DRAFT COMPREHENSIVE CONSERVATION PLAN/
ENVIRONMENTAL IMPACT STATEMENT

For

VIEQUES NATIONAL WILDLIFE REFUGE

VIEQUES, PUERTO RICO

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

Southeast Region
Atlanta, Georgia

October 2006

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Executive Summary

The Fish and Wildlife Service prepared this Draft Comprehensive Conservation Plan/Environmental Impact Statement (CCP/EIS) to guide the management of the Vieques National Wildlife Refuge in the municipality of Vieques, Puerto Rico. This document outlines alternatives and identifies a proposed alternative for management of the refuge for the next 15 years, as mandated by the National Wildlife Refuge System Improvement Act of 1997.

The Vieques National Wildlife Refuge was created from former Navy managed lands by congressional actions in 2001 and 2003. The refuge consists of approximately 17,771 acres--3,100 acres on western Vieques and 14,671 acres on eastern Vieques.

The refuge lands were historically used for agricultural purposes and more recently for military training activities. As a result, the wildlife habitats and communities are significantly altered and non-native invasive species are common along with remnants of native habitats. As a result of the military training, portions of the refuge contain unexploded ordnance and other contaminants. These areas have been classified as a “superfund site” under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Cleanup of these portions of the refuge is being conducted by the Navy in accordance with CERCLA. In addition, a Federal Facilities Agreement between the Navy, U.S. Environmental Protection Agency, Fish and Wildlife Service, and the Commonwealth of Puerto Rico will help to guide the cleanup process.

Although the short-term use and management of areas contaminated with unexploded ordnance would be restricted, the alternatives in this CCP/EIS were developed with the assumption that these lands would be cleaned of any contaminants that would pose a threat to either the wildlife or visitors to the refuge. Until the lands are cleaned and certified as suitable for a proposed use, the Service would not be able to implement portions of this plan. After cleanup and certification, implementation of management proposals would progress in accordance with agency priorities.

Before the Service began the development of the CCP/EIS, it hosted a series of public scoping meetings to solicit public opinion and identify issues the plan should address. To address the existing habitat conditions, the ongoing cleanup activities, the issues identified by the public and the mission and purpose of the refuge, the planning team established a series of goals for the plan. The goals are: 1) Conserve, enhance, and restore native plant communities and wetland habitats and their associated fish, wildlife, and plants, representative of the native biological diversity that would have been found on Vieques Refuge lands prior to major agricultural and military use of the lands; 2) Monitor, protect, and recover special status animals, plants, and species of management interest; 3) Provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history; 4) Through cooperative efforts with partners, ensure the refuge is cleaned of all classes of contaminants that could pose a threat to the health and safety of the wildlife, residents, staff, and visitors; 5) Provide the resources needed to implement the selected management alternative and ensure the other goals and objectives identified in the plan can be achieved; and 6) Develop effective and open communication with the community to raise public awareness of refuge programs, management decisions, the mission of the Fish and Wildlife Service and the National Wildlife Refuge System by working closely with the Vieques citizens and interested groups and organizations.

Based on these goals and information obtained during the scoping process, the planning team developed three alternatives to help address the issues identified and achieve the vision for the Vieques National Wildlife Refuge.

ALTERNATIVE A (CURRENT MANAGEMENT OR NO ACTION)

The current management alternative provides for a continuation of the existing level of management. Staffing would remain at the current levels and ongoing programs and activities would continue with only minor changes and no new programs.

ALTERNATIVE B (RESOURCE EMPHASIS)

This alternative focuses on wildlife and habitat management but maintains the existing visitor programs and public uses. Habitat management and monitoring would be expanded and agreements with research, governmental, and non-governmental organizations would be developed to provide information needed for the management of forests, grasslands, coastal wetlands, beaches, and listed species and their habitats. In partnership with others, programs would be developed for management of nesting sea turtle populations on Vieques beaches.

ALTERNATIVE C (*HABITAT MANAGEMENT AND PUBLIC USE EMPHASIS*)
(PROPOSED ALTERNATIVE)

This alternative directs the refuge toward a realistic and achievable level of both habitat management and public use and provides a management program that addresses the needs of the resources and, where appropriate and compatible with the refuge purposes, the needs of the community. This alternative provides for increases in management efforts to restore the refuge habitats without diminishing the wildlife values associated with the current conditions. There is also a focus on management activities to benefit threatened and endangered species. This includes the possible reintroduction of species extirpated from Vieques and expansion of populations of species already found on the refuge. Priority public uses, as identified in the National Wildlife Refuge System Improvement Act of 1997, would be expanded and other uses that are determined to be compatible with the refuge mission may be permitted. Historic and archaeological resources would be stabilized and, where possible, interpretation of their significance and role in the evolution of Vieques would be provided.

SECTION A. DRAFT COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL IMPACT STATEMENT

I. Introduction, Purpose of and Need for Action

INTRODUCTION

The proposed action considered in this document is the development and implementation of a comprehensive conservation plan that achieves the purpose, vision, and goals for the Vieques National Wildlife Refuge; contributes to the National Wildlife Refuge System mission; addresses the significant issues identified during the development of the plan; complies with relevant legislative and policy mandates, and is consistent with principles of sound fish and wildlife management.

This Draft Comprehensive Conservation Plan/Environmental Impact Statement (Draft CCP/EIS) for the Vieques National Wildlife Refuge combines two documents required by federal laws: a comprehensive conservation plan required by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57) and an environmental impact statement required by the National Environmental Policy Act of 1969.

The comprehensive conservation plan would be used as a tool by the refuge staff and partners to provide direction for refuge management and restoration activities. It would guide management decisions over the next 15 years and identify strategies for achieving refuge goals and objectives.

The draft environmental impact statement describes a range of alternative management actions and programs that are being considered for inclusion in the final comprehensive conservation plan. Upon completion of the review process, public involvement, and analysis of all available information, the comprehensive conservation plan would be finalized. The Draft CCP/EIS is divided into 6 chapters: I) Introduction, Purpose of and Need for Action; II) Affected Environment; III) Alternatives, Objectives, and Strategies; IV) Environmental Consequences; V) Consultation and Coordination; and VI) List of Preparers. Appendices provide supporting information for the final CCP/EIS and provide the reader with background information to aid understanding of the document's contents.

PURPOSE OF AND NEED FOR ACTION

The Vieques National Wildlife Refuge is one of more than 540 refuges in the National Wildlife Refuge System managed by the Fish and Wildlife Service. Overall, there is a need to manage the refuge in accordance with the Refuge System mission, goals, and policies as described in the National Wildlife Refuge System Improvement Act of 1997 (Appendix III). A comprehensive conservation plan, required by the Refuge System Improvement Act, is needed to address significant problems that may adversely affect the populations and habitats of fish, wildlife, and plants and the actions necessary to correct or mitigate such problems. Specifically, the focus of the plan for the Vieques Refuge seeks to: ensure the biological integrity, diversity, and environmental health of refuge habitats; restore degraded forest, coastal and wetland habitats; evaluate and manage visitor use; and ensure that the clean-up of the refuge is adequate to protect the environment, the fish and wildlife resources, and the visitors to the refuge. In addition, the Refuge System Improvement Act requires the Service to consider providing opportunities for people to experience wildlife-dependent recreation. The purpose

of this comprehensive conservation plan is to develop a vision for the refuge and provide management guidance through science, maintenance, restoration ecology, and compatible public use of refuge resources during the next 15 years. Specifically, the plan would:

- set a long-term vision for the refuge;
- establish management goals, objectives, and strategies;
- define compatible recreational uses of the refuge;
- determine appropriate levels of use;
- outline habitat and public use projects that support the goals and objectives;
- identify areas of the refuge suitable for public use activities;
- describe highest priorities for habitat restoration and management; and
- adopt step-down plans for specific management activities.

The purpose of the environmental impact statement is to describe alternative plans for managing the refuge. The environmental impact statement shows a range of alternative management activities and public uses considered during the planning process and evaluates the possible environmental effects of the various alternatives on the natural, social, cultural, and economic environment.

The comprehensive conservation plan would provide a framework for future refuge management. The environmental analysis of the alternatives for this plan is at the conceptual planning level and does not provide detailed site plans and does not have exact locations for facilities.

PROJECT AREA

Vieques is an island municipality of the Commonwealth of Puerto Rico and is approximately seven miles east of the main island (Figure 1). It has an area of about 51 square miles or 33,120 acres (13,403 ha). The refuge consists of two major parcels of land on the eastern and western portions of the island. The total area of the refuge is 17,769 acres (7,191 ha) or approximately 54 percent of the island (Figure 2). The central portion of the island contains two major population centers, Isabel Segunda on the north and Esperanza on the south. Additional details about the island are provided in Chapter II.

Eastern Refuge Unit

On December 28, 2001, Public Law 107-107 amended the previous Spence Act (Public Law 106-398) to provide the Navy with the authority to close the Vieques Naval Training Range and discontinue training at the range. This law also provided for the transfer of the Live Impact Area, Conservation Zones, and all other Department of Defense real properties on the eastern side of the island to the Department of the Interior. The area transferred to the Fish and Wildlife Service jurisdiction was approximately 14,669 acres (7,191 ha). This included the Live Impact Area identified in the legislation as a separate parcel to be managed as a wilderness, with no public access permitted. In order to carry out the provisions of this law requiring the transfer, the Departments of Navy and Interior developed Memoranda of Agreement for East and West Vieques lands to define the conditions of the transfer and the responsibilities of the two agencies with regard to land management and environmental remediation. Among the responsibilities defined is the Navy acceptance of responsibility to fund and implement any response actions required by law to address environmental contamination resulting from the prior Navy activities. Copies of the Memoranda of Agreement between the Navy and Department of the Interior for both the eastern and western refuge lands are provided in Appendix III.

Figure 1. Vieques location map

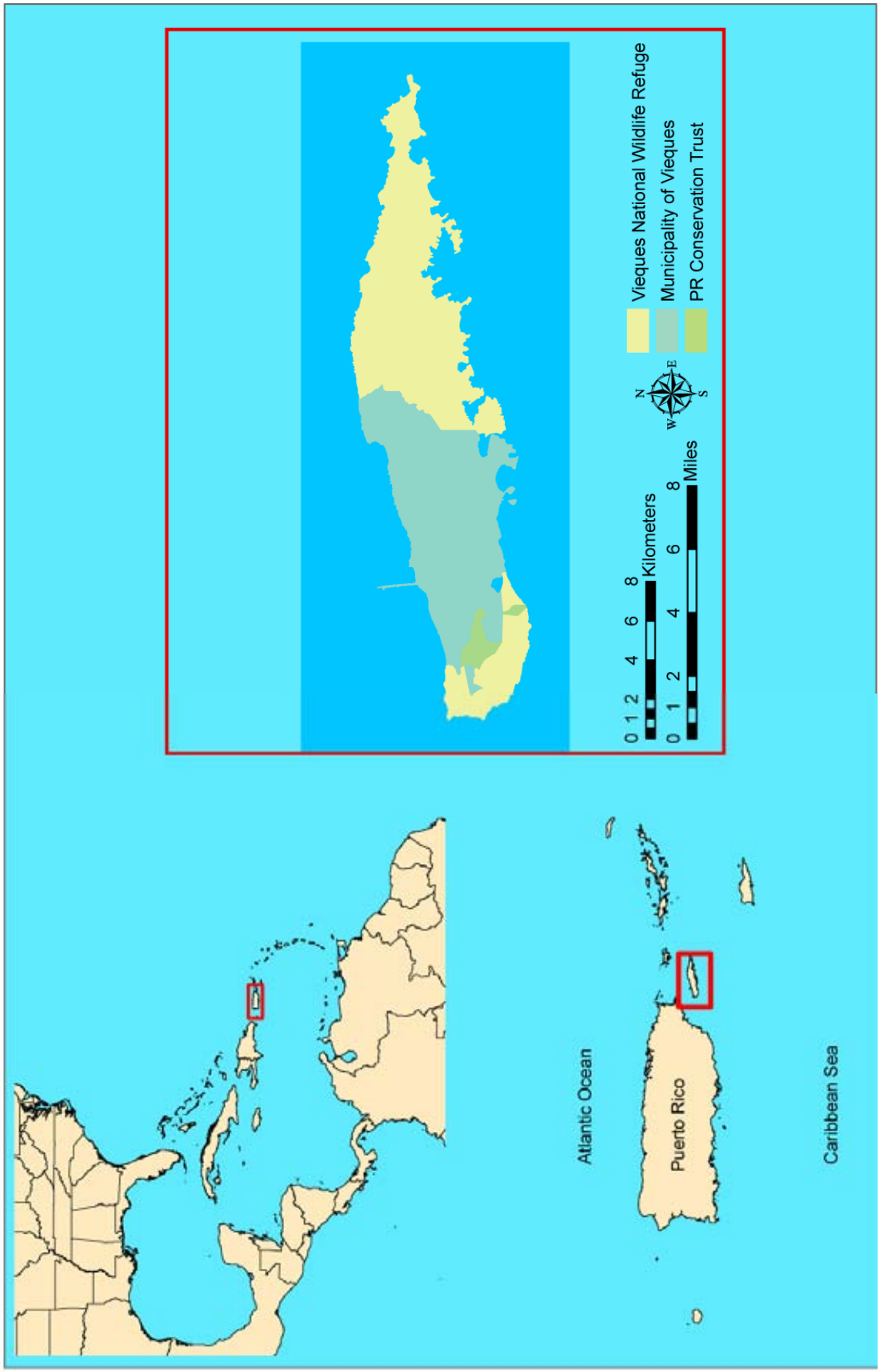


Figure 2. Vieques National Wildlife Refuge boundaries

Western Refuge Unit

Vieques Refuge, on the island of Vieques to the east of the main island of Puerto Rico, was established in May 2001 through the legislated transfer of the Navy lands on the western portion of Vieques. At that time, portions of the Naval Activities Support Detachment property were transferred to the municipality of Vieques, the Puerto Rico Conservation Trust and the Department of the Interior, Fish and Wildlife Service. These lands consisted of approximately 8,200 acres (3,280 hectares) on the western end of Vieques Island, Puerto Rico. Although the property is mainly undeveloped, it was used by the Navy from 1943 until 2001 for a variety of purposes including: ammunition storage, operation of communications facilities, handling and disposal of munitions and other activities; and support services for Naval Station Roosevelt Roads on the main island of Puerto Rico and the Atlantic Fleet Weapons Training Facility on the eastern end of Vieques.

On May 1, 2001, approximately 3,100 acres (1,220 hectares) comprising the Conservation Zones designated in Section IV of the 1983 Memorandum of Understanding between the Commonwealth of Puerto Rico and the Secretary of the Navy were transferred to Department of the Interior. A parcel of 800 acres (320 hectares), composed of the additional Conservation Zones identified in the draft environmental assessment for the western Vieques land transfer, was conveyed to the Puerto Rico Conservation Trust. The remaining Navy lands on western Vieques, approximately 4,200 acres (1,740 hectares), were transferred to the municipality of Vieques.

The final legislation directed the Navy to undertake activities needed to identify and clean-up contaminated areas as required by CERCLA to facilitate utilization of the property for the benefit of the municipality of Vieques. It also directed the Department of the Interior to administer the Conservation Zones transferred to it as a wildlife refuge under the National Wildlife Refuge System Administration Act of 1966 (16 United States Code [USC] 688 dd).

As mandated by Public Law 106-398 (Appendix III), a cooperative agreement for the management of the Conservation Areas was developed and signed by the Commonwealth Department of Natural and Environmental Resources, the Puerto Rico Conservation Trust, and the Fish and Wildlife Service on April 26, 2001. This cooperative agreement established that, subject to funding availability, the agencies responsible for management of the conservation lands would develop a management plan for the conservation of the resources on the areas to be transferred, and would also include the extensive area of sea grasses northwest of the Mosquito Pier, as identified in the 1983 Memorandum of Understanding. On November 20, 2002, a Management Plan for the Western Vieques Conservation Areas was signed by the Commonwealth Secretary of the Department of Natural and Environmental Resources, the Executive Director of the Puerto Rico Conservation Trust, and the Regional Director of the Fish and Wildlife Service.

Concurrent with congressional consideration of the transfer legislation, the Puerto Rico Planning Board, in conjunction with other Commonwealth agencies and the municipality of Vieques, developed a proposed land use plan to be implemented upon conveyance of the property to the municipality. The municipality of Vieques concurred with the proposed Vieques Land Use Plan, prepared by the Puerto Rico Planning Board, and agreed to manage and control the land to be conveyed to it consistent with the terms of the land use plan.

SERVICE POLICIES, LEGAL MANDATES, AND NATIONAL AND REGIONAL CONSERVATION PLANS

Throughout the development of this Draft CCP/EIS, the planning team complied with and considered guidance found in numerous documents. All refuges are guided by the mission and goals of the National Wildlife Refuge System, the designated purpose of the refuge unit as described in establishing legislation or executive orders, Service laws and policy, and international treaties. Key concepts and guidance of the Refuge System are covered in the National Wildlife Refuge System Administration Act of 1966, the Refuge Recreation Act of 1962, Title 50 of the Code of Federal Regulations, the Fish and Wildlife Service Manual, and the National Wildlife Refuge System Improvement Act of 1997. The Refuge System Improvement Act amends the Refuge System Administration Act of 1966 by including a unifying mission for the Refuge System, a new process for determining compatible uses on refuges, and a requirement that each refuge will be managed under a comprehensive conservation plan. The Refuge System Improvement Act also states that wildlife conservation is the priority of Refuge System lands and that the Secretary of the Interior shall ensure that the biological integrity, diversity, and environmental health of refuge lands are maintained. Each refuge must be managed to fulfill the Refuge System mission and the specific purposes for which it was established. The Act requires the Service to monitor the status and trends of fish, wildlife, and plants on each refuge. Additionally, the Act 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, these uses will receive enhanced consideration over other uses in planning and management.

Lands within the Refuge System are different from other multiple-use public lands in that they are not opened to public uses unless the uses are first determined to be compatible with the purposes of the refuge. 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. Sound professional judgment is further defined as a decision that is consistent with principles of fish and wildlife management and administration, available science and resources, and adherence with law. The National Wildlife Refuge System Improvement Act establishes the procedures to conduct compatibility determinations for any proposed use, which include a public review and comment period.

The Act requires that a comprehensive conservation plan be in place for each refuge by the year 2012. It further requires that members of the public have an opportunity to be involved in plan development and revision.

The Department of the Navy transferred a total of 17,769 acres on eastern and western Vieques, Puerto Rico, to the administrative jurisdiction of the Department of the Interior as required by the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398), as amended by Section 1049 of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107). In accordance with the law, the Department of the Interior is required to develop the land for use as a wildlife refuge, with the former live impact area to be managed as a wilderness area and closed to the public. In accordance with the terms of the Memoranda of Agreement between the Departments of Interior and Navy, and the Federal Facilities Agreement between the Environmental Protection Agency, Departments of Interior and Navy and the Commonwealth, the Fish and Wildlife Service will participate with the Navy and the other agencies in future decisions and actions regarding the long-term environmental clean-up at Vieques. While the Department of the Interior is directed to protect and conserve the natural resources through designation of the lands as a national wildlife refuge, the Department of the Navy retains the responsibility for conducting the environmental clean-up of this property. A Management Plan for the Western Vieques Conservation Areas (November

2002) was prepared in accordance with the land transfer legislation. That document provides background and recommendations for management of the refuge, Puerto Rico Conservation Trust lands, and the northwest sea grass beds. During the development of this Draft CCP/EIS, the recommendations and objectives described in that document were considered and incorporated as appropriate. The Fish and Wildlife Service's Caribbean Ecosystem Team prepared the Caribbean Ecosystem Plan in October 2000. At that time, the Vieques Refuge had not yet been established and the ecosystem plan did not address specific issues to be considered for Vieques. However, several of the general issues identified in that plan, such as improving law enforcement capability, protection of coastal resources, sensitive species recovery, and improving communications, have been considered and incorporated into this document.

In December 2004, the commonwealth approved the Vieques and Culebra Master Plan for Sustainable Development. Some of the recommendations made in that plan relate to portions of the Vieques Refuge and are addressed herein. While some of the recommendations are in conflict with the mission and policies of the Fish and Wildlife Service and the National Wildlife Refuge System and cannot be addressed in this plan, the Vieques Draft CCP/EIS Planning Team has reviewed the document and has included some strategies to help address the need to provide a quality eco-tourism destination. The areas of conflict between the Master Plan and Refuge System policies were addressed in the Service's comments to the Master Plan and are attached to this document as Appendix IV.

REFUGE PURPOSES AND LAND ACQUISITION AUTHORITY

National Wildlife Refuge System lands are acquired under a variety of legislative acts and administrative orders. According to the Refuge System Improvement Act, the terms "purposes of the refuge" and "purposes of each refuge" mean 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 subunit. The Service defines the purposes of national wildlife refuges when a refuge is established or when new land is added to an existing refuge. The Service documents the mechanisms used to acquire lands or to receive transferred lands. In the case of Vieques National Wildlife Refuge, the purposes were defined in the legislation that required the transfer of the lands from the Navy to the administrative jurisdiction of the Fish and Wildlife Service.

The purposes shown here are based upon land acquisition documents and authorities. The unit purposes may also include purposes included as deed restrictions, management agreements with primary land managers, and congressional-established wilderness designations, which were not part of the acquisition documents and authorities.

The legislation that established both the eastern (Public Law 107-107) and western (Public Law 106-398) portions of the refuge stated that the Secretary of the Interior shall administer the lands as wildlife refuges under the National Wildlife Refuge Administration Act of 1966 (16 U.S.C. 668dd et seq.). With respect to the "live impact area" on eastern Vieques, Public Law 107-107 further stated that the Secretary of the Interior shall administer that area as a wilderness area under the Wilderness Act (16 U.S.C. 1131 et seq.), and deny public access to the area.

REFUGE OPERATIONAL PLANS (STEP-DOWN PLANS)

Refuge operational plans (step-down) address specific aspects of a refuge management program and provide detailed guidance for the refuge management team to administer the activity. The following is a list of plans that have been or will be prepared for the Vieques Refuge. Anticipated completion dates are provided for the plans that are not currently available:

• Occupational Safety and Health Plan - In Draft
• Fire Management Plan - In Draft
• Public Use Management Plan - 2008
    - hunting
    - fishing
    - visitor services and outreach
    - law enforcement
    - interpretation and environmental education
    - other recreational activities
• Wilderness and Special Areas Management Plan (to be completed with the Public Use Management Plan) - 2006
• Habitat Management Plan - 2007
    - wetland, water, riparian
    - forest management
    - integrated pest/weed management
• Fish and Wildlife Population Management Plan (to be completed with the Habitat Management Plan) - 2007
    - inventory and monitoring

Additional project-specific plans, with appropriate National Environmental Policy Act compliance, may be prepared for activities or programs that are not included in these step-down plans.

REFUGE VISION STATEMENT

The Vieques National Wildlife Refuge is on a scenic tropical island with a unique collection of fish, wildlife, plants, and habitats, as well as other valuable natural and cultural resources. The following vision statement for the refuge contemplates active management, protection of the resources, and compatible uses that will benefit the community and provide enjoyment for all visitors.

> "The Vieques National Wildlife Refuge is managed to: 1) restore, protect, and conserve fish and wildlife resources and habitats, with special emphasis on endangered species, wetlands and forest communities; 2) ensure that lands are clean, healthy, and safe for the wildlife and residents and visitors; and 3) provide opportunities for compatible wildlife-dependent recreational uses. The Service works in partnership with municipal, commonwealth, and federal agencies, the local community, educational institutions, and interest groups to provide a unique refuge environment for the enjoyment of the rich and diverse natural and cultural resources, educational and interpretive programs, scientific research, and to safeguard this heritage for future generations."

REFUGE GOALS

Broad goals are proposed for the Vieques National Wildlife Refuge. They are consistent with the refuge purpose, ecosystem goals, Refuge System goals, Refuge System Improvement Act of 1997, Service policy and guidance, and international treaties. For each goal, the refuge has developed management principles and guidelines to help focus the development of objectives and strategies to obtain the goal. These principles and guidelines are presented below, following the goals to which they apply.

Goal 1: Conserve, enhance, and restore native plant communities and wetland habitats and their associated fish, wildlife, and plants, representative of the native biological diversity that would have been found on Vieques Refuge lands prior to major agricultural and military use of the lands.

- Healthy, high-quality habitats are keys to healthy fish and wildlife populations.
- Restoration of native conditions is a desired direction for management but may not always be achieved in the short term because soils or other environmental factors may be altered so they no longer support native species.
- Both active and passive management approaches will be used to restore and maintain native conditions.
- Forest habitat management goals and objectives will take longer than the life of this plan (15 years) to achieve.
- Native assemblages of wildlife are best maintained and restored by aiming to provide native habitat diversity typical of the ecoregion prior to agricultural clearing, development, and military uses.

Goal 2: Monitor, protect, and recover special status animals, plants, and species of management interest.

- Wildlife monitoring and inventories will be conducted to develop baseline information and detect changes in the populations.
- Wildlife populations will be managed primarily through habitat management.
- The needs of wildlife have priority over public uses of the refuge.

Goal 3: Provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history.

- Wildlife-dependent recreational activities, as identified in the Refuge System Improvement Act of 1997, will be given priority consideration over other uses. These activities are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.
- Existing public uses may continue if they are determined to be compatible with the wildlife objectives for the refuge or if they offer increased wildlife-dependent recreational opportunities.

Goal 4: Through cooperative efforts with partners, ensure the refuge is cleaned of all classes of contaminants that could pose a threat to the health and safety of the wildlife, residents, staff, and visitors.

- Effective natural resource management, wildlife-dependent recreational uses, and other potential uses of the refuge cannot be realized without a comprehensive clean-up of unexploded ordnance and other contaminants that remain from prior uses of the lands.
- Current efforts under the provisions of CERCLA and RCRA are being carried out to address the contaminant issues on the areas currently being managed as the Vieques Refuge.
- Prior to initiation of management or opening of contaminated portions of the refuge to public uses, the lands must be certified as safe for the proposed use.
- Clean-up activities will likely continue beyond the time frame of this comprehensive conservation plan.

Goal 5: Provide the resources needed to implement the selected management alternative and ensure the other goals and objectives identified in the plan can be achieved.

- Effective management of wildlife, habitat, public uses and conducting other resource management activities require personnel, equipment, and facilities.
- The levels of staffing and facilities necessary for each alternative are dependent on the proposed activities and programs.

Goal 6: Develop effective and open means of communication with Vieques citizens, interested groups, and organizations to raise public awareness of refuge programs, management decisions, and the mission of the Fish and Wildlife Service and the National Wildlife Refuge System.

- Effective management of the refuge resources and compatible public uses require that the community is aware of the resources, their relationship to the community, and the management goals of the refuge.
- Support for, input to, and assistance with the development of refuge programs can only be gained if the community is fully informed of the refuge's management goals, plans, and proposals.

THE COMPREHENSIVE CONSERVATION PLANNING PROCESS

The National Wildlife Refuge System Improvement Act requires that a comprehensive conservation plan be in place for each refuge by the year 2012, and that the public have an opportunity for active involvement in plan development and revision. It is Service policy that plans are developed in an open public process and that the agency is committed to securing public input throughout the process.

The process followed for development of this Draft CCP/EIS is guided by the Fish and Wildlife Manual (Part 602 FW2.1, November 1996) and policy related to the Refuge System Improvement Act. Steps in document development include: 1) preplanning; 2) identifying issues and developing vision; 3) gathering information; 4) analyzing resource relationships; 5) developing alternatives and assessing environmental effects; 6) identifying a proposed alternative; and 7) publishing the draft plan. After publication of the Draft CCP/EIS, the next steps in the process are to document and address public comments on the Draft CCP/EIS, prepare the Final CCP/EIS, secure its approval, and then implement the plan.

The goals of the planning process are:

- To ensure that wildlife comes first in the National Wildlife Refuge System and that each refuge is managed to help fulfill the mission of the Refuge System, maintain the ecological integrity of each refuge and the Refuge System, and achieve the specific purposes for which the refuge was established.
- To provide a clear and comprehensive statement of desired conditions for each refuge or planning unit.
- To encourage use of an ecosystem approach in refuge planning. This includes conducting concurrent planning for refuges within the same watershed or ecosystem and considering the broader goals and objectives of the refuges' ecosystems and watersheds when developing management direction (see Ecosystem Approach to Fish and Wildlife Conservation [Part 052 of the Fish and Wildlife Service Manual]).
- To support management decisions and their rationale by using a thorough assessment of available science derived from scientific literature, on-site refuge data, expert opinion, and sound professional judgment.
- To ensure that the six priority wildlife-dependent recreational uses receive priority consideration.
- To provide a forum for the public to comment on the type, extent, and compatibility of uses on refuges, including priority wildlife-dependent recreational uses.
- To provide a uniform basis for budget requests for operational, maintenance, and capital improvement programs.
- To ensure public involvement in refuge management decisions by providing a process for effective coordination, interaction, and cooperation with affected parties, including federal agencies, state conservation agencies, tribal governments, local governments, conservation organizations, adjacent landowners, and interested members of the public.

The planning process for the Vieques National Wildlife Refuge is following the procedures of the Service and attempts to achieve these goals to the greatest extent possible. The process began in September 2003, with the publication of a notice of intent in the Federal Register (68 FR 52418) to prepare a Comprehensive Conservation Plan and Environmental Impact Statement for Vieques National Wildlife Refuge. Subsequently, a core planning team was assembled to begin the process of identifying needs and direction for the development of the comprehensive plan.

In order to include the issues and concerns of the community during the development of the plan for Vieques Refuge, a public involvement strategy was initiated. The major intent of the public involvement efforts was to provide an opportunity for a broad spectrum of the community and refuge visitors to understand the refuge purposes and provide input during plan development. To accomplish this, the planning team organized an Open House to introduce the community and visitors to the refuge and to announce upcoming planning activities. The Open House was held on July 10, 2004. This introduction to the refuge and the planning process was followed by more formal scoping meetings designed to provide an opportunity for interested parties to identify issues they would like to see addressed in the Draft CCP/EIS. The scoping meetings were held on August 19, 2004, and on November 10, 2004. Additional meetings were held with a variety of organizations on Vieques to explain the rationale for the development of the Draft CCP/EIS and to solicit comments on the issues and concerns from the organizations or their members individually. Throughout the scoping process, the community and other interested parties were provided with an opportunity to document their concerns and identify their preferred uses of the refuge. To facilitate this effort, comment sheets were

provided during the open house, scoping meetings, at informational gatherings, and through web sites. After receipt of input from the interested public, the core planning team began formulating specific goals, objectives, and strategies to address each of the envisioned alternatives for the refuge.

Upon release of this Draft CCP/EIS, public meetings, as well as press releases and electronic media, will be used to again provide opportunities for comment. At the conclusion of a 45-day period of public review, all substantive comments will be addressed; 30 days later a Record of Decision will be recorded in the Federal Register, and a Final CCP/EIS will be prepared for distribution. Implementation of the preferred alternative can then begin.

ISSUES, CONCERNS, AND OPPORTUNITIES

Key issues and concerns to be addressed during the planning process were initially identified by the core planning team. Subsequently, during the public scoping process, these issues were modified based on the comments and input from the public and cooperating agencies (Table 1). The refuge goals, along with the issues and concerns identified by the planning team, the public, and cooperators, form the basis for the development and comparison of alternatives presented in this document. The issues are arranged in accordance with the refuge goals and are not necessarily in priority order.

The generally recognized precept for management of national wildlife refuges is that protection and management of wildlife and habitat are the primary functions. Within this concept, there are several issues of importance to the Vieques Refuge as a component of the National Wildlife Refuge System. The natural systems that evolved in Vieques have been altered dramatically over the years. Management to achieve some level of restoration of the natural habitats and species composition will necessitate active manipulation of some environmental components. The types of habitat manipulation and management that can be conducted are affected by several factors, including unexploded ordnance, contaminated areas, invasive species, and the presence of historical and archaeological sites.

While addressing some of the issues identified may require significant alteration of the existing conditions, others may only require monitoring, some form of documentation, or minor management activities. A major goal of identifying the issues and alternatives to be considered during the development of this plan is to ensure that the management program for the refuge is balanced and effectively addresses the needs of both the resources and the human users.

Table 1. Issues identified during scoping

Removal of Contaminants (Clean-up)	
Habitat Management	Restoration of forest habitats Restoration of lagoon hydrology Grassland management Beach erosion Biological monitoring Invasive/exotic plant control Feral animal control Fire management Cooperative research opportunities

Removal of Contaminants (Clean-up)	
Species Management	Endangered species management Sea turtles Listed plants Wading birds Waterfowl Sea birds Other migratory birds Amphibians and reptiles Mammals Invertebrates
Public Uses	Land crabbing Access (Hours the refuge is open) Hunting Use of off road vehicles Hiking trails Biking trails Horseback riding Grazing Camping Night fishing Commercial activities Kayaking Law enforcement activities

ISSUES OUTSIDE THE SCOPE OF THIS DRAFT CCP/EIS

During the scoping phase of the Draft CCP/EIS development, one of the issues identified by members of the local community was the desire for the transfer of the refuge lands or portions of the refuge lands to the people or municipality of Vieques. The legislation that mandated the establishment of the refuge specifically stated that any transfer would require that additional legislation be enacted by Congress. Without specific congressional approval, consideration of land transfers is beyond the authority of the agency; and therefore is not considered in this planning document.

Another issue outside of the scope of this document that was identified during the planning process was the proposed zoning classifications to permit residential or tourism-related development on the refuge.

Additional issues are discussed in Chapter III entitled, “Actions or Proposals Considered but not Fully Developed.”

PLAN AMENDMENT AND REVISION

The Comprehensive Conservation Plan for Vieques National Wildlife Refuge will cover a period of 15 years. After this time, it will be reviewed periodically, at least every 5 years, to determine if there is a need for revision. In keeping with the Service’s approach to adaptive management, amendments or revisions will be initiated if and when significant information indicating a need for a change in

management direction or policy becomes available. The final plan will be augmented by detailed step-down management plans addressing specific strategies that support refuge goals and objectives. Revisions of the plan and/or the step-down management plans that result in alterations of the impacts identified in this document and that may significantly affect the quality of the human environment would be subject to further National Environmental Policy Act compliance.

LEGAL AND POLICY GUIDANCE

Starting with the first refuge, Florida's Pelican Island, established in 1903 by President Theodore Roosevelt, the National Wildlife Refuge System has grown to more than 92 million acres in size. It includes more than 540 refuges, at least one in every state, and over 3,000 waterfowl production areas. The needs of wildlife and their habitats come first on refuges, in contrast to other public lands managed for multiple uses. This principle is found throughout the guidance provided for administration of the National Wildlife Refuge System. The provisions of the National Wildlife Refuge System Improvement Act include the mission statement for the Refuge System, the designation of priority public uses, and a requirement that the environmental health of the Refuge System be maintained (Appendix III).

In addition to the above guidance provided for all units of the National Wildlife Refuge System, the legislation that established the Vieques National Wildlife Refuge also provided specific direction for the management of the refuge. Public Law 106-398 directs the Secretary of the Interior to administer the western Vieques lands "as wildlife refuges under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd et seq.). It also established the requirement that the Secretary of the Interior manage the conservation zones transferred from the Navy in accordance with a cooperative agreement to be developed among the Commonwealth of Puerto Rico, the Puerto Rico Conservation Trust, and the Secretary of the Interior. That agreement (Appendix III) was finalized on April 26, 2001. In accordance with the agreement, the "Management Plan for the Western Vieques Conservation Areas" was prepared and published in November 2002. The management plan provided several objectives for conservation, research, restoration, education and interpretation, outreach and public involvement, and recreation. These objectives and associated proposals were incorporated into the planning for this Draft CCP/EIS.

In addition to the guidance provided in Public Law 106-398, further direction for the management of the refuge was provided when it was amended by Public Law 107-107. The amendments specifically stated that "the Secretary of the Interior shall retain, and may not dispose of any of the properties transferred under paragraphs (2) and (3) of subsection (b) and shall administer such properties as wildlife refuges under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd et seq.) pending the enactment of a law that addresses the disposition of such properties." It further stated that "the Secretary of the Interior shall assume responsibility for the administration of the Live Impact Area upon transfer under paragraph (1) of subsection (b), administer that area as a wilderness area under the Wilderness Act (16 U.S.C. 1131 et seq.), and deny public access to the area."

The portions of Public Law 106-398 and the amendments (Public Law 107-107) related to the refuge lands on Vieques are included in Section B, Appendix III.

Since significant portions of the refuge lands have been included as part of the Vieques "Superfund site" identified under CERCLA, the Fish and Wildlife Service, as the land management agency responsible for future management activities, will work as an integral part of the team developing the clean-up plans and priorities. Under CERCLA, the team includes representatives from the Navy,

Environmental Protection Agency, Commonwealth of Puerto Rico, and the Fish and Wildlife Service. The role of each of the parties will be identified in a "Federal Facilities Agreement" that is currently being developed.

Additional guidance is available in documents developed by the commonwealth and municipal agencies. These include documents such as the Vieques Culebra Master Plan for Sustainable Development, the Puerto Rico Planning Board proposed zoning classification, and Puerto Rico's Comprehensive Wildlife Conservation Strategy (currently in draft). Where the long-term plans and management strategies identified in these documents are appropriate and compatible with the refuge purposes, they may be incorporated into this plan or the management programs of the refuge. The primary focus of the refuge, however, is to help fulfill the agency mission and the legislated purposes of the refuge.

NATIONAL WILDLIFE REFUGE SYSTEM MISSION AND GOALS

REFUGE SYSTEM MISSION STATEMENT

The mission of the National Wildlife Refuge System 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."*

REFUGE SYSTEM GOALS

The following goals guide the administration, management, and growth of the National Wildlife Refuge System:

- To fulfill our statutory duty to achieve refuge purpose(s) and further the System mission.
- Conserve, restore, where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, interjurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants. We sustain all native species of animals and plants that inhabit units of the System through our efforts to maintain the biological diversity, biological integrity, and environmental health of each unit.
- Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.

To foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

II. Description of the Affected Environment

INTRODUCTION

This chapter provides a description of the environment, the natural and cultural resources, and the general setting of the refuge. The intent is to give the reviewers of this document and those who make decisions about the management alternatives the necessary background to understand the impacts that may occur as a result of their decisions.

PHYSICAL ENVIRONMENT

CLIMATE

The climate in Vieques is classified as “tropical-marine.” The easterly trade winds are the dominant factor affecting the climate of Puerto Rico and the rest the Antilles islands. The temperature in Vieques remains relatively constant throughout the year, with an annual average temperature of 78 degrees Fahrenheit (°F). The average high temperatures in the summer months are about 89°F. During the winter, the average high is approximately 84°F. The average low temperatures vary even less with only about a 3-4°F difference between summer and winter.

Due to the topography of the island and the easterly trade winds, there is generally a higher precipitation on the north side of the hills on the western end of the island than there is on the eastern and southern portions of the island. The eastern end of the island receives an average of 25.2 inches per year and the western end receives an average of 49.2 inches per year (Figure 3). Although the annual average rainfall in Esperanza is approximately 38 inches, the average for the entire island is approximately 43 inches. Of this amount, the island receives about half during the rainy season (August to November), with September being the rainiest month. Approximately 15 percent of the total annual precipitation falls during September. March is the driest month, with an average precipitation of less than 2 inches.

The normal dry season extends from December through July. During May, June, and July, localized thunderstorms are relatively common and tropical storms move through the Caribbean from June to November (hurricane season). Tropical storms can affect the regional climate for several days. Hurricanes occur at Vieques Island at a frequency of one every one to two years (National Oceanic and Atmospheric Administration 2000), usually occurring during August and September.

In September 2003, Vieques received 25.75 inches of rain in only 36 hours. That is considered to be a 100-year rain frequency event. By the other hand, in March 2005, Puerto Rico (including Vieques) experienced an extraordinary drought that became a major fire hazard anywhere subtropical dry forest dominated. Vieques reported 62 wild fires, which required immediate suppression response. Several fires occurred on refuge lands.

TOPOGRAPHY

A series of rolling hills and peaks, and narrow, low-lying coastal zones characterize the topography of Vieques. Generally, the hills on the western portion of the island are more gentle and rolling than the rest of the island and possess a deeper soil profile (Figure 4). The hills on the eastern end of the island are more angular and rugged in appearance and have more exposed rock surfaces (Figure 5). The central hills are generally steeper on the northern faces versus the more gradual southern

Figure 3. Vieques average monthly rainfall

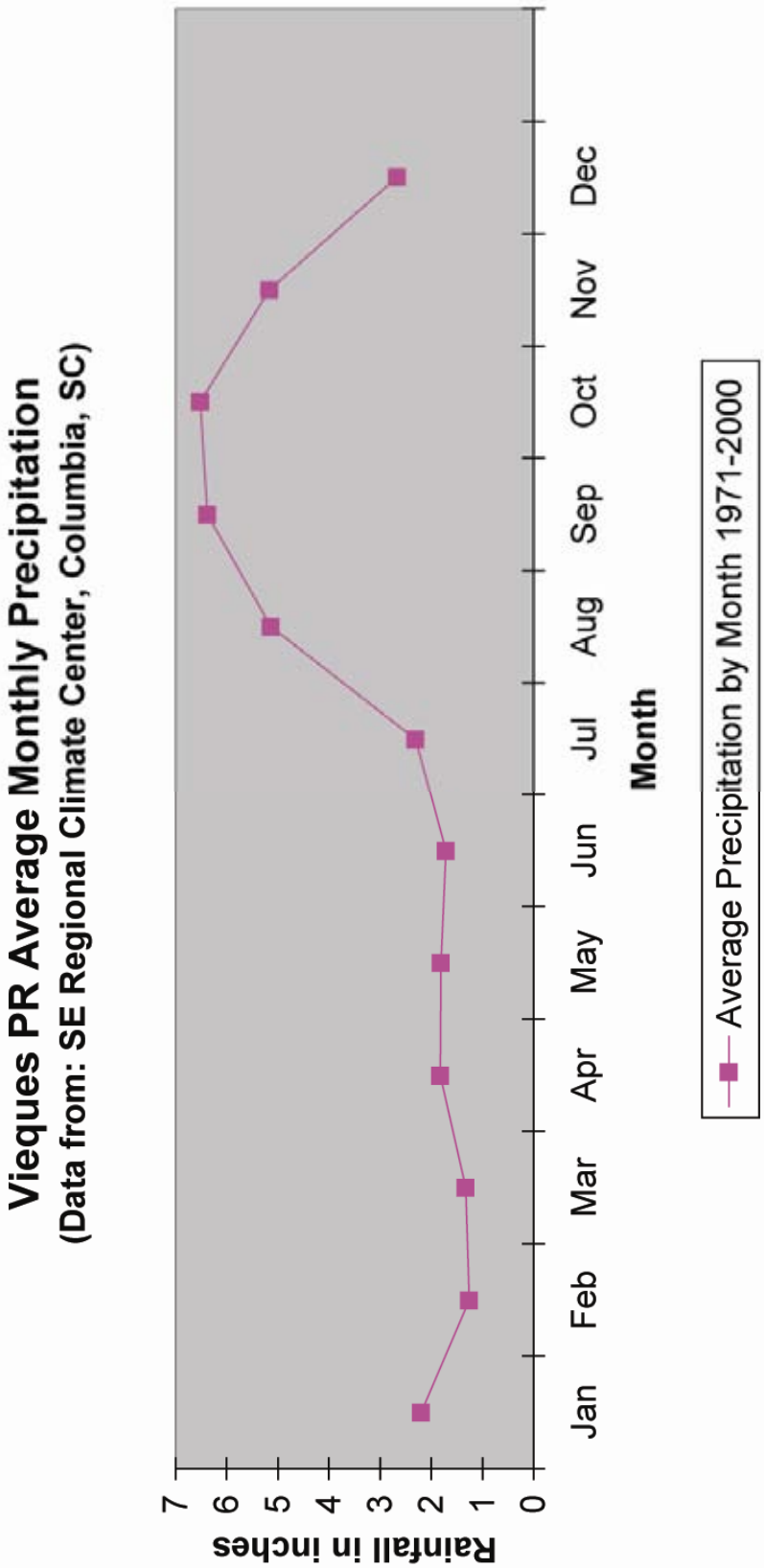


Figure 4. Vieques topographic map (west)

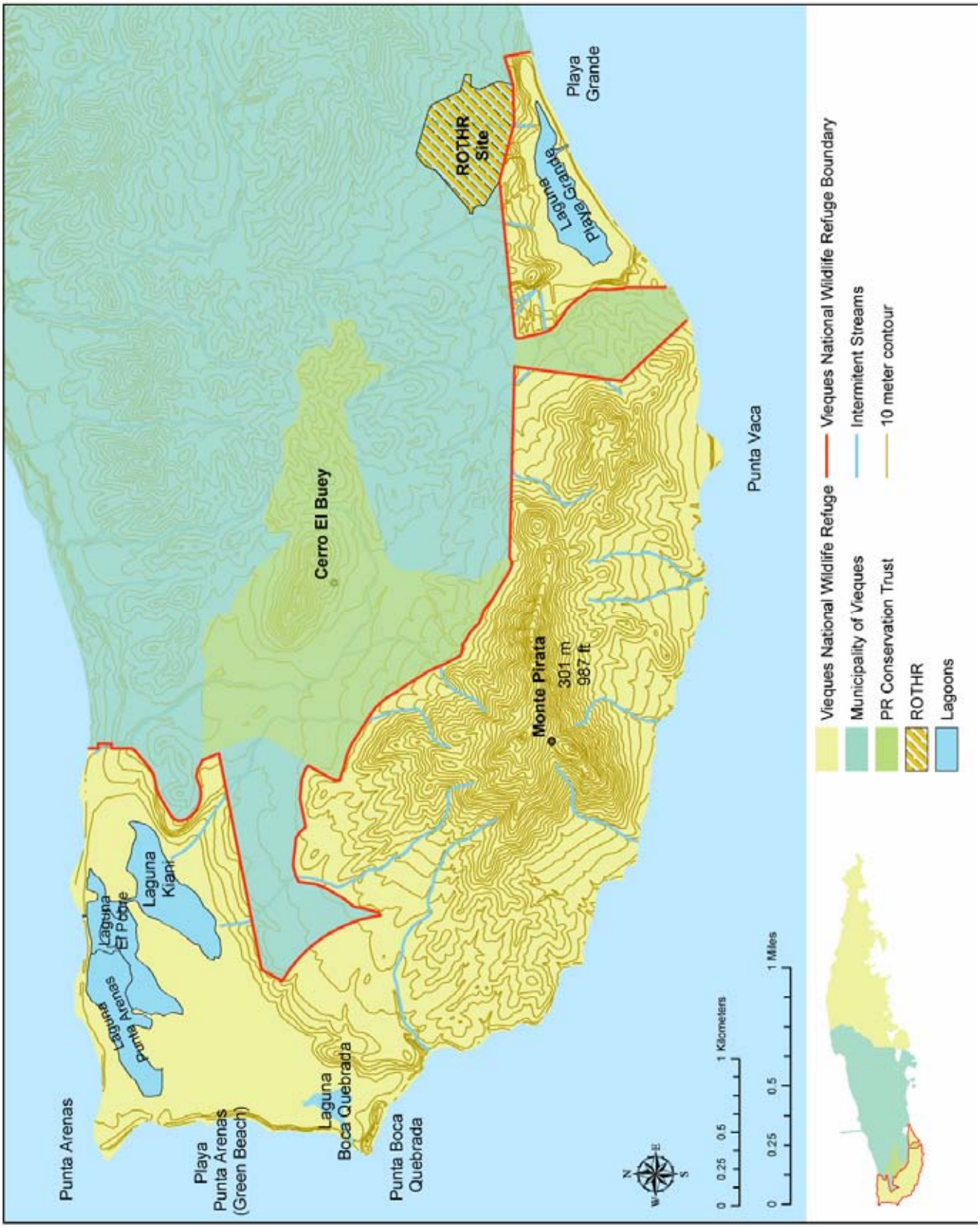
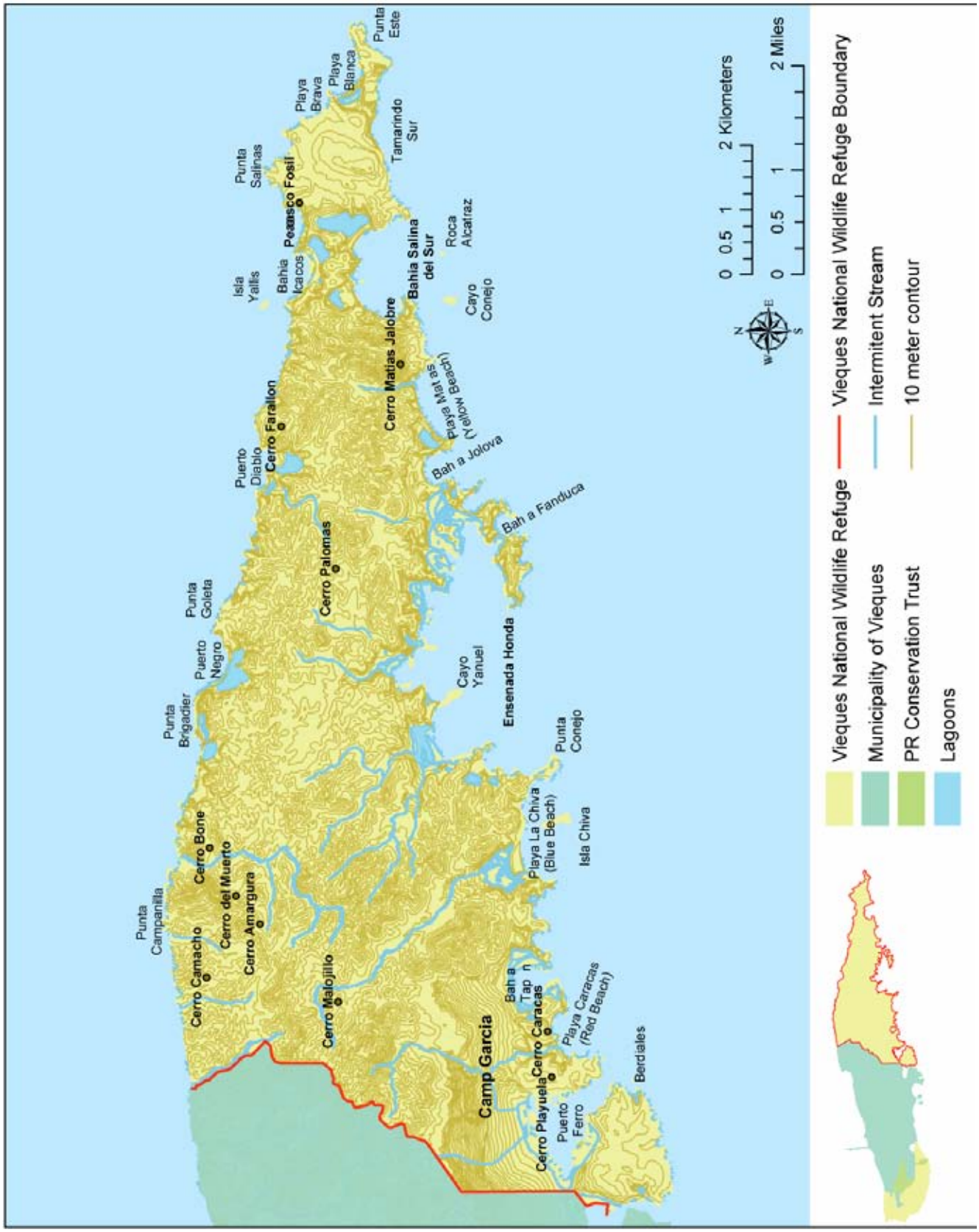


Figure 5. Vieques topographic map (east)



slopes. Several low-lying coastal zones are located on the island. The largest zones are located near the northwestern corner of the island, near the eastern end of the island (north of Bahía Salina del Sur), and in the southern valley between Esperanza and Bahía Tapón (U.S. Geological Survey 1982). The highest elevations are found on the western portion of the island, declining along an axis that runs through the center of the island to the east. The highest peak on the island is Monte Pirata, which lies near the western end of the island at an elevation of 984 feet above mean sea level.

GEOLOGY

The general geological profile for Vieques is described as granitic volcanic rock and marine sedimentary rocks overlain by alluvial deposits. The prominent volcanic rock is Late Cretaceous-aged andesite, which was deposited in a marine environment (Glover 1971). Later in the Cretaceous, a plutonic complex intruded the andesite. From west to east, the texture of the pluton gradually changes from coarse to fine-grained quartz-diorite (Figure 6). Patches of limestone are found in Vieques, mostly in the northern, southern, and eastern coastal areas (U.S. Geological Survey 1980). The limestone is yellow and well weathered at the surface (Figure 7).

Quaternary-aged valley and alluvial deposits are found in the Esperanza and Resolucion valleys. These deposits consist of mixtures of sand, silt, and clay. According to well logs and geophysical data, the thickness of the sedimentary deposits ranges from 0 to 98 feet. A basal clay unit (with a maximum thickness of 16 feet) exists above the granitic quartz-diorite. A deposit of interbedded sand and silt overlies the clay, with a maximum thickness of approximately 66 feet. The uppermost unit consists largely of sand and silt colluvium, with the sand predominating towards the coastal areas (Glover 1971). Unconsolidated beach and dune deposits are found in the coastal areas in the northwestern part of the island and to the south in Esperanza Valley along the Quebrada La Mina (Miller et al. 1999). These sand-sized deposits consist mainly of calcite, quartz, volcanic rock fragments, and minor deposits of magnetite. Erosion is prevalent along the major stream channels that empty into coastal areas, due to the presence of the easily erodible deposits, human disturbance and destabilization of the soils, and periodic storm events.

SOILS

Soils on the refuge are described in the *Soil Survey of Humacao Area of Eastern Puerto Rico* (Boccheciamp 1977). Contained within the eastern and western refuge lands are portions of four different soil associations (Figures 8 and 9). These consist of the Descalabrado-Guayama association, Coamo-Guamani-Vives association, and Swamps-Marshes association, and the Panudra-Rock land-Patillas association. These four soil associations are described by Boccheciamp (1977) as follows:

- The Descalabrado-Guayama association consists of soils that formed in moderately fine-textured to fine residual material derived from basic volcanic rocks. These soils are shallow, well-drained, and strongly sloping to very steep. The soils of this association are used for pasture or are in brush. They have severe limitations for farming, recreation, and urban uses because they are shallow to bedrock, lack sufficient moisture, are steep, and are susceptible to erosion.

- The Coamo-Guamani-Vives association consists of soils that formed in sediment derived from limestone and volcanic rocks. The Coamo soils are deep, well-drained, and nearly level to strongly sloping, and they occur on terraces. The Guamani soils are shallow to sand and gravel, well-drained, and nearly level, and they occur on floodplains. The Vives soils are deep, well-drained, and nearly level to strongly sloping, and they are found on floodplains, alluvial fans, and terraces.

Figure 6. Vieques geological features (west)

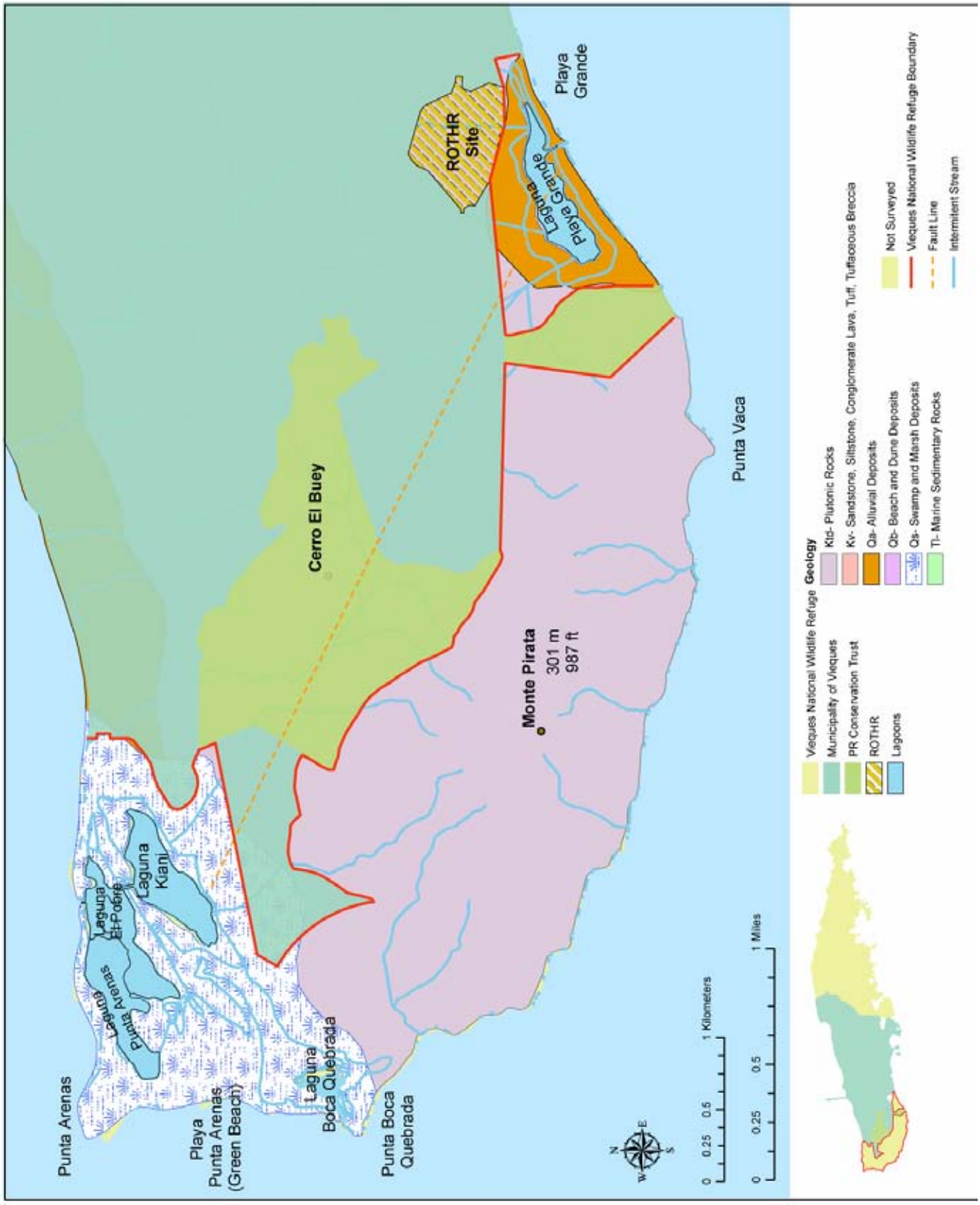


Figure 7. Vieques geological features (east)

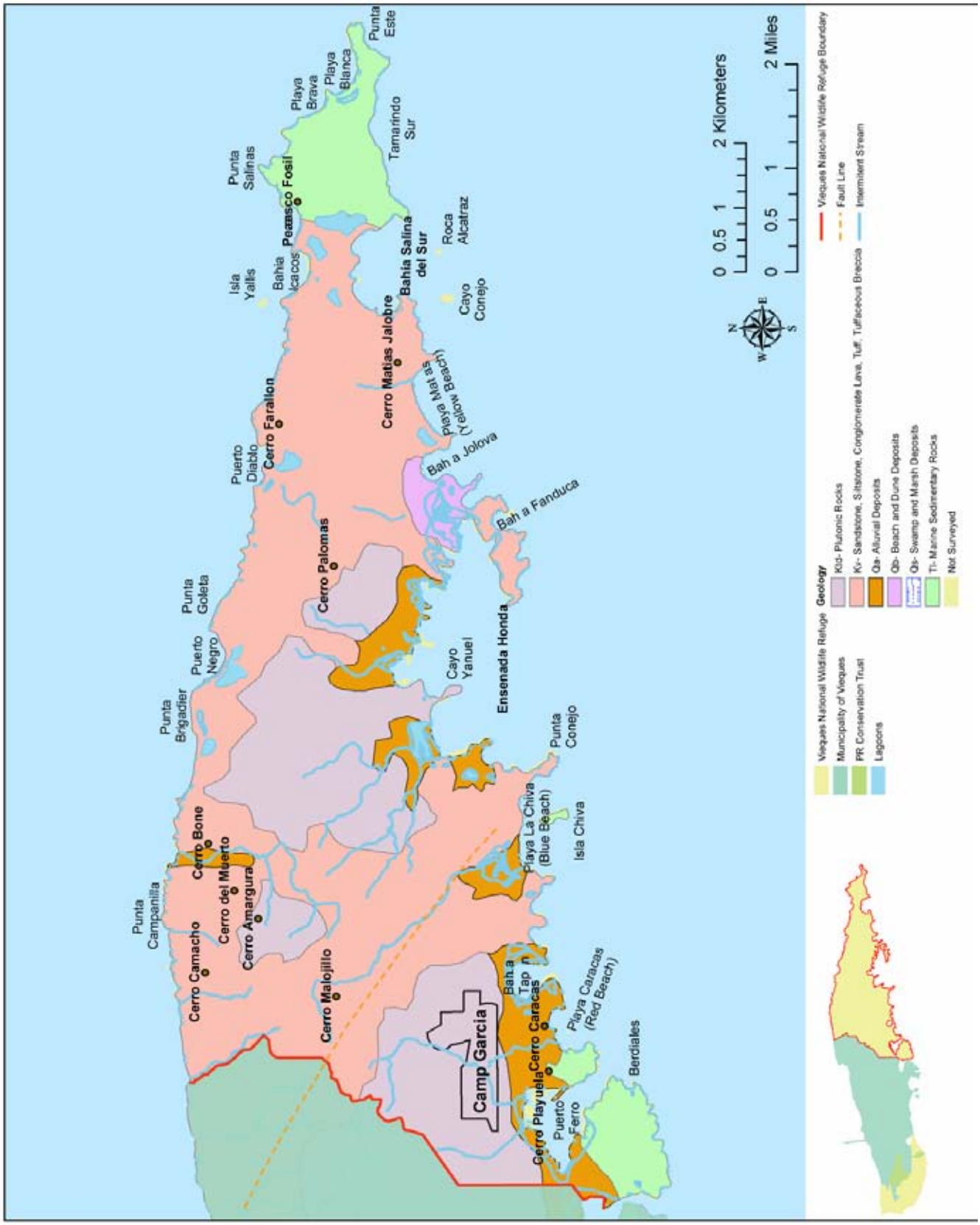


Figure 8. Vieques soils (west)

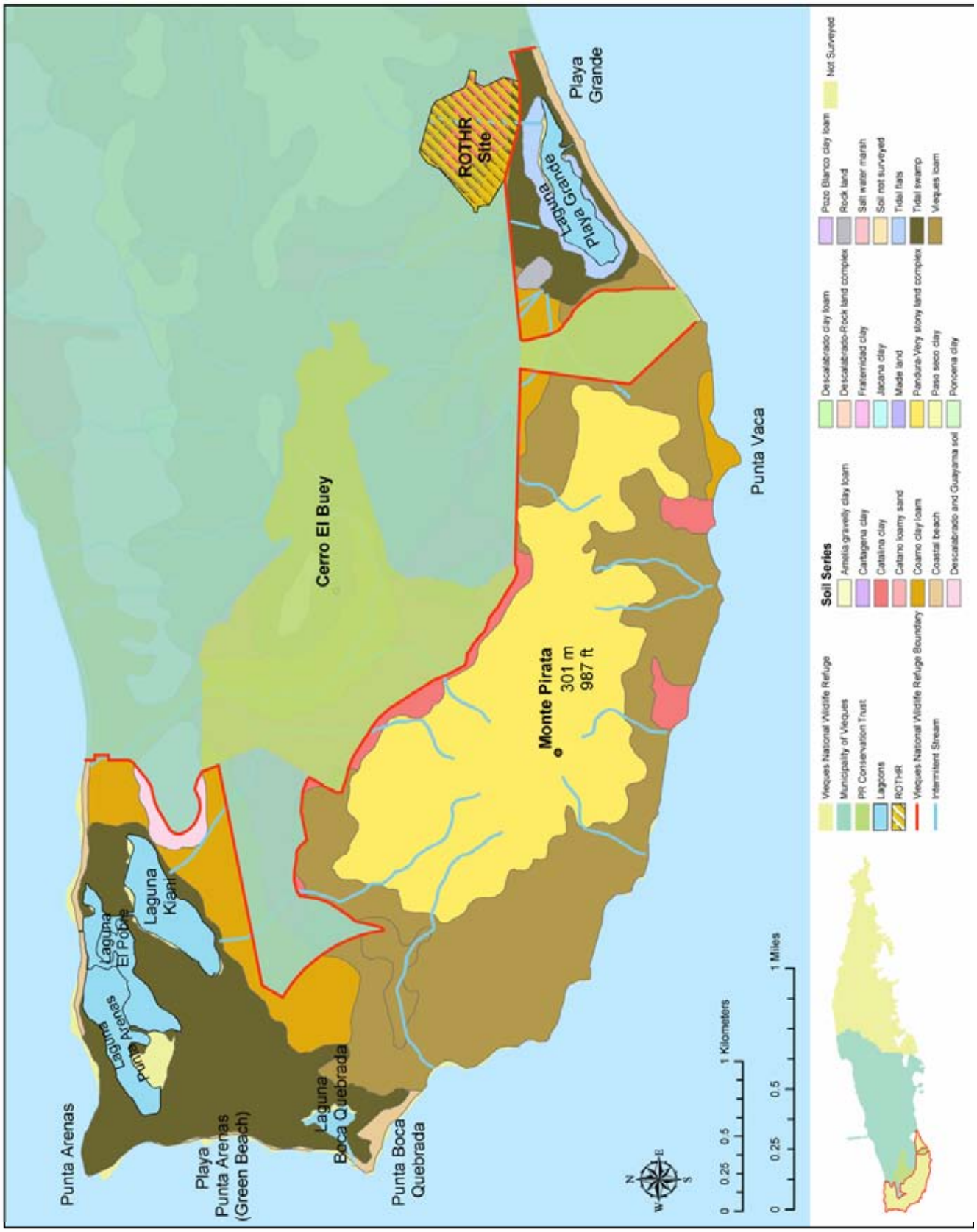
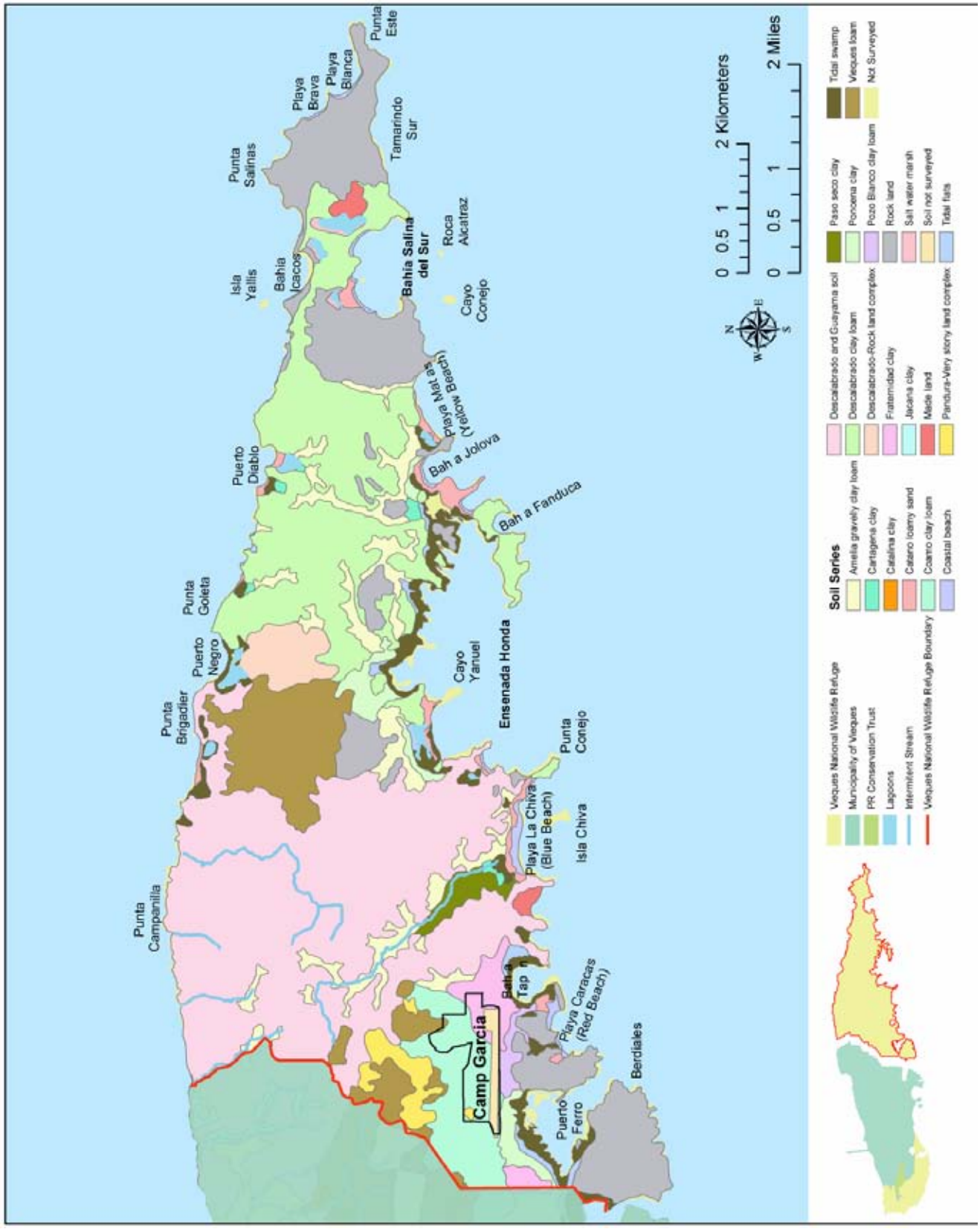


Figure 9. Vieques soils (east)



- The Swamps-Marshes association is in level or nearly level, narrow strips adjacent to the ocean. The areas are slightly above sea level but are wet and, when the tide is high, are covered or affected by salt water or brackish water. The high concentration of salt inhibits the growth of all vegetation except mangrove trees and, in small, scattered patches, other salt-tolerant plants. The soils are sandy or clayey and contain organic material from decaying mangrove trees. They are underlain by coral, shells, and marl at varying depths. This association is not extensive and has no value for farming, but it serves as a feeding and breeding place for birds and crabs.
- The Pandura-Rock land-Patillas association consists of shallow to deep, well-drained, steep and very steep soils on plutonic uplands. This association consists of brown colored soils formed in residual material weathered from plutonic rocks. Pandura soils are moderately deep and well-drained and are underlain by granitic rocks. Rock land consists of 50 to 70 percent cover by granitic boulders. Patillas soils are moderately deep to saprolite, are well-drained and are underlain by partly weathered granitic rocks. Soils of this association are used mainly for food crops and native grasses. Steep slopes and shallow depth of bedrock are limitations for farming, recreation, and urban uses.

Within these associations, there are twenty soil series that have been identified on the Vieques National Wildlife Refuge. The descriptions of the soil series found on the refuge are provided in Appendix V.

HYDROLOGY

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).

Long-term climate change in the Caribbean may be causing gradual, but significant, hydrologic depletions that began several centuries ago, with islands of low elevation exhibiting the most obvious depletions. The reduced streamflow and diminished groundwater supplies may be attributed to decreasing rainfall over the tropical oceans, islands, and coastal areas since the industrial revolution. Oral history indicates that perennial streams occurred on the island of Vieques several centuries ago. Fresh groundwater supplies in the Esperanza Valley have gradually diminished during the past 200 years even though groundwater withdrawals have remained relatively constant. The potable water supply for Vieques is derived from the Río Blanco, on the main island of Puerto Rico. Vieques Island has very limited freshwater resources due to the climatic and physiographic conditions. There are numerous small watersheds ranging in size from 2.9 acres to 1,543.6 acres (Figure 10).

There are four major watersheds present on the eastern refuge lands: Quebrada Hueca, Quebrada Amargura, Quebrada Marunguey, and an unnamed quebrada flowing into Bahía de la Chiva (Figure 11). Although there are reports of permanent streams on Vieques, the geology, which allows for increased infiltration and percolation to aquifers, and topography, which allows for rapid runoff, do not generally support the development of permanent freshwater streams. The National Wetlands Inventory map identifies and classifies potential wetlands, including streams and other water resource habitats. All streams on Vieques are classified as being temporarily flooded based on these maps. Temporarily flooded streams, also considered ephemeral streams, only contain water during and shortly after rainfall events.

Figure 10. Vieques watersheds (west)

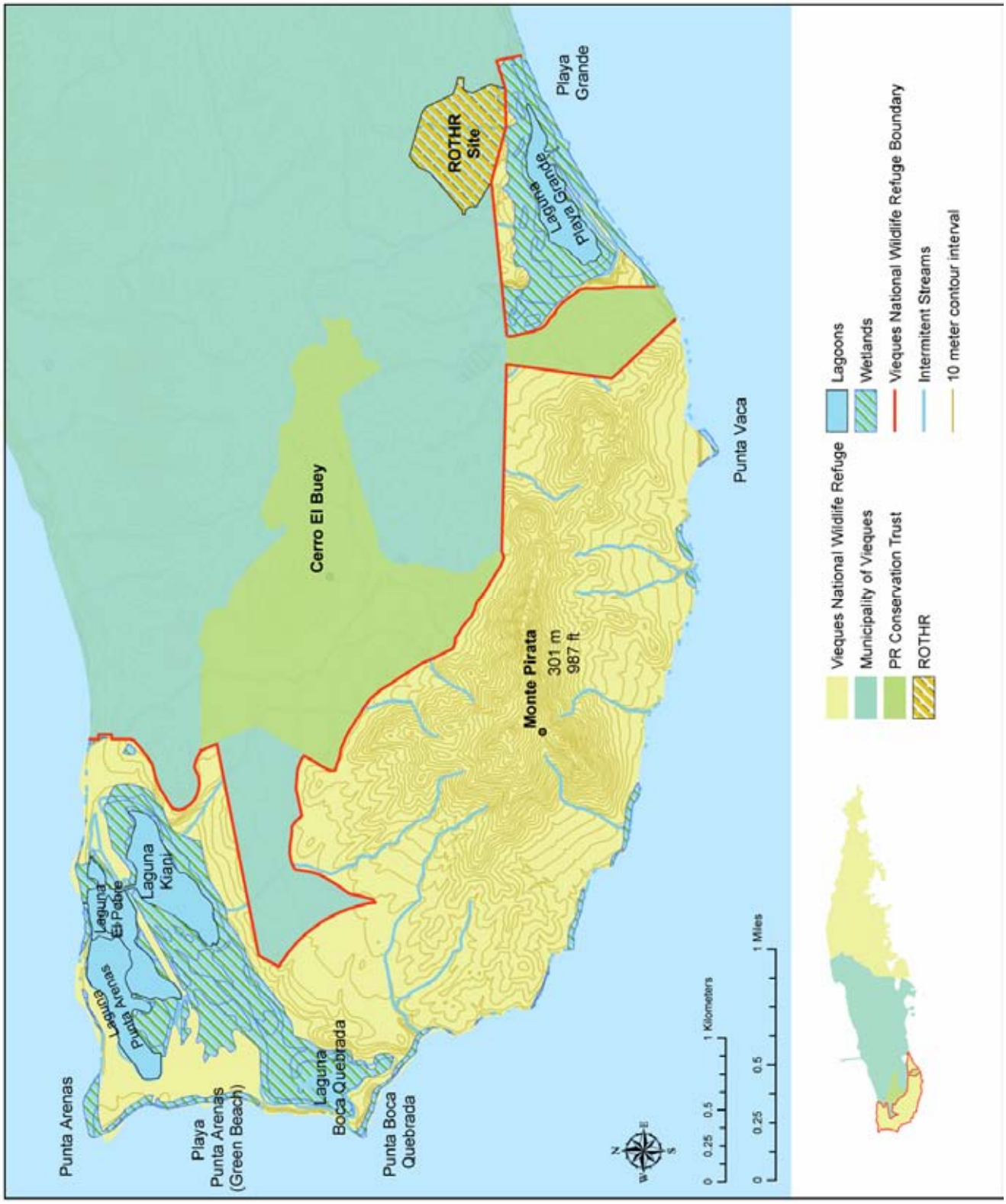


Figure 11. Vieques watersheds (east)

AIR QUALITY

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

A single air quality control region covers Puerto Rico, including Vieques. 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 USC 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 Vieques Refuge are minor and scattered widely. Air pollutants are emitted during occasional operation of power equipment, motor vehicles, and boats, and during vehicle use on unpaved roads throughout the refuge.

CONTAMINANTS/HAZARDOUS MATERIAL

CERCLA, commonly known as "Superfund," was enacted by Congress on December 11, 1980. This law provided federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA authorized two types of response actions: 1) short-term removals, where actions may be taken to address releases or threatened releases requiring prompt response; and, 2) long-term remedial response actions that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on the Environmental Protection Agency's National Priorities List. In order to address the contaminants issues associated with the former utilization of Vieques for military training, the Governor requested that portions of Vieques be placed on the National Priorities List. In accordance with the request, Vieques was placed on this list on February 11, 2005.

Western Vieques

This area was administered by the Navy from the 1940s and development and utilization of various portions of the lands occurred over a 60-year period. As a result, there are small dumps and other undocumented sites in several areas of this former Navy property. While this area was not subject to

any live fire from artillery or bombing, it did serve to store these items and there are more than 100 ammunition bunkers throughout the area. In addition, an open burn/open disposal site was used to dispose of excess and unexploded ordnance.

There are three documented contaminated sites on refuge lands. The open burn/open disposal area, also known as Solid Waste Management Unit 4, is about 100 acres in size and was used to dispose of ammunition. This area is located on a small hill facing Laguna Boca Quebrada to the north, the Caribbean Sea to the west, a small intermittent stream to the south, and woodlands to the east. The site is currently under investigation and several thousand items, mostly 20mm high explosive projectiles, have been found. Metal and explosive compound contamination of the adjacent lagoon sediments and unexploded ordnance are concerns at this site.

Another area, Solid Waste Management Unit 6, a dump area located in a mangrove, was documented in the years 1979, 1980, and 1986. It is located in a mangrove wetland adjacent to the Laguna Kiani channel on the Laguna El Pobre side, directly adjacent to the existing dirt road. The exact content of the dump is not known. Three crab samples taken from the site contained DDT, lead, and cadmium at or close to levels known to have an effect. This site is also under investigation by the Navy.

Area of Concern J, another dump site, is the third known site on the western refuge unit, and is located just outside the existing refuge gate, adjacent to an intermittent stream and mangrove estuary. Service concerns center on impacts to the stream and estuary sediments by metals and other compounds. This site is also under investigation.

Eastern Vieques

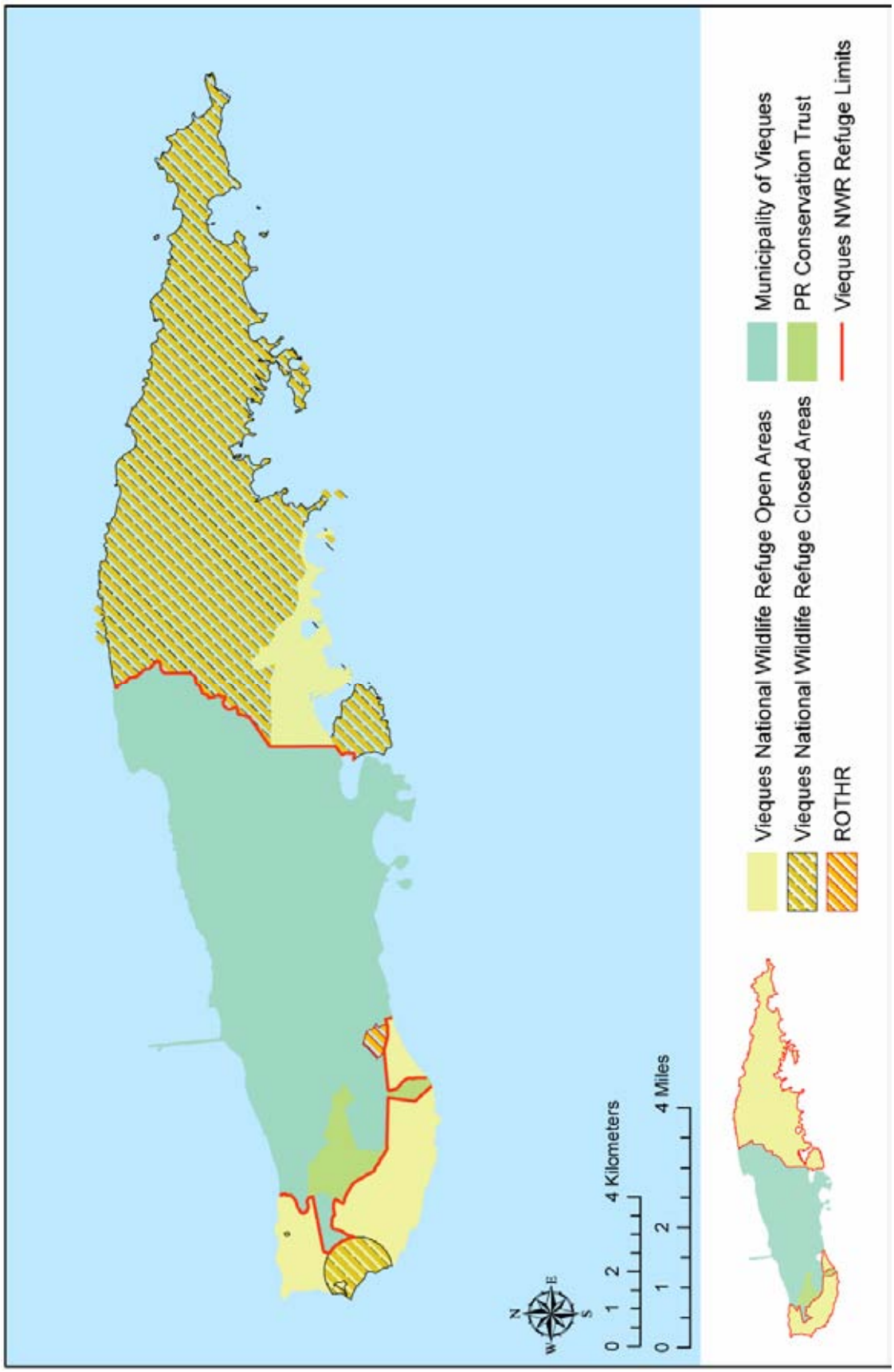
Eastern Vieques was used by the U.S. Marine Corps, the U.S. Army, and the Puerto Rico National Guard for maneuvers since the 1950s. Amphibious landings, parachute drops, artillery, tank, and infantry maneuvers were practiced year-round. In the 1960s, the Navy transferred its naval gunnery and air-to-ground practices to Vieques and established the Live Impact Area. Naval activities continued at this site until 2003. Because of its prolonged and intense use, this area has more sites. Close to 100 sites have been identified, including the Solid Waste Management Units, Photo Identified sites, Areas of Concern, and Potential Areas of Concern, plus the known small arms ranges, gun positions, and the Surface and Live Impact Areas. The degree of contamination of soil/sediment or biota by metals and other contaminants in many of these sites is yet to be determined.

Contaminant concerns in east Vieques include metal and explosive compound levels in soil and sediments, especially in lagoon sediments, since many of the lagoons in east Vieques are natural sediment basins. The Service is also concerned with the possible presence of pesticide residue levels of organochlorine pesticides, as these were used heavily during the 1950s and 1960s for mosquito control.

The presence of unexploded ordnance is an issue due to the use of this area for numerous types of military maneuvers. Because of the possible presence of unexploded ordnance, currently about 10,000 acres of the eastern refuge lands are closed to the public. As the clean-up progresses, additional lands will be opened for management and appropriate public use activities.

See Figure 12 for the opened/closed areas for both the western and eastern portions of the refuge.

Figure 12. Opened/closed areas



AESTHETICS

Vieques National Wildlife Refuge occupies significant portions of eastern and western Vieques Island. Major portions of these lands were cleared for agricultural purposes and were later used for military purposes. As a result of the agricultural clearing and subsequent abandonment, these lands are now predominantly vegetated with subtropical dry forest composed of a mix of native and introduced species. While there has been limited development on the refuge, there are still remains of structures from the agricultural and military activities of the past. Most significant is the development at Camp Garcia, where the military maintained a compound with numerous facilities to support its activities. The Observation Post near the east end of the island is one of the most noticeable structures remaining.

Visitors to the refuge will find limited facilities, including a boardwalk trail and informational kiosk at Kiani Lagoon and beach shelters on Caracas Beach and La Chiva Beach. At the present time, major portions of the refuge are closed to public access because of the potential hazards of unexploded ordnance from previous military training activities. The open roads that provide public access into the refuge are not conducive to hiking or nature observation because any passing vehicle will raise a dust cloud. Hiking or seeking solitude in the off-road areas would be very difficult because of the abundance of thorny dry forest vegetation.

The beaches that are open to public access are considered by many to be some of the most beautiful in the world and are aesthetically one of the greatest attractions to the area. In addition to the beaches, a casual observer will also note a series of lagoon systems with associated salt flats, wetlands, and surrounding mangrove forests, as well as expanses of sub-tropical dry and moist forests and hills rising from the shores. The biological resources discussed in the next section also provide an aesthetic appeal to many visitors.

ROADS, UTILITIES, AND INFRASTRUCTURE

Vieques National Wildlife Refuge is divided into the western and eastern tracts that are accessible by land though four main entrances and three secondary entrances that lead to various roads. There are approximately 100 kilometers (57 miles) of roads throughout the combined east and west portions of the refuge. Approximately 70 kilometers (44 miles) of roads are located on the east tract and 30 kilometers (19 miles) are on the west tract. There are numerous buildings and other structures and utilities that were on the lands when transferred to the administration of the refuge. The following provides a general description of the infrastructure found on the refuge.

Western Refuge Lands

The western tract of the refuge can be divided into three sections. The first section on the northern side is referred to as Punta Arenas. Entering the main gate (the refuge is officially closed from dusk until 6 a.m.) there are approximately 3.5 kilometers (2 miles) of public access roads that lead to the beaches. On the southern portion of this section there is a 1.6-kilometer (1 mile) side road used to access the power lines that carry power from the Puerto Rico mainland to Vieques. On the main road from the gate towards Punta Arenas (Green) Beach, there is one side access road that leads to a natural boat ramp, a small concrete building that houses the main valve for the water supply to Vieques (the building and the access to this site are part of an easement agreement between the Service and the Puerto Rico Water Utilities Company), two steel Bailey bridges, one interpretive kiosk, a short boardwalk onto Kiani lagoon, and one public use beach gazebo.

All the public use sites have parking available to accommodate vehicles for the visiting public. The Service has also installed several 55-gallon plastic trash containers in and around the main public sites. There are two fenced areas within the Punta Arenas area that are restricted from public use due to the potential dangers of unexploded ordnance. The first restricted area for public use is where the Puerto Rico Electric Power Authority has a large fenced-in transformer that distributes the electrical power for the main island to Vieques. The area where the transformer is located, along with the two main access roads, is part of an easement between the Service and the Power Authority. The second restricted area is Solid Waste Management Unit 4, which comprises approximately 400 acres starting at the canal of Boca Quebrada Lagoon, continuing inland in a circular manner, and finishing back at the coast. Also in this area is a small section of railroad track that dates back to the days of sugarcane farming. In addition to the potentially historic track, there are three large containers that were used during the same time period to store molasses before shipping it to the main island of Puerto Rico. Near the beach gazebo there are remains of a historic pier used during the sugarcane era.

The second or central section is referred to as the Mt. Pirata area. The road that leads to this main entrance starts on municipal lands and remains open to the public until it encounters a closed gate. From there the road leads to fenced area on the top of Mt. Pirata. The area contains a helicopter landing area, three small concrete buildings (electrical power is available to this site), and two large transmission towers. This area is maintained and used by the Department of Homeland Security as a communications site in accordance with an agreement between the Service and Home Security. The approximately 4-kilometer (2.5 miles) road from the boundary of the refuge to the top of Mt. Pirata is the only completely paved road segment on the refuge.

The third or southern section starts south of the Mt. Pirata area and ends on the shoreline. This section is commonly referred to as the Playa Grande area. There are more than 10 kilometers (6 miles) of roads across the southern section, however, most of them are severely deteriorated and are closed to ensure public safety. Currently, there is approximately 1.6 kilometers (1 mile) of road from the main entrance on Playa Grande to the Playa Grande lagoon that is accessible to the public. Parking is available for the visiting public's vehicles at this area. There are a few remnants of old structures on this portion of the refuge, but there is no other infrastructure.

Eastern Refuge Lands

There is one land entrance onto the main road on the eastern tract of the refuge. The eastern tract is open to the public from 6 a.m. to dusk. Crossing this entrance there is also a road that runs north to south, which serves as a fire break between the refuge lands and the community areas in town. This road runs along approximately 15 kilometers (9 miles) of fence that establishes the boundary of the refuge. Of the approximately 70 kilometers (40 miles) of road located on this tract, only 17 kilometers (10 miles) are open and accessible to the general public. The remainders of the roads on the east tract of the refuge are currently located inside various areas that are restricted to the general public due to the dangers of unexploded ordinance.

Inside the refuge, and next to main entrance, there is a small gazebo, a Fish and Wildlife Service welcome sign and a smaller sign that mentions permitted activities. Water mains, electrical utility poles, and telephone lines also enter the refuge from this point and parallel the main road for approximately 5 kilometers (3 miles), where they enter a fenced area formerly known as "Camp Garcia." Inside this area, there are currently fourteen buildings, most of which are unoccupied. The two largest are utility sheds that are used by the Service to house heavy equipment and other machinery. One of these buildings is an original stone structure that has historical value that dates from the time when these lands were used as sugarcane plantations. Outside and east of this fenced

area there is one unoccupied concrete building. To the south of this area there are two public restrooms, one gazebo, an underground septic tank, and a 1-mile-long inactive aircraft runway.

Additional infrastructure in the areas open to the public include nine public use beach gazebos and three open grills on Caracas beach (Red beach), one aluminum Bailey Bridge over La Chiva lagoon, plus ten more beach gazebos on La Chiva beach (Blue beach) area. The Service has installed several 55-gallon trash drums throughout the open public areas, particularly on the sites leading to or on the edge of the beaches. There are also three natural and historic sites used as boat ramps on the public areas of the refuge. From west to east, the first public area is located on a small peninsula on Barracuda bay, the second is on the east side of La Chiva beach and the third is at the eastern most portion of la Plata beach within the bay of Ensenada Honda. The first two areas have additional parking and turnarounds created to accommodate vehicles towing boat trailers. All the beaches that are currently open and being used for public recreation have parking lot areas. Road accesses directly onto the beaches are blocked with various barriers (e.g., mostly boulders), since vehicular and horse traffic are not allowed on the beach.

Four different gates to the north of the main road separate the public areas from the currently restricted areas. Inside the restricted areas there are seven unoccupied concrete structures; the largest being Observation Post One. Utilities for these structures are not currently operational.

BIOLOGICAL RESOURCES

FAUNA

Terrestrial and marine animals on Vieques are common all over mainland Puerto Rico whenever suitable habitat for the species is available. The native terrestrial component is comprised mostly of birds, reptiles, and amphibians and some bat species. The marine animal component is largely composed of near shore and pelagic fish species, sea turtles, marine mammals, mollusks, and crustaceans.

Birds

Over 150 bird species, including migratory and resident, have been reported to occur on Vieques (Department of the Navy 1986, Sorrie 1978, D. Gemill, personal comm.; and personal observations). Of those, at least 14 species are marine seabirds that use the near-shore/off-shore marine habitats to feed. These birds use rocky shores, cliffs, cays, sandy beaches, and lagoons to nest and/or roost.

During the island-wide bird census, conducted in 2005 (by refuge staff and in cooperation with the Puerto Rico Ornithological Society), four species were reported for the first time on Vieques. Preliminary surveys seem to indicate that the lagoons and the mostly undisturbed tracts of land managed by the refuge provide important nesting and foraging habitats for both resident and migratory species. Vieques is the largest land mass that bridges the gap between the Greater and Lesser Antilles. Because of its natural areas and geographical location, it appears to be a very important resting stopover for several bird species as they migrate between North and South America.

In 2001, the Service started a bird banding program on the refuge. This study began as part of an overall Service program across other national wildlife refuges in the Caribbean complex. In collaboration with the Smithsonian, the refuge study provided data to search for west Nile virus and today it continues as an important bi-annual survey to monitor species on the refuge. The birds that occur in Vieques can be divided into four groups: land birds, wading birds, waterfowl, and sea birds. Appendix V includes a list of the bird species found on Vieques.

Land Birds

This is the largest and most diverse group within the refuge, accounting for more than 80 species. The numbers in this group fluctuate throughout the year due to the spring and fall migrations. These birds are primarily found in the semi-arid areas that cover most of the eastern tract of the refuge, but they also occur in the more humid areas on the western tract of the refuge. They inhabit mangroves, upland forests, lowland forests, gallery forests, barren areas, grasslands, evergreen scrub, beach scrub, mixed thorn, and low scrub. Representatives of this group include the Ground Dove, Zenaida Dove, Scaly-napped Pigeon, White-winged Dove, White-crowned Dove, Gray Kingbird, Caribbean Elaenia, Mangrove Cuckoo, Smooth-billed Ani, Belted Kingfisher, Puerto Rican Woodpecker, Black-faced Grassquit, Bananaquit, Greater Antillean Grackle, Yellow Warbler, Adelaide's Warbler, Puerto Rican Vireo, Green-throated Carib, Antillean Crested Hummingbird, Grasshopper Sparrow, Peregrine Falcon, American Kestrel, Red-tailed Hawk, and others.

Wading Birds

With approximately 30 or more species, wading birds make up the second largest group of bird species found in the refuge. This category loosely groups marsh birds, shorebirds, egrets, and herons. With the exception of cattle egrets that accompany feral horses and cattle along all habitats, the majority of wading birds in the refuge are associated with mangrove-lagoon complexes and shorelines bordering the Vieques coast. Due to spring and fall migrations, the numbers of wading birds in the refuge also vary throughout the year. Most of these species are year-round residents in Vieques, whose numbers are usually augmented by winter migratory birds. According to preliminary surveys conducted by the Service on the shallow lagoons in the eastern and western tracts, the number of shore birds is greatly increased during the winter months. When coupled with the fact that several wintering areas across the Antilles have been degraded, the refuge might be an important resting and foraging area for these migratory species; similar to the Laguna Cartagena National Wildlife Refuge in western Puerto Rico. However, much more research is needed before drawing any conclusions.

Greater Flamingos were once frequently found on the eastern tract of the refuge in the areas of Ensenada Honda, Punta Carenero, and Jalova. Flamingos are now only rare visitors to the area; hence, the Service might enter into cooperative agreements with other entities to reintroduce the species to its former range. Other representatives of the wading bird group include the Great Egret, Snowy Egret, Tricolored Heron, Little Blue Heron, Great Blue Heron, Yellow-crowned Heron, Least Bittern, Clapper Rail, Sora Rail, Common Gallinule, Caribbean Coot, Semipalmated Plover, Snowy Plover, Wilson's Plover, Killdeer, Common Snipe, Spotted Sandpiper, Lesser and Greater Yellowlegs, Semipalmated Sandpiper, Short-billed Dowitcher, Black-neck Stilt, and others.

Waterfowl

Waterfowl refers to swans, geese, and ducks, however, the first two are not present in Vieques, but ducks do occur as both resident and migratory species. The most frequently seen waterfowl species in the refuge is the White-checked Pintail. Although this duck, as well as other species, is generally

more abundant in the lagoons with deeper waters on the eastern tract of the refuge, such as Monte Negro lagoon, it also occurs in lesser numbers in lagoons in the western tract, primarily Playa Grande and Kiani lagoons. The West Indian Whistling Duck and the Ruddy Duck are considered residents, while the Blue-winged Teal and the Lesser Scaup are winter migratory species.

Sea Birds

The numbers for sea bird populations in Vieques remain relatively constant throughout the year. This group of birds mostly utilizes the rocky shores, limestone and other rocky cliffs, small islands or cays, sandy beaches, mangroves, and occasionally lagoons near the coast. Some species reside on the island while others occasionally fly over the land or the near shore waters. The largest nesting colony of the endangered brown pelican in Puerto Rico is located on Cayo Conejo (under Commonwealth jurisdiction) off the southeast coast of the refuge. This group is also represented by Boobies, Frigatebirds, Gulls, Oyster Catchers, Tropicbirds, and Terns.

Reptiles and Amphibians

The herpetofauna (amphibian and reptiles) on Vieques is composed of at least 22 species (Department of Defense 2000; refuge staff observations). These species include four species of marine sea turtles (three nest on Vieques), a native species of fresh water turtle, four frogs, 11 lizards and geckos, the Worm Snake (*Typhlops richardii*), and the Ground Snake (*Alsophis spp*.). Introduced species include the Cane Toad, Green Iguana, and Ball Python.

Mammals

Four species of bats have been identified on Vieques, plus the presence of three other species needs to be confirmed (Rodriguez-Duran 2000). Confirmed species are *Noctilio leporinus*, *Artibeus jamaicensis*, *Molossus molussus* and *Stenoderma rufum*. The species in question are *Tadarida brasiliensis, Brachyphylla cavernarum*, and *Eptesicus fuscus.*

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

Introduced animals include the mongoose, two species of rats, and a mouse. Free-ranging cattle and horses are common on the eastern and western parts of the refuge, as a result of a poorly managed grazing concession the Navy gave to a local rancher association. Most of the cattle and horses are inside restricted areas (areas closed due to the potential presence of unexploded ordnance), but refuge personnel allow for the removal of these animals whenever it is safe and possible. The deliberate abandonment of domestic animals (e.g., cats, dogs, chickens, and ducks) on refuge lands seems to be a more recent illegal activity.

Aquatic organisms

A diverse fish assemblage inhabits the costal waters around Vieques Island. Of the approximately 800 species of fish known to occur in the coastal waters around Puerto Rico and surrounding islands (Causey et al. 2000), 242 species were recorded during the 1995 survey on Vieques and nearby St. Croix in the U.S. Virgin Islands (Department of Defense 2001).

At least 12 species of crustaceans are known to occur on Vieques: the Spiny Lobster, two shrimp species (one estuarine, one fresh water), Mole Crab *(Emerita portoricensis*), Beach Crab (*Hippia cubensis*), Ghost Crab (*Ocypode quadrata*), Common Land Crab (*Cardisoma guanhumi*), "juey pelu" (*Ucides cordatus*), Fidler Crab (*Uca spp*.), *Aratus pisonnii* and *Goniopsis cruentata*.

Seven species of marine or estuarine mollusks are known to occur on Vieques. They are the Octopus (*Octopus spp*.), Queen Conch (*Strombus gigas*), Coquina Clam (*Donax denticulate*), Oyster (*Crassostrea rhizophorae*), Sea Snails (*Nerita spp*.), and the clam or "almeja" (*Mercenaria mercenaria*). Recent studies have tentatively identified two to four amphidromous shrimp species and two to five freshwater fish in the streams. Further studies will be required to confirm the species and their year-round presence in Vieques.

Invertebrates

Land invertebrates make up the largest group of terrestrial fauna in the Vieques Refuge. At this time, an inventory and a description of these species has not been fully compiled. Aside from the different species of water and land crabs, which are listed above as aquatic organisms, there are several arthropods, gastropods, one or two Onychophora, and some annelids that can be found throughout various habitats within and around the refuge.

Some of these are arachnids, such as the greater Puerto Rican Tarantula (*Cyrtopholis portoricae*), Banana Spiders (*Argiope spp.*), hexagonal shaped spiders (*Gasteracantha spp*.), and a few different species of scorpions probably from the genera *Centruroides* and *Tytius*. The diploda are represented by two known genera of millipedes on the refuge, *Rhinocricus* and *Orthocricus*, while the chilopoda are represented by different species of centipedes perhaps including the genus *Scolopendra*. The Class Insecta is well represented by a large variety of butterflies, moths, bees, wasps, ants, dragonflies, beetles, weevils, grasshoppers, walking sticks, termites, etc. There are at least two species of annelids (earthworms) along with perhaps two species of *Peripatus* (velvet worms) that have been collected in and around the refuge (Segui, University of Puerto Rico, personal communication 2005), and there are several species of gastropods (snails) in these habitats. This last group includes the *Pseudopineria viequense*is, a land snail that was first discovered and described on the island of Vieques (Ortiz, University of Puerto Rico, personal communication 2005).

FLORA

Information on the flora of Vieques was collected as early as 1694 (Proctor 1994). The first collector was Jean-Baptiste Labat, a French friar who visited Vieques between 1694 and 1705. Several other botanical collectors visited the island between this time and Shafer's (1914) and Wilson's (1917) reports on the vegetation of Vieques Island. Some botanists only compiled lists and others actually documented reports with herbarium collections. Other sources of information include the Flora of Puerto Rico (Britton and Wilson 1924-1930); Proctor's (1994) checklist for Vieques; the grasses listed in Hitchcock (1936); trees in Little and Wadsworth (1964) and Little, Woodbury and Wadsworth (1974); orchids in Ackerman (1996); and vines and lianas in Acevedo (2003). Woodbury and Woodbury and Martorell collected extensively during the 1960s and specimens are located in New York and Puerto Rico. More recently Breckon (2004) compiled, based on literature citations and a limited herbarium survey plus collections made by Pedro Juan Rivero (2002) and by Breckon, a working checklist of 830 species for Vieques.

During the 19th century much of the island of Vieques was cleared of its dense forests for the planting of sugarcane. As early as 1851, it was necessary to import lumber for construction. This makes the vegetation on Vieques profoundly disturbed by human habitation and the dense forest that once covered the island has been replaced by secondary woodlands. The woodland areas and remnant forests found on the slopes of Monte Pirata will never have the same species composition or diversity of the original forests of Vieques but none the less provide habitat for the island's fauna.

A large number of the species are introductions and many are widespread weeds associated with human activities. Of the 830 plants included in the checklist, 165 or about 20 percent are introduced or exotic. Relatively few rare plants, however, have been observed to be present. Twenty-seven rare species of plants have been recorded of which five are federally listed as either threatened or endangered (Table 2). Three of the latter are known to occur on refuge lands. No plant species have been reported to be endemic to Vieques, however, several species reported from Vieques are known to be endemic to Puerto Rico.

VEGETATION COMMUNITIES

The geologic history of Puerto Rico helps explain the variety and distribution of its vegetation. Puerto Rico sits at the eastern end of a massive oceanic volcanic mountain chain. During past glacial periods the climate is believed to have been drier and cooler. Sea levels fluctuated drastically dropping as much as 100 meters during maximum glaciations. The Virgin Islands (except for the island of St. Croix), Culebra, and Vieques were connected with Puerto Rico as recently as during the maximum ice advance approximately 11,000 years ago. This land mass formed the Puerto Rican bank, which encompassed an area twice the present size of Puerto Rico. This complex history has led to the presence of many different vegetation types. Conserving biological diversity at the level of natural communities complements the single-species conservation approach because natural communities contain important assemblages of species and the habitats that support them.

Vieques Island is located 9.65 kilometers southeast of the nearest point on the main island of Puerto Rico. The island is approximately 22 miles long and 4.55 miles wide at its widest point. It totals 51.35 square miles or approximately 32,864 acres. The deepest water separating the islands reaches only 18 meters. Vieques does not have any endemic plant species. It has a recorded flora of 781 species representing 109 families. Of this total, 660 species are believed to be native, while 121 have been introduced from elsewhere. There are nine plant species on Vieques that do not appear elsewhere on Puerto Rico.

In 1742, it was reported that Vieques was covered with lush vegetation. By 1812, valuable timber species were being exported from Vieques and used to build houses, boats, and sugar presses. The following species were listed as exports in 1812: Palo Blanco, Caoba, Tachuelo, Capa, Pimienta, Guyacan, Malagueta, Mora, Ucar, Tortugo, and Huco. By 1851 it was reported that Vieques had begun importing timber as local supplies had become exhausted.

Table 2. Vieques rare plant species

VIEQUES RARE PLANT SPECIES
Amphitecna latifolia (Miller) A.Gentry
Baccharis dioica Vahl.
Calyptranthes thomasiana Berg.*
Celtis trinervia Lam.
Chamaecrista glandulosa (L.) Greene var. *mirabilis* *
Chamaesyce ophthalmica (Pers.) Burch
Cordia rupicola Urb.
Erythrina eggersii Krukoff & Moldenke
Eugenia cordata (Sw.) DC. var. *sintenisii* (Kiaersk.) Krug & Urb.
Eugenia sessiliflora Vahl
Goetzea elegans Wydler*
Ipomoea eggersii (House) D.F.Austin
Malpighia woodburyana Vivaldi
Morisonia americana L.
Myrciaria floribunda (West *ex* Willd.) Berg
Myrciaria myrtifolia Alain
Peperomia myrtifolia (Vahl) A.Dietr.
Pilea sanctae-crucis Liebm.
Prockia crucis L.
Psidium longipes (Berg) McVaugh var. *orbiculare* (Berg) McVaugh
Psychilis macconnelliae Sauleda
Sabal causiarum (O.F.Cook) Becc
Schoepfia schreberi Gmel.
Sesuvium microphyllum Willd.
Stahlia monosperma (Tul.) Urb.*
Tetrapterys inaequalis Cav.
Tolumnia prionochila (Kränzlin) Braem

*(*federally listed as either threatened or endangered under the Endangered Species Act)*

The island in general underwent profound disturbance during the sugarcane era when its cultivation dominated the economy. As the forest was cut, sugarcane, plantain, cotton, and tobacco plantations slowly covered much of the island. Sugarcane reached its peak in 1922 when there were four processing mills on the island. Aerial photographs show the majority of the west end of the island under cultivation except for the highest peaks and ridges. The drier eastern part of the island was

used extensively for grazing livestock. By 1950, most all of the Navy lands were used for grazing livestock rather than sugarcane. After the demise of sugarcane, unmanaged pastures readily reverted to dense thorn thickets and secondary growth forest. This vegetation in general is more characteristic of the dry coastal vegetation zone.

According to the ecological life zone system, six life zones are found in Puerto Rico and the Virgin Islands. These are: subtropical dry forest, subtropical moist forest, subtropical wet forest, subtropical rain forest, subtropical lower montane forest, and lower montane rain forest. The subtropical moist forest is the dominant life zone covering more than 58 percent of the area. According to this life zone perspective, approximately two-thirds of Vieques is covered with subtropical dry forest and about one-third is covered with subtropical moist forest. On Vieques these two ecological life zones can be further divided into various different vegetation cover types. The flora of Vieques has undergone extensive disturbance and remains in various stages of succession and is not in equilibrium. The grassland cover is not an original vegetation type but rather the result of disturbance by which it is maintained. There are similar communities of plants occurring within the different vegetation types. The plant community is more or less a cohesive group of species, mutually interacting and characterized by its floristic composition and structure. To facilitate discussion and for purposes of mapping, seven vegetation cover types will be identified. This system is intended to conform to the International Classification of Ecological Communities System and has been selected by the United States Federal Geographic Data Committee as the standard for describing vegetation communities throughout the Americas. The International Classification System describes vegetation types in several hierarchical levels including vegetation structure and composition. These are: beach, coastal strand forest, mangrove, seagrass beds, dry forest and shrub, mixed evergreen-deciduous forest, and grassland.

Beach

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

Although the sandy beaches are usually sterile in the intertidal zone, the rocky shores where the surf reaches are often covered with the algas *Turinaria turbinate* and *Enteromorpha* sp. Where sand has accumulated within the rocks, *Euphorbia buxifolia, Suriana martima,* and *Borrichia arborescens* are found. Dense mats of *Fimbristylis spadicea* and *Spartina patens* are common in the deeper open sands where dense stands of buttonwood mangrove, *Conocarpus erectus,* are absent. Above this disturbed area on pitted limestone slabs, spiny succulent vegetation occurs with: *Melocactus intortus, Opuntia rubescens, Caphalocereus royenii, Lemaireocereus hystrix,* and *Amaranthus spinosus*. This desert like vegetation gives way to various xerophytic shrubs, especially *Coccoloba uvifera*.

Coastal Strand Forest

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

Mangrove

Mangroves may be Puerto Rico's most endangered ecosystem and worldwide are disappearing at rates comparable to those of tropical wet forest (1.5 percent/year). Mangrove stands host exceptionally diverse communities of benthic invertebrates and dense assemblages of resident and migratory birds. Mangrove forests are located along the northern and southern coasts of Vieques. There are 36 major mangrove sites on the island totaling approximately 900 acres. Twenty of the mangrove sites are classified as closed lagoon forests, seven are classified as ephemeral, six as fringe, two as open, and one as a dwarf forest.

In general, hydrologic pattern determines mangrove community structure and function. Restoring tidal fluctuations and flushing to impounded areas will improve the health of many of these stressed areas. Livestock grazing and excess sedimentation due to upland erosion are still major problems that need to be addressed. The largest mangrove communities are located along the south-central coast. Ensenada Honda is the largest at approximately 200 acres, followed by Puerto Ferro with 93 acres, and Puerto Mosquito with 60 acres. Laguna Kiani on the west end of the island encompasses approximately 96 acres.

Stands of red mangrove (*Rhizophora mangle*) typically line the shorelines of the bays, lagoons, and channels. Red mangrove prop roots decrease shoreline erosion and provide shelter for numerous marine fauna. Moving inland, one finds black mangrove (*Avicennia germinans*), followed by white mangrove (*Laguncularia racemosa*) on slightly higher ground. Buttonwood (*Conocarpus erectus*) occurs. Sandy salt flats often extend behind the tidal mangrove areas and often with the following herbaceous associates: *Batis maritime, Susuvium portulacastrum, Heliotropium curassavicum, Lantana involucrate, Ipomoea pes-caprae, Sporobulis virginicus,* and other grasses and sedges. Common woody vegetation includes the natives: *Randia aculeata, Pictetia acuelata, Cocccoloba uvifera, Bucida buceras,* and *Tabebuia heterophylla*. The Old World (*Thespesia polpunea*) forest alliance is often associated with mangroves adjoining them on the inland side though generally not tidally flooded.

Botanical studies on Vieques have occurred as far back as 1705. However, a detailed inventory of the mangrove wetlands and ecology was not done until the late 1970s (Lewis, Roy R. 1979 Mangrove Forests of Vieques) as part of the Environmental Impact Statement for the Continued Use of the Atlantic Fleet Weapons Training Facility Inner Range (Vieques).

At the time of the environmental impact statement, it was estimated that between 1936 and 1978 about 329 acres of mangroves were eliminated. This includes the loss of wetlands in the Laguna Kiani and Playa Grande areas, which showed a loss of about 264 acres of forested wetlands and an increase in mud flats. The major cause of mortality in these areas was attributed to restriction of tidal flow or alteration of freshwater drainage into the wetlands. At that time, it was reported that Laguna Boca Quebrada had the highest mortality of mangroves due to restricted tidal exchange.

Lewis (Lewis et al. 1981) determined that there were 36 individual mangrove forests covering a total of 904 acres (366 hectares) in 1981. This represented an 18 percent decline from the historical forest coverage (1936) of 1,102 acres (446 hectares). The major problems affecting mangrove forests at that time were 1) cattle grazing; 2) excess erosion/sedimentation due to poor land management practices, including overgrazing by both horses and cattle; 3) blockage of natural tidal channels by construction; 4) filling of tidal channels by sand due to areas being destabilized by military practices; 5) natural drought; and 6) bomb damage in the Live Impact Area.

Lewis made several recommendations regarding the enhancement and restoration of several lagoons. These recommendations included re-routing of roads, installation of bridges, improving culverts, and reduction and control of livestock grazing.

Lewis returned in 1985 to do a follow up study of the mangroves on Vieques (Lewis 1985, Status of Mangrove Forests on Vieques, Puerto Rico). Attention was given to engineering activities taken by the Navy to improve the existing conditions in the mangroves. Based on the information gathered during this status survey, the following results were indicated:

1) Since 1978, eleven of the forests have shown improvement;
2) Since 1978, three forests have shown decline; and
3) Since 1978, twenty-two of the mangrove forests have shown little change.

The successful exclusion of grazing animals was one of the factors for wetland improvement. However, grazing and excess sedimentation from upland erosion continue to be problematic in eastern Vieques.

By 1985, a bridge had been placed over the opening of the lagoon at Bahía Chiva and Kiani Lagoon. However, other lagoons like Laguna Puerto Diablo still remain blocked by a roadway and attempts at restoring the hydrological connection at Laguna Boca Quebrada have not been successful.

In 1996, the Land Use Management Plan for U.S. Naval Facilities at Vieques, Puerto Rico, was written by GeoMarine. This was the third Land Use Management Plan for the area, but unlike the previous two, it provided specific management recommendations over a 1- to 20-year period. All of these plans were written as a result of the 1983 Memorandum of Understanding between the Navy and the Commonwealth of Puerto Rico. The 1996 Land Use Management Plan called for the removal of free-ranging livestock that continued to impact native vegetation, removal of roads that were impacting mangroves, and improving hydrology to the various coastal lagoons. According to the land use plan, livestock overgrazing, erosion from road construction and maintenance, and blockage of hydrology continued to be the main threats to mangroves on Vieques. Lagoons with restricted flow continued to be Laguna Boca Quebrada, Laguna Bahia Chiva, and Laguna Puerto Diablo.

The removal of a rock groin at the mouth of Laguna Boca Quebrada was recommended for immediate action since the structure was trapping sand and making the situation at the lagoon worse.

The re-routing of the roads at Laguna Puerto Diablo and Laguna Monte Largo and the restoration of hydrological connection to the sea was recommended as short-term action items.

Erosion and sedimentation of mangrove wetlands due to runoff from the adjacent and sometimes surrounding dirt roads have consistently been cited as an impact to these ecologically sensitive areas. This has lead to changes in microtopography that result in vegetation shifts from wetland to upland vegetation and loss of habitat.

Sea Grass Beds

This permanently flooded subtropical hydromorphic rooted vegetation occurs in shallow waters on muddy or sandy substrate. The northwest coast seagrass bed covers approximately 5,000 acres and is the largest seagrass bed in Puerto Rico. This important conservation zone is habitat for the threatened green sea turtle (*Chelonia mydas*), the Antillean manatee (*Trichechus m. manatus*), the brown pelican (*Pelecanus occidentalis occidentalis*), and the queen conch (*Strombus gigas*), as well as other species of commercial and recreational value for the local community. This broad shallow shelf contains dense and continuous seagrass beds comprising a mix of turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), and shoal grass (*Halodule wrightii*). This area is within the territorial waters under the jurisdiction of the Commonwealth of Puerto Rico but it will be considered in this Draft CCP/EIS.

Dry Forest and Shrub

Subtropical dry forest was the original dominant forest cover on Vieques. This original vegetative cover has been greatly modified and today is best characterized as dense, dry, spiny woodland and shrub. This is for the most part a secondary succession developing after the original forest was cleared for agriculture. Vegetation is generally short and spiny with a high stem density. Dominant species are several *Acacia spp., Prosopis juliflora, Leucaena leucocephala, Ziziphus mauritania, Pithecellobium ungis-cati*, various Croton and Lantana species, *Randia aculeata*, and *Bucida buceras,* among others. This exotic and altered vegetation is often called mesquite savanna and involves the Prosopis/Bucida woodland alliance with *Panicum maximum* or *Chloris barbata-Dichanthium annulatum* dominating the herbaceous layer. The later often includes the woody species *Achyranthes aspera, Parkinsonia aculeate,* and *Capparis flexuosa*. Other areas may be classified as lowland drought-deciduous shrubland consisting of the *Acacia macracantha-Acacia farnesiana* shrubland alliance and the *Leucaena leucocephala* shrubland alliance.

This vegetation is widely scattered and consists of a mixture of native and introduced species. The introduced species were the primary colonizers of the abandoned agricultural areas and serve as nurse trees creating microenvironments suitable for the return of the native dry forest component. The seed source for these areas comes from the valuable stands of remnant, mostly native dry forest that is best represented on the limestone bedrock in the Puerto Mosquito, Puerto Ferro, and Bahia Corcho areas. Common species include: *Coccoloba spp, Pisonia subcordata, Krugiodendron ferreum, Crossopetalum rhacoma, Bourreria succulenta, Gymnanthes lucida, Rauvolfia nitida,* and *Bursera simaruba*. Other remnant stands with high native species composition occur on the hilltops and ridges where *Thrinax morrisii* is dominant. The hills on the west end are gentler and more rolling with deeper corresponding soils. The east end landscape is more rugged with more exposed rock surfaces.

Mixed Evergreen-Deciduous Forest

This forest vegetation is mostly mesophytic occurring in moderately wet and humid areas. Mature remnants of this mesic forest grow on the upper southwest slopes and ridges of Monte Pirata, Cerro El Buey, and on the hillside above and down within Quebrada Marunguey. This is the most diversified and undisturbed association and has the greatest number of species present. Two of the most conspicuous upper-story species are the slender fan palm (*Cocothrinax alta*), which is endemic to Puerto Rico and the Virgin Islands, and the almacigo (*Bursera simaruba*). This area contains many of the rare and other endemic species found on the island such as: *Eugenia woodburyana* and *Goetzea elegans* -- two endemic, federally listed endangered species, as well as *Myrciaria myrtifolia, Malphigia fucata, Cordia ricksecker*i and *Acalypha berteroana*. Other common species within the

forest are: *Savia sessiliflora, Krugiodendron ferreum, Chrysophyllum argenteum,* and *Ceiba pentandra*. The roadside vegetation leading up to Monte Pirata is quite disturbed and supports various weedy species, such as *Leucaena leucocephala, Cordia polycephala,* and *Mimosa ceratonia*.

Grassland

Historically, these communities of perennial graminoid vegetation were maintained in pasture through grazing and fire. Much of this area is now in the process of returning to woody vegetation. Weedy herbaceous and shrub species begin the process and are followed by several early successional tree species such as *Leuceana leucocephala* and *Albizzia lebbeck*. These unmanaged grassland areas island-wide are readily reverting to dry forest and shrub, except in those areas recently subjected to fire or maintained by mowing, such as the areas around Camp Garcia. These areas are dominated by short bunch grasses and several alliances occur including: the *Dichanthium annulatum* herbaceous alliance and the *Cenchrus ciliaris* herbaceous alliance. Several other mixed grass stands are common including: *Bothriochloa pertusa, Eleusine indica,* and *Sporobulus indicus*. The African guinea grass (*Panicum maximum*) herbaceous vegetation is also very common and is considered a tall grassland type. These grass complexes are dis-climax and will revert to woody vegetation in the absence of disturbance. The overgrazing of grassland areas will also move an area towards thorn shrub consisting of dense stands of *Acacia* spp., *Ziziphus mauritania,* and *Prosopis juliflora*. A grassland management plan needs to be initiated to maintain selected representative grassland habitat.

THREATENED AND ENDANGERED SPECIES (FEDERALLY LISTED)

The Vieques National Wildlife Refuge supports important habitats for native, migratory, rare, and protected species. Approximately eighteen (18) federally listed plants and animal species have been reported from or expected to occur on the Vieques Refuge and surrounding waters. These species include four (4) species of plants; four (4) species of reptiles, including sea turtles; three (3) species of birds; and three (3) species of mammals, including the Antillean manatee (Figures 13 and 14).

No designated critical habitat is found on Vieques Refuge.

Listed Plants

Four species of federally listed plants occur in the Vieques: Cóbana negra (*Stahlia monosperma*), *Calyptranthes thomasiana, Chamaecrista glandulosa var. mirabilis,* and Matabuey (*Goetzea elegans*). All four of these species have been documented within the Vieques Refuge, the Matabuey only recently.

Cóbana negra *(Stahlia monosperma)* is a medium-sized, evergreen tree that reaches 25 to 50 feet in height, and 1 to 1.5 feet in diameter. Flowers are yellow and are produced between March and May, depending on rainfall. Scattered populations survive in Puerto Rico, Vieques, and the eastern portion of the Dominican Republic (FWS 1996). This species grows in brackish, seasonally flooded wetlands in association with mangrove communities and in upland areas. Cultivated plants have been reported from inland areas as well. On the Vieques Refuge, the species is located in the Laguna Kiani and Laguna Yanuel areas. Approximately 8 individuals of Cóbana negra were observed by Santiago-Valentín and Rojas-Vázuez in Laguna Yanuel during their studies in 1995 (Santiago-Valentín, Rojas-Vázquez 2001).

Figure 13. Threatened and endangered species (west)

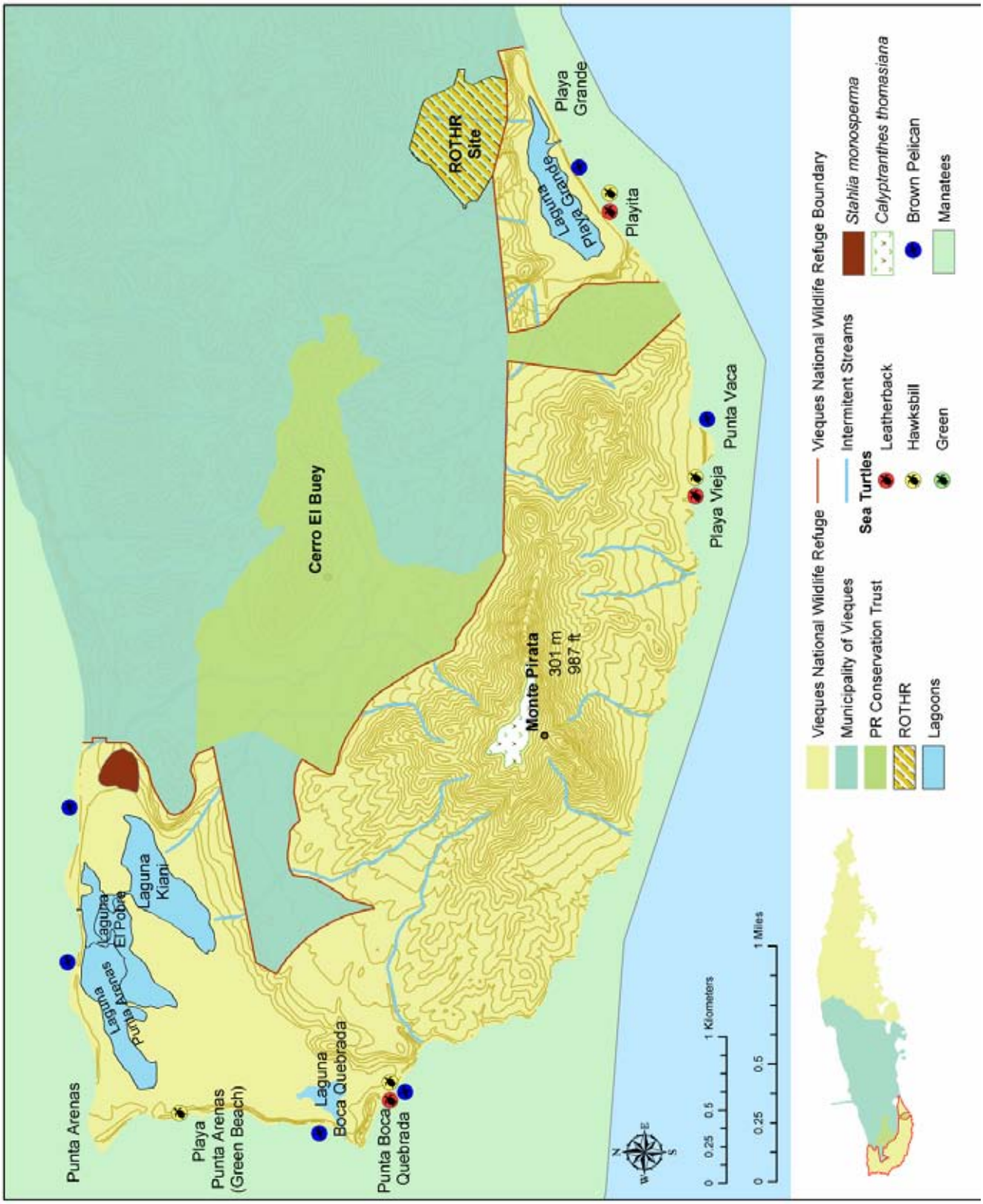
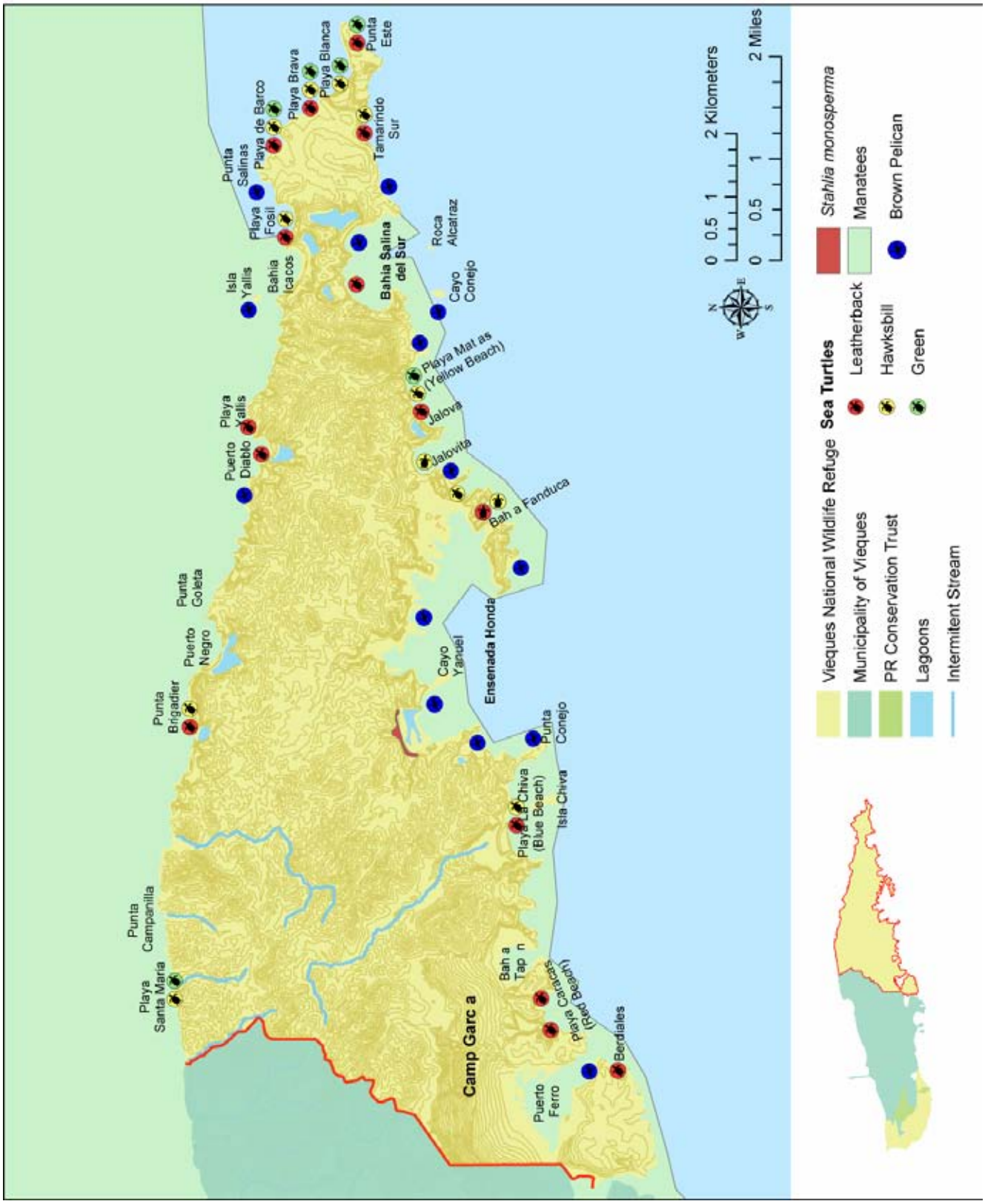


Figure 14. Threatened and endangered species (east)



Calyptranthes thomasiana is a shrub or small tree that may reach 30 feet in height and 5 inches in diameter. It is only known from three locations: Monte Pirata in Vieques; Bordeaux Mountain in St. John; and Gorda Peak in Virgin Gorda. Approximately 10 to 12 individuals are known to occur on Vieques near the summit of Monte Pirata. In Monte Pirata, *Calyptranthes thomasiana* is found in the moist deciduous formation of the inner hills and slopes, a forest type that also includes semi-evergreen forests (FWS 1997).

Chamaecrista glandulosa var. mirabilis is a shrub which may reach up to 3 feet in height. This species is known from only scattered locations along the southern shore of Tortuguero Lagoon and one area in Dorado (Fish and Wildlife Service 1994). The species utilizes silica sands associated to limestone formations. A historical record indicated that the species had been collected near Red Beach or Bahía Corcho in Vieques. Surveys were conducted in 1996 and 2000 and no individuals were found (Geomarine 2003).

Goetzea elegans (Matabuey) is a shrub or small tree reaching 30 feet in height with a stem diameter of 5 inches. The species generally flowers and sets fruit between April and August and the funnel-shaped flowers are yellow-orange in color. The fruit is an orange one-seeded berry that is reputed to be poisonous (Fish and Wildlife Service 1987). The species habitat consists of semi evergreen forests of the subtropical moist forest zone (Ewel and Whitmore 1973), and in mainland Puerto Rico the species has been found only below 660 feet (200 meters) elevation in the foothills and mogotes (karst limestone hills) of northern Puerto Rico (FWS 1987). In 2000, the species was found in four locations along forested drainages in western Vieques. Approximately 200 individuals, from seedlings to adults, have been documented (Geomarine 2003, personal communication Marcos Caraballo 2005).

Listed Reptiles

Sea Turtles

Of the six sea turtle species that are found in waters of the United States or that nest on beaches of the United States, only the leatherback sea turtle, hawksbill sea turtle, and green sea turtle nest regularly in Vieques. The loggerhead sea turtle occurs in waters near Vieques, but no nests have been documented in Vieques.

Sea turtles are among the largest living reptiles. Except for the leatherback sea turtle, which is a pelagic species, most sea turtles live in warm tropical and subtropical waters. Sea turtles, during their nesting seasons, come ashore to lay their eggs. The Service jurisdiction on sea turtles only includes this land-base behavior. Sea turtles nest in different types of beaches, since habitat requirements vary among species. Reproductive biology is very similar for all sea turtle species. However, there are some differences in habitat use and nesting seasons.

The leatherback (*Dermochelys coriacea*) is the most migratory and wide-ranging sea turtle species. Nesting grounds are distributed world-wide. In the Caribbean, the species nests in French Guiana, Surinam, Guyana, Colombia, Venezuela, Panamá, and Costa Rica. In U.S. territories, the leatherback sea turtle nests in Puerto Rico, U.S. Virgin Islands, and Florida (National Marine Fisheries Service and Fish and Wildlife Service 1992). The leatherback sea turtle requires sandy beaches backed with vegetation and sloped sufficiently so that the crawl to dry sand is not too far. The preferred beaches have proximity to deep water and generally rough or high energy seas. The species nest from February to August in Puerto Rico. Peak nesting season starts in April and may last until July. This varies among beaches and years.

Nesting by hawksbill sea turtle (*Eretmochelys imbricata*) within the United States territory occurs in Puerto Rico, the U.S. Virgin Islands, and very infrequently in Florida (National Marine Fisheries Service and Fish and Wildlife Service 1993). Nesting of hawksbill sea turtles occur on almost any sand or mixed sand/gravel vegetated beach. They prefer shallow low-energy beaches and pocket beaches. Hawksbills may crawl up to 50-70 meters landward to nest under or near the vegetation. This species nest in low densities and nesting season varies with locality. In most locations, nesting occurs sometime between April and November. In Vieques, the peak season for hawksbills has been identified from June to December.

Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green sea turtle is a circumglobal species in tropical and subtropical waters. Within the United States, green turtles nest in small numbers in the Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida (National Marine Fisheries Service and Fish and Wildlife Service 1991). The green sea turtle shares nesting habitat with leatherback and hawksbill sea turtles. In Vieques, the green sea turtle utilizes high-energy beaches. The nesting season varies with the locality but, in Vieques, the species nest from June to October.

Vieques Refuge supports important nesting beaches for all three species. Approximately 21 beaches of the refuge have been identified as sea turtle nesting beaches (Belardo et al. 1991, Belardo et al. 1992, Belardo et al. 1993, Belardo et al. 1994, Belardo et al. 1995, Belardo et al 1996, Belardo et al. 1997, Belardo et al. 1999, Belardo et al. 2000, and Belardo et al. 2001).

Approximately 846 sea turtle nesting activities have been reported from these beaches in the last decade. High numbers of nesting activities have been recorded at Jalova, Matias (Yellow Beach), Brava, Fanduca, Jalovita, Tamarindo Sur, Playa de Barco, and Punta Arenas (Green Beach). Moderate numbers of nesting activities have been recorded at Playa Campaña (Purple Beach), la Chiva (Blue Beach), Playa Blanca, Boca Quebrada, and Caracas (Red Beach). Relatively low numbers of nesting records are available for the rest of the beaches. The beaches of Eastern Vieques produced approximately 92 percent of all nesting activities during the 10-year period.

Nesting activity varies among years, sea turtle species, and beaches. Nesting activities per year ranged from a minimum of 28 nesting activities in 1995 to a maximum of 142 in 1994. Peak nesting activities have been documented every 3 to 4 years.

The leatherback sea turtle is the species with greater number of nesting activities, with a total of 391 nesting activities in 10 years, followed by the hawksbill sea turtle with 290 nesting activities in 10 years, and the green sea turtle with 165 nesting activities from 1992 to 2000.

The three species of sea turtles nesting in the Vieques Refuge utilize the beaches differently. Beaches such as Playa Jalova (Yellow Beach), Playa Brava, and Playa de Barco provide nesting habitat for all three species of sea turtles.

The majority of the beaches are used by both leatherback and hawksbill sea turtles. The beaches of the eastern point of Eastern Vieques (Playa Blanca, Brava and Playa de Barco) are mainly used by green sea turtles.

Virgin Islands Tree Boa and Culebra Giant Anole

Although suitable habitat for the Virgin Islands Boa and Culebra Giant Anole has been identified on the refuge, the species have not been reported.

Endangered Mammals

Antillean Manatee

The Antillean (West Indian) Manatee is found in the Caribbean region and the Gulf of Mexico (Fish and Wildlife Service 1986). Although manatees are generally restricted to large slow-moving rivers, river mouths, and shallow low-energy coastal areas, they can move as far as one or two miles from shore, particularly when traveling between areas. Based on aerial surveys of the entire coast of Puerto Rico, the Service estimates that no more than 200 manatees are found in the island (Fish and Wildlife Service 2001). The manatee is known to travel through, feed, and bottom rest in the coastal waters of Vieques. Manatees have been sighted primarily in coastal waters in the northwestern part of Vieques, but have been observed as far as Puerto Ferro, in the south-central coast of the island.

Endangered Whales

Five (5) species of whales have been reported traveling through the coastal waters of Vieques. However, the Service does not have any jurisdiction over these species nor does it propose any management of the species habitat.

Federally Listed Birds

Brown Pelican

Traditional brown pelican (*Pelecanus o. occidentalis*) roosting sites occur on the coast of the refuge near Punta Vaca and Punta Boca Quebrada, within the Laguna Kiani, and east and west of the Mosquito Pier. The brown pelican feeds in areas such as the coves, inlets, and lagoons of Vieques. The most important nesting colony of pelican in Puerto Rico is located in Cayo Conejo, a small island off the southeastern coast of Vieques and administered by the Commonwealth of Puerto Rico.

Roseate Tern

The Caribbean Roseate Tern *(Sterna dougallii*) is listed as threatened in the Caribbean. The species is distributed throughout the Caribbean, with the largest populations occurring in the Lesser Antilles (Fish and Wildlife Service 1993). The species utilizes different types of habitats for nesting, including small offshore islands, marine rocks, cays, islets, near vegetation or jagged limestone rock, open sandy beaches, and among coral rubble (FWS 1993). In Vieques, the species was reported nesting on the eastern tip of the island in 2001.

Yellow-shouldered Blackbird

Historic records of the yellow-shouldered blackbird from Vieques are available in literature (Fish and Wildlife Service 1978). However, no current sightings of the species in Vieques have been documented.

Species of Special Concern

The refuge ecosystems also support habitat for species of special concern (Table 3), which are considered rare, critical, or locally listed by the Puerto Rico Department of Natural and Environmental Resources. Rare plant species were listed in Table 2.

Table 3. Commonwealth critical species

Scientific Name	*Common Name*	*Status*	*Certainty of Occurrence*
ANIMALS			
Oxyura jamaicensis	Ruddy Duck	V	Known
Patagioenas leucocephala	White-crowned Pigeon	V	Known
Dendrocygna arborea	West Indian Whistling Duck	V	Known
Fulica caribaea	Caribbean Coot	V	Known
Anas bahamensis	White-cheeked Pintail	V	Known

Key: V = Vulnerable, considered threatened by DNER

NOXIOUS/INVASIVE SPECIES

Flora

The mountains of Puerto Rico rose above the sea in the late Eocene or early Oligocene approximately 40 million years ago, and since that time a flora of 3,126 species has developed. Birds or storm systems probably brought in most of the original species from other landmasses. Two hundred and forty endemic species evolved in Puerto Rico or remained here after extinctions elsewhere. Thus, endemic species account for about 9 percent of the flora, which is much lower than the other major Antillean islands, Cuba has about 49 percent endemism, Hispaniola about 36 percent, and Jamiaca almost 30 percent. Puerto Rico has no endemic plant genera.

The flora of Vieques consists of 830 species in 109 families. Of this total, 165 have been introduced from elsewhere. Pre-Columbian people undoubtedly imported many of the fruit-bearing tree species. The expansion of the flora continued with the early European settlers and traders who brought in a number of useful species. Francis and Liogier (1982) estimated that 45 of these species were reproducing in the wild. In the last century, additional species were introduced for ornamental, forestry, coffee shade, and other purposes. About 35 species imported as ornamentals and about an equal number imported for forestry or agriculture have naturalized. The species naturalized in Puerto Rico have come from tropical and subtropical areas all over the world. It is estimated that 55 species originated in the new world (47 percent), 50 species are Asian, predominately India to Oceania (42 percent) and 13 species or (11 percent) came from Africa and the Mediterranean.

In Vieques, much of the original forest has long since been converted to agriculture and most subsequently, replaced by housing, pasture, and thorn scrub woodland. The two most severe ecological threats to the continuation of dry forests are wildfires and cattle grazing. Dry forest is easily cleared with fire and woody regeneration in fields and pastures easily suppressed with fire. The vegetation on the island evolved in the absence of large herbivores and is very susceptible to livestock grazing. The areas with the most extensive coverage of thorn scrub and other non-native vegetation are those that have been most heavily grazed, for example, within the Agricultural Out-Lease Area located in the eastern section of the refuge. In 1985, it was reported that 10,200 acres or 45 percent of Navy land were leased to the Cooperative de Ganaderos de Vieques. The Fish and Wildlife Service's Field Station reported that "there was severe overgrazing of lease acreage and trespass in conservation zones." In 1986, the commonwealth placed the Cooperative de Ganaderos in receivership. It was allowed to construct a 300-acre holding pen near the entrance to Camp Garcia and

began selling cattle. This holding pen has been subjected to the most recent overgrazing and supports extensive stands of thorn scrub. Cattle still roam the refuge on both ends of the island and continue to disturb the secondary growth forests, especially on the hillsides, drainages, and wetland areas.

In general, the past ecological damage has been so complete in some cases that the refuge is now faced with the challenge and opportunity to assist in the design, creation, and direction of new habitats. Restoration ecology works best when it complements and reinforces the various ongoing natural processes. Recovery is a key component of restoration, the contribution of the system itself. Recovery involves allowing the system to express itself through natural succession and using the existing framework to move the composition to more native diversity. Conserving species diversity is essential. However, refuge management must try to understand and assess functional group diversity and strive to encourage more interactions. Habitats develop through a series of stages and many of the non-native species present in early stages will not persist.

The following are several of the 165 introduced plant species occurring on Vieques:

Zizyphus mauritiana-Indian Jujube, Aprin. An abandoned experimental commercial plantation with 3x3 meter spacing on the south coast west of Esperanza has provided an ample source of seed that is readily dispersed by birds. This now naturalized species occurs across the island.

Calotropis procera-Giant Indian Milkweed. Already widespread in 1912 when reported by Wetmore as Asclepias. This species is indicative of severe overgrazing which apparently had occurred by this time. This species continues its hold in poorly managed pasture.

Acacia farnesiana-Aroma, Cassia. A thorny, weedy, aggressive species that has taken over large areas of previously overgrazed pasture. It forms dense impenetrable thickets often in association with several other species of Acacia.

Prosopis juliflora-Bayahonda, Mesquite. This species arrived more than 200 years ago and has established itself widely in abandoned pasture throughout disturbed, dry areas island-wide. Although it can grow in diameter a centimeter per year for 100 years, its propagation is almost completely dependent on livestock.

Jasminum fluminense-Brazilian jasmine. This evergreen, climbing, woody vine produces small black berries relished by many birds. Its vigorous growth and rapid spread at Cabo Rojo National Wildlife Refuge has caused problems for planted and wild native tree saplings.

Casuarina equisetifolia-Australian pine, Casuarina. Large evergreen tree that has invaded extensive areas of south Florida. Although present in Puerto Rico and on Vieques, it has not as yet spread widely. Propagation of this species should not be encouraged.

Thespesia populnea-Seaside mahoe, Emajagua, Emajaguilla. Evergreen shrubby tree with spreading lower branches making almost impenetrable thickets; its large fruit crop increases its dense growth. Originating in India, it is a common plant of coastal strands across Old and New World tropics. It is now a common constituent of mangrove communities and low-wave action beaches. Its fruits and seeds are buoyant and adapted to long-distance dispersal by ocean currents. It has taken over beaches used by nesting sea turtles on St. John, U.S. Virgin Islands.

Fauna

Puerto Rico's fauna, as well as flora, has been augmented by introductions both deliberate and accidental across all taxonomic classes. The entire native mammalian land fauna in Puerto Rico has been extirpated. The ground sloths, hutia, shrews, and spiny rats are long gone. The only remaining native mammals in Puerto Rico are the bats with sixteen named species. Three are extinct and among the thirteen living species are one endemic species and six endemic subspecies. Seven bat species are presumed to be present on Vieques.

The introduced mammalian fauna begins with the Old World roof rat (*Rattus rattus*), which is widespread on Puerto Rico and all offshore islands, the brown rat (*Rattus norvegicus*), which is present but less widespread than *R. rattus* and apparently not present on Mona, and the house mouse (*Mus musculus*), which is ubiquitous and permanently stationed around the world. The small Indian mongoose (*Herpestes auropunctatus*) was introduced into Puerto Rico around 1877 from Jamaica and has become abundant across the island, as well as on Vieques. Its potential impact on small mammals is reflected in the difference in density of rats. The terrestrial brown rat is less abundant in areas of high mongoose densities, but the arboreal black rat numbers remain high in the presence of mongoose. Various other introduced mammals are found on the island, including dogs, cats, horses, and cattle. These feral animals cause considerable harm by preying on native species, destroying nests, and trampling mangroves and other vegetation. Mongoose, as well as dogs and cats, are known to prey on sea turtle hatchlings, ground nesting birds, and reptiles. Other introduced mammals include the agouti (*Dasyprocta sp*.), which was reportedly introduced by Amerindians to Vieques but is now presumed extinct.

Puerto Rico harbors approximately 76 exotic avian species, one of the highest per unit area of anywhere in the world. Over 20 percent of the Puerto Rico avifauna is comprised of exotic finches, representing 82 percent of Puerto Rico's granivorous birds. Many of these introductions have been accidental and related to the hugely popular pet trade in birds.

The Pin-tailed Whydah (*Vidua macroura*) has established on the main island since two of its native African hosts, the Orange-cheeked Waxbill (*Estrilda sp*.) and Red-eared Waxbill (*Estrilda troglodytes*) have established. The Whydah has been observed parasitizing the introduced Indian Silverbill (*Lonchura malabarica*) and the Strawberry Finch (*Amandava amandava*) but is not yet known to parasitize any native species. The Whydah was observed nesting in a Corozo palm at the Vieques airport in 2001.

The Bronze Mannikin was introduced to Puerto Rico in early 1800s from Africa and apparently spread to Vieques. It was locally common in a few pastures on the west end around the Navy barracks according to Sorrie in the 1970s and is fairly common today.

Vieques serves as an important stepping-stone for birds that winter in the Lesser Antilles, as well as facilitating range expansions. The glossy cowbird (*Molothrus bonariensis*) was first reported in 1858 in Vieques but did not show up in large numbers until the 1960s. It apparently moved up through the Lesser Antilles to Vieques and Puerto Rico.

Failed introductions can also be instructive. A total of 40 Blue-hooded Euphonia (*Euphonia musica*) were introduced in Vieques in 1910 but disappeared by 1912. In 1971, the Department of Agriculture's Division of Fish and Wildlife introduced 400 bobwhite quail though survival was short-lived.

The herpetofauna of the Antilles is practically entirely an old Central America fauna extinct or nearly so in Central America. This generally applies to our endemic avifauna as well. Approximately 10 percent of the herpetofauna of Puerto Rico is considered non-native. Fourteen reptile and five amphibian species have been reported from Vieques, including the giant Cane Toad (*Bufo marinus*) introduced in the 1920s to control June beetle larvae in sugarcane fields. The Green Iguana (*Iguana iguana*) has recently become established on Vieques and young Ball Pythons (*Python regius*) have also been seen on the refuge. At this time, it is not known if the pythons are reproducing in the wild.

SOCIOECONOMIC CHARACTERISTICS

CULTURAL HISTORY

The first permanent inhabitants of Vieques are considered to be the Archaic who lived there from 1680 to 1500 B.C. This culture was followed by others known as the Saladoid, Huecoid, Ostionoid, and Taino cultures (Figures 15 and 16). At the time of the arrival of Christopher Columbus in 1493, the Taino population of Puerto Rico was estimated to be about 60,000. Within a very short period, the Taino people were subjugated by the Spanish and their population was decimated by disease, emigration, in combat with Spanish troops, and assimilation into the population. Since the first Spanish settlers did not bring women, it was common practice to take Taino wives. In 1511, several of the Taino chiefdoms in Puerto Rico, allied with the Caribs, and tried to defeat the Spaniards. This uprising was defeated by troops under the control of Governor Juan Ponce de León.

In 1514, Cacimar, the Indian chief of Bieque, (Indian name for small land) actively participated in the attacks against the Spaniards. His brother, Yaureibo, led the last combat in Vieques in which the Spaniards brutally killed many Tainos and burned their huts and plantations.

Although the Spaniards considered Vieques an important part of their colonization project, they did not inhabit the island immediately. The English, Dutch, and French settled on the island at various times during the 17th and 18th centuries, but they were all eventually evicted.

In 1811, the Governor of Puerto Rico sent Juan Roselló to colonize the island. Although he was not fully successful, he was followed by Teófilo J.J. M. Le Guillou, of French descent. In 1828, Le Guillou asked the Governor of Puerto Rico to let him be in charge of Vieques' lands, thus becoming the first Governor of Vieques. He led the Vieques' colonization until his death in 1843. During his governing period, the first sugar plantations were established. The sugar industry and plantation system resulted in significant increases in the slave trade and the use of slaves in Vieques during the period up to the abolition of slavery in Puerto Rico. Slavery was officially abolished in Puerto Rico in 1873. During the late1800s, the sugar industry in Vieques was expanding with as many as five mills processing sugar in the early years of the Twentieth Century.

Between the early 1900s and the expropriations by the Navy, sugar production was a major but declining agricultural activity in Vieques. The sugar plantation economy that developed during the 19th century brought about a concentration of lands under the control of relatively few owners. This was the case in Vieques, as well as other cane growing areas. Associated with the large land holdings was the practice of permitting workers to live, build homes, and tend gardens and livestock on parcels within the larger estates. These workers, or "*agregados,"* did not have title to the lands they lived on, but were generally permitted to remain and provided a labor force for the landowners on a seasonal basis.

Figure 15. Cultural resources (west)

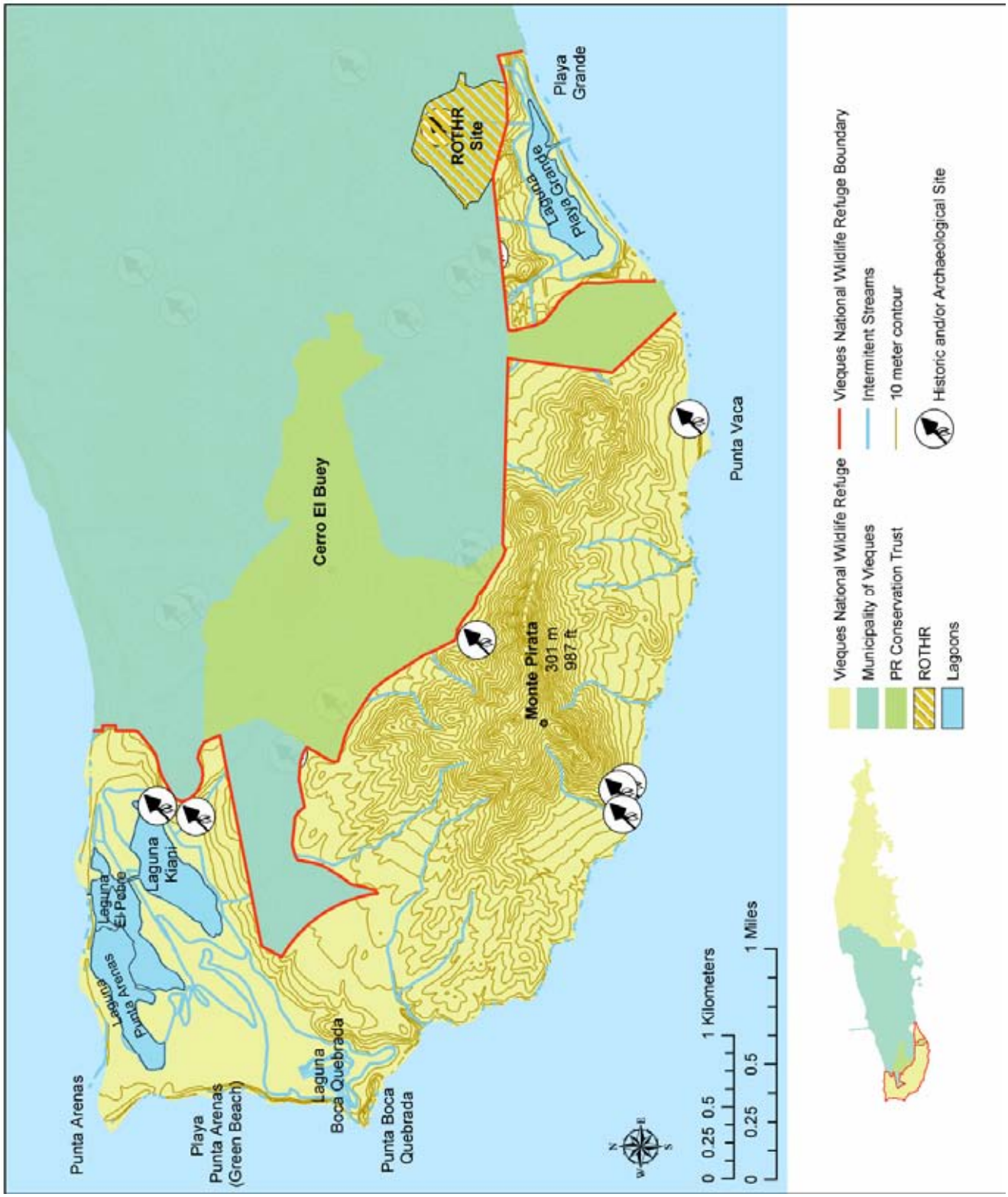
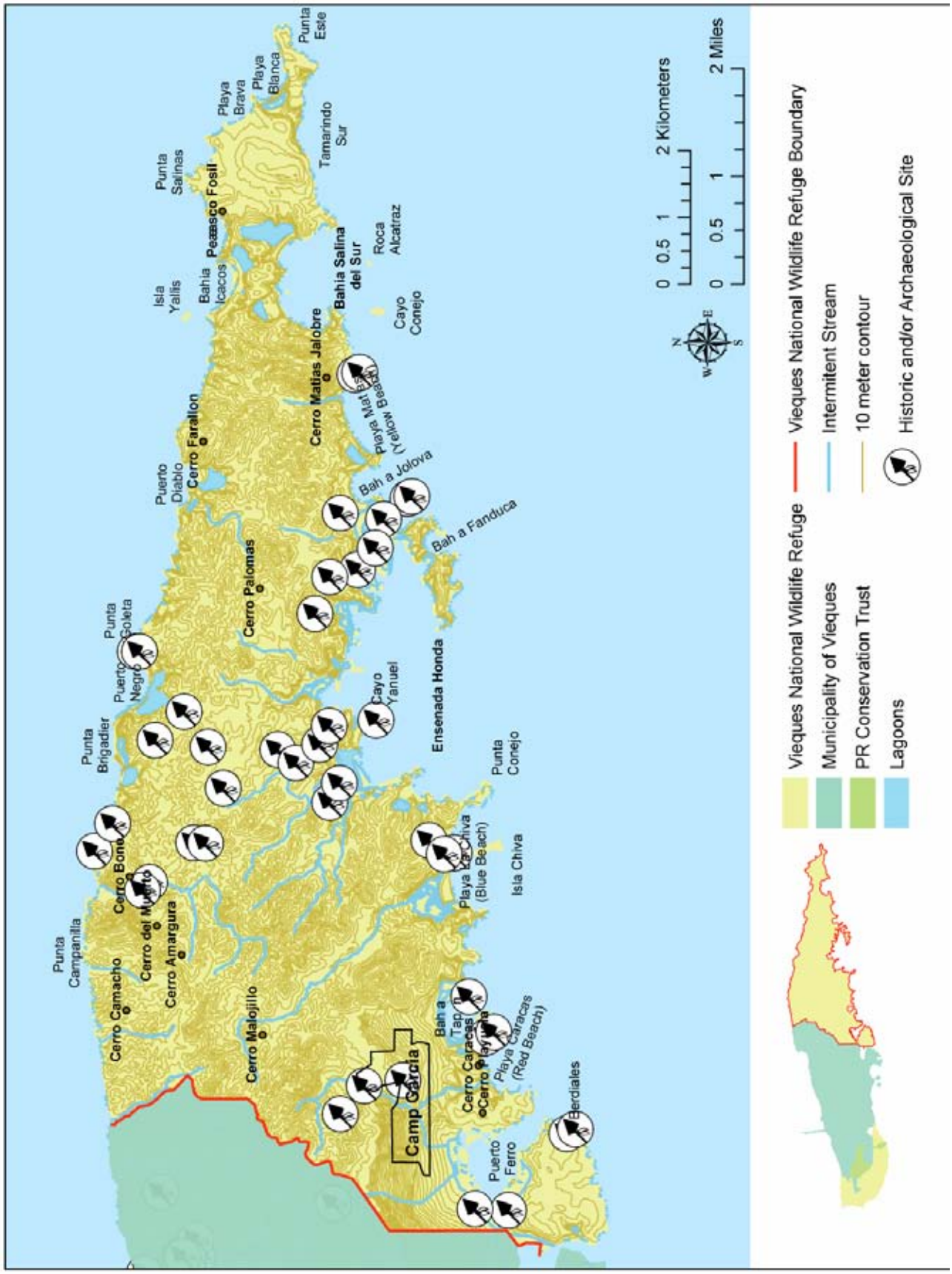


Figure 16. Cultural resources (east)



By the beginning of the Great Depression of the 1930s, the sugar plantations that were still operating faced an economic crisis and many families from Vieques left for the island of Saint Croix to pursue work opportunities. Between 1920 and 1940, the population in Vieques dropped from its peak of approximately 11,600 to 10,300. Ayala (2004) reported that between 1930 and 1940, 2,749 people emigrated from Vieques. After the expropriations of the 1940s, the population continued to decline until approximately 1960, and has shown slight increases since then.

Between 1941 and 1947, the United States expropriated approximately 26,000 acres on the Island of Vieques for use by the Navy as a base and training facility. The expropriation of the lands on the eastern and western portions of the island left the civilian population with the zone in the center of the island. On August 25, 1941, the U.S. Congress approved Public Law 247, which authorized the Navy to assume immediate possession of the lands to be expropriated for the construction of the naval base in Vieques. Shortly after acquiring the lands, the Navy began construction activities on the military facilities in Vieques. For a few years, this construction activity provided employment opportunities for the local population. After the first several years of Navy presence, the construction job opportunities declined and since the potential for agricultural employment was greatly reduced, emigration from Vieques continued. The remaining population was restricted to a strip of land between the eastern and western military operations.

For many years, segments of the Vieques population opposed the Navy presence and lobbied to stop the military activities. In 1980, members of Congress recommended that the Navy leave Vieques. In 1983, the Government of Puerto Rico and the Navy entered into a Memorandum of Understanding regarding community assistance, land use, operation of the ranges, and environmental issues. That agreement established the conservation zones within the Navy-controlled areas. In 1999, a civilian security guard was killed by accident at the Observation Post adjacent to the Live Impact Area on eastern Vieques. That incident brought about an increase in the opposition to the Navy use of Vieques as a training area. In 2001, 4,000 acres of former Navy lands on western Vieques were transferred to the municipality, 800 acres to the Puerto Rico Conservation Trust, and 3,100 acres to the Department of the Interior. That same year, a non-binding referendum was held and 68 percent of the Vieques voters demanded that the Navy cease military practices, clean-up, and “return” the lands. On May 1, 2003, military operations and bombing in Vieques ceased and the eastern lands (14,543 acres) were transferred to the administrative jurisdiction of the Department of the Interior.

The *Plan de Ordenamiento Territorial* (land use plan), recently approved for Vieques, seeks to present guidelines for the island’s development. The documents include infrastructure projects and works consistent with the development vision established in the Sustainable Development Master Plan for the Municipality of Vieques. In 1999, by virtue of Executive Order 1999-21, the Vieques Special Commission and its Special Commissioner Office were created to evaluate the impacts of the Navy’s presence in Vieques. This office is an interagency means to facilitate the coordination between the Federal Government, the Government of Puerto Rico and its agencies, the Office of the Resident Commissioner, the municipality of Vieques, the private sector, and the community.

EMPLOYMENT

In Vieques, the total employment experienced a general increasing tendency from 1990 to 2002 (Table 4). In the early 1990s, employment was at a low with 1,153 people employed. Later it recovered and in 1998 began to decline again, arriving at 1,292 people employed in 2001. In 2002, recovery returned with 1,389 people employed. The increases although small have been less significant than in Puerto Rico as a whole. Reports produced by the Puerto Rico Department of Labor indicate that Vieques is among the municipalities with the lowest average annual employment growth in the eastern region.

Table 4. Average annual employment growth, by municipality (1990-2002)

Municipality	Annual Employment Growth (%)
Juncos	4.3
Culebra	4.2
Patillas	3.5
Rio Grande	1.7
Fajardo	1.6
Yabocoa	1.2
Humacao	1.1
Las Piedras	1.0
Vieques	**0.9**
Naguabo	0.7
Maunabo	0.1
Luquillo	-1.7
Ceiba	-2.3
Eastern Region	1.2
Puerto Rico	1.6

Information from: Puerto Rico Department of Labor and Human Resources

The unemployment rate was 18.1 percent in 2002, and dropped to 16.0 percent in 2003. It is among the highest when compared to the surrounding municipalities in the region. The government is the principal employer in the municipality. In 2001, the government employed 41.1 percent of the workers. Based on this information, it can be seen that economic activity on the island is not very diverse. Other industries with reduced employment are manufacturing, insurance, and real estate. Employment has increased in construction and wholesale trade.

Income

The income level in Vieques is lower than in other areas of Puerto Rico with the average annual salary per worker reaching a maximum of $16,308 in 2002. Salaries vary from one industry to another but overall do not attain the levels of the other municipalities of Puerto Rico.

Commercial Activity

Studies conducted in Vieques related to commercial activities have shown a reduction over time. In the case of sales at supermarkets and other food stores, construction materials, and eating and drinking establishments, there is an increase at the present time. The data shows that the number of establishments is decreasing by an average of 0.3 percent per year.

Construction

Based on the number of construction permits the Planning Board has granted, it appears that construction has increased during the last decade.

Tourism Projects

The Tourism Company of Puerto Rico reported that in January 2004, there were six tourism projects in Vieques. There are currently over 25 establishments providing lodging. These include small guest houses with only a few rooms to the Martineau Bay Resort with 138 rooms. There are more than 25 eating establishments.

Cost of Living

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

POPULATION

The total population of Vieques, according to the U.S. Census of 2000, was 9,106. Between 1970 and 2000, the population of Vieques increased from 7,767 to 9,106, an increase of only 17.2 percent. By comparison, the overall population of Puerto Rico increased by 40.4 percent during this same time period. Selected demographic information from the census data is provided in Table 5.

Table 5. Vieques selected population characteristics (from: U.S. Census 2000)

VIEQUES SELECTED POPULATION CHARACTERISTICS 2000		
SUBJECT	**NUMBER**	**PERCENT**
Total population	9,106	100.0
Male	4512	49.5
Female	4594	50.5
Under 18 years of age	2704	29.7
Average family size	3.36	
Population in school	2,526	
Percent high school graduate or higher (25 yrs or older)		50.3
Percent bachelor's degree or higher (25 yrs or older)		10.1
Language at home English	1,221	14.5
Language at home Spanish	7,220	85.5

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 U.S. House of Representatives where he/she has a vote in committees but does not have a vote with the full House. The executive authority is vested in a Governor.

Vieques is one of the 78 municipalities in Puerto Rico. Each municipality is administered by a mayor and a municipal assembly. All of these positions are elected. U.S. citizens, 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 chambers of the Legislative Assembly; other senior nominees require confirmation only by the Senate.

PUBLIC USE

The refuge's public use occurs year-round from 6 a.m. to sunset. Recreational activities include wildlife observation, wildlife photography, interpretation, environmental education, fishing access, and beach use. Beach-related recreation, such as sunbathing, is the most popular activity on the refuge. A more detailed look at current levels of use is found in Alternative A - Current Management (No Action).

Access to the Vieques National Wildlife Refuge occurs on both the western and eastern portions of the refuge. The western refuge consists of approximately 3,100 acres with recreational opportunities on areas known as Playa Grande, Punta Arenas (Green Beach), and Kiani Lagoon. The eastern refuge consists of approximately 14,573 acres with recreational opportunities at various beaches, but especially at Playa Caracas (Red Beach) and Playa La Chiva (Blue Beach). Currently, a major portion of the eastern refuge is closed due to the danger of unexploded ordnance and the cleanup process occurring in that area.

Wildlife Observation

The refuge has a wooden boardwalk located at Kiani Lagoon. The boardwalk extends around the lagoon. It provides an excellent view of Mt. Pirata, the highest elevation on the island and the original moist subtropical forest on Vieques. The number of people who visit the refuge to view wildlife is unknown, but many users who visit primarily for other reasons, such as beach use, also enjoy seeing wildlife. Currently, there are no designated wildlife observation trails but the public uses areas of open access to observe a myriad of butterflies and bird species.

Wildlife Photography

Although there are no photography blinds available for public use, visitors can photograph wildlife on the refuge in areas not restricted to access during refuge visiting hours.

Interpretation

The refuge has an interpretive kiosk located at the head of the wooden board walk at Kiani Lagoon, describing elements of the mangrove swamp habitat and its ecological importance. The area is highly visited by local residents and tourists. Recently, an interpretive kiosk was located at the east entrance to the refuge describing the Service and Refuge Mission and informing the public of current recreational opportunities. The Service office hosts lecture programs occasionally during the year highlighting the island's natural resources.

Environmental Education

The refuge has not developed a formal curriculum-based environmental education program. Although there is no formal program, the staff has taken college level students, local community groups, teacher workshop groups and school groups, both from Vieques and Puerto Rico, onto the refuge to teach them about the island's ecosystems and management issues. Refuge staff has also brought environmental education activities to many local schools and local summer camp groups.

Boating/Canoeing

Naturally formed boat launching sites are located on both the eastern and western portions of the refuge. These sites are currently available for launching small water craft. All activities within the waters around the refuge are governed by state regulations. The boat ramps at the eastern refuge are at the east end of Playa La Chiva (Blue Beach), Conch Beach (in the Ensenada Honda area), and at Barracuda Bay also known as Puerto Ferro.

The launch site at the western refuge is located by Kiani Lagoon.

Fishing/Hunting

Sport fishing access is allowed on the beachfront and in the lagoons, except for those areas that are posted closed. Fishing use is governed by state regulations. Hunting is not currently allowed on the refuge for a variety of reasons, including rare species and safety issues.

Beach Use

Beach recreation is the primary public use activity on the refuge. Primary recreational areas include Playa Grande and Punta Arena (Green Beach) at the western section of the refuge. Playa Caracas (Red Beach) and Playa La Chiva (Blue Beach) are the most visited at the eastern section of the refuge. However, there are other beaches used to a lesser extent. Punta Arena (Green Beach) and Playa La Chiva (Blue Beach) are also frequented on weekends and holidays by recreational boaters from Puerto Rico and other neighboring islands. Playa Caracas, Playa La Chiva, and Punta Arenas all have shelters and each has a picnic table. The shelters provide a shaded place for visitors to relax and enjoy their beach related activities.

ARCHAEOLOGICAL RESOURCES

Evidence has been found of indigenous settlements in Vieques from long before the arrival of the Spaniards and its colonization. The first settlers, the Archaic, inhabited the island from 1680 to 1500 B.C. One of the most important findings on Vieques from this period is the discovery of human remains known as the Puerto Ferro man. These bones of a man from almost 4,000 years ago, found in the area of Puerto Ferro, are the most ancient human remains of the Caribbean. Ivonne Narganes

Storde and Luis Chanlatte Baik from the Archaeological Research Center of the University of Puerto Rico at Río Piedras conducted the excavation and found the sites of La Hueca and Sorcé. Since Vieques is a point of encounter between the Greater and Lesser Antilles, the archaeological sites are characterized by cultural traits from diverse Caribbean regions.

In 1977, researchers from the University of Puerto Rico began to study the first aboriginal group to arrive at the island and other Antilles. The oldest settlement belongs to the La Hueca Cultural Complex, or Agriculture-Ceramic I, and the most recent one belongs to the Igneri Cultural Complex, or Agriculture-Ceramic II. In 1980, archaeologists from the Museum of the Turabo University made excavations in the El Destino sector, located in the central mountainous part of Vieques. Among the findings there is the only *batey* of the Taino culture that has been documented on Vieques so far. The archaeological material from the El Destino and La Hueca sectors is currently displayed in the Museum of the Vieques Conservation and Historical Trust located at La Esperanza. Further archaeological findings related to pre-Hispanic cultures of the Caribbean were found in civilian areas of the island in 1983. Materials collected from sites in the Esperanza, Martineau, La Mina, and Caño Hondo sectors are now located in the Museum of Yale University.

Within the former military lands, archaeological research has been conducted since 1978. The U.S. firm, Ecology and Environment, Inc., was commissioned by the Navy to conduct a study, which produced the Cultural Resources Reconnaissance of Vieques' Naval Reserve report. This report was submitted to the State Historic Preservation Office in 1984 and identified 247 sites of cultural and archaeological importance within the military zones. Thirty-three of these locations were recommended for inclusion in the National Registry of Historic Places and seventeen have been included in the registry since 1977.

Early archaeological researchers agreed on the importance of conducting archaeological studies in the previously restrictive areas of the Navy. Prior to the transfer of the lands to the Department of the Interior, the Navy contracted R. Christopher Goodwin and Associates to conduct archaeological surveys on the Navy lands. While some segments of the survey project have been completed, the final reports are still pending publication.

As of February 2001, 321 historic properties were recorded on the former Navy lands of eastern and western Vieques. The site types include isolated artifact find spots, precolumbian lithic and/or ceramic scatters, precolumbian middens (resource extractive stations/camps/villages/burials), petroglyphs, historic sites associated with the sugar plantation complex (i.e., Hacienda Puerto Ferro and Hacienda Arkadia), 18th - 20th century homesteads, and a historic lighthouse. The Navy, as part of its Section 110 inventory and as mitigation associated with its transfer of the former Vieques military facilities, have contracted a number of archaeological, geomorphic, and paleoecological investigations since the late 1970s. Portions of the military facility have been transferred to the Fish and Wildlife Service, the Commonwealth of Puerto Rico, and the Puerto Rican Conservation Trust.

Goodwin's 1997 Work Plan presented an integrated model based upon 1) known prehistoric and historic cultural patterns on Vieques, in Puerto Rico, and the Virgin Islands; 2) distribution of recorded sites on the island; 3) assessment of methods employed and the results obtained by previous investigations; and 4) geomorphic landforms and natural resource distribution on the island. It has been refined based upon the recent investigations, which included archival, field, laboratory, and data analyses. The Navy has amassed digital sets of aerial photos (from the 1930s on), both black and white and colored infrared, to aid in the archaeological investigations and long-term habitat management.

The island was broken down by drainage and divided into the following major zones (Table 6). The broader coastal area is made up of the salt ponds, mangroves and bayheads, thus coastal is not included in the predictive model table.

- Salt ponds (and adjacent area)
- Mangroves (and adjacent area)
- Bayheads
- Valley bottoms
- Coastal areas
- Uplands with slopes less than 15 percent
- Uplands with slopes greater than 15 percent

Table 6. Archaeological site predictive model

Environment	Archaic	Early Ceramic	Late Ceramic	Early Colonial	Late Colonial
Salt Ponds	High	Low	Low	Low	Low
Mangroves	High	Moderate/Low	Moderate	Low	Low
Bayheads	Low/Moderate	Moderate/High	High	High	High
Valley Bottoms	Low	High	Moderate/High	High	Moderate/Low
Uplands	High/Moderate	Moderate	Moderate	Moderate	High
Slopes	Low	Low	Low	Low	Low

During the Early Colonial Period, settlers focused on small-scale provision crop farming (e.g., cotton, tobacco, and coffee). Cattle and other types of livestock were the focus on the eastern part of the island as it was more arid. During the Late Colonial Period, ca. 1850s, the island's economy had shifted to sugar production.

Modern plant communities and soil classification appear to be poor predictors of precolumbian settlement patterns on Vieques. During historic periods, vast areas of the island were under cultivation regardless of the soil regime. During prehistory, access to potable water and marine resources were more important determinants of site locations than immediate proximity to good agriculture land, except during a few centuries following first colonization of island by agricultural groups (early Saladoid).

WILDERNESS

When the Vieques National Wildlife Refuge was established, the legislation stated that “The Secretary of the Interior shall assume responsibility for the administration of the Live Impact Area upon transfer under paragraph (1) of subsection (b), administer that area as a wilderness area under the Wilderness Act (16 U.S.C. 1131 et seq.), and deny public access to the area.” While this language directs the management of the Live Impact Area and requires that it be closed to public access, it does not appear to establish the area as a formal wilderness area. The definition of wilderness in the Wilderness Act states that: “A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean, in this Act, an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.” In addition, the normal criteria for establishing wilderness under the Wilderness Act would require that the area be 5,000 acres or larger without roads.

Refuge planning policy requires a wilderness review concurrent with the comprehensive conservation planning process. A team of Service and Department of Natural and Environmental Resources personnel met at the Vieques Refuge to evaluate the potential for wilderness designation. The team inventoried refuge lands within the planning area and found no areas that meet the eligibility criteria for a wilderness study area as defined by the Wilderness Act. Therefore, the suitability of refuge lands for wilderness designation is not analyzed further in this plan. A summary of the wilderness review is included in Appendix VI.

III. Alternatives

INTRODUCTION

This chapter describes management alternatives for Vieques National Wildlife Refuge. Each alternative addresses several aspects of refuge management, including habitat, public use, and administrative functions. The first section of this chapter gives a brief description of the alternatives with examples of the types of activities included. To give the reader an understanding of the requirements of the Refuge System to ensure authorized activities do not adversely affect the mission of the refuge, a background on “compatibility determinations” is provided. Also included is a discussion of the management actions that are common to all the alternatives and that the Service plans to implement regardless of which alternative is chosen. Following this discussion is a section which describes the three proposed alternatives in the format of goals, objectives, and strategies. Strategies are listed from those common to other alternatives to those specific to each alternative, when applicable. The last section describes major strategies considered but eliminated from further consideration.

Following the text describing the alternatives is a matrix that shows the differences among the alternatives (Table 7). The matrix compares and contrasts the alternatives by their specific management actions and strategies. These actions and strategies, in turn, are grouped according to the refuge goals. Generally, the matrix is a summary of the alternatives chapter.

FORMULATING ALTERNATIVES

The alternatives are packages of complementary management strategies and specific actions for achieving the missions of the National Wildlife Refuge System and the Service, the vision and goals of the refuge, and the purposes for which the refuge was established. They propose different ways of supporting the goals and responding to key issues, management concerns, and opportunities identified during both the internal and public scoping processes.

The three alternatives identified and evaluated represent different approaches and different levels of management to provide for protection, restoration, and management of the refuge’s fish, wildlife, plants, habitats, and other resources, while accommodating differing levels of compatible public use activities. A major factor considered during the development of the alternatives was to ensure that all of the proposals were realistic, feasible, and legally viable considering the constraints of the legislation establishing the refuge and the agency policies and guidance. The physical and biological condition of the refuge, along with the issues and concerns of the community, was assessed by the planning team and considered during the development of goals for the refuge. The objectives and strategies were then formulated for each of the alternatives. While the goals remain constant, the objectives and strategies for reaching refuge goals may vary depending on the alternative.

Clean-up of contaminated areas would proceed under all alternatives. Each alternative was developed with the assumption that the clean-up would be accomplished and the proposed strategies would be implemented without threats to human health or the resources being managed.

GENERAL DESCRIPTION OF THE ALTERNATIVES

The alternatives were guided by different approaches to habitat management, public use, and the levels of funding and staffing in support of basic refuge operations.

ALTERNATIVE A (CURRENT MANAGEMENT OR NO-ACTION)

The current management alternative provides for a continuation of the existing level of management. Staffing would remain at the current levels and ongoing programs and activities would continue with only minor changes and no new programs.

ALTERNATIVE B (RESOURCE EMPHASIS)

This alternative focuses on wildlife and habitat management but maintains the existing visitor programs and public uses. Habitat management and monitoring would be expanded and agreements with research, governmental, and non-governmental organizations would be developed to provide information needed for the management of forests, grasslands, coastal wetlands, beaches, and listed species and their habitats. In partnership with others, programs would be developed for management of nesting sea turtle populations on Vieques beaches.

ALTERNATIVE C (HABITAT AND PUBLIC USE EMPHASIS) - PROPOSED ALTERNATIVE

This alternative directs the refuge toward a realistic and achievable level of both habitat and public use management and addresses the needs of the resources and, where appropriate and compatible with the refuge purposes, the needs of the community. This alternative provides for increases in management efforts to restore the refuge habitats without diminishing the wildlife values associated with the current conditions. There is also a focus on management activities to benefit threatened and endangered species. This includes the possible reintroduction of extirpated species from the refuge and expansion of populations of species already found on the refuge. Priority public uses (as identified in the National Wildlife Refuge System Improvement Act) would be expanded and other uses that are determined to be compatible with the refuge mission would be permitted. Historic and archaeological resources would be stabilized and, where possible, interpretation of their significance and role in the evolution of the refuge would be provided.

PROPOSED ALTERNATIVE

The planning team proposed Alternative C for managing Vieques National Wildlife Refuge over the next 15 years. After public review of the draft comprehensive conservation plan and environmental impact statement, the planning team will address comments and incorporate changes as necessary.

Implementing the proposed alternative will result in an enhanced habitat management program and increased public use opportunities.

An overriding concern reflected in this plan is that wildlife conservation is the first priority in refuge management. The Service allows public uses if they are compatible and appropriate with wildlife and habitat conservation. The refuge would emphasize wildlife-dependent public uses (e.g., hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation).

COMPATIBILITY DETERMINATIONS

Federal law and Service policy provide the direction and planning framework to protect the Refuge System from incompatible or harmful human activities, and to ensure that Americans can enjoy Refuge System lands and waters. The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), is the key legislation regarding management of public uses and compatibility. The compatibility requirements of the Refuge Improvement Act were adopted in the Service's Final Compatibility

Regulations and Final Compatibility Policy published October 18, 2000 (Federal Register, Vol. 65, No. 202, pp 62458-62496). This Compatibility Rule changed or modified Service regulations contained in Chapter 50, Parts 25, 26, and 29 of the Code of Federal Regulations (USFWS 2000c). To view the policy and regulations online, go to http://policy.fws.gov/library/00fr62483.pdf.

The National Wildlife Refuge System Improvement Act of 1997 and Service regulations require that an affirmative finding be made of an activity's "compatibility" before such activity or use is allowed on a national wildlife refuge. A compatible use is one, "…that will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge." Six priority wildlife-dependent uses that are to be considered include: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. These priority wildlife-dependent uses may be authorized on a refuge when they are compatible (as defined above) and not inconsistent with public safety. Not all uses that are determined compatible may be allowed. The refuge has the discretion to allow or disallow any use based on other considerations, such as public safety, policy, and available funding. However, all uses that are allowed must be determined compatible. Except for consideration of consistency with State laws and regulations, as provided for in subsection (m) of the Improvement Act, no other determinations or findings are required to be made by the refuge official under the Improvement Act or the Refuge Recreation Act for wildlife-dependent recreation to occur (Refuge Improvement Act).

Compatibility determinations for the priority public uses and other activities identified in Alternative C (proposed alternative) are included in Appendix IX. Any additional activities identified in revisions to this Draft CCP/EIS would also require compatibility determinations. The uses included in the proposed alternative have been found to be compatible with both the mission of the Refuge System and the purposes for which the refuge was established. The compatibility determinations for these activities are being issued as part of this Draft CCP/EIS.

MANAGEMENT HIGHLIGHTS COMMON TO ALL ALTERNATIVES

This section only includes those strategies that are the same or essentially the same under all alternatives. These are strategies that may have received prior approval and funding; are in accord with previous agreements; were identified as important issues during scoping, need quick resolution, and would not result in significant environmental impacts; or would accomplish the purposes of the refuge and are appropriate for all alternatives.

Emergency Access. The need for access to boats secured in Puerto Ferro during periods of hurricane watches and warnings was identified during the public scoping process. To accommodate this need and help provide security for boaters and their vessels during times of weather-related emergencies, the refuge would develop a formal procedure for permitting limited access through the refuge when hurricane watches or warnings have been issued by the National Weather Service.

Upgrade Entrance to the Eastern Refuge Lands. The entrance to the eastern refuge lands would be upgraded to provide an aesthetically pleasing access to the refuge. The former use of the lands for military training required a level of security beyond that necessary for administration of a national wildlife refuge. While some level of security is necessary to prevent animal trespass and unauthorized uses of refuge resources, the entrance should provide an attractive and welcoming appearance to visitors. To achieve this, the entrance road and gate would be redesigned to meet Fish and Wildlife Service standards.

Fence Removal. Boundary fences separating the eastern refuge lands from private and municipal lands would be removed and reconstructed with materials appropriate for a refuge boundary.

Upgrade Road to Playa Caracas and Playa de la Chiva. This project is associated with the previously mentioned entrance upgrade. The existing roadway to the heavily utilized beach areas at Playa Caracas and Playa de la Chiva is rough and dusty. This project would improve drainage, facilitate future maintenance of the roadway, and reduce the amount of dust generated by vehicle use.

Navy Clean-Up Activities. One of the significant issues brought out during the public scoping for the plan was the clean-up of contaminants and unexploded ordnance remaining from former military activities. The Service is committed to working with the Environmental Protection Agency, Environmental Quality Board, and the Navy to maximize clean-up of refuge lands in accordance with the provisions of the Federal Facilities Agreement between the agencies. The goal of the Service is to seek to ensure the refuge is cleaned of contaminants that pose a threat to the health and safety of the wildlife, as well as residents, staff, and visitors to Vieques. To accomplish this goal the Service would:

- Participate with Navy, Environmental Quality Board, Environmental Protection Agency, and community representatives during the development of documents and clean-up plans for all former Navy lands.
- Coordinate development of refuge management plans to ensure that clean-up addresses needs of the resources and visitors to the refuge.
- Facilitate access by Navy and its contractors to the sites under investigation or being cleaned.
- Make unused facilities available for Navy and contract personnel during the clean-up process.
- Review plans and proposed actions to ensure consideration of human health and environmental concerns.
- Provide a full-time staff member to review documents and work with the environmental restoration associated with former military activities.

Fire Management. The refuge would continue to maintain cooperative agreements with the appropriate state and local fire suppression agencies to support basic wildfire suppression operations on the refuge. Fire suppression capabilities necessary to complement state and local fire suppression forces to contain and suppress wildfires within the refuge would be developed and maintained by the refuge. Prescribed burning and limited mechanical clearing within those areas that are justified by the need to reduce fuel accumulations or address fire management concerns under the Wildlands Urban Interface Program would be implemented, and the use of prescribed fire and wildfire prevention and control measures would be considered as needed for habitat management and protection of refuge resources and adjacent communities.

Research and Educational Access. Access for basic research and educational activities related to the habitats and resources located within the refuge would be facilitated and encouraged.

Informational and Directional Signing. Under all alternatives, the refuge would develop and install improved directional and informational signing to facilitate public utilization and access to the opened areas.

Wilderness Management. In accordance with the legislation transferring administration of the Vieques lands to the Department of the Interior, the area formerly identified as the Live Impact Area would be managed the same as a “Wilderness Area,” with no public access permitted.

Land Exchange “Parcel C.” The Service would continue to seek agreement with the municipality of Vieques and/or the commonwealth for the exchange of “Parcel C” for another area or areas of equal value that are suitable for resource management purposes. “Parcel C” on the northwest portion of the eastern refuge unit (near the current municipality landfill) was transferred to the Fish and Wildlife

Service as a separate parcel. Although the remainder of the lands transferred to the Service cannot be exchanged or disposed of without congressional approval, "Parcel C" does not fall under that restriction.

Historic and Archaeological Sites. Agreements would be sought with commonwealth agencies or non-governmental organizations for the stabilization, restoration, and/or protection of historic and archaeological resources on the refuge.

Building Demolition and Removal. Deteriorated and unused buildings formerly used by the Navy would be demolished and removed. Some facilities would be utilized by the Navy and clean-up contractors during the clean-up process.

Septic System Rehabilitation. The septic system at Camp Garcia would be rehabilitated and reactivated to serve the needs of clean-up personnel, refuge staff, and the public.

RELATIONSHIP OF ISSUES TO GOALS, OBJECTIVES, AND STRATEGIES

The refuge goals were developed to give general direction to the management focus of the refuge. The issues identified during the scoping process have been separated to fit within one of these broad goals. During the development of the alternatives, the planning team attempted to ensure that each issue identified during the scoping phase was considered and, where appropriate, objectives and strategies were developed to help address the issue. Since each of the alternatives has a different focus, not all issues are addressed in each alternative.

ALTERNATIVE A (NO-ACTION – CURRENT MANAGEMENT)

MANAGEMENT FOCUS

In addition to the strategies that are constant for all of the alternatives, this alternative would provide for a continuation of many activities that have already been initiated and funded. The refuge would essentially maintain the current level and focus of management. This alternative establishes a baseline for comparing and contrasting other alternatives. Under Alternative A, the refuge would continue to provide limited habitat and species management, monitor wildlife populations, and maintain existing public access and opportunities for recreational activities. Former Navy facilities not necessary for the refuge or clean-up activities would be removed. The access roads to Playa la Chiva and Playa Caracas would be maintained to provide for public and management access. The refuge headquarters would remain in rental facilities and staffing would not change. Historic and archaeological sites would receive minimal stabilization and protection from natural and human disturbance, however, the Service would continue to seek agreements with commonwealth agencies or non-governmental organizations to stabilize, restore, and/or protect important sites and structures.

The specific strategies associated with this alternative are discussed below under each of the refuge goals.

GOAL 1: **(HABITAT)** Conserve, enhance, and restore native plant communities and wetland habitats and their associated fish, wildlife, and plants, representative of the native biological diversity that would have been found on Vieques Refuge lands prior to major agricultural and military use of the lands.

Discussion: Under the no action or current management alternative, habitat activities are limited by resources, restrictions on access to areas requiring clean-up, and priority public use needs. Efforts to establish baseline information would continue. Monitoring programs and plans would be developed for the highest priority habitat restoration projects, while maintaining current levels of public use activities.

Issue: Restore Lagoon Hydrology

Objective: Conduct annual evaluations and manage lagoon openings to improve habitat and wildlife utilization.

Strategies:

- Evaluate habitat conditions within the lagoons to determine if changes in hydrology would be necessary or beneficial to the system and, if appropriate, open at least one lagoon each year to permit tidal flushing.

- Facilitate the restoration of lagoon hydrology by consulting with and obtaining any necessary permits from the Corps of Engineers or commonwealth agencies for removal of blockages from the lagoon openings to the sea.

Issue: Restoration of Forest Habitats

Objective: Within two years of plan approval, develop a specific plan for the long-term management of the mangrove forest/lagoon systems on the refuge.

Stragegy:

- Continue to document and monitor the conditions and extent of the mangroves and lagoon systems, but not increase efforts to plant or expand either the mangroves or upland forest habitats.

Issue: Fire Management

Objective: Complete a fire management plan by 2007, to define when, where, and how fire would be controlled and managed for habitat benefits and community safety.

Stragegy:

- Develop first phase of fire management plan by identifying and mapping the location of firebreaks to be established and maintained to protect adjacent communities. This would be accomplished by 2006, and incorporated into the plan along with identification of any needed fire suppression equipment and supplies to implement the fire control program. Fire equipment and supplies would be identified in budget request by 2007.

Issue: Feral Animal Control

Objective: Within three years of plan approval, initiate a program to control feral animal population to prevent damage to native species and their habitats, and eliminate conflicts with management programs and authorized public uses.

Strategy:

- Require owners (when they can be identified) of horses, cattle, dogs, and cats to remove their animals from the refuge. This procedure would continue with no additional efforts to identify control mechanisms for domestic animals.

Issue: Research Cooperation

Objective: Provide opportunities for wildlife research to address refuge resource and management needs.

Strategy:

- Continue to permit and, as appropriate, provide support for relevant wildlife- and management-oriented research activities as requested from the academic community.

GOAL 2: Monitor, protect, and recover special status animals, plants, and species of management interest.

Discussion: The management program for selected species of interest is currently focused on monitoring, reducing potential threats, and conducting limited habitat manipulation. Volunteers and cooperators are essential to the continuation of the ongoing sea turtle monitoring and tagging program. Vegetation surveys of areas that are currently accessible have been funded and would be completed to provide baseline information for those areas.

Issue: Threatened and Endangered Species Management

Objective: Monitor, protect, and enhance federally listed plant and animal species and their essential habitats within the refuge.

Strategies:

- Continue to monitor sea turtle nesting activities in cooperation with the Puerto Rico Department of Natural and Environmental Resources, non-governmental organizations, universities, local schools, and the community. This program includes a saturation tagging program on Matias Beach (Yellow). As part of the sea turtle program to protect habitat and nests from natural and human induced activities, such as predation and poaching, public use would be limited. Refuge staff would also focus on enhancement of coastal vegetation to provide suitable habitat and development of an improved education/outreach program. This would inform the public of the reasons and needs to ensure protection of these species.

- Continue to conduct surveys for threatened and endangered plants on the refuge and incorporate results into any management or development plans.

- Conduct routine refuge patrols to identify the presence of roseate terns and their use of habitats on or near the refuge. If nesting sites are identified on the refuge, measures would be implemented to ensure that potential human disturbance to the colonies would be avoided.

- Conduct surveys to determine presence of the Virgin Islands tree boa on the refuge. Surveys would be conducted by refuge staff or researchers.

- Continue to assist other organizations with studies of manatee movement patterns in eastern Puerto Rico and in response to marine mammal stranding events on the refuge.

Objective: Within one year of plan approval, complete an inventory of all vascular and non-vascular plants with a specific emphasis on federal and commonwealth listed species.

Strategy:

- Conduct surveys of all accessible refuge lands (where there is no threat from unexploded ordnance or contamination) and develop a catalog of all species found. Surveys would be conducted by refuge staff or cooperators.

Issue: Wading Bird, Waterfowl, and Shorebird Management

Objective: Evaluate and manage wading birds, waterfowl, and shorebirds to ensure the stability of their populations and to maintain the health of these populations and meet their habitat requirements.

Strategy:

- Conduct preliminary surveys in order to obtain baseline data on wading birds and waterfowl found within the wetland areas of the refuge. Surveys would be conducted by refuge staff or cooperators seasonally to determine the importance of the habitat as a stopover during migration. Surveys would also be conducted to obtain approximate numbers of migratory shorebirds using the shallow flats and lagoon areas of the refuge as part of their winter migratory routes.

Issue: Sea Bird Management

Objective: Evaluate and manage sea birds to ensure the stability of their populations, to maintain the health of the populations, and to meet their habitat requirements.

Strategy:

- Conduct surveys to evaluate potential nesting sites for sea birds on the refuge, but no other potential management studies or activities would be implemented.

Issue: Other Birds

Objective: Within one year of plan approval, develop a formal plan for conducting surveys and a banding program for resident and migratory birds.

Strategy:

- Continue the 3-day winter and 3-day summer mist netting and banding program initiated on western Vieques when the refuge was established. Surveys would be conducted by refuge staff or cooperators.

Objective: Within two years of plan approval, establish survey routes within subtropical moist and dry forests to track population trends of key species (e.g., white-crowned pigeon and Adelaide's warbler) in these habitats.

Strategy:

- Continue to coordinate with the Department of Natural and Environmental Resources to conduct surveys for the white-crowned pigeon.

Issue: Fishery Management

Objective: By 2008, in conjunction with the Department of Natural and Environmental Resources, develop a fishery resource plan to aid in establishing management programs and fishing regulations for refuge lagoon systems.

Strategy:

- Continue to provide information to the public and enforce commonwealth fishing regulations.

GOAL 3: Provide opportunities for wildlife-dependent recreation and education to enhance public appreciation, understanding, and enjoyment of refuge wildlife, habitats, and cultural history.

Discussion: Public use on the eastern and western refuge lands currently occurs primarily at Playa Arenas (Green Beach), de la Chiva (Blue Beach), and Caracas (Red Beach). The available facilities to accommodate the public use activities include unpaved roadways, beach shelters, and a boardwalk trail at Kiani Lagoon.

Strategies:

- Maintain facilites within existing resources. Other than the improvements indicated above under the section entitled "Management Highlights Common to All Alternatives," no new projects would be developed.

- Continue to give priority to wildlife-dependent recreational activities, as identified in the Refuge System Improvement Act of 1997. These activities include: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Issue: Recreational Beach Activities

Objective: Within five years of plan approval, develop an agreement with an appropriate entity to manage compatible recreational activities at high public use beaches on the refuge.

Strategy:

- Continue to monitor and maintain the existing recreation facilities at Playas Arenas (Green Beach), de la Chiva (Blue Beach), and Caracas (Red Beach). Development of opportunities for use of additional areas or expanded activities would be minimal.

Issue: Public Access

Objective: Where safe and practical, provide public access to refuge sites for wildlife-oriented and compatible non-wildlife-oriented activities to address community needs. General public access has traditionally been permitted to beach areas where it is safe to conduct recreational activities.

Strategy:

- Permit access to open areas from dawn to dush to accommodate a majority of the traditional uses.

Issue: Collection of Sea Grapes and Coconuts

Objective: Within one year of plan approval, establish guidelines and officially open designated portions of the refuge for collection of sea grapes and coconuts for personal consumption. Historic use of the coastal portions of the refuge lands includes the collection of sea grapes and coconuts.

Strategies:

- Ensure protection of the resources by assessing historic uses and potential impacts of removal of sea grapes and coconuts.

- Identify areas that are appropriate for harvest of these resources and any regulations that are necessary to ensure the resources are protected for the future.

- Develop a Federal Register notice to officially open selected areas for harvest and establish any necessary regulations.

Issue: Fishing

Objective: Evaluate need and provide improved access for fishing opportunities at a variety of locations on the refuge.

Strategies:

- Continue to permit fishing, which is a traditional activity along the refuge beaches and in the lagoons, during daylight hours in the open areas of the refuge.

- Maintain the existing boardwalk trail and fishing platform at Laguna Kiani.

- Conduct an experimental special use permit program for night fishing. This program would be used to evaluate the demand, potential impacts, and compatibility of night fishing on the refuge.

- Continue to permit access to sites with historic use as launch ramps for fishing access during open hours.

Issue: Hunting

Objective: Within three years of plan approval, complete an evaluation of potential target species and habitats to determine if a hunting program is feasible. At the present time, no hunting is permitted anywhere on the refuge. Under this alternative, there would be no change in this policy.

Issue: Land Crabbing

Objective: Within two years of plan approval, complete a formal evaluation of the opportunities for land crabbing on both the eastern and western refuge lands. Capture of land crabs is a traditional activity that may be appropriate where it is sustainable and can be conducted without long-term impacts on the crabs or other resources.

Strategies:

- Continue to conduct an experimental land crab trapping program at designated sites on the eastern refuge.

- Cooperate with an ongoing National Oceanic and Atmospheric Administration study of contamination in land crabs to determine advisability of human consumption of crabs from different areas of the refuge.

Issue: Interpretive Programs

Discussion: The refuge currently provides a very limited interpretive program. Under this alternative, the refuge would continue a limited interpretive program.

Objective: Provide and enhance non-personal and personal interpretive media and programs that increase awareness and understanding of the refuge's natural and cultural resources.

Issue: Environmental Education Programs

Objective: Provide and enhance environmental education.

Strategies:

- Develop a multi-faceted, curriculum-based program for use on and off the refuge to enhance public awareness and understanding of the refuge's resources and to inspire action among local, national, and international educational groups on behalf of the refuge and Vieques Island.

- Continue to conduct limited environmental education programs for Vieques school groups and other educational institutions of Puerto Rico.

Issue: Camping

Discussion: Camping has historically been a recreational activity on Vieques beaches, especially during the Easter season. Under the current management program, no camping is permitted.

Objective: Determine, within two years of plan approval, if and when camping could be permitted on the refuge.

Issue: Commercial Activities

Discussion: Commercial activities, such as rental of kayaks, beach umbrellas, sales of food or drinks, and providing guide services, have been proposed as potential benefits to visitors and as an economic benefit to the local community. No commercial or concession activities would be authorized under this alternative.

Objective: Within five years of plan approval, complete necessary evaluations to identify and implement appropriate and compatible commercial or concession activities.

Issue: Interpretation and Conservation of Historical and Archaeological Sites

Discussion: Historic and archaeological sites on the refuge receive only the minimum level of maintenance and management. Access to the sites is limited and interpretation has not been provided. Several sites on the refuge are significant to the understanding of local and regional historic and prehistoric cultures. Under the current management program, existing levels of access would be maintained and interpretation would continue to be very limited.

Objective: Within four years of plan approval, provide interpretive signing and information related to the accessible historical and archaeological sites on refuge lands.

Issue: Law Enforcement

Objective: Within two years of plan approval, develop an effective cooperative law enforcement program with commonwealth agencies to address illegal activities on refuge lands.

Strategy:

- Continue the current refuge law enforcement program to ensure staff are trained, equipped, and scheduled to provide adequate security for visitors and refuge personnel. Cooperation with commonwealth law enforcement agencies would be facilitated to provide additional enforcement presence on refuge lands.

GOAL 4: Through cooperative efforts with partners, ensure that the refuge is cleaned of all classes of contaminants that could pose a threat to the health and safety of wildlife, residents, staff, and visitors.

Discussion: Effective natural resource management, wildlife-dependent recreational uses, and other potential uses of the refuge cannot be realized without a comprehensive clean-up of unexploded ordnance and other contaminants that remain from prior uses of the lands. Current efforts under the provisions of CERCLA and RCRA are being carried out to address the contaminants issues on the areas currently being managed as the refuge. Clean-up activities would likely continue beyond the timeframe of this comprehensive conservation plan.

Issue: Wildlife and Human Exposure to Contaminants and Explosives

Objective: Throughout the clean-up process, ensure that the threats and impacts from contaminants, unexploded ordnance, munitions and explosives of concern, or explosive constituents to nearby communities, visitors, wildlife, and employees are removed to the greatest degree possible. Assure that clean-up standards protective of wildlife, plants, and habitats are met.

Strategies:

- Participate with the Navy, Environmental Protection Agency, Environmental Quality Board, Department of Natural and Environmental Resources, and community representatives during the development of documents and clean-up plans for all former Navy lands.

- Coordinate the development of refuge management plans with the above agencies to ensure that clean-up addresses the needs of the resources and visitors to the refuge.

Objective: Ensure that refuge resources are adequately protected during the clean-up process.

Strategy:

- Ensure a clear role in the clean-up process by participating in the development and implementation of the Federal Facilities Agreement that identifies roles and guides the agencies during the clean-up.

GOAL 5: Provide the resources needed to implement the selected management alternative.

Discussion: Effective management of wildlife, habitat, and public uses, as well as conducting other resource management activities, requires personnel, equipment, and facilities. The current level of staffing, the existing office and maintenance area, and ongoing programs would be maintained under this alternative. In accordance with the legislation transferring administration of the Vieques lands to the Department of the Interior, the area formerly identified as the Live Impact Area would be managed similar to a “Wilderness Area,” with no public access permitted.

Issue: Equipment Needs

Objective: Annually evaluate needs and submit funding requests to acquire and maintain equipment necessary to perform identified management activities.

Strategy:

- Develop and maintain Refuge Operation Needs System (RONS) and Service Asset Maintenance Management System (SAMMS) project lists and equipment needs. These programs provide the mechanism to identify needs and request the funding for essential facilities, services, equipment, and management activities.

Issue: Facility Needs

Objective: Within three years of plan approval, formalize plans and funding proposals for visitor contact facilities, interpretive displays, and office space to accommodate visitor and staffing needs.

Strategies:

- Maintain the existing office and visitor contact space at the current rental location in Isabel Segunda.

- Maintain the informational kiosk adjacent to the Kiani Lagoon boardwalk trail.

Objective: Within two years of plan approval, develop plans and funding proposals for maintenance facilities to support the selected alternative.

Strategy:

- Maintain the existing maintenance facilities at the rental space in Isabel Segunda with additional maintenance activities taking place at the limited facilities currently being utilized at the Camp Garcia site.

Objective: Provide meeting and laboratory space for researchers conducting biological, archaeological, or historical investigation to benefit refuge management activities.

Strategy:

- Continue to utilize current office/maintenance rental space in Isabel Segunda for researchers conducting biological, archaeological, or historical investigations whenever the facilities are available and their use is appropriate.

Objective: Within three years of plan approval, develop hiking trails to provide access to selected sites for wildlife-dependent public uses.

Strategy:

- Continue to maintain access to roads and trails currently open for wildlife-dependent and other compatible public use activities.

Objective: Provide adequate parking for refuge visitors while minimizing impacts on the natural resources.

Strategy:

- Continue to maintain existing levels of parking at Playa Caracas, Playa La Chiva, and Punta Arenas. No expansion or redesign of the parking sites are proposed under this alternative.

Issue: Real Property Management

Discussion: As noted in other sections of this plan, the only land that the Service has authority to dispose of is the 98-acre parcel referred to as "Parcel C." Regulations require that the Service receive lands of comparable value for any lands transferred out of the Refuge System.

Objective: Within two years of plan approval, evaluate potential alternatives for land disposal and acquisition.

Strategy:

- Continue coordination efforts with the commonwealth and municipality to develop a plan for the exchange of "Parcel C" to meet community needs and comply with Service requirements.

Issue: Staffing Needs

Discussion: This alternative would maintain the current level of staffing (eleven full-time employees) to conduct ongoing programs and activities (Figure 17).

Objective: Within two years of plan approval, provide both permanent and temporary staff needed to accomplish the strategies identified under the selected alternative.

Issue: Use of Volunteers

Objective: The use of volunteers facilitates the accomplishment of many refuge programs and permits refuge staff to focus on the highest priority activities. Within one year of plan approval, develop a formal refuge policy to incorporate volunteers as a routine component of the refuge management program.

Strategy:

- Continue to seek assistance from and accept and work with volunteers to accomplish refuge objectives and strategies identified in this alternative.

GOAL 6: Develop effective and open means of communication with Vieques citizens, interested groups, and organizations to raise public awareness of refuge programs, management decisions, and the mission of the Fish and Wildlife Service and the National Wildlife Refuge System.

Discussion: An effective outreach program is essential to maintain communication with the community and ensure that factual information about the Service, refuge plans, and management programs is available.

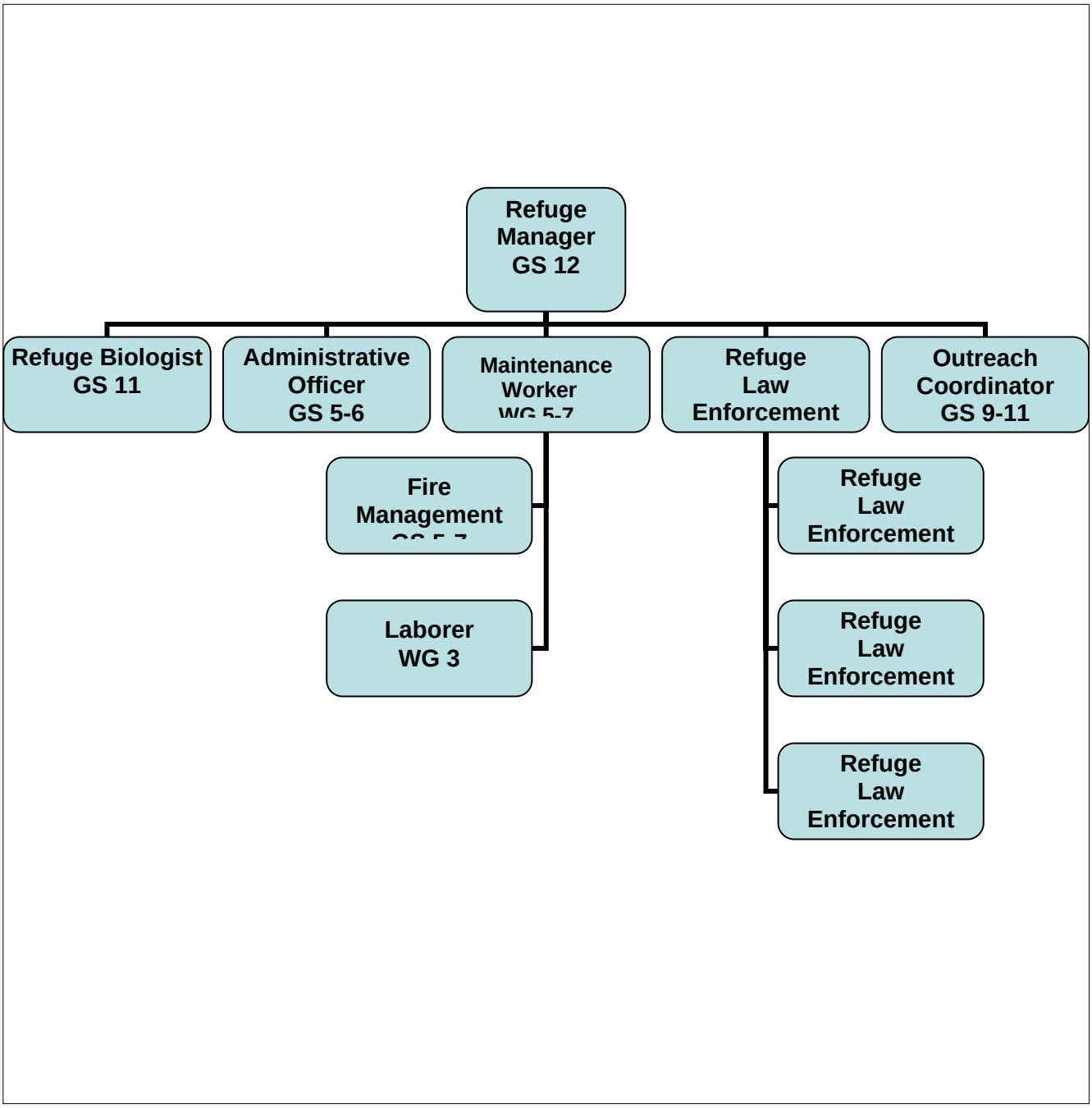
Issue: External Communications

Objective: Within two years of plan approval, develop and implement a formal outreach plan to ensure community awareness of refuge programs and activities.

Strategy:

- Continue with ongoing communication techniques through news releases, flyers, and meetings with organized groups and individuals.

Figure 17. Organization of personnel under Alternative A



ALTERNATIVE B (RESOURCE EMPHASIS)

MANAGEMENT FOCUS

In addition to the strategies that are constant for each of the alternatives and those that are presented in Alternative A, this alternative would provide for an increase in the programs, activities, and projects oriented toward resource management. The refuge would develop additional programs and strategies with a primary focus on natural resource management and compatible wildlife-dependent public uses. A refuge headquarters, visitor contact station, and maintenance facility would be planned and developed in the vicinity of Camp Garcia. Additional public use facilities for some wildlife-dependent activities would be developed. Historical and archaeological sites would receive minimal stabilization and protection from natural and human disturbance, however, the Service would continue to seek agreements with commonwealth agencies or non-governmental organizations to stabilize, restore, and/or protect important sites and structures.

The specific strategies associated with this alternative are discussed below under each of the refuge goals.

GOAL 1: Conserve, enhance, and restore native plant communities and wetland habitats and their associated fish, wildlife, and plants, representative of the native biological diversity that would have been found on Vieques Refuge lands prior to major agricultural and military use of the lands.

Discussion: Under the wildlife emphasis alternative, habitat management activities would take precedence over other activities, and intensive efforts would be initiated to manage, restore, and improve the habitats and wildlife utilization of refuge lands. Increases in resources would be directed toward the new and expanded wildlife management programs. Compatible wildlife-dependent public uses would be encouraged and programs and facilities to support these uses would be developed.

Issue: Restore Lagoon Hydrology

Objective: Conduct annual evaluations and manage lagoon openings to improve habitat and wildlife utilization.

Strategies:

- Provide an intensive wildlife management program that would involve the development of a monitoring program to assess current conditions and the effects of opening lagoons on the associated habitats. Information from the monitoring program would be used to identify the highest priority lagoon system for management and restoration.

- Conduct hydrologic studies to assess whether or not restoration actions are necessary to maximize the productivity of Kiani Lagoon. Since primary jurisdiction over tidal waters is normally with the commonwealth, all proposed actions involving the opening of lagoons or other habitat restoration activities in or adjacent to commonwealth waters would be closely coordinated with the Department of Natural and Environmental Resources.

- Obtain any appropriate permits and open two to four lagoons each year to permit tidal flushing, after evaluation and determination that opening of the lagoons is appropriate and beneficial to the refuge. Follow-up would be conducted at these sites to maintain openings and monitor habitat and species utilization changes. Specific projects that have been identified to aid in restoring lagoon hydrology include the following: 1) Remove the rock groin

- at the mouth of Laguna Boca Quebrada. Monitor the area to determine if additional work is needed; 2) Construct connections to provide circulation between Laguna Arenas and Laguna El Pobre with Laguna Kiani to mitigate the impacts of the existing dirt road; 3) Remove rock groins at the entrance channel to reduce coastal erosion at Playa Grande; 4) Evaluate the potential for re-establishing hydrology between the Puerto Ferro and Puerto Mosquito by replacement of a portion of the existing dirt road with a bridged section to allow water flow between the two areas; 5) Restore drainages from the Camp Garcia airstrip to Laguna Bahia de Corcho; 6) Remove excess sediments in upper areas of Bahia Tapon and eliminate trash heaps and excess trails to improve hydrology in the western area; 7) Remove rock armor and rip rap from the area south of the entrance of Laguna Bahia Chiva; 8) Restore hydrology in Laguna Puerto Diablo by placing a culvert or bridge across the historical opening, which is currently blocked by a road; 9) Restore hydrological connection to Laguna Anones to the sea at Bahia Salinas del Sur; 10) Restore hydrological connection to Laguna Icacos; and 11) Restore hydrology to Laguna Gato.

- Review and adapt management practices after five years of monitoring to ensure that benefits to the habitats are maximized.

Issue: Restoration of Forest Habitats

Objective: Within two years of plan approval, develop a specific plan for the long-term management of the mangrove forest/lagoon systems on the refuge.

Strategies:

- Review existing studies and recommendations for mangrove forest restoration.

- Determine baseline conditions and restoration goals by consulting with the Department of Natural and Environmental Resources and knowledgeable local citizens;

- Evaluate aerial photographs and maps to determine the historical status of the mangrove areas.

- Remove trash, scrap metal, concrete debris, and other items that have been deposited in various mangrove wetlands. Cleaned areas would be restored to surrounding elevations, when necessary, in order to allow the mangrove wetlands to adequately recolonize. The mangrove fringe at Bahia Playa Blanca has been identified as one of the sites in need of evaluation for potential restoration.

Objective: Within two years of plan approval, survey existing forested habitat to establish baseline information and identify sites to be managed for increased species diversity and habitat use by native species.

Strategies:

- Establish management planning units for the development of the forest management component of the habitat management step-down plan scheduled for completion in 2007.
- Designate at least 5 experimental restoration plots within the management units.
- Monitor long-term success of experimental plots and application of adaptive management techniques.
- Establish inventory/monitoring plots (e.g., Smithsonian long-term plots).
- Incorporate information from vegetation and bird surveys and the monitoring plots into plan revisions.

Issue: Fire Management

Objective: Complete the fire management plan by 2007 (currently in draft) to define when, where, and how fire would be controlled and managed for habitat benefits and community safety.

Strategies:

- Identify and map firebreak locations to protect adjacent communities, consulting with the Department of Natural and Environmental Resources, fire department personnel, and the Environmental Quality Board regarding the potential use of prescribed fire to reduce wildfire hazards and to manage habitat.
- Acquire by 2007, fire suppression equipment and supplies as identified in the fire management plan.

Issue: Grasslands Management

Objective: Maintain grassland habitats annually through an active management program to minimize invasion by woody species.

Strategy:

- Identify areas for cutting, haying, burning, and selective clearning as part of the habitat management plan to be completed by 2007

Issue: Invasive/Exotic Plants

Objective: Within three years of plan approval, initiate a plan to control invasive and exotic species while restoring native species on a minimum of 25 acres annually. Invasive/exotic plants are one of the major factors affecting the native species and habitats of the refuge.

Strategies:

- Monitor, biannually, to detect new populations of exotic or invasive species.
- Evaluate the effectiveness of management techniques, such as prescribed burning, herbicide treatments, and selective and mechanical removal of mesquite and acacia.
- Reintroduce native species where removal has been conducted.
- Develop a public education program to reduce the potential for additional introductions.

Issue: Feral Animal Control

Objective: Feral animals are affecting both the habitats and the species found on the Vieques Refuge. Within three years of plan approval, initiate a program to control the feral animal population to prevent damage to native species and their habitats, and to eliminate conflicts with management programs and authorized public uses.

Strategies:

- Reduce the impacts of these animals by having owners (when identified) of horses, cattle, dogs, and cats remove their animals from the refuge.
- Initiate an active program of trapping and removal of unclaimed feral horses, cattle, dogs, and cats.
- Initiate surveys of mongoose and iguanas to determine their population levels and impacts on habitats and native species. Where feasible, control measures would be initiated to limit the expansion and impacts of these species.

Issue: Research Cooperation

Objective: Agressively seek partnerships with universities and other research entities to develop proposals and conduct research needed to establish baseline data in order to develop effective wildlife management.

Strategy:

- Provide opportunities for wildlife research on the refuge to address resource and management needs, as part of a program to utilize the best science available.

GOAL 2: Monitor, protect, and recover special status animals, plants, and species of management interest.

Discussion: The management program for selected species of interest under the resource management alternative would be focused on monitoring, reducing potential threats, and conducting substantial habitat restoration activities. In addition to the activities identified in the “no action” alternative, major efforts would address threatened and endangered species currently found on the refuge, reintroduction of species formerly identified from Vieques, and management of habitats for

migratory birds. Expanded volunteer and cooperative research programs would be developed to assist with the implementation of intensive monitoring and management activities.

Issue: Threatened and Endangered Species Management

Objective: Monitor, protect, and enhance federally listed plant and animal species and their essential habitats within the refuge. Beaches on the refuge provide important nesting sites for hawksbill, leatherback, and green sea turtles.

Strategies:

- Ensure that refuge beaches are protected and that any changes in the populations or utilization of the beaches are detected.

- Conduct an intensive program to document sea turtle activities to include: the monitoring of all accessible refuge beaches for nesting activities in cooperation with the Department of Natural and Environmental Resources, non-governmental organizations, universities, local schools, and the community; establishing a saturation tagging program at all beaches with "significant" nesting activities to determine the nesting population size; establishing an effective mechanism to protect sea turtle nests from poaching and other human-related disturbances (e.g., vehicles and lights); monitoring nest predation and establishing a predator control program, if needed; enhancing sea turtle nesting habitat through planting of native coastal vegetation; and evaluating the need to close important sea turtle beaches to recreational activities during peak nesting and hatching seasons.

- Conduct routine patrols to determine the level of utilization and the need for management of roseate terns that frequent the refuge.

Objective: Within one year of plan approval, complete an inventory of all vascular and non-vascular plants with a specific emphasis on federal and commonwealth listed species.

Strategies:

- Complete surveys for threatened and endangered plants and evaluate the availability of habitat for these species. Because portions of the refuge are not accessible, this work has not been completed. Completion of these surveys would be the first component of the refuge's threatened and endangered plant management program.

- Collect voucher specimens of all species and obtain GPS locations for all federal or commonwealth listed plant species.

- Initiate a cooperative program with other agencies and community members to collect seeds or vegetative material to establish a propagation program for plants. The propagated plants would be used to augment existing plant communities and establish new populations in accordance with species recovery plans.

Issue: Wading Bird, Waterfowl, and Shorebird Management

Objective: Evaluate and manage wading birds, waterfowl, and shorebirds to ensure the stability of their populations, to maintain the health of the populations, and to meet their habitat requirements. Management for wading birds, waterfowl, and shorebirds is closely associated with the management of lagoons and salt flats.

Strategies:

- Establish a long-term survey and monitoring program to develop baseline data on the species, utilizing the wetlands and salt flats for wintering, roosting, nesting, and feeding within the refuge to determine the relative importance and suitability of existing habitats for these species.

- Conduct the monitoring program in conjunction with the Department of Natural and Environmental Resources and provide information necessary to monitor population trends and develop management programs, if needed.

Issue: Sea Bird Management

Objective: Evaluate and manage sea birds to ensure the stability of their populations, to maintain the health of the populations, and to meet their habitat requirements. There is currently a limited amount of information on the utilization of the refuge by sea birds.

Strategy:

- Conduct surveys as a primary focus of the management program for these species to obtain baseline data and to monitor the populations of sea birds on the coastal areas of the refuge. Through the data obtained, the refuge would have a basis to identify, manage, and protect feeding, mating, roosting, and nesting habitats used by sea birds. This program would ensure that the refuge management activities and human disturbances would not interfere with nesting and other activities of resident and migratory sea bird species.

Objective: Within three years of plan approval, identify cliff habitats utilized for nesting by sea birds.

Strategy:

- Initiate an inventory of cliff habitats that may be used by several species of sea birds, especially on eastern refuge lands, in order to identify nesting habitat.

Issue: Other Birds

Objective: Within one year of plan approval, develop a formal plan for conducting surveys and banding programs for resident and migratory birds.

Strategy:

- Continue the limited banding program utilizing mist nets in the summer and winter. This program would be expanded to obtain data and band upland birds at least four times per year. The expanded program would include sites on both east and west Vieques and would incorporate cooperators (e.g., Department of Natural and Environmental Resources and non-governmental organizations) into the banding program.

Objective: Within two years of plan approval, establish survey routes within subtropical moist and dry forests to track population trends of key species (e.g., white-crowned pigeon and Adelaide's warbler) in these habitats.

Strategy:

- Continue to coordinate surveys of white-crowned pigeons with the Department of Natural and Environmental Resources and expand survey efforts to identify critical nesting and feeding areas for this species. Data gathered from the surveys would be used to develop forest habitat management recommendations for the forest management component of the habitat management step-down plan.

Issue: Amphibians and Reptiles Management

Objective: Conduct surveys to confirm the presence or absence of reported reptiles and amphibians on refuge lands. Aside from the sea turtles, information on other reptiles and amphibians on the refuge is limited.

Strategies:

- Establish transects or study plots to provide both qualitative and quantitative data on the abundance and distribution of amphibians and reptiles.

- Encourage university and high school student participation in the surveys and conservation of these species.

Issue: Mammals Management

Objective: Conduct surveys to determine the population status of bat species on refuge lands. The only native land mammals on Vieques are bats. A few species have been identified and others are expected to occur on the refuge, but have yet to be confirmed.

Strategies:

- Conduct mist netting twice a year to determine the presence and relative abundance of the bat species on the refuge.

- Promote bat research and management studies by university researchers and students.

- Incorporate management recommendations in conjunction with these studies into species and habitat management plans scheduled for development in 2007.

Issue: Fishery Management

Objective: By 2008, in conjunction with the Department of Natural and Environmental Resources, develop a fishery resource plan to aid in establishing management programs and fishing regulations for refuge lagoon systems. Fishery resources are under the primary jurisdiction of the Commonwealth Department of Natural and Environmental Resources.

Strategies:

- Work closely with the commonwealth to provide information to the public and to enforce commonwealth fishing regulations.
- Survey fish species in Kiani and Playa Grande Lagoons and assess the size, abundance, and sustainability of the populations.
- Provide information from these studies to the Department of Natural and Environmental Resources for use in developing commonwealth regulations.

Issue: Invertebrates

Objective: Determine the abundance and composition of terrestrial and aquatic macro invertebrates on refuge lands. Very limited information is available on the invertebrate species located on the refuge.

Strategies:

- Develop a characterization of the macro invertebrate fauna of Laguna Playa Grande and Laguna Kiani, with the assistance of cooperating researchers, to initiate a database from which future studies may be generated.
- Focus additional studies on mangroves, subtropical dry forests, and subtropical moist forest types.
- Investigate terrestrial species with an emphasis on the search for an endemic land snail (*Pseudopineria viequense),* which is referenced in historical records.

GOAL 3: Provide opportunities for wildlife-dependent recreation and education and other compatible uses to enhance public appreciation, understanding, and enjoyment of the refuge's wildlife, habitats, and cultural history.

Discussion: Public use on the western and eastern refuge lands would continue to occur primarily at Playa Arenas (Green Beach), de la Chiva (Blue Beach), and Caracas (Red Beach). As in Alternative A, the currently available facilities, roadways, beach shelters, and boardwalk trail at Kiani Lagoon would be maintained and, in addition, a new Visitor Contact Station would be developed in conjunction with an office maintenance complex in the vicinity of Camp Garcia. Wildlife-dependent recreational activities, as identified in the Refuge System Improvement Act of 1997, would be given priority consideration over other uses. These activities are hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation.

Issue: Recreational Beach Activities

Objective: Within five years of plan approval, manage compatible recreational activities at high public use beaches on the refuge.

Strategies:

- Continue to monitor and maintain the existing recreational activities and facilities at Playas Arenas (Green Beach), La Chiva (Blue Beach), and Caracas (Red Beach).

- Consult with commonwealth agencies (e.g., Department of Natural and Environmental Resources and Compaña de Parques Nacionales) regarding the potential of a cooperative agreement for the management of the high public use beach recreation areas.

- Install composting toilet at high public use beach locations, in cooperation with the appropriate commonwealth agencies.

Issue: Public Access

Objective: Where safe and practical, provide public access to refuge sites for wildlife-dependent and compatible non-wildlife-dependent activities to address community needs. General public access has traditionally been permitted to beach areas where it is safe to conduct recreational activities.

Strategy:

- Permit access to open areas from dawn to dusk to accommodate a majority of the traditional uses.

Issue: Collection of Sea Grapes and Coconuts

Objective: Within one year of plan approval, establish guidelines and officially open designated portions of the refuge for collection of sea grapes and coconuts for personal consumption. Historic use of the coastal portions of the refuge lands includes the collection of sea grapes and coconuts.

Strategies:

- Ensure protection of the resources by assessing historic uses and potential impacts of removal of sea grapes and coconuts.

- Identify areas that are appropriate for harvest of these resources and any regulations that are necessary to ensure the resources are protected for the future.

- Develop a Federal Register notice to officially open selected areas for harvest and establish any necessary regulations.

Issue: Fishing

Objective: Evaluate the need and demand for fishing opportunities at a variety of locations on the refuge. Fishing is a traditional activity along the refuge beaches and in the lagoons.

Strategies:

- Continue to permit fishing during daylight hours in the open areas of the refuge.
- Conduct an experimental special use permit program for night fishing. This program would be used to evaluate the demand, potential impacts, and compatibility of night fishing on the refuge.
- Continue to permit access to sites with historic use as launch ramps for fishing access during open hours.
- Provide fishery information and regulations at fishing access points throughout the refuge.
- Conduct inventories of lagoon fisheries resources to determine potential for use and need for regulation of uses.
- Develop a fishing brochure to provide information and describe regulation and conditions of permits in cooperation with the Department of Natural and Environmental Resources;
- Repair or replace the fishing platform at Laguna Kiani.

Issue: Hunting

Discussion: Hunting for doves, pigeons, and waterfowl is wildlife-dependent recreation that might be appropriate on the refuge if it is compatible with other uses and does not conflict with the purposes of the refuge. Since white-crowned pigeon populations are very low, this species would be excluded from any potential hunting program and hunting would not be permitted in areas where they are known or expected to occur.

Objective: Within three years of plan approval, complete an evaluation of potential target species and habitats to determine if a hunting program is feasible.

Strategies:

- Determine if populations of doves, pigeons, and waterfowl are adequate to be considered for inclusion in a hunting program by cooperating with the Department of Natural and Environmental Resources to conduct population and reproduction surveys of these species.
- Develop a hunting plan by 2010, if a determination is made that a hunting program is sustainable and appropriate.

Issue: Land Crabbing

Discussion: Capture of land crabs is a traditional activity that may be appropriate where it is sustainable and can be conducted without long-term impacts on the crabs or other resources.

Objective: Within two years of plan approval, complete a formal evaluation of the opportunities for land crabbing on both the eastern and western refuge lands.

Strategies:

- Continue to conduct an experimental land crab trapping program at designated sites on the eastern refuge. Utilize information from the experimental program to monitor populations and reproduction of land crabs in order to determine their status and the potential for sustainable harvests. If sustainable, a formal program would be incorporated as part of the public use management plan scheduled for completion in 2008.

- Cooperate with an ongoing National Oceanic and Atmospheric Administration study of contamination in land crabs to determine advisability of human consumption of crabs from different areas of the refuge.

Issue: Interpretive Programs

Objective: Provide and enhance non-personal and personal interpretive media and programs that increase awareness and understanding of the refuge's natural and cultural resources.

Discussion: The refuge currently provides a very limited interpretive program. Under this alternative, the refuge would continue a limited interpretive program.

Issue: Environmental Education Programs

Objective: Provide and enhance environmental education.

Strategies:

- Develop a multi-faceted, curriculum-based program for use on and off the refuge to enhance public awareness and understanding of the refuge's resources and to inspire action among local, national, and international educational groups on behalf of the refuge and Vieques Island.

- Continue to conduct limited environmental education programs for Vieques school groups and other educational institutions of Puerto Rico.

Issue: Camping

Discussion: Camping has historically been a recreational activity on Vieques beaches, especially during the Easter season.

Objective: Within two years of plan approval, determine if and when camping could be permitted on the refuge.

Strategies:

- Consider camping associated with environmental education activities and evaluate potential sites for this activity.

- Issue special use permits, if camping is deemed appropriate in association with organized environmental education activities.

Issue: Commercial Activities

Discussion: Commercial activities, such as rental of kayaks, beach umbrellas, sales of food or drinks, and providing guide services, have been proposed as potential benefits to visitors and as an economic benefit to the local community.

Objective: Within five years of plan approval, complete necessary evaluations to identify and implement appropriate and compatible commercial or concession activities.

Strategy:

- Evaluate the potential for permitting commercial wildlife-dependent tours and activities in compliance with commonwealth and federal requirements. Commercial activities associated with non-wildlife-dependent activities would not be considered.

Issue: Interpretation and Conservation of Historical and Archaeological Sites

Discussion: The refuge would comply with Section 106 of the National Historic Preservation Act and/or any other pertinent historic preservation mandates prior to initiation of any undertaking or habitat management activity. Historical and archaeological sites on the refuge would receive a minimum level of maintenance and management. Several sites on the refuge are significant to the understanding of local and regional historic and prehistoric cultures.

Objective: Within four years of plan approval, provide interpretive signing and information related to the accessible historical and archaeological sites on the refuge lands.

Issue: Law Enforcement

Discussion: To protect the wildlife resources and maintain visitor safety, an effective law enforcement program is an important component of the overall refuge management.

Objective: Within two years of plan approval, develop an effective cooperative law enforcement program with commonwealth agencies to address illegal activities on refuge lands.

Strategies:

- Continue the current refuge law enforcement program to ensure staff are trained, equipped, and scheduled to provide adequate security for visitors and refuge personnel.

- Cooperate with commonwealth law enforcement agencies to provide additional enforcement presence on refuge lands.

GOAL 4: Through cooperative efforts with partners, ensure that the refuge is cleaned of all classes of contaminants that could pose a threat to the health and safety of the wildlife, residents, staff, and visitors.

Discussion: Effective natural resource management, wildlife-dependent recreational uses, and other potential future uses of the refuge cannot be realized without a comprehensive clean-up of unexploded ordnance and other contaminants that remain from prior uses of the lands. Current efforts under the provisions of CERCLA and RCRA are being carried out to address the contaminants issues on the areas currently being managed as the refuge. Clean-up activities would likely continue beyond the timeframe of this agreement.

Issue: Wildlife and Human Exposure to Contaminants and Explosives

Objective: Throughout the clean-up process, ensure that the threats and impacts from contaminants, unexploded ordnance, munitions and explosives of concern, or explosive constituents to nearby communities, visitors, wildlife, and employees are removed to the greatest degree possible. Assure that clean-up standards protective of wildlife, plants, and habitats are met.

Strategies:

- Participate with the Navy, Environmental Protection Agency, Environmental Quality Board, Department of Natural and Environmental Resources, and community representatives during the development of documents and clean-up plans for all former Navy lands.

- Coordinate the development of refuge management plans with the above agencies to ensure that clean-up addresses the needs of the resources and visitors to the refuge.

Objective: Ensure that refuge resources are adequately protected during the clean-up process.

Strategy:

- Ensure a clear role in the clean-up process by participating in the development and implementation of the Federal Facilities Agreement that identifies roles and guides the agencies during the clean-up.

GOAL 5: Provide the resources needed to implement the selected management alternative.

Discussion: Effectively managing wildlife, habitat, and public uses, as well as conducting other resource management activities, requires personnel, equipment, and facilities. The levels of staffing and facilities necessary for each alternative are dependent on the proposed activities and programs. In accordance with the legislation transferring administration of the Vieques lands to the Department of the Interior, the area formerly identified as the Live Impact Area would be managed as a "Wilderness Area" with no public access permitted.

Issue: Equipment Needs

Objective: Annually evaluate needs and submit funding requests to acquire and maintain equipment necessary to perform identified management activities

Strategy:

- Develop and maintain Refuge Operation Needs System (RONS) and Service Asset Maintenance Management System (SAMMS) project lists and equipment needs. These programs provide the mechanism to identify needs and request funding for essential facilities, services, equipment, and management activities.

Issue: Facilities Needs

Objective: Within three years of plan approval, formalize plans and funding proposals for visitor contact facilities, interpretive displays, and office space to accommodate visitor and staff needs.

Strategies:

- Develop new facilities to provide a combined visitor contact station and refuge office in the vicinity of Camp Garcia on eastern Vieques refuge lands.

- Maintain informational kiosk adjacent to the Kiani Lagoon boardwalk on western Vieques.

Objective: Within two years of plan approval, develop plans and funding proposals for maintenance facilities.

Strategy:

- Develop plans for additional maintenance facilities and upgrade and maintain the existing facilities at the Camp Garcia site.

Objective: Provide meeting and laboratory space for researchers conducting biological, archaeological, or historical investigation to benefit refuge management activities.

Strategy:

- Ensure that adequate facilities are available for researchers by evaluating the potential of using existing structures or additional space developed in conjunction with the proposed visitor contact station and office in the vicinity of Camp Garcia.

Objective: Within three years of plan approval, provide hiking trails for access to selected sites for wildlife-dependent public uses.

Strategies:

- Continue to permit access to recreational sites at Playa La Chiva and Playa Caracas. Close other roads in the conservation management areas to vehicular access in order to minimize potential impacts from public uses.

- Designate selected roads and trails within these areas for access by foot and non-motorized conveyance.

Objective: Provide adequate parking for refuge visitors while minimizing impacts on the natural resources.

Discussion: At the present time, parking at the beach recreation areas is not organized and visitors are permitted to use any open space for parking. This results in greater impacts than would occur with an organized system of parking sites.

Strategy:

- Organize and reduce the number of roadways associated with parking at Playas Caracas, La Chiva, and Punta Arenas to minimize the areas impacted, but still maintain the current level of access.

Issue: Real Property Management

Objective: Within two years of plan approval, evaluate potential alternatives for land disposal and acquisition.

Discussion: As noted in other sections of this plan, the only land that the Service has authority to dispose of is the 98-acre parcel referred to as "Parcel C." Regulations require that the Service receive lands of comparable value for any lands transferred out of the Refuge System.

Objective: Within two years of plan approval, evaluate potential alternatives for land disposal and acquisition.

Strategy:

- Continue coordination efforts with the commonwealth and municipality to develop a plan for the exchange of "Parcel C" to meet community needs and comply with Service requirements.

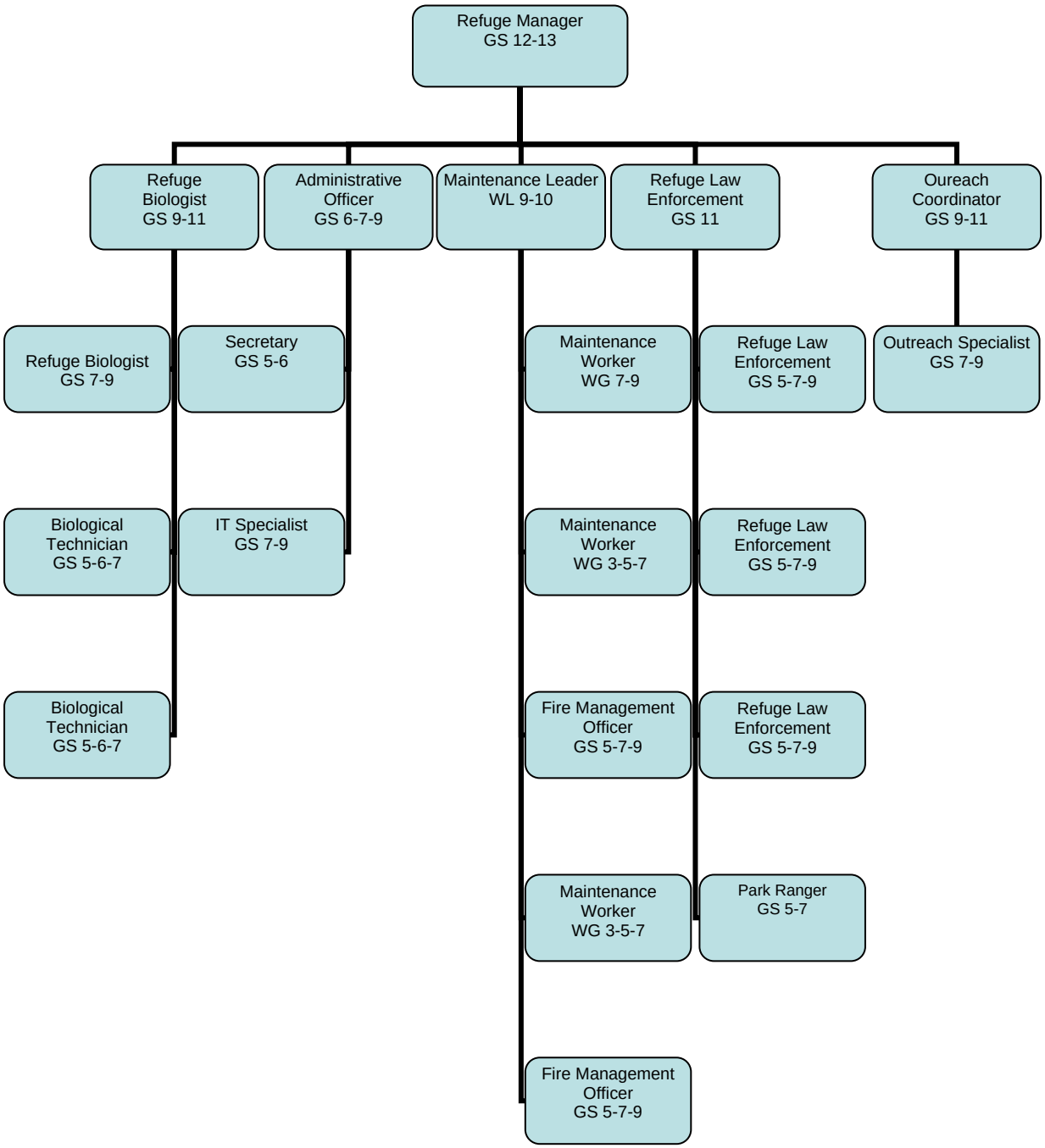
Issue: Staffing Needs

Objective: Within two years of plan approval, provide both permanent and temporary staff needed to accomplish the goals identified under the selected alternative.

Strategy:

- Add twenty-one positions to the refuge to fully implement this plan (Figure 18). These positions include biological, fire management, and support staff needed to focus on wildlife management while maintaining current levels of public use.

Figure 18. Organization of personnel under Alternative B



Issue: Use of Volunteers

Objective: Within one year of plan approval, develop a formal refuge policy to incorporate volunteers as a routine component of the refuge management program.

Strategy:

- Develop a refuge policy and increase outreach to potential volunteers to assist with an expanded biological monitoring program and refuge management activities. Volunteers would be essential to the completion of intensive surveys and monitoring programs and would facilitate the maintenance of public recreational activities that would otherwise be a lower priority.

GOAL 6: Develop effective and open means of communication with Vieques citizens, interested groups, and organizations to raise public awareness of refuge programs, management decisions, and the mission of the Fish and Wildlife Service and the National Wildlife Refuge System.

Issue: External Communications

Objective: Within two years of plan approval, develop and implement a formal outreach plan to ensure community awareness of refuge programs and activities.

Strategy:

- Continue with ongoing communication techniques through news releases, flyers, and meetings with organized groups and individuals.

ALTERNATIVE C *(HABITAT AND PUBLIC USE EMPHASIS)* (PROPOSED ALTERNATIVE)

MANAGEMENT FOCUS

The primary focus of the management program identified in this alternative is to provide a realistic and achievable level of both habitat management and public use. Implementation of this alternative would necessitate increased staff and development of additional facilities on the refuge. In addition to the activities and facilities that are included in Alternative A, this alternative proposes the development of a new office/maintenance/visitor center complex in the vicinity of Camp Garcia, additional trail development on both eastern and western refuge lands, a proactive approach to management and interpretation of historical and archaeological sites, and expansion of the areas opened to public uses. This alternative also provides for increases in management efforts to restore refuge habitats, recover threatened and endangered species, and expand priority public uses. Other uses may be permitted when they are both appropriate and compatible.

Some strategies proposed in this alternative are also included in Alternatives A and B. To facilitate a clearer understanding of the proposed action and to eliminate the need for referencing other sections of this document, a description of the proposed actions is included, even when they are the same as described in the other alternatives.

<u>GOAL 1:</u> (HABITAT) Conserve, enhance, and restore native plant communities and wetland habitats and their associated fish, wildlife, and plants, representative of the native biological diversity that would have been found on Vieques Refuge lands prior to major agricultural and military use of the lands.

Issue: Restore Lagoon Hydrology

Objective: Conduct annual evaluations and manage lagoon openings to improve habitat and wildlife utilization.

Strategies:

- Provide for an intensive wildlife management program that would involve the development of a monitoring program to assess current conditions and the effects of opening lagoons on the associated habitats. Information from the monitoring program would be used to identify the highest priority lagoon system for management and restoration.

- Conduct hydrologic studies to assess whether or not restoration actions are necessary to maximize the productivity of Kiani Lagoon. Since primary jurisdiction over tidal waters is normally with the commonwealth, all proposed actions involving the opening of lagoons or other habitat restoration activities in or adjacent to commonwealth waters would be closely coordinated with the Department of Natural and Environmental Resources.

- Obtain any appropriate permits and open two to four lagoons each year to permit tidal flushing, after evaluation and determination that opening of the lagoons is appropriate and beneficial to the refuge. Follow-up studies would be conducted at these sites to maintain openings and monitor habitat and species utilization changes. Specific projects that have been identified to aid in restoring lagoon hydrology include the following: 1) Remove the rock groin at the mouth of Laguna Boca Quebrada. Monitor the area to determine if additional work is needed; 2) Construct connections to provide circulation between Laguna Arenas and Laguna El Pobre with Laguna Kiani to mitigate the impacts of the existing dirt road; 3) Remove rock groins at the entrance channel to reduce coastal erosion at Playa Grande; 4) Evaluate the potential for re-establishing hydrology between the Puerto Ferro and Puerto Mosquito by replacement of a portion of the existing dirt road with a bridged section to allow water flow between the two areas; 5) Restore drainages from the Camp Garcia airstrip to Laguna Bahia de Corcho 6) Remove excess sediments in upper areas of Bahia Tapon and eliminate trash heaps and excess trails to improve hydrology in the western area; 7) Remove rock armor and rip rap from the area south of the entrance of Laguna Bahia Chiva; 8) Restore hydrology in Laguna Puerto Diablo by placing culvert or bridge across historical opening, which is currently blocked by a road; 9) Restore hydrological connection to Laguna Anones to the sea at Bahia Salinas del Sur; 10) Restore hydrological connection to Laguna Icacos; and 11) Restore hydrology to Laguna Gato.

- Review and adapt management practices after 5 years of monitoring to ensure benefits to the habitats are maximized.

Issue: Restoration of Forest Habitats

Objective: Within two years of plan approval, develop a specific plan for the long-term management of the mangrove forest/lagoon systems on the refuge.

Strategies:

- Consult with the Department of Natural and Environmental Resources and knowledgeable local citizens to determine baseline conditions and restoration goals.

- Evaluate aerial photographs and maps to determine the historical status of the mangrove areas. This strategy is closely related to the restoration of lagoon hydrology and would involve the review of existing studies and recommendations for mangrove forest restoration.

- Remove trash, scrap metal, concrete debris, and other items that have been deposited in various mangrove wetlands. Cleaned areas would be restored to surrounding elevations, when necessary, in order to allow the mangrove wetlands to adequately recolonize. The mangrove fringe at Bahia Playa Blanca has been identified as one of the sites in need of evaluation for potential restoration.

Objective: Within two years of plan approval, survey existing forested habitat to establish baseline information and identify sites to be managed for increased species diversity and habitat use by native species.

Strategy:

- Establish management planning units for the development of the forest management component of the habitat management step-down plan scheduled for completion in 2007. The forest management component will include: 1) designating experimental restoration plots within the management units; 2) monitoring long-term success of experimental plots and application of adaptive management techniques; 3) establishing inventory/monitoring plots (e.g. Smithsonian long-term plots); and 4) incorporatng information from vegetation and bird surveys and the monitoring plots into plan revisions. The numbers of experimental plots and their sizes would be determined by available resources, cooperating research activities, and availability of volunteers to conduct monitoring activities.

Issue: Fire Management

Objective: Complete a fire management plan by 2006 (currently in draft) to define when, where, and how fire would be controlled and managed for habitat benefits and community safety.

Strategies:

- Identify and map firebreak locations to protect adjacent communities, consulting with the Department of Natural and Environmental Resources, fire department personnel, and the Environmental Quality Board regarding the potential use of prescribed fire to reduce wildfire hazards and to manage habitat.

- Acquire by 2007, fire suppression equipment and supplies as identified in the fire management plan, and fully implement the fire management and suppression program.

Issue: Grasslands Management

Objective: Maintain grassland habitats annually through an active management program to minimize invasion by woody species.

Strategy:

- Identify areas to be managed for grassland habitats, as part of the habitat management plan to be prepared by 2007, and maintain areas through an active program of cutting, haying, burning, and selective clearing.

Issue: Invasive/Exotic Plants

Objective: Within three years of plan approval, initiate a plan to control invasive and exotic species while restoring native species on a minimum of 25 acres annually. Invasive/exotic plants are a major factor affecting the native species and habitats of the refuge.

Strategies:

- Monitor, biannually, to detect new populations of exotic or invasive species.
- Evaluate the effectiveness of management techniques, such as prescribed burning, herbicide treatments, and selective and mechanical removal of mesquite and acacia.
- Reintroduce native species where removal has been conducted.
- Develop a public education program to reduce the potential for additional introductions.

Issue: Feral Animal Control

Objective: Feral animals on the refuge are affecting both the habitats and the species found on the Vieques Refuge. Within three years of plan approval, initiate a program to control the feral animal population to prevent damage to native species and their habitats, and to eliminate conflicts with management programs and authorized public uses.

Strategies:

- Reduce the impacts of these animals by having owners (when identified) of horses, cattle, dogs, and cats remove their animals from the refuge.
- Initiate an active program of trapping and removal of unclaimed feral horses, cattle, dogs, and cats.
- Initiate surveys of mongoose and iguanas to determine their population levels and impacts on habitats and native species. Where feasible, control measures would be initiated to limit the expansion and impacts of these species.

Issue: Research Cooperation

Objective: Aggressively seek partnerships with universities and other research entities to develop proposals and conduct research needed to establish baseline data in order to develop effective wildlife management programs.

Strategy:

- Provide opportunities for wildlife research on the refuge to address resource and management needs, as part of a program to utilize the best science available.

GOAL 2: Monitor, protect, and recover special status plants and animals and species of management interest.

Issue: Threatened and Endangered Species Management

Objective: Monitor, protect, and enhance federally listed plant and animal species and their essential habitats within the refuge.

Strategies:

- Ensure that refuge beaches are protected and that any changes in the populations of Hawksbill, Leatherback, and Green Sea Turtles or their utilization of the beaches are detected.

- Conduct an intensive program to document sea turtle activities to include: the monitoring of all accessible refuge beaches for nesting activities in cooperation with the Department of Natural and Environmental Resources, non-governmental organizations, universities, local schools, and the community; establishing a saturation tagging program at all beaches with “significant” nesting activities to determine the nesting population size; establishing an effective mechanism to protect sea turtle nests from poaching and other human-related disturbances (e.g., vehicles and lights); monitoring nest predation and establishing a predator control program, if needed; enhancing sea turtle nesting habitat through planting of native coastal vegetation; and developing an outreach education program focused on sea turtle conservation measures.

- Conduct routine patrols to determine if Roseate Terns are nesting or foraging on the refuge. When found, implement measures to ensure human disturbance to the colonies is avoided.

- Ensure the protection and continued success of the brown pelican nesting colony on Cayo Conejo, which is under the primary jurisdiction of the Department of Natural and Environmental Resources. Assist the Department in the development of management plans, protection of habitat, and monitoring of pelican use on Cayo Conejo.

- Conduct studies to determine if the Virgin Islands tree boa is present on the refuge. Although there have been reports of snakes on Vieques and the refuge lands, the presence of a reproducing population of the boa has not been determined.

- Cooperate with the Department of Natural and Environmental Resources, university personnel, and others conducting research and management studies related to manatee movements and marine mammal stranding events. The cooperative "Management Plan for the Western Vieques Conservation Areas," prepared by the Commonwealth of Puerto Rico, the Puerto Rico Conservation Trust, and the Department of the Interior, identifies the northwest seagrass beds as important habitat for manatees.

Objective: Within one year of plan approval, complete an inventory of all vascular and non-vascular plants with a specific emphasis on federal- and commonwealth-listed species.

Discussion: Surveys for threatened and endangered plants and evaluation of the available habitat for these species have been initiated; however, because portions of the refuge are not accessible, this work has not been completed. Continuation and completion of these surveys would be the first component of the refuge's threatened and endangered plant management program.

Strategies:

- Collect voucher specimens of all species and obtain GPS locations for all federal- or commonwealth-listed plant species as a part of this program.

- Initiate a cooperative program with other agencies and community members to collect seeds or vegetative material to establish a propagation program for plants. The propagated plants would be used to augment existing plant communities and establish new populations in accordance with species recovery plans.

- Work with commonwealth agencies and non-governmental organizations to promote studies and develop recovery actions for federal- or commonwealth-listed plants on refuge lands.

Issue: Wading Bird, Waterfowl, and Shorebird Management

Objective: Evaluate and manage wading birds, waterfowl, and shorebirds to ensure the stability of their populations, to maintain the health of the populations, and to meet their habitat requirements. Management of these species is closely associated with the management of lagoons and salf flats. Survey and monitoring data would be incorporated into habitat, fish, and wildlife population management step-down plans scheduled for completion in 2007.

Strategies:

- Determine the relative importance and suitability of existing habitats for these species by establishing a long-term survey and monitoring program to develop baseline data. Conduct program in conjunction with the Department of Natural and Environmental Resources and provide information necessary to monitor population trends and develop management programs, if needed.

- Utilize information from the surveys to evaluate the feasibility of opening and conducting a yearly waterfowl hunting season within selected areas of the refuge. In addition to the surveys and habitat monitoring of these species, public uses and other resource management activities would be controlled to ensure maintenance of the species and their habitats.

- Coordinate with the commonwealth, ornithological societies, other agencies, and non-governmental organizations to facilitate collection of complete census data.

Issue: Sea Bird Management

Objective: Evaluate and manage sea birds to ensure the stability of their populations, to maintain the health of the populations, and to meet their habitat requirements. Survey and monitoring data would be incorporated into habitat, fish, and wildlife population management step-down plans scheduled for completion in 2007. There is currently a limited amount of information on the utilization of the refuge by sea birds.

Strategies:

- Conduct surveys as a primary focus of the management program for these species to obtain baseline data and monitor the populations of sea birds on the coastal areas of the refuge. Through the data obtained, the refuge would have a basis to identify, manage, and protect feeding, mating, roosting, and nesting habitats used by sea birds. This program would ensure that the refuge management activities and human disturbances would not interfere with nesting and other activities of resident and migratory sea bird species.

- Coordinate with the commonwealth, ornithological societies, other agencies, and non-governmental organizations to facilitate collection of complete census data.

Issue: Other Birds

Objective: Within one year of plan approval, develop a formal plan for conducting surveys and banding programs for resident and migratory birds.

Strategy:

- Continue the limited banding program utilizing mist nets in the summer and winter. This program would be expanded to obtain data and band upland birds at least four times per year. The expanded program would include sites on both east and west Vieques and would incorporate the Department of Natural and Environmental Resources and non-governmental organizations in the banding program.

Objective: Within two years of plan approval, establish survey routes within subtropical moist and dry forests to track population trends of key species (e.g., white-crowned pigeon and Adelaide's warbler) in these habitats.

Strategies:

- Establish seasonal surveys for shorebirds along with monthly surveys for waterfowl and land birds. These surveys would be developed using transects and techniques that can be repeated.

- Continue to coordinate surveys of the white-crowned pigeon with the Department of Natural and Environmental Resources and expand survey efforts to identify critical nesting and feeding areas for this species. Data gathered from the surveys would be used to develop forest habitat management recommendations for the forest management component of the habitat management step-down plan.

Issue: Amphibians and Reptiles Management

Objective: Conduct surveys to confirm the presence or absence of reported amphibians and reptiles on refuge lands. Aside from sea turtles, information on other reptiles and amphibians on the refuge is limited.

Strategies:

- Establish transects or study plots to provide both qualitative and quantitative data on the abundance and distribution of amphibians and reptiles.

- Encourage university and high school student participation in the surveys and conservation of these species.

Issue: Mammals Management

Objective: Conduct surveys to determine the population status of bat species on refuge lands. The only native land mammals on Vieques are bats. A few species have been identified and others are expected to occur on the refuge, but have not yet been confirmed.

Strategies:

- Conduct mist netting twice a year to determine the presence and relative abundance of bat species on the refuge.

- Promote bat research and management studies by university researchers and students.

- Incorporate management recommendations in conjunction with these studies into species and habitat management plans scheduled for development in 2007.

Issue: Fishery Management

Objective: By 2008, in conjunction with the Department of Natural and Environmental Resources, develop a fishery resource plan to aid in establishing management programs and fishing regulations for refuge lagoon systems. Fishery resources are under the primary jurisdiction of the Department of Natural and Environmental Resources.

Strategies:

- Work closely with the commonwealth to provide information to the public and to enforce commonwealth fishing regulations.
- Conduct surveys of Kiani and Playa Grande Lagoons to assess the size, abundance, and sustainability of fish populations.
- Provide information from the studies to the Department of Natural and Environmental Resources for its use in developing regulations.

Issue: Invertebrates

Objective: Determine the abundance and composition of terrestrial and aquatic macro-invertebrates on refuge lands. Very limited information is available on the invertebrate species located on the refuge.

Strategies:

- Conduct, along with cooperating researchers, a macro-invertebrate survey on refuge lands that would focus on mangroves, subtropical dry forests, and subtropical moist forest types to form a database from which future studies may be generated.
- Investigate terrestrial species with an emphasis on the search for an endemic land snail (*Pseudopineria viequense),* which is referenced in historical records.

GOAL 3: Provide opportunities for wildlife-dependent recreation and education and other compatible uses to enhance public appreciation, understanding, and enjoyment of the refuge's wildlife, habitats, and cultural history.

Discussion: This alternative provides for an increase in the public uses of the refuge while remaining consistent with the management policies of the Fish and Wildlife Service. As with each of the alternatives proposed for managing the refuge, access and authorized activities are currently limited due to the potential hazards from previous military activities, and are contingent on the certification that the sites are safe for use.

Issue: Recreational Beach Activities

Objective: Within five years of plan approval, develop an agreement with an appropriate entity to manage compatible recreational activities at high public use beaches on the refuge.

Strategies:

- Continue to monitor and maintain existing recreational activities and facilities at Playas Arenas (Green Beach), La Chiva (Blue Beach), and Caracas (Red Beach).
- Continue efforts to consult with commonwealth agencies regarding the potential of a cooperative agreement for the management of the high public use beach recreation areas.
- Install composting toilets at high public use beach locations in cooperation with the appropriate commonwealth agencies.

Issue: Public Access

Objective: Where safe and practical, provide public access to refuge sites for wildlife-dependent and compatible non-wildlife-dependent activities to address community needs.

Strategies:

- Facilitate compatible wildlife-dependent recreational activities by making accessible portions of the refuge open 24 hours per day for certain activities (Figures 19 and 20).
- Maintain public access on roads currently opened and provide access to selected sites on the northeast portion of the refuge, once the routes and beaches are cleared of potential hazards (Figure 21).
- Coordinate the process of clearing these areas of potential hazards in accordance with the Federal Facilities Agreement that is currently being developed by the Environmental Protection Agency, the Navy, the Environmental Quality Board, and the Department of the Interior.
- Develop a system for monitoring the current use of the refuge in order to accommodate the uses, while ensuring the protection of the resources.
- Conduct a carrying-capacity study within the next five years to determine the maximum number of visitors who could use the high public use areas without adversely affecting the resources or the experience of other visitors. In conjunction with the carrying-capacity study, an evaluation of visitor satisfaction and use patterns would be developed. Incorporate the results of this study into the public use management plan.

Figure 19. Proposed alternative public uses (west)

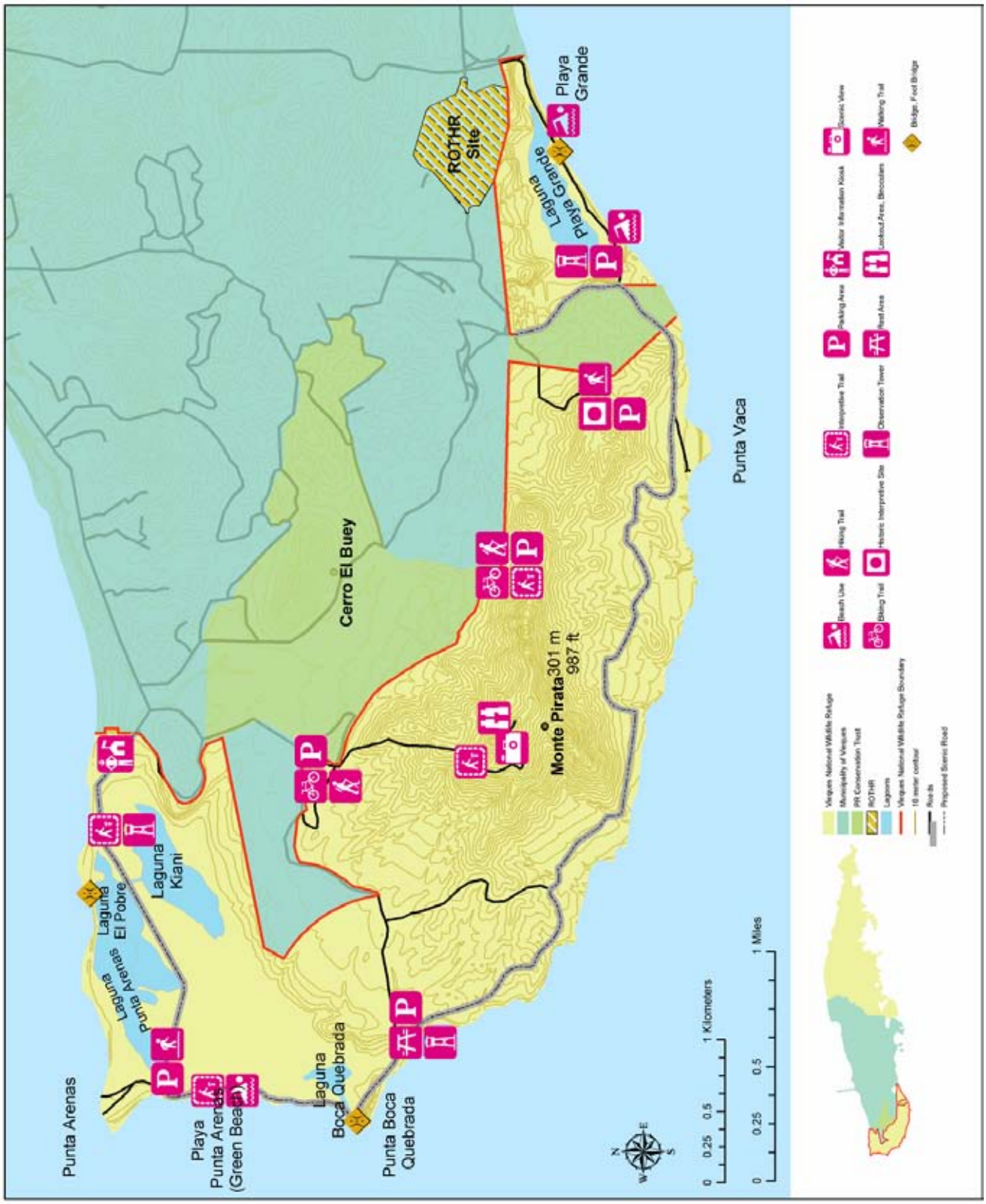


Figure 20. Proposed alternative public uses (east)

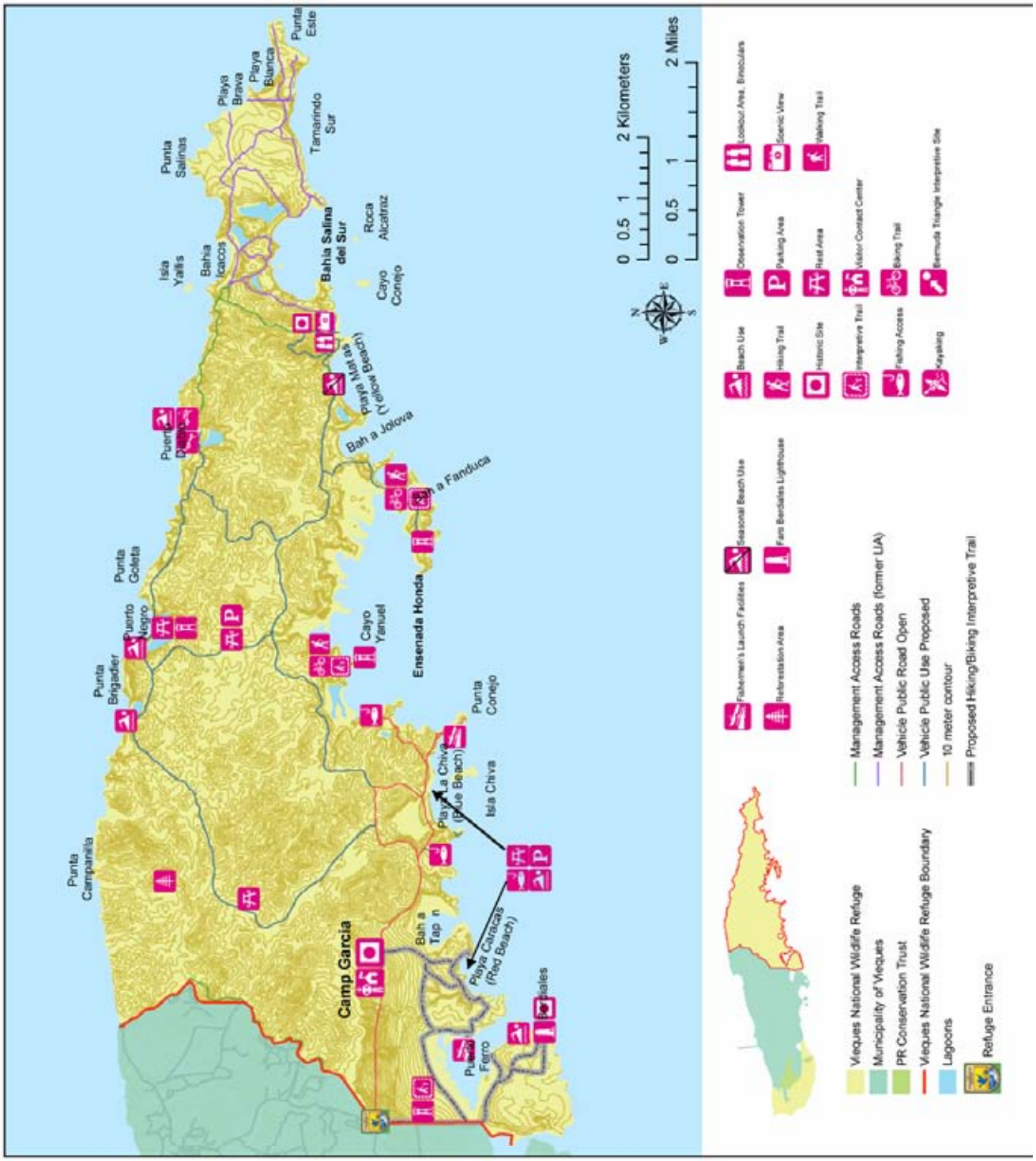
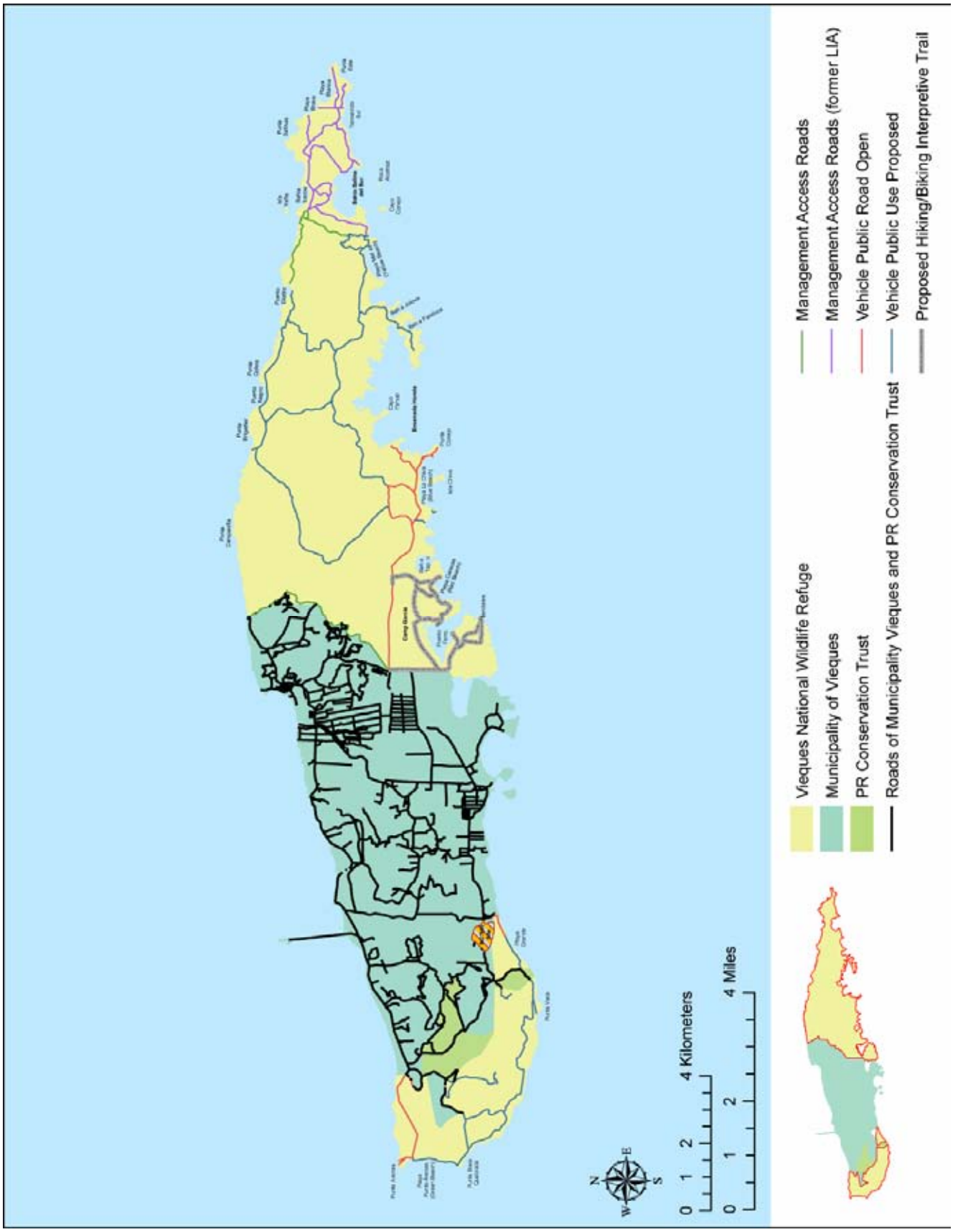


Figure 21. Proposed alternative roads and trails



Accommodate and enhance the experience of visitors by: constructing welcoming kiosks, observation towers with fixed mounted telescopes, interpretive boardwalks to highlight different habitats; and interpretive trails, such as hiking, equestrian, and biking that would close seasonally to minimize wildlife impacts. Specific routes have not been established; however, wherever possible, existing roads and trails would be incorporated to minimize impacts on the resources. A proposed trail through the old growth forest at Monte Pirata would not utilize a previously existing route.

- Maximize use of both old and new access areas by providing interpretive/directional signs on all trails, observation towers, and boardwalks throughout the refuge.

Issue: Collection of Sea Grapes and Coconuts

Objective: Within one year of plan approval, establish guidelines and officially open designated portions of the refuge for collection of sea grapes and coconuts for personal consumption. Historic use of the coastal portions of the refuge lands includes the collection of sea grapes and coconuts.

Strategies:

- Ensure protection of the resources by assessing historic uses and potential impacts of removal of sea grapes and coconuts.

- Identify areas that are appropriate for harvest of these resources and any regulations that are necessary to ensure the resources are protected for the future. After this evaluation is completed, the refuge would open selected areas for harvest. As additional areas of the refuge are cleaned and certified safe, they would be evaluated for suitability for harvest of sea grapes and/or coconuts.

Issue: Fishing

Objective: Evaluate need and provide improved access for fishing opportunities at a variety of locations on the refuge. Fishing is a traditional activity along the refuge beaches and in the lagoons.

Strategies:

- Continue to permit fishing during daylight hours in the open areas of the refuge. Where fishing is compatible and appropriate, it would be permitted 24 hours per day.

- Maintain the existing boardwalk trail and fishing platform at Laguna Kiani.

- Continue to permit access to sites historically used for launching boats.

- Improve and maintain launch areas at Playas Caracas, la Chiva, la Plata, Baracuda Bay, Puerto Ferro, and Kiani.

- Provive parking spaces for vehicles and trailers used by fishermen at Playa la Chiva and a fishing access ramp at the western end of the road to Puerto Ferro.

- Provide signing of access routes to these sites.

- Provide fishery information and regulations at fishing access points throughout the refuge.

- Conduct inventories of lagoon fisheries resources to determine potential for use and need for regulation of uses.

- Develop a fishing brochure in cooperation with the Department of Natural and Environmental Resources to provide information and regulations.

- Install monofilament recycling boxes at each of the access areas.

- Conduct a yearly fishing derby in conjunction with the commonwealth and Sea Grant.

Issue: Land Crabbing

Discussion: Under commonwealth regulations, land crabbing is considered to be "fishing." Capture of land crabs is a traditional activity that may be appropriate where it is sustainable and can be conducted without long-term impacts on the crabs or other resources. Since land crabbing and fishing were identified as separate issues during the scoping process, they are considered separately in this plan. All forms of fishing would be considered during the development of the public use management step-down plan.

> Objective: Within two years of plan approval, complete a formal evaluation of the opportunities for land crabbing on both the eastern and western refuge lands.

Strategies:

- Continue to conduct an experimental land crab trapping program at designated sites on the eastern refuge.

- Cooperate with an ongoing National Oceanic and Atmospheric Administration study of contamination in land crabs to determine advisability of human consumption of crabs from different areas of the refuge. The information from the experimental program and the Administration's study would be incorporated into a program to monitor populations and reproduction of land crabs to determine their status and the potential for sustainable harvests. If sustainable, a formal program would be incorporated as part of the public use management plan scheduled for completion in 2008. Any special regulations governing this activity would be consistent with commonwealth regulations.

Issue: Hunting

Discussion: Hunting for doves, pigeons, and waterfowl is wildlife-dependent recreation that might be appropriate on a national wildlife refuge if it is compatible with other uses and it does not conflict with the purposes of the refuge. Since white-crowned pigeon populations are very low, this species would be excluded and hunting would not be permitted in areas where they are known or expected to occur.

> Objective: Within three years of plan approval, complete an evaluation of potential target species and habitats to determine if a hunting program is feasible.

Strategies:

- Determine if the populations of doves, pigeons, and waterfowl are adequate to be considered for inclusion in a hunting program by cooperating with the Department of Natural and Environmental Resources to conduct population and reproduction surveys of these species.

- Develop a hunting plan by 2010, if a determination is made that a hunting program is sustainable and appropriate.

Issue: Interpretive Programs

Objective: Within five years of plan approval, develop a program to provide and enhance non-personal and personal interpretive media and programs that increase awareness and understanding of the refuge's natural and cultural resources.

Strategies:

- Develop a public use management plan that would include identification of interpretive themes for the refuge.

- Initiate several activities to aid in the accomplishment of the identified objectives for interpretation. These would include: the development of a refuge video that provides basic information about the purposes of the refuge and its natural resources; the development of various refuge brochures that highlight the refuge, its species, and wildlife-dependent activities; initiation of seasonal ranger-guided and self-guided tours of the refuge; establishment of interpretive trails and signs explaining the species and the habitats to facilitate self-guided or ranger-guided tours; and work with local organizations and individuals to establish a refuge cooperating association.

- Include interpretive exhibits as an integral part of the proposed office/visitor center complex being planned for the Camp Garcia vicinity.

Issue: Environmental Education Programs

Objective: Within five years of plan approval, develop a program to provide and enhance environmental education both on- and off-refuge.

Strategies:

- Develop a public use management plan that would include a multi-faceted, curriculum-based program for use on- and off-refuge to enhance public awareness and understanding of the refuge's resources, and to inspire action among local, national, and international education groups on behalf of the refuge and Vieques Island.

- Include in the environmental education component of the plan the following: grade-appropriate activities and materials that highlight both cultural and natural resources; designation of sites for education facilities, including indoor and outdoor classroom settings at various locations on the refuge to reduce conflicts between groups and/or activities; development of teacher workshop materials; and conduct teacher workshops at the refuge. An additional component of the proposed environmental education program would be the development of a cooperating

association or concession operation that supports curriculum-based environmental education activities.

Issue: Camping

Objective: Within two years of plan approval, determine if and when camping could be permitted on the refuge. Camping has historically been a recreational activity on Vieques beaches, especially during the Easter season.

Strategy:

- Evaluate potential sites for overnight camping associated with environmental education activities and compatible recreational uses. If, after evaluation of the potential sites, a determination is made that camping is compatible with the refuge mission and purposes, the Service would seek to develop a cooperative agreement with a commonwealth or municipal agency to manage a limited camping program at the designated sites. Camping associated with approved environmental education activities would be authorized through special use permits.

Issue: Commercial Activities

Objective: Within three years of plan approval, complete necessary evaluations to identify and implement appropriate and compatible commercial or concession activities. Commercial activities, such as renting of kayaks and beach umbrellas, selling of food or drinks, and providing guide services, have been proposed as potential benefits to visitors and as an economic benefit to the local community.

Strategy:

- Evaluate the potential for permitting commercial wildlife-dependent tours and activities in compliance with commonwealth and federal requirements. Where compatible and appropriate, plans would be developed to authorize specific activities through concession contracts in accordance with Service policy.

Issue: Interpretation and Conservation of Historical and Archaeological Sites

Objective: Within four years of plan approval, provide interpretive signing and information related to the accessible historical and archaeological sites on the refuge. As with all alternatives, the Service would comply with Section 106 of the National Historic Preservation Act and/or any other pertinent historic preservation mandates prior to the initiation of any undertaking or habitat management action.

Strategies:

- Ensure proper protection and management of these resources by thoroughly evaluating the historic and archaeological sites to determine which should be stabilized, which should be restored, and which should be subject to interpretation. The sites to be evaluated would, at a minimum, include: the lighthouse at Puerto Ferro; the railroad and sugar industry remains at Punta Arenas, Taino petroglyphs on eastern Vieques; and the sugar plantation remains at Camp Garcia.

- Ensure consistency with the Service's program for historic properties by entering pertinent data on the sites into the regional site GIS database within two years of plan approval.

- Obtain a complete set of the Navy's technical reports describing the refuge's archaeological, historical, architectural, paleoecological, and geomorphological investigations within three years of plan approval.

- Publish a cultural resources overview that provides a detail cultural resources history and chronology within five years of plan approval, which describes past investigations, cultural resources and their National Register status, and identifies pertinent future research topics. Within five years of plan approval, complete the archaeological inventory of refuge lands on the western end of the island.

- Seek agreement with commonwealth agencies and non-governmental organizations for their stabilization, restoration, and protection In order to maximize the potential for restoration of historical and archaeological sites on the refuge.

- Develop a plan, in cooperation with partners, to stabilize and restore the Puerto Ferro Lighthouse within five years of plan approval.

Issue: Law Enforcement

Objective: Within two years of plan approval, develop an effective cooperative law enforcement program with commonwealth agencies to address illegal activities on refuge lands. Cooperation with commonwealth and other federal law enforcement agencies is essential to maximize security on the refuge.

Strategies:

- Increase enforcement presence on refuge lands through agreements with the commonwealth agencies.

- Train, equip, and schedule Service and cooperating law enforcement agency personnel in order to provide adequate security for visitors.

- Provide, at appropriate locations, boat access and docking facilities for refuge and commonwealth vessels to facilitate patrols of beaches and the more remote sections of the refuge.

GOAL 4: Through cooperative efforts with partners, ensure that the refuge is cleaned of all classes of contaminants that could pose a threat to the health and safety of the wildlife, residents, staff, and visitors.

Discussion: Effective natural resource management, wildlife-dependent recreational activities, and other potential uses of the refuge cannot be realized without a comprehensive clean-up of unexploded ordnance and other contaminants that remain from prior uses of the lands. Current efforts under the provisions of CERCLA and RCRA are being carried out to address the contaminants issues on the areas currently being managed as the refuge. Clean-up activities would likely continue beyond the timeframe of this plan.

Issue: Wildlife and Human Exposure to Contaminants and Explosives

Objective: Throughout the clean-up process, ensure that the threats and impacts from contaminants, unexploded ordnance, munitions and explosives of concern, or explosive constituents to nearby communities, visitors, wildlife, and employees are removed to the greatest degree possible. Assure that clean-up standards protective of wildlife, plants, and habitats are met.

Strategy:

- Participate with the Navy, Environmental Protection Agency, Environmental Quality Board, Department of Natural and Environmental Resources, and community representatives during the development and review of documents and implementation of clean-up plans for all former Navy lands.

Objective: Ensure that refuge resources are adequately protected during the clean-up process. Overall clean-up of the refuge lands would involve an extensive process guided by a Federal Facilities Agreement between the Environmental Protection Agency, Navy, Environmental Quality Board, and Department of the Interior.

Strategies:

- Participate in the development and implementation of the Federal Facilities Agreement.
- Provide first-aid and unexploded ordnance training (through Navy or contract personnel) to the staff required to assist the public.
- Develop a safety plan to cover all refuge operations, including responses to identified contaminants or unexploded ordnance issues.

GOAL 5: Provide the resources needed to implement the selected management alternative.

Issue: Equipment Needs

Objective: Annually evaluate needs and submit funding requests to acquire and maintain equipment necessary to perform identified management activities

Strategy:

- Develop and maintain Refuge Operating Needs System (RONS) and Service Asset Maintenance Management System (SAMMS) project lists and equipment needs. Update databases annually to identify the facilities, equipment, projects, and staff needed to carry out the programs identified in this Draft CCP/EIS.

Issue: Facilities Needs

Objective: Within three years of plan approval, formalize plans and funding proposals for visitor contact facilities, interpretive displays, and office space to accommodate visitor and staffing needs.

Strategies:

- Initiate preliminary planning for the proposed visitor center/office complex, including maintenance facilities, in the vicinity of Camp Garcia on the eastern refuge tract. The plans would be finalized and budget proposals developed for these facilities within three years of plan approval.

- Identify the need to upgrade and maintain the informational kiosk at the Kiani Lagoon boardwalk trail and the design and construction of an additional informational kiosk for the entrance to the eastern refuge

Objective: Provide meeting and laboratory space for researchers conducting biological, archaeological, or historical investigation to benefit refuge management activities.

Strategy:

- Ensure that these activities are accommodated by evaluating the potential of using existing facilities or space developed in conjunction with the proposed visitor center and office in the vicinity of Camp Garcia.

Objective: Within three years of plan approval, provide hiking trails to give access to selected sites for wildlife-dependent public uses. The public use component of this alternative identifies the development of several trails.

Strategies:

- Close most of the roads in the former conservation management areas to vehicular access.

- Develop and maintain selected trails within these areas for access by foot and non-motorized conveyance.

- Adapt previously developed roads or trails for hiking, biking, or horseback access where possible.

- Develop additional trails in the Verdiales and Laguna Kiani areas. Develop an interpretive trail at the “old growth” forest on Monte Pirata.

Objective: Provide adequate parking for refuge visitors while minimizing impacts on the natural resources.

Discussion: At the present time, parking at the beach recreation areas is not organized and visitors are permitted to use any open space for parking. This results in greater impacts than would occur with an organized system of parking.

Strategies:

- Organize and reduce the number of roadways associated with parking at Playas Caracas, La Chiva, and Punta Arenas to minimize the areas impacted, but still maintain the current level of access.

- Develop and maintain a parking area for access to the proposed “old growth” interpretive trail on Monte Pirata.

Objective: Within two years of plan approval, redesign the eastern refuge entrance to provide an aesthetically pleasing entrance to the refuge with parking and a visitor contact point.

Strategy:

- Develop proposals to provide an aesthetically pleasing entrance with a place for visitors to obtain information and directions to refuge attractions.

Issue: Real Property Management

Objective: Within two years of plan approval, evaluate potential alternatives for land disposal and acquisition.

Strategy:

- Continue to seek agreement with the municipality of Vieques and/or the commonwealth government for the exchange of “Parcel C” for another area or areas of equal value suitable for resource management purposes. This parcel on the northwest portion of the eastern refuge unit (near the current municipality landfill) was transferred to the Service as a separate parcel. Although the remainder of the lands transferred to the Service cannot be exchanged or disposed of without congressional approval, “Parcel C” does not fall under that restriction.

Issue: Staffing Needs

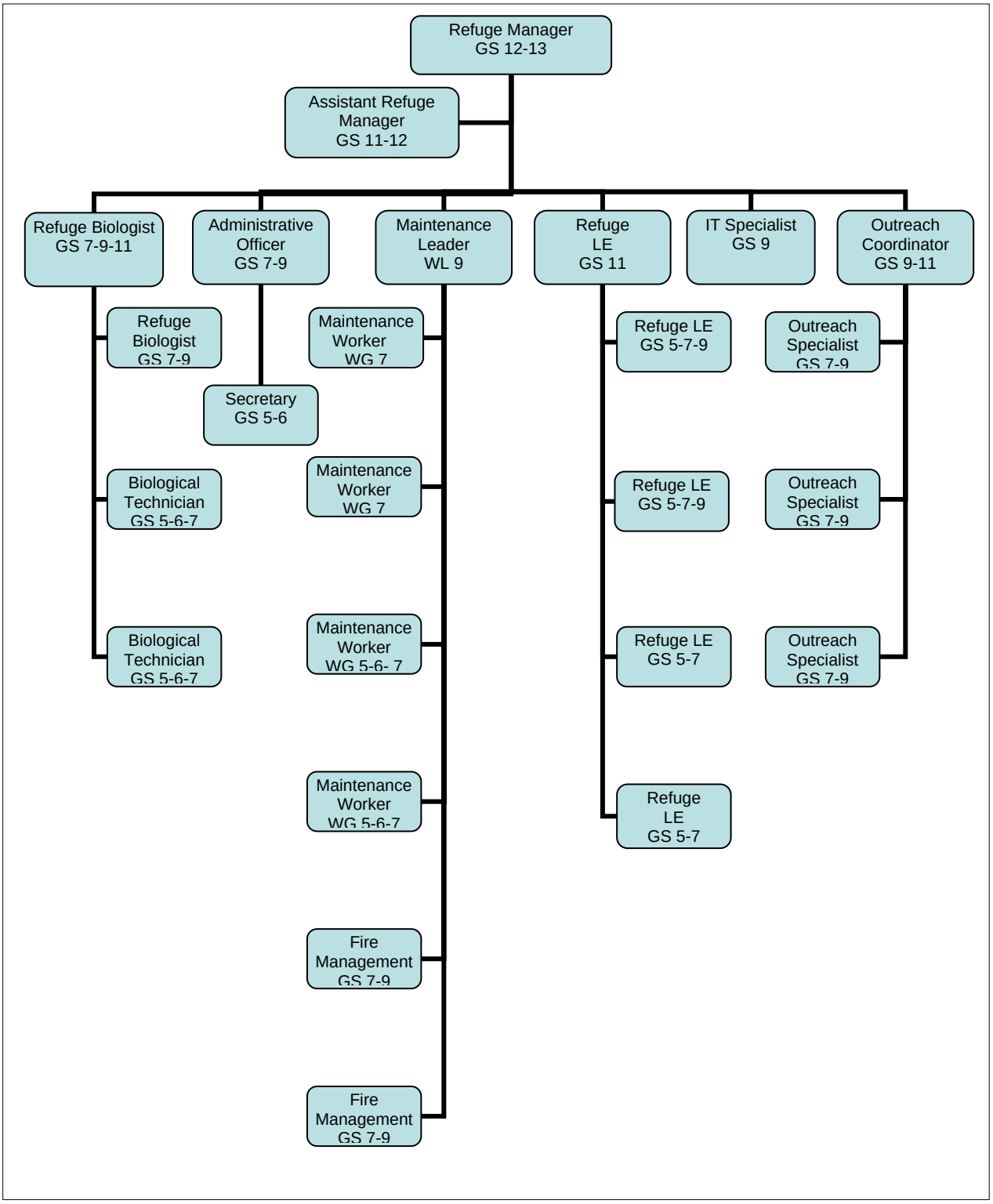
Objective: Within two years of plan approval, provide both permanent and temporary staff needed to accomplish the goals identified under the selected alternative.

Discussion: Full implementation of the proposed alternative would allow the refuge to conduct more active management of the refuge biological resources to increase native species diversity and, at the same time, increase opportunities for wildlife-dependent recreational, educational, and interpretive programs and activities. Staff increases would be required to administer these programs, to provide maintenance of facilities, and to protect resources and the visitors. A total of twenty-five positions would be needed to provide the resources to implement this alternative (Figure 22).

Issue: Use of Volunteers

Objective: Within one year of plan approval, develop a formal refuge policy to incorporate volunteers as a routine component of the refuge management program.

Figure 22. Organization of personnel under Alternative C



Strategy:

- Increase outreach to potential volunteers to assist with the expanded biological monitoring program, resource management activities, and public use activities. Volunteers would be an integral part of both the biological and public use aspects of the management program.

GOAL 6: Develop effective and open means of communication with Vieques citizens, interested groups, and organizations to raise public awareness of refuge programs, management decisions, and the mission of the Fish and Wildlife Service and the National Wildlife Refuge System.

Issue: External Communications

Objective: Within three years of plan approval, develop and implement a formal outreach plan to ensure community awareness of refuge programs and activities.

Discussion: In order to ensure the community is informed of refuge activities and programs, the outreach plan (scheduled for completing in 2008) would include a variety of outreach communication methods, such as newspapers, websites, news releases, local newspapers, and television and radio programs. In addition, issue-specific meetings would be held with community representatives and individuals, and the refuge would support the establishment of a cooperating association.

Objective: By 2007, implement a formal program of cooperation with other agencies and organizations.

Discussion: Through the development of this plan and other documents relating to the management of lands in Vieques, the Service has established partnerships with several federal, commonwealth, and local agencies and organizations.

Strategy:

- Cooperate with the above-names entities to facilitate communications with Vieques residents and the Puerto Rican community. Some of the cooperative activities proposed include: development of tools for outreach activities in conjunction with the Department of Natural and Environmental Resources (e.g., exhibits, games, and traveling exhibit); cooperation with the Vieques Conservation Historical Trust to generate community interest in the refuge; integration of local schools and clubs into refuge outreach activities; coordination of emergency response, law enforcement, and conservation and education activities with commonwealth, local agencies, and non-governmental organizations; development of partnerships with organizations to seek funding for research, conservation, and educational purposes; and, development of a multifaceted Junior Refuge Manager Program for young refuge users.

Table 7. Comparison of alternatives

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
MANAGEMENT HIGHLIGHTS COMMON TO ALL ALTERNATIVES			
Emergency Access	Provide access to Puerto Ferro during hurricane watches and warnings.		
Upgrade Entrance	Upgrade entrance to eastern refuge to improve aesthetics, welcome visitors, and maintain security.		
Fence Removal	Reconstruct boundary fences using materials appropriate for refuge.		
Roads to East Beaches	Improve major public use roads to reduce dust, improve drainage, and facilitate access.		
Clean Up	Participate with Navy, Environmental Quality Board, Environmental Protection Agency, and community to ensure refuge is cleaned of contaminants that pose a threat to the health and safety of wildlife, residents, staff, and visitors.		
Fire Management Program	Develop fire suppression capabilities and agreements with local agencies.		
Research and Educational Access	Facilitate access to refuge for research and educational activities related to habitats and resources.		
Signing	Develop and install directional and informational signing to facilitate public utilization and access.		
Wilderness Area	In accordance with legislation the former “Live Impact Area” would be managed as a “Wilderness Area.”		
Real Property	The Service would continue to seek an agreement with the municipality or commonwealth for the exchange of “Parcel C.”		
Historic and Archaeological Sites	Seek agreements with commonwealth agencies and non-governmental organizations for the stabilization, restoration, and protection of historic and archaeological sites.		
Remove Unused Structures	Former Navy buildings that are deteriorated and unused would be demolished and removed.		
Rehabilitate Utilities	Septic system, water, and electric utilities used at Camp Garcia would be maintained and rehabilitated for use by clean-up personnel, staff, and public.		

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 1. HABITAT AND WILDLIFE			
Restore Lagoon Hydrology	• Evaluate needs, obtain permits, and open lagoons when budgets permit.	• Same as Alternative A, plus conduct monitoring to assess conditions and effects of openings; determine priorities for opening; conduct hydrologic studies to determine need for restoration at Kiani Lagoon; as appropriate, open 2-4 lagoons annually; complete 11 specific projects identified in narrative; establish bird survey transects to monitor response to habitat changes; and after five years of monitoring, adapt management program.	• Same as Alternative B, except budgets and other priorities would determine if any lagoons are opened during a given year.
Forest Habitat Restoration			
• *Mangroves*	• Continue to monitor mangrove forests and lagoon systems.	• Review previous mangrove forest recommendations; determine the historical status of the mangrove areas; • Remove debris from and and restore mangrove wetlands; • Evaluate need for restoration of mangrove fringe at Bahia Playa Blanca.	• Same as Alternative B

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 1. HABITAT AND WILDLIFE (cont'd)			
• *Upland Forest*	• No current management	• Establish forest management planning units; • Establish 5 experimental restoration plots of at least 1 acre yearly within the units; • Monitor long-term success and apply adaptive management techniques; Establish inventory/monitoring plots (e.g., Smithsonian long-term plots); • Complete "step down" forest management plan by 2006, incorporating information from vegetation and bird surveys and monitoring plots.	Same as Alternative B, except experimental plots would be fewer and size would be determined by funding and manpower constraints.
Fire Management	• Identify fire breaks and acquire equipment.	• By 2006, identify and map firebreaks to protect adjacent communities. • Prepare a draft fire plan by 2006 and final by 2007. • By 2007, acquire equipment and supplies identified in the fire plan.	• By 2006, identify and map firebreaks to protect adjacent communities. • In consultation with the Department of Natural and Environmental Resources and fire department personnel, prepare a draft and final fire management plan by 2006. • By 2007, acquire equipment and supplies as identified in the fire management plan.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 1. HABITAT AND WILDLIFE (cont'd)			
Grasslands Management	• No current management	• Maintain selected grasslands through cutting, haying, burning, and selective clearing.	• Same as Alternative B
Invasive/Exotic Plants	• No current management	• Initiate control of invasive and exotic species while restoring native species on a minimum of 25 acres annually. • Conduct biannual surveys of exotic or invasive species. • Evaluate effectiveness of prescribed burning, herbicide treatments, and selective and mechanical removal of mesquite and acacia or other species found. • Reintroduce native species where removal has been conducted. • Develop an education program to reduce potential for additional introductions.	• Same as Alternative B

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 1. HABITAT AND WILDLIFE (cont'd)			
Feral Animal Control	• Require owners of horses, cattle, dogs, and cats to remove animals.	• Continue activities from Alternative A. • Initiate trapping and removal of unclaimed feral horses, cattle, dogs, and cats. • Survey mongoose and iguanas to determine populations and impacts. • Initiate control to limit the expansion and impacts from these species.	• Same as Alternative B
Research Cooperation	• Permit and support wildlife oriented research.	• Aggressively seek partnerships to develop proposals and conduct research needed to establish baseline data and develop wildlife management programs.	• Same as Alternative B

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT			
Endangered & Threatened Species			
• *Sea Turtles*	• Monitor sea turtle nesting in cooperation with the Department of Natural and Environmental Resources, non-governmental organizations, universities, local schools, and the community, including a saturation tagging program on Matias Beach (Yellow). • Protect sea turtle nests from natural and human activities (e.g., predation, poaching, and public use)	• Continue activities from Alternative A. • Monitor all accessible refuge beaches for sea turtle nesting activities in cooperation with the Department of Natural and Environmental Resources, non-governmental organizations, universities, local schools, and the community. • Establish saturation tagging program for sea turtle nesting species at all beaches with “significant” nesting to determine population size. • Protect sea turtle nests from human related disturbances (e.g. vehicles, and lights). • Monitor nest predation and establish a predator control program, if needed. • Enhance nesting habitat through planting of native coastal vegetation. • Close beaches to recreational activities during peak nesting and hatching seasons, as needed.	• Continue monitoring sea turtle nesting activities in cooperation with the Department of Natural and Environmental Resources, non-governmental organizations, universities, local schools, and the community. • Establish a saturation tagging program for sea turtle nesting species on selected beaches to determine nesting population size. • Protect sea turtle nests from natural and human activities (e.g., predation, poaching, and public use). • Enhance nesting habitat through planting native coastal vegetation. • Promote sea turtle conservation through outreach and education efforts.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
• *Roseate Terns*	• Survey for roseate terns and habitat.	• Conduct surveys to determine if roseate terns are nesting or foraging on the refuge.	• Conduct routine patrols to identify presence of roseate terns and habitat use. • Prevent human disturbance to roseate tern nesting colony.
• *Pelicans*	• No current management activity.	• Assist the Department of Natural and Environmental Resources with monitoring of nesting brown pelicans at Cayo Conejo.	• Assist the Depatment of Natural and Environmental Resources with monitoring of nesting brown pelicans at Cayo Conejo.
• *Virgin IslandI Tree Boa*	• Conduct surveys of Virgin Island tree boa to determine presence.	• Conduct surveys of Virgin Island tree boa to determine presence.	• Conduct surveys of Virgin Island tree boa to determine presence.
• *Manatees and Marine Mammals*	• Assist others studying manatees and responding to marine mammal stranding events on the refuge.	• Collaborate with other research and management entities in studies of manatee movements and in responses to marine mammal stranding events.	• Same as Alternative B.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
• *Plants*	• Survey threatened and endangered plants. • Complete an inventory of all vascular and non-vascular plants with a specific emphasis on federal- and commonwealth-listed species.	• Same as Alternative A plus: • Establish an endangered species plant propagation program. • Collect voucher specimens and obtain GPS locations for all federal- or commonwealth-listed plant species. • Augment existing communities and establish new populations with propagated individuals in accordance with species recovery plans.	• Same as Alternative A plus: • Collect voucher specimens of all species and obtain GPS locations for all federal- or commonwealth-listed plant species. • Work with commonwealth agency and non-governmental organization partners to promote studies and develop recovery actions for federal- or commonwealth-listed plants on refuge lands, including propagation and establishment or enhancement of populations.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Wading Bird Management	• Conduct preliminary surveys to obtain baseline data.	• Conduct surveys to obtain baseline data and monitor wading birds. • Identify, manage, and protect feeding, mating, roosting, and nesting habitats used by wading birds. • Conduct surveys to determine the numbers of shorebirds using the refuge during migration.	• Conduct surveys of wading birds in order to obtain baseline data. • Identify, manage, and protect feeding, mating, roosting, and nesting habitats used by wading birds. • Ensure that other management activities and human disturbances do not interfere with feeding and other activities related to the migratory patterns of many species of wading birds. • Work with others agencies, institutes, and ornithological societies to conduct regular census and monitoring efforts for wading bird populations.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Waterfowl Management	• Conduct preliminary surveys to obtain baseline data.	• Conduct surveys to obtain baseline data and monitor waterfowl in wetland areas. • Identify, manage, and protect feeding, mating, roosting, and nesting habitats used by waterfowl.	• Conduct surveys in order to obtain baseline data. • Ensure that other management activities and human disturbances do not adversely affect waterfowl. • Evaluate the feasibility of opening a yearly waterfowl hunting season within specific refuge areas. • Identify, manage, and protect feeding, mating, roosting, and nesting habitats used by waterfowl. • Work with others agencies, institutes, hunting groups, and ornithological societies to conduct regular census and monitoring efforts for waterfowl populations.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Sea Bird Management	• Survey and identify potential sea bird nesting sites.	• Conduct surveys to obtain baseline population and nesting data and monitor sea birds. • Identify, manage, and protect feeding, mating, roosting, and nesting habitats used by sea birds. • Ensure that management activities and human disturbances do not interfere with nesting and other activities sea birds. • Conduct nesting season inventories of cliff habitats.	• Conduct surveys to obtain baseline data and monitor the species of sea birds. • Identify, manage, and protect feeding, mating, roosting, and nesting habitats used by sea birds. • Work with others agencies, institutes, and ornithological societies to conduct regular census and monitoring efforts for sea birds. • Ensure that other management activities and human disturbances do not adversely affect seabirds or their habitat.
Other Birds	• Continue banding program. • With Department of Natural and Environmental Resources, survey key species (e.g., white-crowned pigeon).	• Expand banding program to at least four times per year and include sites on both east and west Vieques. Incorporate cooperators (e.g., Department of Natural and Environmental Resources and non-governmental organizations) into the banding program.	• Expand banding program to at least four times per year and include sites on both east and west Vieques. Incorporate cooperators (e.g., Department of Natural and Environmental Resources and non-governmental organizations) into the banding program.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Other Birds *(Cont'd)*		• Establish survey routes within subtropical moist and dry forests to track trends of key species (e.g., white-crowned pigeon and Adelaide's warbler) in these habitats. • Continue to coordinate surveys of white-crowned pigeon with Department of Natural and Environmental Resources and identify critical nesting and feeding areas for this species. • Utilize survey information to help develop forest habitat management recommendations for the forest management plan.	• Initiate seasonal surveys for shorebirds and monthly surveys for waterfowl and landbirds utilizing transects that can be repeated. Coordinate all surveys with Department of Natural and Environmental Resources, the Sociedad Ornitológica Puertorriqueña (SOPI) and local non-governmental organizations. • Establish survey routes within subtropical moist and dry forests to track trends of key species (e.g., white-crowned pigeon and Adelaide's warbler) in these habitats. • Continue to coordinate with Department of Natural and Environmental Resoruces to conduct surveys of white-crowned pigeons and identify nesting and feeding sites. • Utilize survey information to help develop forest habitat management. recommendations for the Forest Management Plan.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Amphibians and Reptiles	• No current management.	• Conduct surveys to confirm the presence or absence of reported amphibians and reptiles. • Establish transects or study plots to quantify the abundance and distribution of amphibian and reptile species. • Actively encourage university and high school student participation in the surveys and conservation of these species.	• Same as Alternative B.
Mammals Management	• No current management.	• Conduct surveys to determine the population status of bat species. • Mist net twice a year to determine the presence and relative abundance of bats. • Promote bat research and management work by universities and students. • Implement management recommendations provided by bat studies.	• Same as Alternative B.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Fishery Management	• Provide information to public and enforce commonwealth regulations.	• By 2008, in conjunction with Department of Natural and Environmental Resources, develop a fishery resource plan to aid the establishment of management programs and fishing regulations for the lagoon systems. • Continue to provide information to the public and enforce commonwealth fishing regulations. • Coordinate with Department of Natural and Environmental Resources' fishery personnel to ensure enforcement of commonwealth regulations on or adjacent to the refuge. • Conduct surveys in Kiani and Playa Grande Lagoons to assess species, size, and abundance. • Provide information to the Department of Natural and Environmental Resources for use in developing Commonwealth regulations.	• Same as Alternative B.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 2 SPECIAL EMPHASIS SPECIES MANAGEMENT (Cont'd)			
Endangered & Threatened Species (Cont'd)			
Invertebrates	• No current management.	• Conduct a characterization of macro invertebrate fauna at Laguna Playa Grande and Laguna Kiani. • Conduct a macro invertebrate survey on refuge lands, focusing on the mangroves, subtropical dry forest, and subtropical moist forest types. • Conduct an extensive survey of terrestrial invertebrates, with emphasis on the search for the historical record of the endemic land snail *(Pseudopineria viequense)*.	• Conduct a macro invertebrate survey on refuge lands, focusing on the mangroves, lagoons, subtropical dry forest, and subtropical moist forest types. • Conduct an extensive survey of terrestrial invertebrates, with emphasis on the search for the historical record of the endemic land snail *(Pseudopineria viequense)*.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION			
Recreational Beach Activities	• Maintain current access and facilities at Punta Arenas, La Chiva, and Caracas Beaches.	• Same as Alternative A plus: • Consult with commonwealth agencies (Department of Natural and Environmental Resources, Parques Nacionales) regarding the potential for a cooperative agreement for the management of the high public use beach recreation areas. • In cooperation with the appropriate commonwealth agencies, install composting toilet at high public use beach locations.	• Same as Alternative B.
Public Access	• Public access to open areas from dawn to dusk.	• Same as Alternative A.	• Public access to open areas permitted 24 hours per day for wildlife-dependent activities. • Conduct carrying-capacity study within five years • Develop a system to monitor the number of visitors. • Develop and implement a survey that measures visitor satisfaction and use patterns. • Maintain public access by currently opened roads and open additional roads to provide access to additional areas, including beaches.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Collection of Sea Grapes, Coconuts etc.	• Assess historic uses and potential impacts. • Officially open appropriate sites.	• Same as Alternative A.	• Same as Alternative A plus identify additional areas suitable for harvest after clean-up and certification that they are free of hazards and contamination.
Fishing	• Permitted during daylight hours. • Maintain existing facilities at Kiani Lagoon. • Conduct experimental night fishing program. • Continue access to historic launch sites.	• Same as Alternative A plus provide fishery information and regulations at fishing access points throughout the refuge. • Conduct inventories of lagoon fisheries resources to determine potential for use and need for regulation of uses. • Where compatible with other refuge programs and management needs, permit night fishing by permit.	• Same as Alternatives A and B plus, if compatible and appropriate, permit fishing access to open areas 24 hours per day. • Install informational kiosks at fishing access points with commonwealth and federal regulations. • Maintain and improve fishing access ramps at Caracas, La Chiva and La Plata beaches, Baracuda Bay, Puerto Ferro, and Kiani lagoon, and provide signing of access routes to these sites.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Fishing *(Cont'd)*		• In cooperation with Department of Natural and Environmental Resources, develop a fishing brochure to provide information and describe regulations and conditions of permits. • Repair or replace fishing platform at Laguna Kiani.	• Identify parking spaces for vehicles and trailers used by fishermen at La Chiva beach. • Develop a fishing access ramp at the western end of the road to Puerto Ferro. • Install monofilament recycling boxes at each new access area. • Provide a yearly fishing derby for the community in conjunction with Department of Natural and Environmental Resources and Sea Grant. • Maintain/upgrade current fishing platform at Kiani Lagoon.
Hunting	• No hunting permitted.	• In conjunction with Department of Natural and Environmental Resources, initiate population and reproduction surveys of doves, pigeons, and waterfowl that could be considered for inclusion in a hunting program. • If appropriate, develop a hunting plan by 2010. • Prohibit hunting in areas where white-crowned pigeons are known or expected to occur.	• Same as Alternative B.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Land Crabbing	• Conduct experimental program on eastern sites. • Cooperate with NOAA study to determine contamination levels. •	• Same as Alternative A.	• Same as Alternative A plus initiate a program to monitor populations and reproduction to determine sustainability of harvests.
Interpretive Programs	• Continue limited interpretive programs as staff and funding permit.	• Same as Alternative A.	• Provide and enhance non-personal and personal interpretive media and programs that increase awareness and understanding of the refuge's natural and cultural resources. • Within five years, develop interpretive themes for the refuge. • Within five years, develop the visitor services management plan. • Within 15 years, implement the visitor services management plan. • Develop a refuge video. • Develop various types of refuge brochures that highlight the refuge, species, wildlife-dependent activities, etc. • Develop a visitor center within refuge land with interpretive exhibits.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
Interpretive Programs *(Cont'd)*			• Initiate seasonal ranger-guided and self-guided tours of the refuge. • Develop interpretive trails and signs explaining the species and the habitats to facilitate self-guided or guided tours. • Work with local organizations and individuals to establish a refuge cooperating association.
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Environmental Education Programs	• Continue limited programs for school groups as resources permit.	• Provide and enhance environmental education. • Develop a multi-faceted, curriculum-based program for use on and off the refuge to enhance public awareness and understanding of the refuge's resources and to inspire action among local, national, and international educational groups on behalf of the refuge and Vieques Island.	• Provide and enhance environmental education. • Develop a multi-faceted, curriculum-based program for use on and off the refuge to enhance public awareness and understanding of the refuge's resources and to inspire action among local, national, and international educational groups on behalf of the refuge and Vieques Island. • Develop grade-appropriate environmental education activities and materials that highlight both cultural and natural resources.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
Environmental Education Programs *(Cont'd)*			• Develop environmental education facilities, including outdoor and indoor classroom settings at various locations of the refuge to reduce conflicts between groups and/or activities. • Develop a plan that deals with the administration of groups seeking environmental education from contact to follow-up activities. • Develop and enhance environmental education outreach to local schools and other interested groups. • Develop environmental education support materials for teachers to use both on and off refuge. • Develop teacher workshop materials and host teacher workshops at the refuge. • Encourage concession operations at various locations of the refuge to support curriculum-based environmental education and sales items.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Camping	• No camping permitted.	• Evaluate potential sites for overnight camping associated with environmental education activities. • If compatible with the refuge mission permit camping associated with permitted environmental education activities.	• Evaluate potential sites for overnight camping associated with environmental education activities and compatible recreational uses. • If compatible with the refuge mission, develop a cooperative agreement with commonwealth or municipal agency to manage limited camping program at designated sites.
Commercial Activities	• No commercial or concession activities permitted.	• Within 3 years, evaluate the potential of permitting compatible commercial wildlife-dependent tours and activities in compliance with commonwealth and federal requirements.	• Within 3 years, evaluate potential and develop plans, as appropriate, for permitting compatible concession operated or commercial activities, such as wildlife tours, guided walks, kayak rentals, and beach equipment rentals.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Historic and Archaeological Sites	• Comply with Section 106 of the National Historic Preservation Act and/or any other pertinent historic preservation mandates prior to the initiation of any refuge undertaking or habitat management action. • Maintain current access without further interpretation, restoration, or protection.	• Comply with Section 106 of the National Historic Preservation Act and/or any other pertinent historic preservation mandates prior to the initiation of any refuge undertaking or habitat management action. • Provide interpretive signing and information related to the accessible historical and archaeological sites on the refuge lands. • Maintain current level of access.	• Comply with Section 106 of the National Historic Preservation Act and/or any other pertinent historic preservation mandates prior to the initiation of any refuge undertaking or habitat management action. • Provide interpretive signing and information related to the accessible historical and archaeological sites on the refuge lands. • Evaluate historic and archaeological sites to determine which should be stabilized, which should be restored, and which should be subject to interpretation. The sites to be evaluated will at a minimum include: the lighthouse at Puerto Ferro; the railroad and sugar industry remains at Punta Arenas, Taino petroglyphs on eastern Vieques, and the sugar plantation remains at Camp Garcia.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
Historic and Archaeological Sites *(Cont'd)*			• Within 1-2 years, input the pertinent data regarding the refuge's recorded historic properties into the Regional Site GIS Database. • Within 4 years, amass a complete set of the Navy's technical reports that describe its archaeological, historical, architectural, paleoecological, and geomorphological investigations. • Within 5 years, publish a cultural resource overview that provides a detail cultural resource history and chronology, describes past investigations, describes the refuge's cultural resources and their National Register status, and identifies pertinent future research topics. • Within 5-10 years, complete the archaeological inventory of refuge lands on the western end of the island. • Within 5 years, stabilize and restore the Puerto Ferro Lighthouse.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 3. COMPATIBLE RECREATION, EDUCATION, AND INTERPRETATION (Cont'd)			
Law Enforcement	• Ensure that law enforcement staff are trained and equipped to provide adequate security for visitors. • Cooperate with commonwealth to provide additional law enforcement for refuge.	• Same as Alternative A.	• Ensure refuge law enforcement staff are trained, equipped, and scheduled to provide adequate security for the visitors. • Cooperate with commonwealth law enforcement agencies to provide additional enforcement presence on refuge lands. • Provide boat access and docking facilities for refuge and commonwealth vessels at appropriate locations to facilitate access to remote refuge beaches.
GOAL 4. CONTAMINANTS REMOVAL			
Wildlife and Human Exposure	• See Management Highlights Common to All Alternatives	• Same as Alternative A.	• Same as Alternative A.
GOAL 5. ADMINISTRATION AND FACILITIES			
Equipment Needs	• Maintain RONS and SAMMS lists (Appendix XI) in accordance with needs Identified in the alternative.	• Same as Alternative A.	• Same as Alternative A.
Facilities Needs	• Maintain existing office space at Isabel Segunda. • Maintain kiosk at Kiani Lagoon.	• Finalize plans for a combined visitor contact station and office in the vicinity of Camp Garcia on eastern Vieques.	• Finalize plans and budget proposals for combined visitor center/office complex in the vicinity of Camp Garcia on the eastern refuge tract.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
Facilities Needs *(Cont'd)*	• Maintain maintenance facilities at Isabel Segunda with limited facilities at Camp Garcia. • Utilize current office space to facilitate research and investigations. • Maintain currently opened roads and trails. • Maintain current parking areas at Punta Arenas, La Chiva, and Caracas beaches.	• Maintain the informational kiosk adjacent to the Kiani Lagoon boardwalk trail. • Develop plans for additional maintenance facilities and upgrade and maintain the existing facilities at the Camp Garcia site. • Provide meeting and laboratory space for researchers conducting biological, archaeological, or historical investigation at existing facilities or space developed in conjunction with the proposed visitor contact station and office in the vicinity of Camp Garcia. • Roads in conservation management areas will be closed to vehicular access. Selected trails within these areas will be maintained for access by foot and non-motorized conveyance. • Organize and reduce roadways associated with parking at Playas Caracas, La Chiva, and Punta Arenas.	• Upgrade and maintain the informational kiosk at the Kiani Lagoon boardwalk trail. • Design and construct a visitor contact station at the entrance to the eastern refuge. • Develop plans and budget proposal for maintenance facilities to be incorporated with the plans for the proposed visitor center/office complex in the Camp Garcia vicinity. • Provide meeting and laboratory space for researchers conducting biological, archaeological, or historical investigation in conjunction with the proposed visitor center and office in the vicinity of Camp Garcia. • Create interpretive trails (e.g., hiking, equestrian, and biking) at different points of the refuge that can be closed seasonally to minimize wildlife impacts. • Provide interpretive/directional signs on all trails, observation towers, and boardwalks throughout the refuge.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
Facilities Needs *(Cont'd)*			• Roads in conservation management areas will be closed to vehicular access. Selected trails within these areas will be maintained for access by foot and non-motorized conveyance. Additional trails will be developed in the Verdiales and Laguna Kiani areas. • Develop an interpretive trail at the "old-growth" forest on Monte Pirata. • Maintain and define parking areas at Playa Caracas and Playa La Chiva. • Reorganize parking at Punta Arenas to eliminate some roads while maintaining spaces for the current level of use. • Identify and develop parking to provide access to the "old-growth" interpretive trail on Monte Pirata. • Develop plans and specifications for the eastern refuge entrance road gate and visitor contact point. Prepare and submit funding request through the Refuge Operations Needs System (RONS).

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 5. ADMINISTRATION AND FACILITIES			
Real Property Management	• See Management Highlights Common to All Alternatives.	• Same as Alternative A.	• Same as Alternative A.
Staffing	• Maintain current staffing: • Refuge Manager (1); Refuge Biologist (1); Administrative Officer (1); Maintenance Staff (3); Law Enforcement (4); Outreach Coordinator (1) (See Figure 17)	• Request resources to accommodate increased biological monitoring and habitat management programs: • Refuge Manager (1); Refuge Biologist (2); Biological Technicians (2); Administrative Staff (3); Maintenance Staff (6); Law Enforcement (5); Outreach Staff (2). (See Figure 18)	• Request resources to support increased biological and public use program activities: • Refuge Manager (1); Assistant Refuge Manager (1); Refuge Biologist (2); Biological Technicians (2); Administrative Staff (3); Maintenance Staff (7); Law Enforcement (5); Outreach Staff (4). (See Figure 22)
Volunteers	• Seek assistance, accept, and work with volunteers.	• Develop policy and increase outreach to potential volunteers to assist with an expanded biological monitoring program and refuge management activities	• Develop policy and informational welcome packages to provide background information for volunteers and contractors who will work with biological monitoring, management, and visitor use program activities on the refuge.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
GOAL 6 EFFECTIVE AND OPEN COMMUNICATION WITH THE COMMUNITY			
External Communications	• Continue to use news releases, flyers, and meetings on a periodic basis to communicate with the community,	• Same as Alternative A.	• Develop and implement a formal Outreach Plan to ensure community awareness of refuge programs and activities. • Use a variety of outreach communication methods, such as newspaper, website, news releases, local newspaper column and TV radio programs. • Conduct outreach opportunities by providing one-on-one contact through house-to-house visits or Barrio meetings. • Support the establishment of a cooperating association. • Develop tools in conjunction with the Department of Natural and Environmental Resources (e.g., exhibits, games, and traveling exhibit) for outreach activities. • Work with the Vieques Conservation Historical Trust and Department of Natural and Environmental Resources to generate community interest in the refuge.

ISSUES	ALTERNATIVE A CURRENT MANAGEMENT	ALTERNATIVE B WILDLIFE EMPHASIS	ALTERNATIVE C PROPOSED ACTION
External Communications *(Cont'd)*			• Work closely with the local schools by integrating local clubs with the refuge outreach activities. • Meet regularly with local and state agencies and non-governmental organizations to coordinate activities related to emergencies, law enforcement, conservation, and education. • Partner with groups to seek funding for research, conservation and educational purposes. • Develop a multifaceted Junior Refuge Manager Program for all young refuge users, including those off the refuge via the Internet.

ACTIONS OR PROPOSALS CONSIDERED BUT NOT FULLY DEVELOPED OR INCLUDED IN THE ALTERNATIVES

This section provides a discussion of several projects or actions that were proposed during the development of the Draft CCP/EIS but for various reasons have not been included in alternatives.

During the scoping process, several issues, important to the community of Vieques, were identified by individuals and organizations providing recommendations for the Service to consider during the development of the Draft CCP/EIS. Among these issues were several that are beyond the authority of the Fish and Wildlife Service to address. One of the comments received from several respondents was that the Service should transfer refuge lands or portions of refuge lands to the people or municipality of Vieques.

The legislation that mandated the establishment of the refuge specifically stated that any transfer would require that additional legislation be enacted by Congress. Without specific congressional approval, consideration of land transfers is beyond the authority of the agency, and therefore is not considered in this planning document. One exception to the restriction on the transfer of property is the area known as “Parcel C.” This is a 98-acre parcel located on the northwestern portion of the eastern refuge near the existing municipal landfill. The Service’s authority to transfer this parcel is limited to exchange for another parcel of comparable value that could be managed for natural resource purposes. The Service has contacted the municipality of Vieques to explain this restriction and to seek a mutually acceptable exchange that would permit the municipality to utilize “Parcel C” for expansion of the municipal landfill or other appropriate municipal purpose.

In December 2004, Governor Calderon approved the Master Plan for Sustainable Development of Vieques and Culebra. This document identified several activities that might be conducted on the areas under the jurisdiction of the Fish and Wildlife Service and provided zoning classifications for the refuge lands. The Service provided comments on the draft master plan to the Vieques Culebra Special Commissioner in a letter dated November 23, 2004 (Appendix IV). That letter addressed, among other issues, the zoning classifications that were identified for some of the refuge lands. These zoning classifications included areas for residential and agricultural development, ecotourism, etc. Residential development, ecotourism lodges, and many agricultural activities are not normally considered appropriate or compatible uses for a national wildlife refuge.

Both the Master Plan for Sustainable Development and comments submitted during the scoping of issues for this Draft CCP/EIS suggested the potential for development of wind generators on the eastern portions of the refuge. Any proposed use of the refuge must be compatible with the refuge purposes and other authorized and compatible uses and consideration of any such uses would require a thorough evaluation to show that the refuge purposes would not be adversely affected. Since migratory birds, including endangered species, are known to utilize the refuge and adverse effects from wind generators on avian species have been documented, it would be inappropriate to consider placement of wind generators on a refuge that has a mission to conserve and protect these species.

A proposal to utilize refuge forest resources for a bio-generation project was also presented during the scoping period. One of the objectives of the refuge is to restore native forest species. This activity may, at times, require the removal of exotic and invasive, non-native species, however, the primary objective of any timber removal must be the restoration of the forest, while maintaining the wildlife resources that utilize both the native and non-native forest. Unless timber utilization is an integral part of the natural resource restoration program, it would not be appropriate for the refuge.

Grazing, haying, and other agricultural activities were identified during the scoping process as activities that could potentially provide economic benefits to a segment of the local community. Grazing and haying can be utilized for management of grasslands on national wildlife refuges under specific conditions where they are an integral part of a habitat management program. As the step-down management plans for Vieques are developed, these activities will be considered along with other habitat management techniques to accomplish specific habitat restoration goals. At the present time, agricultural activities are not included in the alternatives, since the habitat restoration plans have not been developed. Prior to incorporation of agricultural activities into any management program, the resource impacts and benefits would need to be analyzed and a compatibility determination would need to be developed.

IV. Environmental Consequences

INTRODUCTION

This chapter describes the potential environmental impacts that may result from implementation of each of the alternatives considered and described in Chapter III. The impacts are discussed for the major categories described in Chapter II (i.e., physical, biological and socioeconomic factors). The parameters within each of these categories that are evaluated are those that may be impacted by the strategies identified in the alternatives. These parameters are identified in Table 8. Chapter II includes aspects of the affected environment that are not specifically included in this analysis since they will not be affected by any of the alternatives (e.g., topography) or they are components of the strategies that may affect the other resources (e.g., contaminants/hazardous materials, and roads, utilities, and infrastructure). By comparing the environmental consequences of the alternatives, the Service and other reviewers can determine which alternative results in the best combination of beneficial effects without unacceptable adverse impacts.

Table 8. Environmental consequences evaluation factors

Physical Environment	Soils
	Hydrology and Water Quality
	Air Quality
	Aesthetics
Biological Resources	Flora and Fauna
	Threatened and Endangered Species
	Species of Special Concern
	Noxious/Invasive Species
Socio-Economic Factors	Archaeological and Historic Resources
	Employment
	Public Uses

In the discussion of environmental consequences, impacts are described in terms of severity (negligible, minor, moderate, and major), duration (short-term or long-term), and extent (local, refuge-wide, or regional). Impacts are not necessarily limited to the refuge property. While many impacts occur on a small, localized scale (i.e., vegetation and soil disturbance during construction at a specific site), impacts may also occur on a larger regional scale (i.e., socioeconomic impacts from increased visitation). Impacts may be either adverse or beneficial, or a combination of adverse and beneficial. A summary of criteria used for rating the severity of impacts is presented in Table 9.

EFFECTS COMMON TO ALL ALTERNATIVES

Specific environmental and social impacts of implementing each alternative are examined for the criteria in the broad categories of physical environment, biological resources, and socioeconomic factors (Table 8). Some potential effects of the alternative management schemes, however, are similar under all alternatives and are summarized below.

PHYSICAL ENVIRONMENT

Climate Change Impacts

The Department of the Interior issued an order in January 2001 requiring federal agencies under its direction with 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 temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered. The Department of Energy's "Carbon Sequestration Research and Development" (U.S. DOE 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. Grasslands, forests, wetlands, tundra, perpetual ice, and desert are effective in both preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. The Department of Energy's report concluded that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

Preserving natural habitat for wildlife is the heart of any long-range plan for national wildlife refuges. The actions proposed in the Draft CCP/EIS would conserve or restore land, water, and forest resources and would thus enhance carbon sequestration. This, in turn, would contribute positively to efforts to mitigate human-induced global climate changes.

Impacts to the physical environment from construction and maintenance activities would involve the potential for increased dust and erosion from ground disturbing activities, air quality degradation from heavy equipment, and decreased aesthetic appeal during project development. The Service is committed to using "best management practices" in order to minimize the impact on the environment from these activities. These impacts are expected to be short-term and minor. Operation and maintenance of all facilities, including roads, buildings, and public use activities, are expected to cause long-term, minor impacts to the local area.

Table 9. Criteria for rating severity of impacts

Short-term = Less than five years, normally during construction and recovery.
Long-term = Longer than five years, normally from operations.
Cumulative = Cumulative impacts to environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the area.

Issue	Impact Severity:			
	Negligible	**Minor**	**Moderate**	**Major**
Soil Resources	Impact not perceptible and not measurable; not affecting surroundings.	Impact localized and slightly detectable but would not affect overall structure of any natural community.	Impact clearly detectable; could affect individual species, communities, or natural processes appreciably.	Impact highly noticeable and would substantially influence natural resources; e.g., individuals or groups of species, communities, or natural processes.
Hydrology and Water Quality	Impact not detectable, no discernible effect on hydrology or water quality.	Impact slightly detectable but would not affect overall hydrology or water quality.	Impact clearly detectable and could have an appreciable effect on the hydrology or water quality.	Impact would have a substantial, highly noticeable, potentially permanent effect on the environment.
Air Quality	Impact not perceptible and not measurable; not affecting surroundings.	Impact perceptible but not measurable; would remain localized.	Impact detectable and possibly affecting integrity of surroundings.	Air quality testing would be required. Impact would have a significant impact on surroundings.
Contaminants/ Hazardous Materials	Impact not perceptible and not measurable; not affecting surroundings.	Impact perceptible but not measurable; would remain localized.	Impact measurable and possibly affecting integrity of surroundings. Clean-up necessary.	Contaminants clean-up and monitoring would be required. Impact would be significant on surroundings.

Issue	Impact Severity:			
	Negligible	**Minor**	**Moderate**	**Major**
Aesthetics	Impact not perceptible and not measurable; not affecting surroundings.	Impact perceptible but not measurable; would remain localized.	Impact detectable and possibly affecting integrity of surroundings.	Impact would be significant on site and surrounding areas.
Flora and Fauna	Impact localized and not detectable, or at lowest levels of detection.	Impact localized and slightly detectable but would not affect overall structure of any natural community.	Impact clearly detectable; could affect individual species, communities, or natural processes appreciably.	Impact highly noticeable and would substantially influence natural resources; e.g., individuals or groups of species, communities, or natural processes.
Threatened, Endangered, or Candidate Species	Change in a population or individuals of a species; consequences to population not measurable or perceptible, or other changes not measurable or perceptible.	Change in a population or individuals of a species, if measurable, would be small and localized, or other changes would be slight but detectable.	Change in a population or individuals of a species measurable but localized.	Change in a population or individuals of a species measurable and would result in permanent consequence to the population.
Species of Special Concern	Change in a population or individuals of a species; consequences to population not measurable or perceptible, or other changes not measurable or perceptible.	Change in a population or individuals of a species, if measurable, would be small and localized, or other changes would be slight but detectable.	Change in a population or individuals of a species measurable but localized.	Change in a population or individuals of a species measurable and would result in permanent consequence to the population.

Issue	Impact Severity:			
	Negligible	**Minor**	**Moderate**	**Major**
Noxious/Invasive Species	Change in a population or individuals of a species; consequences to population not measurable or perceptible, or other changes not measurable or perceptible.	Change in a population or individuals of a species, if measurable, would be small and localized, or other changes would be slight but detectable.	Change in a population or individuals of a species measurable but localized.	Change in a population or individuals of a species measurable and would result in permanent consequence to the population.
Archaeological and Historic Resources	Impact barely perceptible and not measurable; confined to small areas or affecting a single contributing element of a larger National Register District with low data potential.	Impact perceptible and measurable, but would remain localized; affecting a single contributing element of a larger National Register District with low to moderate data potential, or would not affect character-defining features of a National Register-eligible or listed property.	Impact sufficient to change a character-defining feature but would not diminish resource's integrity enough to jeopardize its National Register eligibility, or it generally would involve a single or small group of contributing elements with moderate to high data potential.	Substantial, highly noticeable change in character-defining features would diminish resource's integrity so much that it would no longer be eligible for National Register listing, or it would involve a large group of contributing elements or individually significant properties with exceptional data potential.
Employment	Impact not detectable, no discernible effect on socioeconomic environment.	Impact slightly detectable but would not affect overall socioeconomic environment.	Impact clearly detectable and could have an appreciable effect on the socioeconomic environment.	Impact would have a substantial, highly noticeable, potentially permanent influence on socioeconomic environment.

Issue	Impact Severity:			
	Negligible	**Minor**	**Moderate**	**Major**
Public Use	Impact not detectable, no discernible effect on public use activities.	Impact slightly detectable but would not affect overall public use activities.	Impact clearly detectable and could have an appreciable effect on public use activities.	Impact would have a substantial, highly noticeable, potentially permanent influence on public use activities.
Socioeconomic Resources	Impact not detectable, no discernible effect on socioeconomic environment.	Impact slightly detectable but would not affect overall socioeconomic environment.	Impact clearly detectable and could have an appreciable effect on the socioeconomic environment.	Impact would have a substantial, highly noticeable, potentially permanent influence on socioeconomic environment.

BIOLOGICAL RESOURCES

To varying degrees, each of the alternatives would protect habitat types important to migratory birds, reptiles, amphibians, fish, invertebrates and flora, including threatened and endangered species. Alternative A would provide the least amount of habitat protection and management emphasis, while Alternative B would provide the most protection and management. Implementation of any of the alternatives would benefit and not likely adversely affect threatened or endangered species or habitats.

Adverse effects to the biological resources would occur as a result of construction of facilities, rehabilitation of roads, creation of fire breaks, rehabilitation of utilities and removal of unused structures. These activities would cause the localized removal of vegetation and habitat for birds and noise that could disturb wildlife in the vicinity of the projects. The most significant impacts would occur during the construction phase for these projects. Because the project sites are limited in size, these impacts would be short-term, minor-to-moderate, and local.

SOCIOECONOMIC FACTORS

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, or activities on minority or 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 in matters relating to human health or the environment.

None of the management alternatives described in this Draft CCP/EIS would disproportionately place any adverse environmental, economic, social, or health impacts on minority or low-income populations. Implementation of any action alternative that includes public use and environmental education would actually provide a benefit to citizens living in the vicinity of the refuge.

Compatibility Determinations

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." "Wildlife-dependent recreational uses may be authorized on a refuge when they are compatible and not inconsistent with public safety."

A compatibility determination is a document that assesses the compatibility of an activity according to the above criteria. The Vieques Refuge has prepared compatibility determinations for activities proposed in this Draft CCP/EIS. Any additional activities that are considered must meet the compatibility standards prior to being authorized.

Land Acquisition

The administrative jurisdiction for the Vieques National Wildlife Refuge was transferred to the Fish and Wildlife Service in accordance with public laws of the United States. There was no provision in these laws for further acquisition or expansion of the refuge. No land acquisition is proposed under any of the alternatives presented in this Draft CCP/EIS. However, one parcel of approximately 98 acres was transferred to the Service under a different authority. This parcel, referred to as "Parcel C," was previously proposed for transfer to the municipality of Vieques by the Navy. The authorities of the Service do not permit the transfer of this land, but they do permit an exchange for comparable property. Under all alternatives, the Service will pursue an agreement with the municipality or another agency of the commonwealth to facilitate such an exchange if it is desired by the municipality.

Refuge Revenue-Sharing

Since the Vieques Refuge lands are owned by the federal government, they are not subject to Puerto Rico property taxes, however, under the provisions of the Refuge Revenue Sharing Act, the Service makes annual payments to the local taxing authority to offset the loss of property tax revenues. The payments authorized for the Vieques Refuge are equivalent to ¾ of 1 percent of the fair market value. The Revenue Sharing Act requires that the land be reappraised every 5 years to ensure that payments are equitable. The funds for these payments come from revenues received from refuge products such as timber, grazing fees, oil and gas royalties, and leases and permit fees. Since these funds are not generally adequate to make a full distribution to all taxing authorities, Congress is authorized to appropriate funds to make up the shortfall. Congress does not always fully appropriate adequate funding and the taxing authorities receive a pro-rata share of the authorized amount. In 2004, the Revenue Sharing payment allocated for Vieques Refuge was $146,683. This amount was 41 percent of the total authorized by the Refuge Revenue Sharing Act. Annual refuge revenue-sharing payments, also known as payment in lieu of taxes, will be provided under any of the alternatives.

Wilderness Area

In accordance with the legislation that created the refuge, the former "Live Impact Area" will be managed as a "wilderness area." Based on a wilderness review conducted in 2005, no additional areas are considered appropriate for inclusion in the Wilderness System. The environmental consequences of the wilderness management are primarily related to the exclusion of public uses from this area. The significance of this impact is somewhat reduced because there are similar sites that will be available for public use activities that might otherwise have been available in the area managed as a wilderness. The impact of managing this area as a wilderness without public access is considered to be long-term, minor-to-moderate, and regional, since potential use by visitors from other areas would be affected.

COMPARISON OF EFFECTS OF THE ALTERNATIVES

The following discussion provides a brief comparison of the impacts of the different alternatives based on the relative effect each would have on the physical, biological, and socioeconomic resources. Following this discussion is a matrix that provides a side-by-side comparison of the effects of the alternatives (Table 12).

PHYSICAL ENVIRONMENT

Soil Resources

Under all alternatives impacts to soils would occur from removal and deposition of surface material at construction project sites, compaction from heavy equipment, removal of vegetative cover that protects the areas from erosion, and localized contamination from construction and maintenance activities. These impacts are generally short-term and minor. In the immediate area of road, trail, or parking lot, construction impacts are long-term and moderate.

Disturbance of and impacts to the soil resources of the refuge would be less under Alternative A than under the other alternatives since fewer construction and management activities would be undertaken. The greatest impacts would occur with implementation of Alternative C. Under this alternative, the Service would construct a visitor center/office/maintenance complex in the Camp Garcia vicinity, develop roads and trails on both eastern and western refuge lands, construct observation towers, open lagoons to tidal flushing, develop a trail and parking at the Monte Pirata "old growth" forest, and provide increased public access to refuge lands. Although habitat management, reforestation, and invasive species control measures would be greater in Alternative B, impacts from these activities would be short-term; whereas, the new roads' trails and facilities would have long-term, minor-to-moderate local impacts.

Hydrology and Water Quality

Adverse water quality impacts from refuge activities would primarily result from erosion at construction or habitat management sites. The opening of lagoons to tidal flushing would be expected to result in improved water quality in the lagoons and increased benefits to the aquatic resources found there. Some adverse water quality impacts could occur due to increased discharge of sediments and impounded waters to the marine environment during storm events.

Under alternative A, lagoons would be opened only occasionally; whereas, Alternative B would increase the number of lagoons opened to two to four annually. Alternative C would result in the opening of one or two lagoons each year. Under all alternatives, if lagoons are opened, the water quality and habitat responses would be monitored and management would be adapted, as necessary, to mitigate any adverse environmental responses.

Alternatives B and C call for the installation of composting toilets at the high public use beaches (Punta Arenas, Caracas and La Chiva). Since Alternative C provides for an increase in the areas open and facilities available for public uses (e.g., hiking and biking trails and observation towers), an increase in the numbers of visitors is anticipated. The proposed sanitary facilities at the visitor center and composting toilets at the beach sites are expected to ensure maintenance of high water quality. Alternative A does not provide facilities for the current level or anticipated future levels of public use. The water quality impacts from the public uses are expected to be long-term, minor, and local under all alternatives.

Alternative C provides for the expansion and development of maintenance facilities in the Camp Garcia vicinity. This use would increase the potential for spills of gasoline, lubricants, and other chemicals used for management activities.

Air Quality

All alternatives would provide for resurfacing portions of the main access road on eastern Vieques and would, therefore, reduce dust and airborne particulate matter in the area of highest public uses. Opening of additional roads and trails under Alternative C would create the potential for more dust from cars, bikes, horses, and foot traffic on unpaved surfaces.

Alternatives B and C provide for more habitat management that would utilize heavy equipment and potentially fire as a management tool. These activities would increase emissions of exhaust and smoke that would cause a short-term, minor-to-moderate deterioration in air quality in the local vicinity.

Contaminants/Hazardous Materials

Clean-up of potential contaminants and unexploded ordnance were some of the major concerns expressed during the scoping meetings with the Vieques community. When the administrative jurisdiction for the former Navy lands was transferred to the Fish and Wildlife Service, the responsibility for the clean-up of contaminants and unexploded ordnance was retained by the Navy. The Service's role in the clean-up process is through coordination with the Navy, the Environmental Protection Agency, and the Puerto Rico Environmental Quality Board. The relationship of the parties during this process is guided by a Federal Facilities Agreement that defines the respective role of each of the agencies. This agreement is currently under development and will guide all of the agencies during the course of the clean-up. At the same time, the comprehensive conservation plan will guide the management of the refuge for the next 15 years and will assist the parties to the Federal Facilities Agreement in developing priorities for the clean-up activities.

Alternative A would maintain the current level of management and use of the refuge. Alternative B would expand resource management and habitat restoration activities into additional areas of the refuge, including the former Eastern Maneuver Area. Alternative C would provide for management activities and limited public uses on portions of the currently closed area, as well as within the currently open areas. Under Alternatives B and C, prior to opening any new areas for resource management or public uses, certification that the areas are cleared of unexploded ordnance or other contaminants would be required.

In addition to the existing unexploded ordnance and other potential contaminants being cleaned under the "Superfund" program, there is a potential for minor contamination from Service management programs and public use activities. Under all alternatives, management and maintenance activities would create a potential for fuel or lubricant spills. Alternative B would involve increased uses of heavy equipment and potentially pesticides and herbicides associated with habitat management and invasive species control. Alternative C would also increase the use of equipment and potentially chemical control methodologies, along with providing for increased public uses. These activities would increase the likelihood of spills of fuels, lubricants, pesticides, herbicides, and human waste. Applying Best Management Practices to all habitat improvement projects, strictly adhering to label requirements for application of any pesticides, providing sanitary facilities, and regulating public use activities should minimize the potential for measurable impacts from these potential contaminants. With appropriate adherence to applicable regulations, any effects should be short-term, minor, and local.

AESTHETICS

All of the alternatives would provide for modifications to the entrances and roadways accessing the eastern and western refuge lands. During construction of fences, gates, roads, and kiosks,

aesthetics at these sites would be adversely affected by construction material, debris, equipment, and work crews. These impacts should be limited to the immediate project areas and be short-term, minor-to-moderate, and local.

Under Alternatives B and C, visitor and maintenance facilities would be constructed in the vicinity of Camp Garcia. Alternative C would have a greater impact on aesthetics, since the facilities would be larger and construction would take place over a longer period of time. Habitat management projects would be greatest under Alternative B, with a concurrent impact from clearing of non-native vegetation and preparing areas for replanting. The most significant rehabilitation and development of roads and trails would occur with the implementation of Alternative C. These would include an automobile route around the western refuge lands; a trail through the old-growth forest at Monte Pirata; observation towers on both eastern and western lands; and biking, hiking, and vehicle routes on the eastern lands. The impacts from construction of these projects would be short-term, minor-to-moderate, and local. On sites with permanent facilities for staff or visitor uses, such as the office/maintenance/visitor center complex, parking, observation towers and kiosks, impacts would be long-term, moderate, and local.

BIOLOGICAL RESOURCES

Fauna

The limited management with protection of existing habitats under Alternative A would have a minor beneficial impact on resident and migratory birds, including doves, pigeons, and waterfowl. Under Alternatives B and C, these species would be surveyed and populations would be monitored to determine if any or all could support a viable hunting program. Hunting would be permitted in accordance with an approved plan that would address the species to be hunted, compliance with commonwealth regulations, and any necessary special regulations to ensure a sustainable program. Under a managed-hunt program, long-term impacts to the species would be negligible. Short-term, minor impacts from the presence of hunters and disturbance from shooting would affect both target and non-target species in the areas where hunting was taking place.

Harvesting of land crabs has been included as an experimental program under all of the alternatives. Continuation of the program after evaluation and a determination of sustainability could have minor impacts on the habitat, such as trampling and cutting of brush to provide access.

Lagoon openings are presumed to have beneficial effects from increased flushing, improved circulation, and healthier fringing mangroves in the lagoon areas. Minor negative impacts to the coastal habitats could occur where the openings are constructed. Any negative effects are expected to be short-term, minor, and local. Any impacts, either beneficial or negative, would be greatest under Alternative B, since more emphasis would be placed on opening lagoons under that alternative.

Construction of an office maintenance area and visitor facilities, maintenance of roads and trails, and the development of observation towers, parking, and informational kiosks would result in losses of habitat for resident and migratory birds. This habitat loss would be greatest under Alternative C, which includes more facilities than either of the other alternatives. Impacts from these projects would be long-term, minor-to-moderate, and local. Alternative C has expanded public uses and increased access to a greater portion of the refuge, thus increasing the potential for disturbance of animals in and adjacent to the public use areas.

Flora

Alternative A would have a negligible impact on the refuge flora, since there would be little change in the factors that affect it. The level of habitat management and manipulation would be greatest in Alternative B, with a focus on reducing non-native and invasive species, while reintroducing and providing habitat conditions favorable to native species. This alternative would provide for experimental reforestation plots, opening of lagoons to increase flushing of some mangrove areas, and planting of selected sites with native species. It is expected that Alternative B would provide long-term, moderate beneficial effects to the vegetative community.

Alternative C would provide some of the same beneficial effects but would also result in increased public uses and development of visitor facilities (e.g., roads, trails, visitor center, and parking). Although there would be fewer sites actively managed for restoration of plant communities than in Alternative B, it is anticipated that there would be a long-term, moderate, refuge-wide, beneficial effect from this alternative. In the vicinity of construction and demolition projects, the impacts would be short-term, minor, and local. Within the immediate footprint of project sites (e.g., roads, trails, buildings, and parking areas), impacts to the flora would be long-term, moderate, and local.

Threatened, Endangered, and Rare Species

One focus of the management programs for the refuge is the protection and enhancement of threatened, endangered, and rare species. All alternatives are expected to benefit these species. Alternative A provides the least management of these species and their habitat but would still provide for sea turtle monitoring and surveys of roseate terns, Virgn Island tree boas, and listed plants to monitor population trends.

Although the overall long-term impact of the alternatives would be neutrally to moderately beneficial throughout the refuge, specific development projects and management activities would have a potential for short-term, minor negative impacts to some of the species in a localized area. Clearing of project sites for construction of the office/visitor center/maintenance complex, visitor contact facilities, observation towers, roads, trails, and parking could impact listed or rare plant species. In addition, some of the habitat management activities proposed under Alternatives B and C have a potential for negative consequences for both plant and animal species. These activities include: removal of invasive plant species using mechanical methods, herbicides, or prescribed burning (if determined to be compatible) and opening of lagoon entrances, which could affect sea turtle nesting habitat. In addition, disturbance of birds and sea turtles during monitoring activities could have short-term, minor impacts on these species.

SOCIOECONOMIC FACTORS

Archaeological and Historical Resources

Under all alternatives, the cultural resource values of Vieques Refuge would be treated according to the regulations of Section 106 of the National Historic Preservation Act (NHPA). To comply with this Act and to evaluate any effects of proposed activities, surveys, reporting, and consultation with the Service's Regional Archaeologist and the State Historic Preservation Office are required for each project that has the potential to affect historic properties. Under all alternatives the Service will seek agreements with commonwealth agencies or non-governmental organizations to aid in the stabilization, restoration, and protection of historic and archaeological sites. Many activities proposed in the alternatives, such as beach use, education and interpretation activities, fishing, invasive/noxious plant control, and wildlife oriented recreation, have virtually no potential to affect

cultural resources and are perceived as having a “neutral” effect. Cultural resources are sensitive to ground-disturbing types of activities. Potentially negative impacts to cultural resources could occur as a result of construction of facilities, clearing for habitat restoration or fire breaks, development of new trails, and forest management activities.

The known sites where management and development activities might impact cultural resources include the Puerto Ferro lighthouse, remains of sugar plantation structures on both eastern and western refuge lands, and prehistoric sites containing petroglyphs and middens. Effects to cultural resources vary between the alternatives and are dependent on the level of direct management of these resources and other development that may affect the archaeological or historic site. Under Alternative A, there would be very limited development or management activities that would cause ground disturbance or otherwise directly impact known or potential sites. Alternative B would provide interpretation related to some of the sites and would provide for habitat management that might impact cultural resources. Alternative C provides for a proactive approach to management of the cultural resources with the collection of complete cultural resource information and stabilization of the Puerto Ferro lighthouse. Although Alternative C proposes additional trails and facilities, the majority of these would be located on previously disturbed sites (e.g., hiking, biking, and interpretive trails would use existing service roads). Any new facilities at previously unused sites would require surveys and consultations to comply with requirements of the NHPA. After compliance with the regulations, it is anticipated that negative impacts to cultural resources from implementation of any of the alternatives would be short-term, minor, and local. Alternative C could provide long-term, beneficial effects for the cultural resources.

Employment

The staffing and budgets for administration of the refuge affect the local economy both directly through jobs and salaries of the employees and indirectly through expenditures made in the community. Other impacts on employment result from tourism, and researchers and contract personnel who come to the area to conduct work activities. Table 10 provides estimates of the annual budgets for the administration of the refuge programs under the different alternatives.

Table 10. Potential economic effects of alternatives

Potential Economic Effects	Alternatives		
	Alternative A	**Alternative B**	**Alternative C**
Direct Employment (jobs)	11	21	25
Total Salaries and Benefits	$567,000	$1,040,000	$1,312,000
Approximate Annual Refuge Operating Expenses	$140,000 *	$260,000 *	$305,000 *
Total Direct Benefits	**$707,000**	**$1,300,000**	**$1,617,000**

**Does not include capital expenditures*

Public Uses

All alternatives provide for a continuation of the current public use activities on the refuge. Alternatives A and B would maintain beach and fishing access and provide limited improvements to the facilities (e.g., upgrade entrance and access roads and provide directional and informational signing). In addition to the improvements in Alternatives A and B, Alternative C would provide for expanded hours of access, additional roads, trails and beaches would be opened, and a visitor center, kiosks, and improved fishing access would be developed. Both Alternatives B and C would evaluate the potential for hunting of doves, pigeons, and waterfowl and, where appropriate, areas would be opened for these activities. Interpretation and environmental education programs would be minimal under Alternatives A and B, but would be expanded significantly with Alternative C. Camping would not be permitted with Alternative A, would be associated with environmental education activities with Alternative B, and, if compatible, could be expanded to include limited recreational activities under Alternative C.

Overall, public uses and their impacts on the socioeconomic setting of Vieques would be essentially unchanged with Alternative A, would increase slightly with Alternative B, while Alternative C would provide for increases in both wildlife-dependent and compatible non-wildlife dependent recreational opportunities. The increased uses identified in Alternative C could have both positive and negative socioeconomic impacts. Positive aspects would include increased recreational opportunities for local residents and increased tourism with the associated financial benefits to the community. Negative effects include increased traffic, exhaust, noise, congestion, trash, and demand for goods and services that could result in escalation of prices.

The impacts from Alternatives A or B would be long-term, minor and local; whereas, impacts from Alternative C would likely be long-term, moderate, and local.

MITIGATION MEASURES TO BE INCORPORATED IN ALL ALTERNATIVES

The development of an effective refuge management program that includes wildlife habitat restoration, public use activities, and facilities to support these programs will, of necessity, result in some adverse impacts on the resources and potential conflicts among the users. During the development of the proposed alternatives, the planning team attempted to avoid unnecessary impacts, while providing for the development of programs that would benefit both the resources and the public.

The following measures have been developed in an effort to minimize the potential impacts from the strategies implemented under any of the alternatives. Some of these mitigation measures are standard operating procedure for projects developed on Fish and Wildlife Service lands, while others are unique to this proposal.

- The Service would apply “best management practices” to all construction activities.
- To minimize the potential impacts from the development of roads and trails, the Service is proposing to utilize existing roads for these purposes rather than create new ones.
- Whenever lagoons are opened to improve flushing, water quality and habitat responses would be monitored and management adapted, as necessary, to mitigate any adverse environmental responses.

- All projects would be conducted in compliance with Section 106 of the National Historic Preservation Act.

- Prior to initiation of projects, surveys of construction and habitat management sites for threatened, endangered, or rare species would be conducted to determine if there is a potential for any of the species being present.

CUMULATIVE IMPACTS

Cumulative impacts are actions that may be generated by various entities, including other federal or state agencies, local agencies, non-governmental organizations, and private landowners, as each of these groups undertakes actions related to land uses. Increased public use activities on the refuge along with additional uses at the Sun Bay facilities, tourism and development throughout the island will cumulatively result in increased demand for water, electricity, roads, lodging and other infrastructure. The combined impacts of all activities will affect the community and the ability of the local government to provide services. Similarly, the human activities throughout the island will result in alterations to the wildlife and habitats available.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

Short-term and long-term effects describe the relationship between local short-term uses of the human environment and maintenance of long-term productivity of the environment. All of the alternatives are clearly aimed at enhancing the long-term productivity and sustainability of natural resources on the refuge. To varying degrees, the alternatives propose to implement actions that promote the restoration of the natural environment of the refuge, while providing varying levels of public uses of the resources. Outreach and environmental education are a priority in Alternative C and encourage refuge visitors to be better stewards of the environment.

General impacts on biological resources from any of the alternatives are expected to be long-term and beneficial. Habitat for threatened and endangered species, such as sea turtle nesting beaches and listed plant habitats, would receive high priority for restoration. Neotropical migratory bird habitat would also be protected and restored.

Although the environmental and visitor programs proposed for the refuge are not expected to attract massive numbers of visitors, in the long run, the local economy would be impacted positively by increased spending on these programs and visitor services. The programs would attract visitors and increase tourism and wildlife-dependent recreation. Enhanced interpretation and education about the wildlife resources within the ecosystem would lead to better public understanding and support for the restoration and protection of natural resources that support people and wildlife.

The development of visitor center facilities, trails, observation platforms and kiosks, and visitor/educational facilities would result in both short-term and long-term physical impacts on soil and vegetation. These impacts would be localized and confined to the immediate construction sites. Increased attention to environmental education and recreation programs would result in more audiences being involved with environmental education and wildlife-dependent recreation, and a more positive ethic of land stewardship throughout the refuge vicinity.

Long-term beneficial effects of implementation of Alternative B or C, and to a lesser degree Alternative A, include an increased productivity of neotropical migratory bird habitat, protection of threatened and endangered species, shorebird and waterfowl habitat, and other species dependent upon refuge habitats. The public would also gain long-term opportunities for wildlife-dependent recreation and education.

Short-term uses of refuge lands include hunting, fishing, management for selected species, wildlife inventories, water-quality monitoring, forest regeneration, prescribed burning, and the construction of administration and public use facilities. These activities would be implemented with the primary goal of assuring the sustained productivity of refuge resources.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are projected from the changes in levels of management activities as described in Alternatives B and C relative to the current management alternative (Alternative A).

Construction of visitor facilities and increased visitation would affect local air and water quality and natural vegetation through vehicle emissions, localized damage to vegetation, and soil compaction. Disturbance to wildlife is an unavoidable consequence of any development or expanded public use program, regardless of the activity involved. Some activities have a potential to be more disturbing than others. For example, human activity and lights at night on sea turtle nesting beaches could cause turtles to abandon nesting attempts. Although many public use activities would be permitted, the management goal is to provide a balance and to monitor activities to ensure that unacceptable levels of impact do not occur.

Increased visitation resulting from program and facilities development would result in additional disturbances to both resident and migratory wildlife. The construction of roads, trails, buildings, visitor and management facilities and the manipulation of habitats to encourage native species and reduce exotic vegetation would result in the loss or alteration of existing habitats. The short-term alterations and the long-term losses would occur on very small portions of the refuge and should not result in significant permanent impacts.

Unavoidable impacts to the local community would occur due to an increase in tourists to the island. The potential adverse impacts include increased traffic, competition for public transportation (e.g., airline service, ferry, and taxi) and possibly greater difficulty in obtaining consumer goods during periods of high visitation.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The use of non-renewable resources is irreversible. Minerals and fossil fuels are not renewable and therefore any that are utilized during the construction of roads, trails, and facilities, and during implementation of management programs, would not be available for future use. Likewise, an irreversible commitment of resources results when an area is altered in such a way that it cannot be returned to its natural condition for an extended period of time. The lands and habitats occupied by roads, trails, and facilities would constitute an irreversible and irretrievable commitment of these resources. Management of refuge lands acquired would result in an irreversible and irretrievable commitment of funding for operations, administration, and management. Funding and personnel commitments by the Service to develop and manage refuge lands and facilities render those resources unavailable for other Service programs and projects. Table 11 gives a comparison of the funding needs for each of the alternatives.

Table 11. Comparison of funding needs by alternative

Items	Funding Needs by Alternative (in thousands)		
	Alternative A	Alternative B	Alternative C
Total Salaries and Benefits	567	1,040	1,312
Approximate Annual Refuge Operating Expenses	140	260	305
Projects Costs (one time* or annual** in addition to staff and operating expenses)			
East Entrance *	30	30	30
Boundary Fence *	411	411	411
Directional Signing*	60	60	100
Rehab Utilities*	100	100	100
Lagoon Restoration**	40	80	40
Mangrove Restoration**	25	100	100
Upland Forest Restoration**	0	100	100
Fire Management Equipment*	100	120	120
Invasive Plant Control**	0	25	25
Feral Animal Control**	0	10	10
Sea Turtle Program**	25	75	50
Plant Surveys/Propagation*	25	100	100
Waterbird Management**	5	15	15
Upland Bird Management**	5	15	15
Beach Facilities* Composting Yoilets	0	125	125
Road Upgrade (East)* †	7,900	20,000	20,000
Road Upgrade (West)* †	0	1,700	1,700
Improve Boat Launch Sites*	0	0	150
Parking Upgrade (Existing Sites)*	Included in road upgrade projects east and west		
Environmental Education Program**	30	50	75
Historic Site Stabilization*	0	0	1,400
Historic Site Interpretive Signing*	0	0	30
Historic Site Restoration*	0	0	4,700
Equipment Needs* List	See updated SAMMS and RONS lists	See updated SAMMS and RONS lists	See updated SAMMS and RONS lists
Office/Visitor Center/Maintenance Complex*	0	2,500	4,000
Upgraded Boardwalk Trail and Kiosk at Kiani*	0	5	15
Visitor Information Kiosks East and West*	0	30	30
Interpretive Trails (East) (Hiking, Equestrian, and Biking)*	0	0	140
Monte Pirata “Old-growth Interpretive Trail” with Parking*	0	0	150

† Road Upgrade funding to be provided by TEA 21 and Emergency Relief Funds.

Animal and plant communities are renewable in different degrees. Construction sites, and some habitat management practices, may irretrievably alter natural communities, at least for a period of time. Wildlife taken through hunting, fishing, or nuisance control is not available for wildlife observation, photography, or consumptive uses by others. Since these activities are managed to ensure the health and viability of the overall wildlife populations, the species and other uses of the resources should not be irreversibly threatened.

Table 12. Comparison of environmental consequences

Environmental effects change from Alternative A (no-action alternative). This analysis provides a comparison of the effects of implementation of either Alternative B or Alternative C with the effects that could be expected from Alternative A.

AREA OF CONCERN / MANAGEMENT ACTIVITY	Alternative B	Alternative C
PHYSICAL ENVIRONMENT		
Soil Resources		
Forest restoration, invasive species control, lagoon opening	Short-term, minor	Short-term, minor
Construction of facilities, roads and trails	Long-term, minor	Long-term, moderate
Hydrology and Water Quality		
Lagoon opening, habitat management	Long-term, minor	Long-term, minor
Increased beach uses, public use facilities	Long-term, minor	Long-term, minor
Air Quality		
Roads, trails increased traffic	Short-term, minor	Short-term, minor
Habitat management, prescribed burning	Short-term, moderate	Short-term, moderate
Contaminants/Hazardous Material		
Public uses, habitat management, maintenance activities (does not include consideration of Navy clean up activities)	Short-term, minor	Short-term, minor
Aesthetics		
Development of facilities, parking, kiosks, towers etc.	Long-term, minor-to-moderate	Long-term, moderate

AREA OF CONCERN / MANAGEMENT ACTIVITY	Alternative B	Alternative C
BIOLOGICAL RESOURCES		
Fauna/ Resident and migratory birds/		
Lagoon opening	Short-term, minor, beneficial	Short-term, minor, beneficial
Road, trail, parking, facilities development, etc.	Long-term, minor	Long-term, moderate
Land crab harvest	Short-term, minor	Short-term, minor
Hunting	Short-term, minor	Short-term minor
Flora		
Habitat management	Long-term, moderate, beneficial	Long-term, moderate, beneficial
Road, trail, parking, facilities development, etc.	Long-term, minor	Long-term, minor
Threatened, Endangered and Rare Species		
Habitat management	Long-term, moderate, beneficial	Long-term, moderate, beneficial
Roads, trails, facilities development, invasive species control, prescribed burning, surveys and monitoring.	Short-term, minor	Short-term, minor
SOCIOECONOMIC FACTORS		
Archaeological and Historical Resources		
Road, trail, parking, facilities development, etc.	Short-term, minor	Short-term, minor
Cultural resource surveys and agreement	Neutral	Long-term, moderate, beneficial
Environmental Justice		
	No Change	No Change
Employment		
Staff increases	Long-term, minor	Long-term, minor
Public Uses		
Consumptive and non-consumptive recreational uses	Long-term, minor	Long-term, moderate

V. Consultation and Coordination

The primary development of the draft comprehensive conservation plan and environmental impact statement was accomplished by the core planning team that was established early in the planning process. This team is composed of Fish and Wildlife Service personnel from the Divisions of Refuges, Ecological Services, and a representative from the Department of Natural and Environmental Resources who serves as a liaison with other commonwealth representatives having an interest in refuge planning activities. All of the members of the core team work in Puerto Rico or are very familiar with the Vieques Refuge and its natural and cultural resources. Table 13 provides a listing of the core team members and their primary functions on the team.

Table 13. Vieques Refuge core planning team

NAME	TITLE	LOCATION	TEAM FUNCTION
Susan Silander, Fish and Wildlife Service	Manager, Caribbean Islands National Wildlife Refuge	Boquerón, Puerto Rico	Plan development, management direction, coordination with cooperating agencies, review, and editing.
Oscar Diaz, Fish and Wildlife Service	Manager, Vieques National Wildlife Refuge	Vieques, Puerto Rico	Plan development, management direction, coordination with cooperating agencies, review, and editing.
Mike Barandiaran, Fish and Wildlife Service	Assistant Manager, Vieques National Wildlife Refuge	Vieques, Puerto Rico	Plan development and biological alternatives.
Gisella Burgos, Fish and Wildlife Service	Interpretive Specialist, Vieques National Wildlife Refuge	Vieques, Puerto Rico	Plan development, public use alternatives, and meeting coordination.
Joseph Schwagerl, Fish and Wildlife Service	Assistant Manager, Caribbean Islands National Wildlife Refuge	Boquerón, Puerto Rico	Plan development, resource background, editing, and alternatives' development.
James Oland, Fish and Wildlife Service	Special Assistant, Refuges	Annapolis, Maryland	Team organization, writing, and plan editing.
Rosa Maria Quiles, Department of Natural and Environmental Resources	Natural Resource Planner	San Juan, Puerto Rico	Plan development, coordination with commonwealth personnel, background, and socioeconomic information.

NAME	TITLE	LOCATION	TEAM FUNCTION
Karen Torres, Fish and Wildlife Service	Information Technology Specialist	Boquerón, Puerto Rico	Plan development, and GIS data layer preparation.
Marelisa Rivera, Fish and Wildlife Service	Wildlife Biologist	Boquerón, Puerto Rico	Plan development, endangered species background, alternatives' development, and editing.
Felix Lopez, Fish and Wildlife Service	Ecologist	Boquerón, Puerto Rico	Plan development, contaminants, wetlands, and alternatives' development.

Public involvement process: Public scoping was conducted through the following formal events:

Open House - July 10, 2004 (approximately 600 attended)
Public Scoping Meeting - August 19, 2004 (25 attended)
Public Scoping Meeting - November 10, 2004 (49 attended)

The Open House was planned to provide the public with general information about the Fish and Wildlife Service, the Vieques National Wildlife Refuge, and the upcoming process for development of the comprehensive conservation plan. The Public Scoping meetings were announced locally through news releases, flyers, and contacts with community organizations. Each meeting began with an opportunity for guests to visit a selection of refuge exhibits and speak with the planning team members and refuge staff. This was followed by a brief staff presentation about the refuge, the Refuge System, and the planning process. Members of the public were then provided an opportunity to identify issues, make comments, and ask questions before the group. During each of the public events, the public was provided an opportunity and encouraged to identify issues and provide written comments to be used during the development of the alternatives. A total of 78 written comments were received.

In addition to the public scoping activities, approximately 15 agencies and community organizations, representing approximately 200 individuals, were provided presentations on the plan's development and were given an opportunity to provide comments and identify issues. Comment forms were provided at the public forums, were placed at local businesses throughout the community and at the refuge headquarters, and were provided to persons who made inquiries through the Internet, by mail, and in person.

Additional efforts to keep the community informed and to solicit input have been through press coverage of public events, a paid announcement of the public meeting and three radio interviews, information provided for a local web page, and publication and distribution of a planning update flyer.

The Sea Grant College Program of the University of Puerto Rico is conducting a survey of Vieques residents to determine their knowledge, perceptions, and desired uses of the refuge.

The Commonwealth of Puerto Rico, the Navy, and the General Services Administration agreed to work with the Service during the development of the NEPA documentation associated with the planning process. This role was fulfilled primarily during the internal review process when the agencies provided review, comments, and information to facilitate the preparation of the public review draft document.

In 2002, a Biological Review of the Caribbean Islands National Wildlife Refuge was completed. At that time, approximately 3,100 acres on western Vieques lands had been transferred to the Service and were considered in the review. Recommendations from that document were considered and incorporated into this Draft CCP/EIS. The members of the Biological Review Team, their positions and their areas of expertise are provided in Table 14.

Table 14. Caribbean Islands National Wildlife Refuge biological review team

Caribbean Islands National Wildlife Refuge Biological Review Team		
Team Member	**Position**	**Expertise**
Chuck Hunter	Non-game Migratory Bird Coordinator, Fish and Wildlife Service, Atlanta, Georgia	Birds
Marelisa Rivera	Biologist, Fish and Wildlife Service, Boquerón, Puerto Rico	Endangered Species
Jorge Saliva	Biologist, Fish and Wildlife Service, Boquerón, Puerto Rico	Endangered Species, Birds
Leopoldo Miranda	Biologist, Fish and Wildlife Service, Boquerón, Puerto Rico	Birds
Susan Silander	Refuge Manager, Caribbean Islands National Wildlife Refuge, Fish and Wildlife Service, Boquerón, Puerto Rico	Plants, Reptiles, Amphibians, Land Acquisition, Protection
Claudia Lombard	Biologist, Fish and Wildlife Service, Sandy Point National Wildlife Refuge, U.S. Virgin Islands	Reptiles, Amphibians
Amy Mackay	Biological Technician, Fish and Wildlife Service, Sandy Point National Wildlife Refuge, U.S. Virgin Islands	Reptiles, Amphibians

Caribbean Islands National Wildlife Refuge Biological Review Team		
Team Member	**Position**	**Expertise**
Cal Garnett	Assistant Refuge Supervisor, Fish and Wildlife Service, Atlanta, Georgia	Bats
Joseph Schwagerl	Refuge Manager, Fish and Wildlife Service, Boquerón, Puerto Rico	Dry Forest, Fire Management
C. Watson		Wetland Restoration
Stephen Earsom	Refuge Biologist, Fish and Wildlife Service, Boquerón, Puerto Rico	Invasive Species
Keith Watson	Non-game Migratory Bird Biologist, Fish and Wildlife Service, Manteo, North Carolina	Bird inventories, Monitoring
Felix Lopez	Ecologist, Fish and Wildlife Service, Boquerón, Puerto Rico	Contaminants, Unexploded Ordnance
Margaret Miller	Coral Reef Scientist, National Oceanic and Admospheric Administration, Miami, Florida	Corals, Marine Habitats
Beverly Yoshioka	Biologist, Fish and Wildlife Service, Boquerón, Puerto Rico	Aquatic Invertebrates, Corals, Fisheries

APPENDIX I. GLOSSARY

Adaptive Management	A process in which projects are implemented within a framework of scientifically driven experiments to test predictions and assumptions outlined within the comprehensive conservation plan. The analysis of the outcome of project implementation helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.
Alternative	A different means of accomplishing refuge purposes, goals, and objectives and contributing to the National Wildlife Refuge System. An alternative is a reasonable way to fix the identified problem or satisfy the stated need.
Appropriate Use	A proposed or existing use of a national wildlife refuge that (1) supports the Refuge System Mission, the major purposes, goals, or objectives of the refuge; (2) is necessary for the safe and effective conduct of a priority general public use on the refuge; (3) is otherwise determined under Service Manual Chapter 605 FW1 (draft), by the refuge manager and refuge supervisor to be appropriate.
Approved Acquisition Boundary	A project boundary that the Director of the Fish and Wildlife Service approves upon completion of the detailed planning and environmental compliance process.
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. The National Wildlife Refuge System focus is on indigenous species, biotic communities, and ecological processes.
Biological Integrity	The biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions including the natural biological processes that shape genomes, organisms, and communities.
Buffer Zones	Protective land borders around critical habitats or water bodies that reduce runoff and nonpoint source pollution loading; areas created or sustained to lessen the negative effects of land development on animals and plants and their habitats.
Carrying Capacity	The size of the population that can be sustained by a given environment.

Categorical Exclusion	A category of actions that do 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 of 1969.
CFR	Code of Federal Regulations.
Compatible Use	A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the refuge manager, will not materially interfere with, or detract from, the fulfillment of the mission or the purposes of the refuge. A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.
Compatibility Determination	A compatibility determination is required for a wildlife-dependent recreational use or any other public use of a refuge. A compatible use is one which, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from fulfillment of the Refuge System mission or refuge purpose(s).
Comprehensive Conservation Plan	A document that describes the desired future conditions of the refuge; provides long-range guidance and management direction for the refuge manager to accomplish the purposes, goals, and objectives of the refuge; and contributes to the mission of the National Wildlife Refuge System and meets relevant mandates.
Conservation Easement	A legal document that provides specific land-use rights to a secondary party. A perpetual conservation easement usually grants conservation and management rights to a party in perpetuity.
Cooperative Agreement	A legal instrument used when the principle purpose of the transaction is the transfer of money, property, services, or anything of value to a recipient in order to accomplish a public purpose authorized by federal statute and substantial involvement between the Service and the recipient is anticipated.
Corridor	A route that allows movement of individuals from one region or place to another.
Cover Type	The present vegetation of an area.
Cultural Resources	The remains of sites, structures, or objects used by people of the past.
Database	A collection of data arranged for ease and speed of analysis and retrieval, usually computerized.
Ecological Succession	The orderly progression of an area through time in the absence of disturbance from one vegetative community to another.

Ecosystem	A dynamic and interrelated complex of plant and animal communities and their associated non-living environment.
Ecosystem Management	Management of natural resources using systemwide 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.
Ecotourism	A type of tourism that maintains and conserves natural resources as a basis for promoting economic growth and development resulting from visitation to an area.
Environmental Health	The composition, structure, and functioning of soil, water, air, and other abiotic features comparable with historic conditions, including the natural abiotic processes that shape the environment.
Endangered Species	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.
Endemic Species	Plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality.
Environmental Impact Statement	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).
Fauna	All the vertebrate or invertebrate animals of an area.
Federal Trust Species	All species where the Federal Government has primary jurisdiction including federally threatened or endangered species, migratory birds, anadromous fish, and certain marine mammals.
Finding of No Significant Impact	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.
Geographic Information System	A computer system capable of storing and manipulating spatial data.
Goal	Descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but does not define measurable units.

Habitat	The place where a particular type of plant or animal lives. An organism's habitat must provide all of the basic requirements for life and should be free of harmful contaminants.
Historic Conditions	These are the composition, structure, and functioning of ecosystems resulting from natural processes that we believe, based on sound professional judgment, were present prior to substantial human-related changes to the landscape.
Indicator Species	A species of plant or animals that is assumed to be sensitive to habitat changes and represents the needs of a larger group of species.
Issue	Any unsettled matter that requires a management decision; e.g., a Service initiative, an opportunity, a management problem, a threat to the resources of the unit, a conflict in uses, a public concern, or the presence of an undesirable resource condition. Issues should be documented, described, and analyzed in the plan even if resolution cannot be accomplished during the planning process.
Management Plan	A plan that guides future land management practices on a tract of land.
Migratory	The seasonal movement from one area to another and back.
Mission Statement	A 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	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 this Act with other planning requirements, and prepare appropriate policy documents to facilitate better environmental decision-making.
National Wildlife Refuge	A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System.
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, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas.
Native Species	Species that normally live and thrive in a particular ecosystem.
Neotropical Migratory Bird	A bird species that breeds north of the United States/Mexican border and winters primarily south of that border.

Objective	An objective is a concise quantitative (where possible) target statement of what will be achieved. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific.
Partnership	A contract or agreement entered into by two or more individuals, groups of individuals, or organizations or agencies in which each agrees to furnish a part of the capital or some in-kind service, i.e., labor, for a mutually beneficial enterprise.
Planning Area	A planning area may include lands outside existing planning unit boundaries that are being studied for inclusion in the unit and/or partnership planning efforts. It may also include watersheds or ecosystems that affect the planning area.
Planning Team	A planning team prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of the a planning team leader; refuge manager and staff biologists; staff specialists or other representatives of Service programs, ecosystems or regional offices; and state partnering wildlife agencies, as appropriate.
Preferred Alternative	This is the alternative determined by the decision-maker that will best achieve the refuge purpose, vision, and goals; contribute to the refuge system mission, address the significant issues; and is consistent with principles of sound fish and wildlife management.
Proposed Action (or Proposed Alternative)	The proposal for which an environmental impact statement or environmental assessment is being written; the alternative containing the actions and strategies recommended by the planning team. The proposed action is, for all practical purposes, the draft plan for the refuge.
Purpose of the Refuge	The purpose of the refuge is 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 and refuge unit.
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.

Refuge Operating Needs System (RONS)	This is a national database that contains the unfunded operational needs of each refuge. Projects included are those required to implement approved plans and meet goals, objectives, and legal mandates.
Refuge Purposes	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 subunit.
Service Asset Maintenance Management System (SAMMS)	A web-based system designed to track maintenance needs for Fish and Wildlife Service-owned assets.
Step-down Management Plans	Step-down management plans provide the details necessary to implement management strategies and projects identified in the comprehensive conservation plan.
Strategy	A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives.
Threatened Species	Species listed under the Endangered Species Act that likely are to become endangered within the foreseeable future throughout all or a significant portion of their range.
Trust Species	Species for which the Fish and Wildlife Service has primary responsibility, including most federally listed threatened and endangered species, anadromous fish once they enter the inland coastal waterways, and migratory birds.
Understory	Any vegetation with canopy below or closer to the ground than canopies of other plants.
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 (Service Manual, 602 FW 1.5).
Visitor Center	A permanently staffed building offering exhibits and interpretive information to the visiting public. Some visitor centers are co-located with refuge offices and others include additional facilities, such as classrooms or wildlife viewing areas.
Visitor Contact Station	Compared to a visitor center, a contact station is a smaller facility that may not be permanently staffed.

Wildlife Corridor A landscape feature that facilitates the biologically effective transport of animals between larger patches of habitat dedicated to conservation functions. Such corridors may facilitate several kinds of traffic, including frequent foraging movement, seasonal migration, or the once-in-a-lifetime dispersal of juvenile animals. These are transition habitats and need not contain all habitat elements required by migratory animals for long-term survival or reproduction.

Wildlife-Dependent Recreation A use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the Refuge System.

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APPENDIX III. RELEVANT LEGAL MANDATES

NATIONAL WILDLIFE REFUGE SYSTEM AUTHORITIES

The mission of the Fish and Wildlife Service is to conserve, protect, and enhance the Nation's fish and wildlife and their habitats for the continuing benefit of the American people. The Service is the primary federal agency responsible for migratory birds, endangered plants and animals, certain marine mammals, and anadromous fish. This responsibility to conserve our Nation's fish and wildlife resources is shared with other federal agencies and state and tribal governments.

As part of this responsibility, the Service manages the National Wildlife Refuge System. This system is the only nationwide system of federal land managed and protected for wildlife and their habitats. The mission of the National Wildlife Refuge System 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 Vieques National Wildlife Refuge is managed as part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, the Refuge Recreation Act of 1962, Executive Order 12996 (Management and General Public Use of the National Wildlife Refuge System), and other relevant legislation, executive orders, regulations, and policies.

KEY LEGISLATION/POLICIES FOR PLAN IMPLEMENTATION

Antiquities Act (1906): Authorizes the scientific investigation of antiquities on federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Migratory Bird Treaty Act (1918): Designates the protection of migratory birds as a federal responsibility. This Act enables the setting of seasons, and other regulations including the closing of areas, federal or non-federal, to the hunting of migratory birds.

Migratory Bird Conservation Act (1929): Establishes procedures for acquisition by purchase, rental, or gift of areas approved by the Migratory Bird Conservation Commission.

Migratory Bird Hunting and Conservation Stamp Act (1934): Authorized the opening of part of a refuge to waterfowl hunting.

Fish and Wildlife Act (1956): Established a comprehensive national fish and wildlife policy and broadened the authority for acquisition and development of refuges.

Fish and Wildlife Coordination Act (1958): Allows the Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes.

Refuge Recreation Act (1962): Allows the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient funds are available to manage the uses.

Land and Water Conservation Fund Act (1965): Uses the receipts from the sale of surplus federal land, outer continental shelf oil and gas sales, and other sources for land acquisition under several authorities.

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. (Refuge Administration 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 for which the refuge was established. The Refuge Improvement Act clearly defines a unifying mission for the refuge system; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography and environmental education and interpretation); establishes a formal process for determining compatibility; established the responsibilities of the Secretary of the Interior for managing and protecting the System; and requires a comprehensive conservation plan for each refuge by the year 2012. The Refuge Improvement Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

National Environmental Policy Act (1969): Requires the disclosure of the environmental impacts of any major federal action significantly affecting the quality of the human environment.

Rehabilitation Act (1973): Requires that programmatic and physical accessibility be made available in any facility funded by the Federal Government, ensuring that anyone can participate in any program.

Clean Air Act (1990): Directed the Environmental Protection Agency to set limits on how much of a pollutant can be in the air anywhere in the United States. The law allows individual states to have stronger pollution controls, but states are not allowed to have weaker pollution controls than those set for the whole country. Established standards are included in the following table:

Clean Water Act (1977): Requires consultation with the U.S. Army Corps of Engineers for major wetland modifications.

Executive Order 11988 (1977): Each federal agency shall provide leadership and take action to reduce the risk of flood loss and minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the flood plain.

Emergency Wetlands Resources Act (1986): The purpose of the Act is "To promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes."

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species; and an interdisciplinary approach with the cooperation of other federal and state agencies.

Americans with Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

National Ambient Air Quality Standards

Pollutant	Primary Stds.	Averaging Times	Secondary Stds.
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour[1]	None
	35 ppm (40 mg/m^3)	1-hour[1]	None
Lead	1.5 µg/m^3	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m^3)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM_{10})	50 µg/m^3	Annual[2] (Arith. Mean)	Same as Primary
	150 ug/m^3	24-hour[1]	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual[3] (Arith. Mean)	Same as Primary
	65 ug/m^3	24-hour[4]	
Ozone	0.08 ppm	8-hour[5]	Same as Primary
	0.12 ppm	1-hour[6]	Same as Primary
Sulfur Oxides	0.03 ppm	Annual (Arith. Mean)	-------
	0.14 ppm	24-hour[1]	-------
	-------	3-hour[1]	0.5 ppm (1300 ug/m^3)

[1] *Not to be exceeded more than once per year.*
[2] *To attain this standard, the expected annual arithmetic mean PM10 concentration at each monitor within an area must not exceed 50 ug/m^3.*
[3] *To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 ug/m^3.*
[4] *To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 ug/m^3.*
[5] *To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.*
[6] *(a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is <= 1, as determined by appendix H.*
(b) The 1-hour NAAQS will no longer apply to an area one year after the effective date of the designation of that area for the 8-hour ozone NAAQS. The effective designation date for most areas is June 15, 2004. (40 CFR 50.9; see Federal Register of April 30, 2004 (69 FR 23996).)

Executive Order 12996 Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the system.

Executive Order 13007 Indian Sacred Sites (1996): Directs federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

Emergency Wetland 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 also requires the Secretary of the Interior to establish a National Wetlands Priority Conservation Plan, requires the states to include wetlands in their comprehensive outdoor recreation plans, and transfers to the Migratory Bird Conservation Fund an amount equal to import duties on arms and ammunition.

Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended: Public Law 93-205, approved December 28, 1973, repealed the Endangered Species Conservation Act of December 5, 1969 (P.L. 91-135, 83 Stat. 275). The 1969 act amended the Endangered Species Preservation Act of October 15, 1966 (P.L. 89-669, 80 Stat. 926). The 1973 Endangered Species Act provided for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through federal action and by encouraging the establishment of state programs. The Act authorizes the determination and listing of species as threatened and endangered; prohibits unauthorized taking, possession, sale, and transport of endangered species; provides authority to acquire land for the conservation of listed species, using land and water conservation funds; authorizes establishment of cooperative agreements and grants-in-aid to states that establish and maintain active and adequate programs for threatened and endangered wildlife and plants; authorizes the assessment of civil and criminal penalties for violating the Act or regulations; and authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction of anyone violating the Act and any regulation issued thereunder.

Environmental Education Act of 1990(20 USC 5501-5510; 104 Stat. 3325): Public Law 101-619, signed November 16, 1990, established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a federal environmental education program. Responsibilities of the Office include developing and supporting programs to improve understanding of the natural and developed environment, and the relationships between humans and their environment; supporting the dissemination of educational materials; developing and supporting training programs and environmental education seminars; managing a federal grant program; and administering an environmental internship and fellowship program. The Office is required to develop and support environmental programs in consultation with other federal natural resource management agencies, including the Fish and Wildlife Service.

Executive Order 11988, Flood Plain Management: The purpose of this executive order, signed May 24, 1977, 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 flood plain 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 flood plains.”

Fish and Wildlife 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 of the Interior 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.

Historic Preservation Acts include:

Antiquities Act (16 USC 431 - 433)--The Act of June 8, 1906, (34 Stat. 225): This Act authorizes the President of the United States to designate as National Monuments objects or areas of historic or scientific interests on lands owned or controlled by the United States. The Act required that a permit be obtained for examination of ruins, excavation of archaeological sites and the gathering of objects of antiquity on lands under the jurisdiction of the Secretaries of Interior, Agriculture, and Army, and provided penalties for violations.

Archaeological Resources Protection Act (16 U.S.C. 470aa - 47011): Public Law 96-95, approved October 31, 1979, (93 Stat. 721): This Act largely supplanted the resource protection provisions of the Antiquities Act for archaeological items. It established detailed requirements for issuance of permits for any excavation for, or removal of, archaeological resources from federal and Indian lands. It also established civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from federal and Indian lands in violation of any provision of federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any state or local law.

Public Law 100-588, approved November 3, 1988, (102 Stat. 2983) lowered the threshold value of artifacts triggering the felony provisions of the Act from $5,000 to $500, made attempting to commit an action prohibited by the Act a violation, and required the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the nation.

Archaeological and Historic Preservation Act (16 U.S.C. 469-469c): Public Law 86-523, approved June 27, 1960, (74 Stat. 220), and amended by Public Law 93-291, approved May 24, 1974, (88 Stat. 174): This Act directed federal agencies to notify the Secretary of the Interior whenever a federal, federally assisted, or licensed or permitted project may cause loss or destruction of significant scientific, prehistoric or archaeological data. The Act authorized use of appropriated, donated, and/or transferred funds for the recovery, protection, and preservation of such data.

Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461-462, 464-467): The Act of August 21,1935, (49 Stat. 666) popularly known as the Historic Sites Act, as amended by Public Law 89-249, approved October 9,1965, (79 Stat. 971): This Act declared it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provided procedures for designation, acquisition, administration, and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January 1989, thirty-one national wildlife refuges contained such sites.

National Historic Preservation Act of 1966 (16 U.S.C. 470-470b, 470c-470n): Public Law 89-665, approved October 15, 1966, (80 Stat. 915) and repeatedly amended: This Act provided for preservation of significant historical features (e.g., buildings, objects, and sites) through a grant-in-aid program to the states. It established a National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468-468d). The Act established an Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94-422, approved September 28, 1976 (90 Stat. 1319). That Act also created the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their

actions on items or sites listed in, or eligible for listing in, the National Register of Historic Places. As of January 1989, ninety-one such sites on national wildlife refuges are listed in this Register.

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 of 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.

Migratory Bird Hunting and Conservation Stamp Act (16 U.S.C. 718-718j, 48 Stat. 452), as amended: The "Duck Stamp Act," of March 16, 1934, requires each waterfowl hunter, 16 years of age or older, to possess a valid federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

National and Community Service Act of 1960 (42 U.S.C. 12401:104 Stat. 3127), Public Law 101-610, signed November 16,1990: This Act authorizes several programs to engage citizens of the United States in full- and/or part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. Several provisions are of particular interest to the Fish and Wildlife Service.

American Conservation and Youth Service Corps: A federal grant program established under Subtitle C of the law, the Corps offers an opportunity for young adults between the ages of 16-25, or in the case of summer programs, 15-21, to engage in approved human and natural resources projects which benefit the public or are carried out on federal or Indian lands. To be eligible for assistance, natural resource programs must focus on improvement of wildlife habitat and recreational areas, fish culture, fishery assistance, erosion, wetlands protection, pollution control and similar projects. A stipend of not more than 100 percent of the poverty level will be paid to participants. A Commission established to administer the Youth Service Corps will make grants to States, the Secretaries of Agriculture and Interior, and the Director of ACTION to carry out these responsibilities.

National Environmental Policy Act of 1959 (P.L. 91-190,42 U.S.C. 4321-4347, January 1, 1970, 83 Stat. 852) as amended by Public Law 94-52, July 3, 1975, 89 Stat. 258, and Public Law 94-83, August 9, 1975, 89 Stat. 424): Title I of the 1969 National Environmental Policy Act requires that all federal agencies prepare detailed environmental impact statements for "every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment." The 1969 statute stipulated the factors to be considered in environmental impact statements, and required that federal agencies employ an interdisciplinary approach in related decision-making and develop means to ensure that unquantified environmental values are given appropriate consideration, along with economic and technical considerations. Title II of this statute requires annual reports on environmental quality from the President to the Congress, and established a Council on Environmental Quality in the Executive Office of the President with specific duties and functions.

National Wildlife Refuge System Improvement Act of 1997: Public Law 105-57, amended the National Wildlife Refuge System Act of 1966 (16 U.S.C. 668dd-ee), and provided guidance for management and public use of the refuge system. The Act mandates that the refuge system be consistently directed and managed as a national system of lands and waters devoted to wildlife conservation and management. The Act establishes priorities for recreational uses of the refuge system. Six wildlife-dependent uses are specifically named in the Act: hunting, fishing, wildlife observation, wildlife photography, and environmental education and interpretation. These activities are to be promoted within the Refuge System and subject to compatibility determinations. A

compatible use is one that, in the sound professional judgment of the refuge manager, will not materially interfere with, or detract from, fulfillment of the National Wildlife Refuge System Mission or refuge purpose(s). As stated in the Act, "The mission of the system 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 Act also requires the development of a comprehensive conservation plan for each refuge and that management be consistent with the plan. When writing a plan for expanded or new refuges, and when making management decisions, the Act requires effective coordination with other federal agencies, state fish and wildlife or conservation agencies, and refuge neighbors. A refuge must also provide opportunities for public involvement when making a compatibility determination.

North American Wetlands Conservation Act (103 Stat. 1968; 16 U.S.C. 44O1~4412) Public Law 101-233, enacted December 13, 1989: This act 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 Act converts the Pittman-Robertson account into a trust fund, with the interest available without appropriation through the year 2006, to carry out the programs authorized by the Act, along with an authorization for annual appropriation of $15 million plus an amount equal to the fines and forfeitures collected under the Migratory Bird Treaty Act. Available funds may be expended, upon approval of the Migratory Bird Conservation Commission, for payment of not to exceed 50 percent of the United States' share of the cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands). At least 50 percent and no more than 70 percent of the funds received are to go to Canada and Mexico each year.

Refuge Recreation Act of 1952: 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.

Refuge Revenue Sharing Act (16 U.S.C. 715s): Section 401 of the Act of June 15, 1935, (49 Stat. 383) provided for payments to counties in lieu of taxes, using revenues derived from the sale of products from refuges. Public Law 88-523, approved August 30, 1964, (78 Stat. 701) made major revisions by requiring that all revenues received from refuge products, such as animals, timber and minerals, or from leases or other privileges, be deposited in a special Treasury account and net receipts distributed to counties for public schools and roads. Public Law 93-509, approved December 3, 1974, (88 Stat. 1603) required that moneys remaining in the fund after payments be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act. Public Law 95-469, approved October 17, 1978, (92 Stat. 1319) expanded the revenue sharing system to include National Fish Hatcheries and Service research stations. It also included in the Refuge Revenue Sharing Fund receipts from the sale of salmonid carcasses. Payments to counties were established as follows: on acquired land, the greatest amount calculated on the basis of 75 cents per acre, three-fourths of one percent of the appraised value, or 25 percent of the net receipts produced from the land; and on land withdrawn from the public domain, 25 percent of net receipts and basic payments under Public Law 94-565 (31 U.S.C. 1601-1607, 90 Stat. 2662). This amendment also authorized appropriations to make up any difference between the amount in the fund and the amount scheduled for payment in any year. The stipulation that payments be used for schools and roads was removed, but counties were required to pass payments along to other units of local government within the county that suffer losses in revenues due to the establishment of Service areas.

Wilderness Act of 1954: Public Law 88-577, approved September 3,1964, directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge and National Park Systems for inclusion in the National Wilderness Preservation System.

LEGISLATION SPECIFIC TO VIEQUES NWR

Public Law 106-398

TITLE XV--NAVY ACTIVITIES ON THE ISLAND OF VIEQUES, PUERTO RICO

Sec.1501.Assistance for economic growth on Vieques.
Sec.1502.Conveyance of Naval Ammunition Support Detachment, Vieques Island.
Sec.1503.Determination regarding continuation of Navy training.
Sec.1504.Actions if training is approved.
Sec.1505.Requirements if training is not approved or mandate for referendum is vitiated.
Sec.1506.Certain properties exempt from conveyance or transfer.
Sec.1507.Moratorium on improvements at Fort Buchanan.
Sec.1508.Transfer and management of Conservation Zones.

SEC. 1501. ASSISTANCE FOR ECONOMIC GROWTH ON VIEQUES.

(a) Authorization of Appropriations.--There is authorized to be appropriated to the Secretary of Defense for fiscal year 2000, $40,000,000 to be used to provide economic assistance for the people and communities of the island of Vieques, Puerto Rico, in accordance with the terms and conditions of the Vieques supplemental appropriation.

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(b) Transfer Authority.--The Secretary of Defense may transfer amounts of authorizations made available to the Department of Defense in subsection (a) to any agency or office of the United States Government in order to implement the projects for which the Vieques supplemental appropriation is made available. The transfer authority under this section is in addition to any transfer authority provided in Public Law 106-65 or any other Act.
(c) Notice to Congress.--The advance notice required by the Vieques supplemental appropriation of each proposed transfer shall also be submitted to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives.
(d) Definition.--In this section, the term ``Vieques supplemental appropriation'' means the paragraph under the heading ``Operation and Maintenance, Defense-Wide'' in chapter 1 of title I of the Emergency Supplemental Act, 2000 (division B of Public Law 106-246; 114 Stat. 525).

SEC. 1502. CONVEYANCE OF NAVAL AMMUNITION SUPPORT DETACHMENT, VIEQUES ISLAND.

(a) Conveyance Required.--
(1) Property to be conveyed.--The Secretary of the Navy shall convey, without consideration, to the Municipality of Vieques, Puerto Rico, all right, title, and interest of the United States in and to the land constituting the Naval

Ammunition Support Detachment located on the western end of the island of Vieques, Puerto Rico, except for--

(A) the property that is exempt from conveyance under section 1506;

(B) the property that is required to be transferred to the Secretary of the Interior under section 1508(a); and

(C) any property that is conveyed pursuant to section 1508(b).

(2) Time for conveyance.--The Secretary of the Navy shall complete the conveyance required by paragraph (1) not later than May 1, 2001.

(b) Description of Property.--The Secretary of the Navy, in consultation with the Secretary of the Interior on issues relating to natural resource protection under section 1508, shall determine the exact acreage and legal description of the property required to be conveyed pursuant to subsection (a), including the legal description of any easements, rights of way, and other interests that are retained pursuant to section 1506.

(c) Environmental Restoration.--

(1) Objective of conveyance.--An important objective of the conveyance required by this section is to promote timely redevelopment of the conveyed property in a manner that enhances employment opportunities and economic redevelopment, consistent with all applicable environmental requirements and in full consultation with the Governor of Puerto Rico, for the benefit of the residents of the island of Vieques.

(2) Conveyance despite response need.--If the Secretary of the Navy, by May 1, 2001, is unable to provide the covenant required by subparagraph (A)(ii)(I) of section 120(h)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9620(h)(3)) with respect to the property to be conveyed, the Secretary shall still complete

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the conveyance by that date, as required by subsection (a)(2). The Secretary shall remain responsible for completing all response actions required under such Act. Upon completion of such response actions, the Secretary shall execute and deliver to the transferee the warranty referred to in subparagraph (C)(iii) of such section. The completion of the response actions shall not be delayed on account of the conveyance.

(3) Continued navy responsibility.--Consistent with existing Navy and legal requirements, the Secretary of the Navy shall remain responsible for the environmental condition of the property, and neither the Commonwealth of Puerto Rico nor the Municipality of Vieques shall be responsible for such condition existing at the time of the conveyance.

(4) Savings clause.--All response actions with respect to the property to be conveyed shall take place in compliance with current law.

(d) Control of Conveyed Property.--The government of the Municipality of Vieques, acting through the elected officials of that government, shall have the power to administer, manage, and control the property conveyed under subsection (a) in any manner determined by the government of the Municipality of Vieques as being most advantageous to the majority of the residents of the island of Vieques (consistent with the laws of the United States).

(e) Indemnification.--

(1) Entities and persons covered; extent.--(A) Except as provided in subparagraph (C), and subject to paragraph (2), the Secretary of Defense shall hold harmless, defend, and indemnify in full the persons and entities described in subparagraph (B) from and against any suit, claim, demand or action, liability, judgment, cost or other fee arising out of any claim for personal injury or property damage (including death, illness, or loss of or damage to property or economic loss) that results from, or is in any manner predicated upon, the release or threatened release (after the conveyance is made under subsection (a)) of any hazardous substance or pollutant or contaminant as a result of Department of Defense activities at those parts of the Naval Ammunition Support Detachment conveyed pursuant to subsection (a).

(B) The persons and entities described in this paragraph are the following:

(i) The Commonwealth of Puerto Rico (including any officer, agent, or employee of the Commonwealth of Puerto Rico).

(ii) The Municipality of Vieques, Puerto Rico, and any other political subdivision of the Commonwealth of Puerto Rico that acquires such ownership or control (including any officer, agent, or employee of that Municipality or other political subdivision).

(iii) Any other person or entity that acquires such ownership or control.

(iv) Any successor, assignee, transferee, lender, or lessee of a person or entity described in clauses (i) through (iii).

(C) To the extent the persons and entities described in subparagraph (B) contributed to any such release or threatened release, subparagraph (A) shall not apply.

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(2) Conditions on indemnification.--No indemnification may be afforded under this subsection unless the person or entity making a claim for indemnification--

(A) notifies the Secretary of Defense in writing

within two years after such claim accrues or begins action within six months after the date of mailing, by certified or registered mail, of notice of final denial of the claim by the Secretary of Defense;

(B) furnishes to the Secretary of Defense copies of pertinent papers the entity receives;

(C) furnishes evidence of proof of any claim, loss, or damage covered by this subsection; and

(D) provides, upon request by the Secretary of Defense, access to the records and personnel of the entity for purposes of defending or settling the claim or action.

(3) Responsibilities of secretary of defense.--(A) In any case in which the Secretary of Defense determines that the Department of Defense may be required to make indemnification payments to a person under this subsection for any suit, claim, demand or action, liability, judgment, cost or other fee arising out of any claim for personal injury or property damage referred to in paragraph (1)(A), the Secretary may settle or defend, on behalf of that person, the claim for personal injury or property damage.

(B) In any case described in subparagraph (A), if the person to whom the Department of Defense may be required to make indemnification payments does not allow the Secretary of Defense to settle or defend the claim, the person may not be afforded indemnification with respect to that claim under this subsection.

(4) Accrual of action.--For purposes of paragraph (2)(A), the date on which a claim accrues is the date on which the plaintiff knew (or reasonably should have known) that the personal injury or property damage referred to in paragraph (1) was caused or contributed to by the release or threatened release of a hazardous substance or pollutant or contaminant as a result of Department of Defense activities at any part of the Naval Ammunition Support Detachment conveyed pursuant to subsection (a).

(5) Relationship to other laws.--Nothing in this subsection shall be construed as affecting or modifying in any way subsection 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9620(h)).

(6) Definitions.--In this subsection, the terms ``hazardous substance'', ``release'', and ``pollutant or contaminant'' have the meanings given such terms under paragraphs (9), (14), (22), and (33) of section 101 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601).

SEC. 1503. DETERMINATION REGARDING CONTINUATION OF NAVY TRAINING.

(a) Referendum.--

(1) Requirement.--Except as provided in paragraph (2), the President shall provide for a referendum to be conducted on the island of Vieques, Puerto Rico, to determine by a majority

of the votes cast in the referendum by the Vieques electorate whether the people of Vieques approve or disapprove of the continuation of the conduct of live-fire training, and any other types of training, by the Armed Forces at the Navy's training sites on the island under the conditions described in subsection (d).

(2) Exception.--If the Chief of Naval Operations and the Commandant of the Marine Corps jointly submit to the congressional defense committees, after the date of the enactment of this Act and before the date set forth in subsection (c), their certification that the Vieques Naval Training Range is no longer needed for training by the Navy and the Marine Corps, then the requirement for a referendum under paragraph (1) shall cease to be effective on the date on which the certification is submitted.

(b) Prohibition of Other Propositions.--In the referendum under this section, no proposition or option may be presented as an alternative to the propositions of approval and of disapproval of the continuation of the conduct of training as described in subsection (a)(1).

(c) Time for Referendum.--The referendum required under this section shall be held on May 1, 2001, or within 270 days before such date or 270 days after such date. The Secretary of the Navy shall publicize the date set for the referendum 90 days before that date.

(d) Required Training Conditions.--For the purposes of the referendum under this section, the conditions for the continuation of the conduct of training are those that are proposed by the Secretary of the Navy and publicized on the island of Vieques in connection with, and for a reasonable period in advance of, the referendum. The conditions shall include the following:

(1) Live-fire training.--A condition that the training may include live-fire training.

(2) Maximum annual days of use.--A condition that the training may be conducted on not more than 90 days each year.

(e) Proclamation of Outcome.--Promptly after the referendum is completed under this section, the President shall determine, and issue a proclamation declaring, the outcome of the referendum. The President's determination shall be final, and the outcome of the referendum (as so determined) shall be binding.

(f) Vieques Electorate Defined.--

(1) Registered voters.--In this section, the term ``Vieques electorate'', with respect to a referendum under this section, means the residents of the island of Vieques, Puerto Rico, who, on both dates specified in paragraph (2), are registered to vote in a general election held for casting ballots for the election of the Resident Commissioner of the Commonwealth of Puerto Rico.

(2) Registration dates.--The dates referred to in paragraph (1) are as follows:

(A) November 7, 2000.

(B) The date that is 180 days before the date of the referendum under this section.

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SEC. 1504. ACTIONS IF TRAINING IS APPROVED.

(a) Condition for Effectiveness.--This section shall take effect on the date on which the President issues a proclamation under subsection (e) of section 1503 declaring that the continuation of the conduct of training (including live-fire training) by the Armed Forces at the Navy's training sites on the island of Vieques, Puerto Rico, under the conditions described in subsection (d) of such section, has been approved in the referendum conducted under such section.

(b) Authorization of Appropriations for Additional Economic Assistance.--There is authorized to be appropriated to the President $50,000,000 to provide economic assistance for the people and communities of the island of Vieques. This authorization of appropriations is in addition to the amount authorized to appropriated to provide economic assistance under section 1501.

(c) Training Range To Remain Open.--The Vieques Naval Training Range shall remain available for the use of the Armed Forces, including for live-fire training.

SEC. 1505. REQUIREMENTS IF TRAINING IS NOT APPROVED OR MANDATE FOR REFERENDUM IS VITIATED.

(a) Conditions for Effectiveness.--This section shall take effect on the date on which either of the following occurs:

(1) The President issues a proclamation under subsection (e) of section 1503 declaring that the continuation of the conduct of training (including live-fire training) by the Armed Forces at the Navy's training sites on the island of Vieques, Puerto Rico, under the conditions described in subsection (d) of such section, has not been approved in the referendum conducted under such section.

(2) The requirement for a referendum under section 1503 ceases to be effective pursuant to subsection (a)(2) of such section.

(b) Actions Required of Secretary of Defense.--

(1) Termination of operation.--Not later than May 1, 2003, the Secretary of Defense shall--

(A) terminate all Navy and Marine Corps training operations on the island of Vieques; and

(B) terminate all Navy and Marine Corps operations at Naval Station Roosevelt Roads, Puerto Rico, that are related exclusively to the use of the training range on the island of Vieques by the Navy and the Marine Corps.

(2) Relocation of units.--The Secretary of Defense may relocate the units of the Armed Forces (other than those of the reserve components) and activities of the Department of Defense

(including nonappropriated fund activities) at Fort Buchanan, Puerto Rico, to Naval Station Roosevelt Roads, Puerto Rico, to ensure maximum utilization of capacity.

(3) Closure of installations and facilities.--The Secretary of Defense shall close the Department of Defense installations and facilities on the island of Vieques, other than properties exempt from conveyance and transfer under section 1506.

(c) Actions Required of Secretary of the Navy.--The Secretary of the Navy shall transfer, without reimbursement, to the administrative jurisdiction of the Secretary of the Interior--

(1) the Live Impact Area on the island of Vieques;

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(2) all Department of Defense real properties on the eastern side of the island that are identified as conservation zones; and

(3) all other Department of Defense real properties on the eastern side of the island.

(d) Actions Required of Secretary of the Interior.--

(1) Retention and administration.--The Secretary of the Interior shall retain, and may not dispose of any of, the properties transferred under paragraphs (2) and (3) of subsection (c) and shall administer such properties as wildlife refuges under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd et seq.) pending the enactment of a law that addresses the disposition of such properties.

(2) Responsibility for Live Impact Area.--Upon a termination of Navy and Marine Corps training operations on the island of Vieques under subsection (b)(1), the Secretary of the Interior shall assume responsibility for the administration of the Live Impact Area, administer that area as a wilderness area under the Wilderness Act (16 U.S.C. 1131 et seq.), and deny public access to the area.

(3) Live Impact Area Defined.--In this section, the term ``Live Impact Area'' means the parcel of real property, consisting of approximately 900 acres (more or less), on the island of Vieques that is designated by the Secretary of the Navy for targeting by live ordnance in the training of forces of the Navy and Marine Corps.

(e) GAO Review.--

(1) Requirement for review.--The Comptroller General shall review the requirement for the continued use of Fort Buchanan, Puerto Rico, by active Army forces and shall submit to the congressional defense committees a report containing--

(A) the findings resulting from the review; and

(B) recommendations regarding the closure of Fort Buchanan and the consolidation of units of the Armed Forces to Naval Station Roosevelt Roads, Puerto Rico.

(2) Time for submittal of report.--The Comptroller General shall submit the report under paragraph (1) not later than one year after the date on which the referendum under section 1503 is conducted or one year after the date on which a certification is submitted to the congressional defense committees under subsection (a)(2) of such section, as the case may be.

SEC. 1506. CERTAIN PROPERTIES EXEMPT FROM CONVEYANCE OR TRANSFER.

(a) Exempt Property.--The Department of Defense properties and property interests described in subsection (b) may not be conveyed or transferred out of the Department of Defense under this title.

(b) Properties Described.--The exemption under subsection (a) applies to the following Department of Defense properties and property interests on the island of Vieques, Puerto Rico:

(1) ROTHR site.--The site for relocatable over-the-horizon radar.

(2) Telecommunications sites.--The Mount Pirata telecommunications sites.

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(3) Associated interests.--Any easements, rights-of-way, and other interests in property that the Secretary of the Navy determines necessary for--

(A) ensuring access to the properties referred to in paragraphs (1) and (2);

(B) providing utilities for such properties;

(C) ensuring the security of such properties; and

(D) ensuring effective maintenance and operations on such properties.

(4) Remediation activities.--Any easements, rights-of-way, and other interests in property that the Secretary of the Navy determines necessary for protecting human health and the environment in the discharge of the Secretary's responsibilities for environmental remediation under section 1502(c), until such time as these responsibilities are completed.

SEC. 1507. MORATORIUM ON IMPROVEMENTS AT FORT BUCHANAN.

(a) In General.--Except as provided in subsection (b), no acquisition, construction, conversion, rehabilitation, extension, or improvement of any facility at Fort Buchanan, Puerto Rico, may be initiated or continued on or after the date of the enactment of this Act.

(b) Exceptions.--The prohibition in subsection (a) does not apply to the following:

(1) Actions necessary to maintain the existing facilities (including utilities) at Fort Buchanan.

(2) The construction of reserve component and nonappropriated fund facilities authorized before the date of the enactment of this Act.

(c) Termination.--This section shall cease to be effective upon the issuance of a proclamation described in section 1504(a) or the enactment of a law, after the date of the enactment of this Act, that authorizes any acquisition, construction, conversion, rehabilitation, extension, or improvement of any facility at Fort Buchanan, Puerto Rico.

SEC. 1508. TRANSFER AND MANAGEMENT OF CONSERVATION ZONES.

(a) Transfer to Secretary of the Interior.--

(1) Transfer required.--Except as provided in section 1506, the Secretary of the Navy shall transfer, without reimbursement, to the administrative jurisdiction of the Secretary of the Interior all Department of Defense real properties on the western end of the Vieques Island, consisting of a total of approximately 3,100 acres, that are designated as Conservation Zones in section IV of the 1983 Memorandum of Understanding between the Commonwealth of Puerto Rico and the Secretary of the Navy.

(2) Time for transfer.--The Secretary of the Navy shall complete the transfer required by paragraph (1) not later than May 1, 2001.

(b) Conveyance to Conservation Trust.--

(1) Conveyance required.--Except as provided in section 1506 and subject to paragraph (2), the Secretary of the Navy shall convey, without consideration, to the Puerto Rico Conservation Trust the additional Conservation Zones, consisting of a total of approximately 800 acres, identified in Alternative 1 in the Draft Environmental Assessment for the proposed transfer of Naval Ammunition Support Detachment property,

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Vieques, Puerto Rico, prepared by the Department of the Navy, as described in the Federal Register of August 28, 2000 (65 Fed. Reg. 52100).

(2) Time for conveyance.--The Secretary of the Navy shall complete the conveyance required by paragraph (1) not later than May 1, 2001, except that paragraph (1) shall apply only to those portions of the lands described in such paragraph that the Commonwealth of Puerto Rico, the Secretary of the Interior, and the Puerto Rico Conservation Trust mutually agree, before that date, to--

(A) include in the cooperative agreement under subsection (d)(2); and

(B) manage under standards consistent with the standards in subsection (c) applicable to the lands transferred under subsection (a).

(c) Administration of Properties as Wildlife Refuges.--The Secretary of the Interior shall administer as wildlife refuges under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd et seq.) the Conservation Zones transferred to the Secretary under subsection (a).

(d) Cooperative Agreement.--

(1) Required; parties.--The Secretary of the Interior shall manage the Conservation Zones transferred under subsection (a) pursuant to a cooperative agreement among the Commonwealth of Puerto Rico, the Puerto Rico Conservation Trust, and the Secretary of the Interior.

(2) Inclusion of adjacent areas.--Areas adjacent to the Conservation Zones transferred under subsection (a) shall be considered for inclusion under the cooperative agreement. Subject to the mutual agreement of the Commonwealth of Puerto Rico, the Secretary of the Interior, and the Puerto Rico Conservation Trust, such adjacent areas may be included under the cooperative agreement, except that the total acreage so included under this paragraph may not exceed 800 acres. This determination of inclusion of lands shall be incorporated into the cooperative agreement process as set forth in paragraph (4).

(3) Sea grass area.--The Sea Grass Area west of Mosquito Pier, as identified in the 1983 Memorandum of Understanding between the Commonwealth of Puerto Rico and the Secretary of the Navy, shall be included in the cooperative agreement to be protected under the laws of the United States and the laws of the Commonwealth of Puerto Rico.

(4) Management purposes.--All lands covered by the cooperative agreement shall be managed to protect and preserve the natural resources of the lands in perpetuity. The Commonwealth of Puerto Rico, the Puerto Rico Conservation Trust, and the Secretary of the Interior shall follow all applicable Federal environmental laws during the creation and any subsequent amendment of the cooperative agreement, including the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and the National Historic Preservation Act (16 U.S.C. 470 et seq.).

(5) Completion and implementation.--The cooperative agreement shall be completed not later than May 1, 2001. The Secretary of the Interior shall implement the terms and

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conditions of the cooperative agreement, which can only be amended by agreement of the Commonwealth of Puerto Rico, the Puerto Rico Conservation Trust, and the Secretary of the Interior.

PUBLIC LAW 107-107 TO AMEND PL 106-398

SEC. 1049. TERMINATION OF REFERENDUM REQUIREMENT REGARDING CONTINUATION OF MILITARY TRAINING ON ISLAND OF VIEQUES, PUERTO RICO, AND IMPOSITION OF ADDITIONAL CONDITIONS ON CLOSURE OF TRAINING RANGE.

(a) In General.--Title XV of the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (as enacted into law by Public Law 106-398; 114 Stat. 1654A-348) is amended by striking sections 1503, 1504, and 1505 and inserting the following new sections:

``SEC. 1503. CONDITIONS ON CLOSURE OF VIEQUES NAVAL TRAINING RANGE.

``(a) Conditional Authority To Close.--The Secretary of the Navy may close the Vieques Naval Training Range on the island of Vieques, Puerto Rico, and discontinue training at that range only if the Secretary certifies to the President and Congress that both of the following conditions are satisfied:

``(1) One or more alternative training facilities exist that, individually or collectively, provide an equivalent or superior level of training for units of the Navy and the Marine Corps stationed or deployed in the eastern United States.

``(2) The alternative facility or facilities are available and fully capable of supporting such Navy and Marine Corps training immediately upon cessation of training on Vieques.

``(b) Consultation Required.--In determining whether the conditions specified in paragraphs (1) and (2) of subsection (a) are satisfied, the Secretary of the Navy shall take into account the written views and recommendations of the Chief of Naval Operations and the Commandant of the Marine Corps. The Secretary shall submit these written views and recommendations to Congress with the certification submitted under subsection (a).

``SEC. 1504. CLOSURE OF VIEQUES NAVAL TRAINING RANGE AND DISPOSAL OF CLOSED RANGE.

``(a) Termination of Training and Related Closures.--If the conditions specified in section 1503(a) are satisfied and the Secretary of the Navy makes a determination to close the Vieques Naval Training Range and discontinue live-fire training at that range the Secretary of the Navy shall--

``(1) terminate all Navy and Marine Corps training operations on the island of Vieques;

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``(2) terminate all Navy and Marine Corps operations at Naval Station Roosevelt Roads, Puerto Rico, that are related exclusively to the use of the training range on the island of Vieques by the Navy and the Marine Corps; and

``(3) close the Navy installations and facilities on the island of Vieques, other than properties exempt from conveyance and transfer under section 1506.

``(b) Transfer to Secretary of the Interior.--Upon termination of Navy and Marine Corps training operations on the island of Vieques, the Secretary of the Navy shall transfer, without reimbursement, to the administrative jurisdiction of the Secretary of the Interior--

``(1) the Live Impact Area on the island of Vieques;

``(2) all Department of Defense real properties on the eastern side of the island that are identified as conservation zones; and

``(3) all other Department of Defense real properties on the eastern side of the island.

``(c) Administration by Secretary of the Interior.--

``(1) Retention and administration.--The Secretary of the Interior shall retain, and may not dispose of any of, the properties transferred under paragraphs (2) and (3) of subsection (b) and shall administer such properties as wildlife refuges under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd et seq.) pending the enactment of a law that addresses the disposition of such properties.

``(2) Live impact area.--The Secretary of the Interior shall assume responsibility for the administration of the Live Impact Area upon transfer under paragraph (1) of subsection (b), administer that area as a wilderness area under the Wilderness Act (16 U.S.C. 1131 et seq.), and deny public access to the area.

``(d) Live Impact Area Defined.--In this section, the term `Live Impact Area' means the parcel of real property, consisting of approximately 900 acres (more or less), on the island of Vieques that is designated by the Secretary of the Navy for targeting by live ordnance in the training of forces of the Navy and Marine Corps.''.

(b) Conforming Amendment.--Section 1507(c) of such Act (114 Stat. 1654A-355) is amended by striking ``the issuance of a proclamation described in section 1504(a) or''.

COMMONWEALTH/FWS AGREEMENT FOR WESTERN VIEQUES

Cooperative Management Agreement
between the
U. S. Fish and Wildlife Service
and the
Government of Puerto Rico
to Manage Lands on the Vieques Island

This Cooperative Agreement is entered into this third day of November in the year 2000, by and between the United States Fish and Wildlife Service (USFWS) and the Government of Puerto Rico (GPR), hereinafter referred to as "the parties," with regard to management of certain lands on the Island of Vieques and describe the cooperative management relationship for these lands.

The parties recognize the natural and cultural importance and sensitivity of the diverse coastal and terrestrial tropical ecosystems located on the western end of Vieques and agree that these must and shall be managed to insure their protection and preservation in perpetuity for the benefit of the general public, in particular those living on the Island of Vieques, consistent among others with the Requirements of Section 106 and Section 110 of the National Historic Preservation Act (NHPA), 16 U.S.C. 470 et. seq., and the Archeological Resources Protection Act (ARPA), 16 U.S.C. 470aa-470mm.

Whereas, Section 1508(a)(1) of the National Defense Authorization Act for Fiscal Year 2001 directs the Secretary of the Navy to transfer 3,100 acres of land designated as Conservation Zones in the western end of the Island of Vieques to the Secretary of the Interior to be managed as a wildlife refuge under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668d et seq.);

Whereas, the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668d et seq.) requires that the USFWS manage lands included within the refuge system;

Whereas, the USFWS has the authority to enter into a cooperative management agreement with GPR to manage programs, activities, and projects within the lands to be included as part of the refuge system;

Whereas, Section 1508(a)(2)(d)(3) of the National Defense Authorization Act for Fiscal Year 2001 includes the sea grass beds in the western end of the Island of Vieques to be managed as part of this Cooperative Agreement; and

Whereas, Section 1508(a)(2)(d)(1) of the same Act requires the preparation of a cooperative agreement for the management of these lands, including the sea grass beds and the coral reefs of the GPR.

Therefore, the parties hereby agree to the following, within funding allocations, consistent with the applicable laws, policies and regulations of the USFWS, including the National Wildlife Refuge System Administration Act, the NHPA and ARPA, and the applicable laws, policies and regulations of the GPR:

(1) Cooperate in the development of land use management plans to protect and enhance the diverse coastal and terrestrial tropical ecosystems;

(2) Cooperate in locating, mapping, assessing, and determining control mechanisms for both plant and animal exotic species;

(3) Cooperate in conducting wildlife and plant surveys of the acquired lands and waters (Some of the primary survey needs are for sea turtle nesting, sea birds, endangered plants, sea grass beds, manatees, and fish);

(4) Cooperate in law enforcement activities to protect vulnerable, rare, protected, threatened, and endangered resources and archeological and historical sites;

(5) Cooperate in a coordinated research effort to gain a better understanding of the ecological processes of the lands and waters;

(6) Cooperate in management strategies that will protect and preserve, in perpetuity, fish and wildlife resources and their habitat;

(7) Cooperate to develop educational and interpretive materials and implement programs that will help the public to understand and appreciate the tropical coastal and terrestrial environments, as well as cultural, historic and archeological resources;

(8) Cooperate in surveying and identifying methods to protect sea grass beds and coral reefs and their associated species;

(9) Coordinate compliance with the terms of the Programmatic Agreement (PA) executed for the transfer of Naval Ammunition Support Detachment among the U.S. Navy, the Puerto Rico State Historic Preservation Office (PRSHPO), the Puerto Rico Planning Board, the Municipality of Vieques, the Puerto Rico Conservation Trust, the USFWS and the Advisory Council on Historic Preservation to comply with the requirements of Section 106 of the NHPA, 16 U.S.C. 470 et. seq.;

(10) Participate with the Puerto Rico Planning Board, the Municipal Government of Vieques, and the PRSHPO in the development of a Land Use Plan to ensure that zoning and development of areas outside of the conservation zones do not adversely affect the natural and cultural resources of these areas, and adhere to the PA and applicable guidelines and regulations;

(11) Develop a detailed plan to implement this Cooperative Management Agreement that will be executed no later than sixty (60) days from the date on which lands are transferred from the Navy to the USFWS; and

(12) Meet periodically, and at least four (4) times per year, to discuss the progress and implementation of this Cooperative Management Agreement and the detailed implementation plan.

This agreement will become effective at such time as the transfer of said properties is conveyed. The implementing entities for this Agreement shall be the Puerto Rico Department of Natural and Environmental Resources together with the USFWS Regional Office in Atlanta, Georgia.

11/3/00

Sam D. Hamilton
Southeast Regional Director
U. S. Fish and Wildlife Service

11-3-00

Daniel Pagán Rosa, Secretary
Department of Natural and Environmental Resources

COOPERATIVE MANAGEMENT AGREEMENT AMONG THE COMMONWEALTH OF PUERTO RICO, THE PUERTO RICO CONSERVATION TRUST, AND THE U.S. DEPARTMENT OF THE INTERIOR TO MANAGE LANDS ON THE ISLAND OF VIEQUES

I. PURPOSE

This Cooperative Management Agreement ("Agreement"), is made this 26th day of April, 2001, by and among the Commonwealth of Puerto Rico ("the Commonwealth"), acting through the Department of Natural and Environmental Resources ("DNER"); the Puerto Rico Conservation Trust, also known as the Puerto Rico Conservation Trust Fund ("the Trust"), a charitable non-profit perpetual Trust, organized under the laws of the Commonwealth of Puerto Rico, pursuant to Deed Number five (5) executed January twenty-third (23), nineteen hundred and seventy (1970) before Notary Public Luis Felipe Sánchez Vilella, whose trustees are Thomas Lovejoy Paige, also known as Thomas E. Lovejoy Paige, of legal age, single, executive and resident of Washington, District of Columbia, Arleen Pabón Charneco, of legal age, single, architect and resident of Guaynabo, Puerto Rico, and Kate Donnelly de Romero, also known as Kate Romero, of legal age, married, property owner and resident of Dorado, Puerto Rico, all are hereby represented in this act by the Executive Director of the Puerto Rico Conservation Trust, Francisco Javier Blanco Cestero, also known as Javier Blanco, of legal age, married, architect and resident of San Juan, Puerto Rico; and the U.S. Department of the Interior, acting through the U.S. Fish and Wildlife Service ("USFWS") (hereinafter collectively referred to as "the Parties"), to satisfy the requirements of Section 1508 of P. L. 106-398, The Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Oct. 30, 2000) ("the Spence Act") to include certain lands on the Island of Vieques in a cooperative agreement among the Parties, and to provide general management principles for the protection of those lands and their natural resources.

II. BACKGROUND

WHEREAS, section 1508 (a) (1) of the Spence Act directs the Secretary of the Navy to transfer 3,100 acres of land (described in Attachment A) designated as Conservation Zones in the western end of the Island of Vieques to the administrative jurisdiction of the Secretary of Interior, to be managed as a wildlife refuge under the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668d *et seq.*) ("Refuge Act"), and pursuant to this Agreement; and

WHEREAS, section 1508 (b) (1) of the Spence Act also directs the Secretary of the Navy to convey to the Trust, without consideration, certain real properties (approximately 800

Parties' Initials: 24/IV/01 Trust; CP 4/26/01 DNER; SDH 4/26/01 USFWS

50

acres, described in Attachment B) that are designated as additional Conservation Zones in the western end of the Island of Vieques and are included in this Agreement; and

WHEREAS, the Spence Act provides that the lands transferred to the administrative jurisdiction of the Secretary of the Interior and those conveyed to the Trust pursuant to section 1508 shall be managed pursuant to a cooperative management agreement among the Parties; and

WHEREAS, the Spence Act requires that all lands covered by the Agreement shall be managed to protect and preserve the natural resources of the lands in perpetuity; and

WHEREAS, the Parties, pursuant to their respective authorities, have the authority to enter into this Agreement to fulfill the purposes and requirements of section 1508 of the Spence Act;

AND WHEREAS, the Secretary of the Department of Natural and Environmental Resources has authority to execute this agreement on behalf of the Commonwealth under Organic Act, Law No. 23 of June 20, 1972, as amended, has authority to establish agreements under Section 155 with United States agencies, and is responsible for implementing the public policy on the conservation and utilization of Puerto Rico's natural resources; the Regional Director of Region 4 of the USFWS, has authority to execute this agreement on behalf of the Secretary of the Interior under authorities delegated through 209 Departmental Manual (DM) 6.1, 242 DM 1.1, and 031 Fish and Wildlife Manual 2.1; and the Executive Director of the Trust has authority to execute this agreement on behalf of and representing the Trustees of the Trust pursuant to a resolution dated December 8, 2000;

NOW, THEREFORE, the Parties agree upon the terms and conditions as described herein.

III. TERMS AND CONDITIONS

A. The Parties agree to include within this agreement the 3,100 acres of Conservation Zone lands required to be transferred to the administrative jurisdiction of the Secretary of the Interior pursuant to Section 1508(a) of the Spence Act, and agree to include within this agreement the 800 acres of additional Conservation Zone lands to be conveyed to the Trust pursuant to Section 1508(b) of the Spence Act.

Parties' Initials: Trust 26/IV/01 CP 4/26/01 DNER SDH 4/26/01 USFWS

B. The lands transferred to the administrative jurisdiction of the Secretary of the Interior shall be administered as a wildlife refuge under the Refuge Act and pursuant to this Agreement and related subsequent agreements among the Parties.

C. The lands conveyed to the Trust shall be managed under standards consistent with the Refuge Act and pursuant to this Agreement and related subsequent agreements among the Parties.

D. As provided in section 1508(d)(3) of the Spence Act, the Sea Grass Area west of Mosquito Pier, as identified in the 1983 Memorandum of Understanding between the Commonwealth of Puerto Rico and the Secretary of the Navy is also subject to and covered by this Agreement, to be protected under the laws of the United States and the laws of the Commonwealth of Puerto Rico. The Parties agree to further delineate a description of the boundaries of this area in the management plan prepared pursuant to paragraph F.

E. The Parties recognize the natural and cultural importance and sensitivity of the diverse tropical ecosystems located on the western end of Vieques and agree that these must and shall be managed to insure their protection and preservation in perpetuity for the benefit of the general public, and in particular those living on the Island of Vieques.

F. Subject to available funding, and consistent with all applicable federal and Puerto Rico laws, policies and regulations, the Parties agree to prepare within nine (9) months of the effective date of this Agreement, a resource management plan ("management plan") to protect and preserve the diverse coastal, terrestrial, cultural archeological and historic resources of the lands subject to this Agreement. This management plan shall incorporate the requirements of section 1508 of the Spence Act, and shall incorporate, as appropriate, provisions addressing science and research, education, outreach, enforcement, funding, land use, and such other provisions as deemed appropriate by the Parties. With respect to the 3,100 acres transferred to the U.S. Department of the Interior, the management plan will be subject to final review and approval by the USFWS.

G. The management plan shall not require the Trust to permit within any of its properties destructive sampling or research, or any other activities that may contravene the rules, norms, or policies of the Trust, to the extent consistent with section 1508 of the Spence Act.

H. The United States Department of the Interior and the Trust agree to cooperate to provide each other with appropriate, compatible access to the lands that are subject to this Agreement, including visitor access.

Parties' Initials: Trust 24/IV/01 DNER CAP 4/26/01 USFWS SDH 4/26/01

I. Law Enforcement. The USFWS and the DNER agree to cooperate in the enforcement of applicable laws and regulations in furtherance of the purposes of this Agreement.

J. Coordination among the Parties. The Parties agree to meet periodically and not less than three (3) times per year, to discuss the progress and implementation of this Agreement. The meetings shall be set for mutually agreeable times, and an agenda for all meetings circulated in advance.

K. Funding. The Parties agree, consistent with and subject to their own respective budgetary policies and means, to obtain or make available funding to implement this Agreement. The Parties further agree, to the extent appropriate, to cooperate fully in supporting their individual or joint initiatives for obtaining funding for preparation of the management plan. The Parties also agree that the Trust's share of the cost and expense of preparing the management plan shall not exceed an amount proportional to the Trust's acreage included within this Agreement. Nothing in this Agreement shall be construed as obligating funds in violation of the Anti-Deficiency Act , 31 U.S.C. 1341.

L. Relationship to Other Federal Laws. As provided in the Spence Act, the Commonwealth of Puerto Rico, the Trust, and the Secretary of the Interior shall follow all applicable Federal environmental laws during the creation and any subsequent amendment of this Agreement, including the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), and the National Historic Preservation Act (16 U.S.C. 470 et seq.).

M. Integration and Relationship to Other Agreements. This Agreement integrates all prior discussions among the Parties. This Agreement replaces the "Cooperative Management Agreement between the Commonwealth and the U.S. Fish and Wildlife Service, entered into on November 3, 2000, which shall no longer be effective.

N. Modification of this Agreement. Neither this Cooperative Agreement nor any provisions hereof shall be modified, or amended, except by an instrument in writing signed by the Parties. Modification of this Agreement may be proposed at any time by any party, and upon agreement by all the Parties, shall become effective pursuant to the terms of such modification.

O. Assignment. The Trust may assign its duties and obligations pursuant to this Agreement to an entity or entities controlled by the trustees of the Trust or their designated authorized representatives. Prior to any such assignment, the Trust shall notify the other Parties in writing.

Parties' Initials: Trust 26/IV/01 DNER 4/24/01 USFWS 4/26/01

P. Governing Law. This Agreement shall be enforced and construed according to the laws of the United States and the laws of the Commonwealth of Puerto Rico, as applicable.

Q. Effective Date. This Agreement will become effective upon execution for purposes of satisfying the requirements of Section 1508(b)(2) of the Act, and will become effective for purposes of implementation upon the transfer of the subject lands to the administrative jurisdiction of the Secretary of the Interior and conveyance to the Trust.

Francisco Javier Blanco
Executive Director
Puerto Rico Conservation Trust

26/IV/01
Date

Carlos Padin
Secretary
Department of Natural and
Environmental Resources
Commonwealth of Puerto Rico

4/26/01
Date

Sam D. Hamilton
Regional Director, Region 4
U.S. Fish and Wildlife Service
U.S. Department of the Interior

4/26/01
Date

MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES DEPARTMENT OF THE NAVY
AND
THE UNITED STATES DEPARTMENT OF THE INTERIOR
CONCERNING THE TRANSFER OF
DEPARTMENT OF DEFENSE PROPERTIES ON THE EASTERN END OF VIEQUES ISLAND
TO THE DEPARTMENT OF THE INTERIOR

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I. PURPOSE

This Memorandum of Agreement ("MOA") between the United States Department of the Navy ("Navy") and the United States Department of the Interior ("Interior") sets forth the terms and conditions for the transfer to Interior, pursuant to Section 1504 of Title XV of Public Law 106-398, as amended by Section 1049 of Public Law 107-107, of approximately 14,573 acres of United States property ("East Vieques") more fully described in the attached Exhibit A, currently held by the Department of Defense (DOD) on the eastern end of Vieques Island, Puerto Rico. A map and a legal description of the property to be transferred are attached as Exhibit A.

II. BACKGROUND

WHEREAS, Navy is required by the Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001, Public Law No. 106-398, as amended by Public Law No. 107-107 ("Act"), to transfer East Vieques without reimbursement to the administrative jurisdiction of the Secretary of the Interior; and

WHEREAS, the lands to be transferred to Interior on East Vieques consist of the Live Impact Area (LIA), conservation zones, and other properties; and

WHEREAS, the Act directs that the Secretary of the Interior shall administer the LIA as a wilderness area under the Wilderness Act, 16 U.S.C. §§1131 - 1136, and deny public access; and

WHEREAS, the lands to be transferred to Interior shall be administered as a wildlife refuge by the U.S. Fish and Wildlife Service (FWS) under the National Wildlife Refuge System Administration Act of 1966, 16 U.S.C. §§668dd - 668ee; and Interior shall not dispose of the transferred lands except as appropriate under the Act, or for purposes of the LIA, under the National Wildlife Refuge Administration Act, or as directed by Congress; and

WHEREAS, Navy will conduct, complete, operate and maintain appropriate environmental response actions on East Vieques, consistent with applicable law and regulations, including the statutorily-directed future use of the lands as wildlife refuge and wilderness areas; and

WHEREAS, the mission of the National Wildlife Refuge System ("Refuge System") is to administer 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, 16 U.S.C. § 668dd(a)(2); and

WHEREAS, environmental response actions must be protective of human health and the environment in accordance with applicable law; and

WHEREAS, Navy's use of an active range on Vieques since World War II is expected to make necessary the imposition of land use controls for purposes of public safety, some of which may be short-term while others may be long-term, depending on considerations such as the technical and economic feasibility of response actions, and refuge management plans and objectives; and

WHEREAS, Navy and Interior recognize that their respective roles and responsibilities related to Navy's obligations and refuge management decisions affected by or which could affect environmental response will require close coordination and cooperation; and

WHEREAS, Navy and Interior recognize the importance of cooperating and coordinating with the public and with other federal and Commonwealth of Puerto Rico ("Commonwealth") agencies with respect to activities on East Vieques.

NOW, THEREFORE, the parties agree upon the terms and conditions as described herein.

III. DEFINITIONS

A. "Act" means Title XV of Public Law 106-398, The Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Oct. 30, 2000), as amended by Section 1049 of Public Law 107-107 (Dec. 28, 2001).

B. "DOD" means the U.S. Department of Defense.

C. "Environmental Contamination" means any substance, material, or waste which is a (1) hazardous substance, pollutant, or contaminant under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. 9601, et seq.; (2) any substance designated pursuant to 33 U.S.C. 1321(b)(2)(A) of the Federal Water Pollution Control Act; (3) any hazardous waste having the characteristics identified under or listed pursuant to 42 U.S.C. 6921 of the Solid Waste Disposal Act (but not including any waste, the regulation of which under the Solid Waste Disposal Act (42 U.S.C. 6901 et seq.) has been suspended by Act of Congress); (4) any toxic pollutant listed under 33 U.S.C. 1317(a) of the Federal Water Pollution Control Act; (5) any hazardous air pollutant listed under 42 U.S.C. 7412 of the Clean Air Act; (6) any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to 15 U.S.C. 2606 of the Toxic Substances Control Act; (7) petroleum and any petroleum product or derivative; (8) any Munitions and Explosives of Concern (MEC), or radioactive materials or by-products, if not otherwise defined as a hazardous substance, pollutant, or contaminant; and (9) any other substance, material or waste that in the future is regulated as hazardous under federal or state law applicable to the Transferred Property and that requires

a Response Action to ensure that the remedy is protective of human health and the environment.

D. "East Vieques" means the United States property holdings under the Navy's administrative jurisdiction, custody, and control located on Vieques Island, Commonwealth of Puerto Rico, as described in Exhibit A attached hereto.

E. "Engineering Controls" are physical means of treating, containing, or monitoring Environmental Contamination, or limiting access to a site where such contamination remains in place. Examples include a landfill cap, monitoring wells, signs, and fencing.

F. "Institutional Controls" are nonengineering measures, such as legal or administrative mechanisms, whether temporary or permanent, designed to prevent or limit exposure to Environmental Contamination left in place at a site or to assure effectiveness of the chosen remedy. In the case of East Vieques, they include the statutory prohibition set forth in Section 1504 (c)(2) of P.L. 107-107, against public access to the LIA and those conditions documented in Interior's Land Use Control Records pursuant to section IV.H of this MOA.

G. "Interior" means the United States Department of the Interior, including the United States Fish and Wildlife Service.

H. "Land Use Controls" are any type of physical, legal, or administrative mechanism used to restrict the use of, or limit access to, real property to ensure that there are no unacceptable risks to human health, safety, or the environment. Land Use Controls consist of Engineering Controls and/or Institutional Controls. Land Use Controls may be either temporary or permanent.

I. "Land Use Control Record" means a document that sets forth the specific Land Use Controls at identified sites.

I. "Munitions and Explosives of Concern (MEC)" means unexploded ordnance, discarded military munitions and munitions constituents.

J. "Munitions Constituents" means any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

K. "Munitions Response" means any investigations, removals or remedial actions taken to address the explosives safety hazards and human health or environmental risks presented by MEC.

L. "Navy" means the United States Department of the Navy.

M. "Refuge Security" means structures, physical barriers, signs and/or personnel that are employed to ensure that East Vieques is administered and used as a wildlife refuge and wilderness area in accordance with the governing statute.

N. "Remedy Review" means a review of any remedial action where Environmental Contamination remains at the site, conducted no less than 5 years after the initiation of such Response Action and at 5-year intervals thereafter, for as long as needed to assure that human health and the environment are being protected.

O. "Remedy Security" means structures, physical barriers, signs, and/or personnel that are used to implement or protect Institutional or Engineering Controls or otherwise ensure the safety and integrity of the remedy. Remedy Security includes, but is not limited to, construction and maintenance of fencing, signage, and physical barriers to access.

P. "Response Action" means any action taken in response to Environmental Contamination, including removal or remedial action as defined in CERCLA (42 U.S.C. § 9601(23) and (24)), and corrective action or closure requirements under the Solid Waste Disposal Act, and Munitions Response.

Q. "Transferred Property" means the real property (East Vieques) transferred by the Secretary of the Navy to the administrative jurisdiction, custody and control of the Secretary of the Interior, pursuant to Section 1504 of the Act.

IV. TRANSFER OF ADMINISTRATIVE JURISDICTION

A. **Transfer by Navy.** Pursuant to Section 1504 of the Act, the Secretary of the Navy shall transfer East Vieques, without reimbursement, to the administrative jurisdiction, custody and control of the Secretary of the Interior

B. **Easements and Agreements.** Navy shall transfer East Vieques subject to existing easements and shall not terminate or modify any existing easement, unless Interior has consented to such termination or modification. Navy shall not enter into any other real estate agreements concerning Eastern Vieques without the consent of Interior.

C. **Acceptance by Interior.** Upon execution of this MOA and the acceptance by Interior of the transfer of administrative jurisdiction from Navy to Interior of East Vieques, Interior shall assume jurisdiction, custody, and control of the Transferred Property in accordance with this MOA.

D. **Navy Access for Response Actions and Environmental Compliance.** Interior shall provide Navy (including Navy contractors) with access to the Transferred Property as may be reasonably required to carry out Navy's obligations under this MOA. Prior to entry, except in cases of emergency, Navy shall provide Interior with reasonable notice, to allow coordination between Response Actions and refuge management activities. In cases of emergency, Navy shall notify Interior as soon as practicable, but no later than 24 hours after entry.

E. **Navy Use of Utilities for Response Actions and Munitions Response**. Navy will obtain Interior's approval prior to the placement and use of mechanized equipment, water, and power necessary to conduct Response Actions and Munitions Response. Navy shall be responsible for the costs associated with the use of power and water for purposes of implementing Response Actions and Munitions Response.

F. **Interior Restrictions on Use.** Prior to conducting activities or allowing uses of the Transferred Property that could interfere with Navy's obligations to address Environmental Contamination, Interior shall consult with Navy. For ground-disturbing activities, Interior shall follow the provisions of Section VI.J of this MOA. Interior shall not conduct activities on or allow uses of the Transferred Property that will materially interfere with Navy's compliance with its obligations.

G. **Maintenance of Roads and Bridges.** Navy shall retain operation and maintenance responsibility, to the minimum standards necessary to meet Navy purposes, for roads and bridges within the Transferred Property that are needed only by Navy for purposes of performing its obligations as provided in this MOA. Interior shall be responsible for maintaining roads and bridges within the Transferred Property that are needed by both Navy and Interior, but to no standard higher than that needed by Interior for its administration of the property. The Navy shall coordinate with Interior on the use of such roads or bridges. The repair of any damage, other than normal wear and tear, caused by the Navy or its contractors to Interior-maintained roads shall be the responsibility of Navy.

H. **Interior Land Status Map**. Interior shall record Land Use Controls, as documented in Land Use Control Records, on the FWS's Land Status Map for East Vieques, or other appropriate Interior land status map.

V. INFORMATION AND RECORDS

A. Environmental Baseline Survey and Other East Vieques Records. Navy shall provide Interior with copies of the East Vieques Environmental Baseline Survey(s) and Preliminary Range Assessment (PRA), including drafts prepared prior to completion of the EBS and PRA. Navy shall maintain or dispose of East Vieques records in accordance with Navy and Marine Corps Disposition Manual, SECNAVINST 5212.5D. Prior to Navy's disposal of any East Vieques records, Navy and Interior shall jointly identify all East Vieques records (e.g., property records, environmental records, historical, or cultural resources surveys) that shall be transferred to Interior or otherwise preserved.

B. Additional Information. Navy and Interior will work cooperatively to share in a timely manner all information relevant to the role of each on East Vieques and as requested. Navy shall provide Interior with all information concerning environmental investigations, documentation, past or proposed Response or restoration actions, or other compliance, closure, maintenance, restoration, or related activity associated with Navy's obligations to address Environmental Contamination on the Transferred Property.

VI. ENVIRONMENTAL CONTAMINATION AND RESPONSE ACTIONS

A. Response Action Funding and Implementation. With respect to the Transferred Property, Navy shall have sole and exclusive federal responsibility to fund and implement any Response Actions (including operation and maintenance) required by applicable law or implementing regulations, including but not limited to CERCLA and RCRA, to address Environmental Contamination resulting from the activities or presence of DOD (including entities acting with permission or under the authority of or in a contractual relationship with DOD) or which is present at the time of transfer by Navy to Interior (including contamination subsequently discovered), except to the extent that Interior or a third party caused or contributed to such contamination after the date of transfer.

B. Coordination of Response Action and Land Management Decision-Making. Navy and Interior intend to coordinate decisions regarding Response Actions and land management. Both parties must concur in remedy selection for any such Response Actions. Navy will act as a cooperating agency under the National Environmental Policy Act (NEPA) with Interior in the development of the NEPA documentation for refuge land use planning. Consistent with applicable law, the parties shall apprise OMB as early as possible of any land use proposals contained in its CCP or any other land use planning processes having potentially significant

budgetary implications upon Navy. To the extent permitted by law, OMB will review and determine budgetary issues unresolved between Interior and Navy resulting from the CCP or other land use planning processes, or Response Actions.

C. **Project Team.** To facilitate consultation and coordination, the parties will form a Project Team of Navy and Interior representatives to address the working-level development and management of Response Actions and land use planning. Within thirty (30) days of the effective date of this MOA, the parties will determine the size and composition of the Project Team, and will designate their respective project managers. The Project Team will cooperate and coordinate its activities with the appropriate federal and Commonwealth authorities and shall remain in place, as needed, to assess the effectiveness of response activities.

D. **Document Review.** To facilitate Interior's concurrence on final Response Action decision documents, Navy will provide draft and draft final documents to Interior for review and comment, including scopes of work, work plans, sampling plans, and response decision documents. To facilitate Navy's role as a cooperating agency, Interior will provide draft and draft final documents to Navy for review and comment including land use plans. The parties shall develop suitable schedules and timetables for review, consultation, and concurrence on response-related documents.

E. **Restoration.** Restoration of natural resources that have been injured by Environmental Contamination or Response Actions will be considered during and incorporated into Response Actions in accordance with applicable law.

F. **Live Impact Area.** Response Action decisions for the LIA shall, at a minimum, take into consideration the following factors:

(A). The Act prohibits public access to the LIA;
(B). The Act requires that Interior manage the LIA as a wilderness area; pursuant to the Wilderness Act;
(C). The Wilderness Act prohibits the use of motorized equipment or motor vehicles except as necessary to meet minimum requirements for the administration of the area as a wilderness area which includes undertaking measures necessary for the health and safety of people.
(D). Interior will have access for resource management requirements in the LIA and in adjoining areas;
(E). Access by the parties may be required for responding to emergencies in the LIA or in adjoining areas.

(F). Response Actions in the LIA may be necessary to address Environmental Contamination on or migrating off of the LIA. Access will be in accordance with IV.D.

G. **Recurring Reviews and Additional Response Actions.** The Navy, in consultation with Interior, will conduct periodic Remedy Reviews in accordance with applicable law to ensure that the selected remedy is still protective of human health and the environment. Such reviews may result in Navy conducting additional Response Actions, including removing or modifying Land Use Controls. The Navy will conduct additional Response Actions if the remedy fails (e.g., the remedy fails to achieve remedial action objectives); if new contamination is discovered that is not addressed by an existing remedy; or if changes in laws and regulations require additional Response Actions.

H. **Subsequent Agreement with EPA.** The Navy and Interior intend to negotiate and conclude a comprehensive cleanup agreement with EPA. Should there be any conflict between the terms of the later-negotiated agreement, the terms of the comprehensive cleanup agreement will control.

I. **Specific Navy Responsibility for Response Actions and Related Security and Institutional Controls.** With respect to any areas of the Transferred Property containing Environmental Contamination, Navy shall continue to fund security as agreed by Navy and Interior to be necessary to protect public safety and the environment with respect to such areas, including any security personnel that may be needed over and above Interior refuge management personnel, until the remedy is in place and operating successfully. Navy shall consult with Interior and EPA concerning security assessments prior to completion of the remedy. Navy shall fund and implement any Response Action, including any cleanup and remedy-related operation and maintenance required by the Response Action, to address Environmental Contamination resulting from the activities or presence of DOD (including entities acting with permission or under the authority of or in a contractual relationship with DOD) or which is present at the time of transfer by Navy to Interior (including contamination subsequently discovered), except to the extent that Interior or a third party caused or contributed to such contamination after the date of transfer.

J. **Notice and Approval for Ground-Disturbing Activities.** Prior to conducting, or authorizing any other entity to conduct, any ground-disturbing activities on an area of the Transferred Property that is subject to Land Use Controls, and where the activities may adversely impact the remedy, Interior shall notify Navy of the proposed activities. Interior shall then seek from Navy written approval that the proposed activities will not adversely affect the remedy in place or human health or

the environment. Following such Navy approval, in the event the proposed activities result in a release or threatened release of Environmental Contamination for which Navy is responsible under this MOA, Navy shall fund and implement all actions required to address the release or threatened release. Interior may, but is not required to, seek Navy written approval for ground-disturbing activities on areas not described above, and in such event the terms and conditions of this paragraph shall apply. For purposes of providing a written approval under this paragraph, Navy may rely on existing information if it deems such information adequate to support the approval.

K. **Safety Training.** Navy will, at no cost to Interior, provide Interior personnel and Interior contractors working on the Transferred Property with appropriate materials and initial on-site safety training involving the recognition of Environmental Contamination and shall identify and update all known locations that may contain Environmental Contamination as that information becomes available. Navy will also provide at no cost to Interior, written materials appropriate for reproduction and distribution to the public, regarding the risks presented by MEC and related safety information. After the initial training, Interior may request that Navy provide additional training materials and conduct additional safety training that is beyond Interior's training capability.

L. **Discovery of Additional Environmental Contamination**

1. **Notice.** If Interior discovers additional Environmental Contamination for which the Navy is responsible on the Transferred Property, or otherwise identifies previously-unidentified conditions associated with such Environmental Contamination that may require a Response Action, it shall notify Navy of such contamination as soon as reasonably possible after such discovery.

2. **Navy Action Upon Notice.** After Navy receives notice from Interior, or any third party regulatory agency or other third parties, of the presence or reasonably likely presence of Environmental Contamination for which Navy is responsible, Navy shall provide written notification to Interior as soon as practical, but in no event later than 30 days after such notification, of Navy's proposed course of action. Interior will, to the maximum extent practicable, give Navy an opportunity to execute any required response actions.

M. **Interior Response Actions.**

1. **Interior Authority to Respond.** The Parties recognize that, under certain circumstances, Interior may discover Environmental Contamination that

requires an emergency response because it poses a risk to human health or the environment. Interior may take whatever action is necessary to isolate and prevent access to the contaminated site for purposes of protecting human health or the environment. Before taking further action, Interior will provide notice to Navy, which, in consultation with Interior, will determine whether further Response Actions are required and how such Response Actions will be accomplished.

2. **Funding Emergency Response.** Navy will take appropriate action to fund reasonable and legally authorized costs incurred by Interior in responding to an emergency.

VII. BUILDINGS, INFRASTRUCTURE, AND OTHER MANMADE STRUCTURES, OBJECTS, EQUIPMENT OR DEBRIS

A. **Demolition and Removal.** Navy will remove or demolish, and properly dispose of, manmade structures, objects, equipment, debris, and temporary buildings and infrastructure as set out in Attachment 1. All other buildings, infrastructure and structures not identified as items to be removed or demolished on Attachment 1 will be transferred to Interior. Navy shall remove or demolish structures, equipment, objects, or debris, within a timetable jointly agreed to by the Parties. This paragraph applies to structures, objects, and debris other than Environmental Contamination, which is separately addressed in this MOA.

B. **Building Closure.** Unless specifically requested by Interior, all buildings not demolished will be transferred to Interior free of equipment, furniture, and debris not permanently affixed to the structure.

C. **Equipment and Small Tools.** Navy shall transfer to Interior equipment and small tools as agreed to by the Parties.

D. **Utilities Transfer**. Navy will terminate existing utility services on or about April 30, 2003. Interior is responsible for initiating new services as desired.

E. **Asbestos and Asbestos-Containing Materials**. Navy shall provide Interior all documents related to asbestos surveys conducted by the Navy or by Navy contractors. Navy will undertake abatement or removal of asbestos and asbestos-containing materials (ACM) only in accordance with its policy for removing damaged, friable, accessible ACM. Navy shall not be responsible for abatement of ACM that becomes damaged, friable, or accessible after the property transfer of East Vieques.

F. **Lead-based Paint.** Navy shall not be responsible for removing any lead-based paint from existing structures.

VIII. **PHYSICAL CONDITION INSPECTION.** Prior to or within 30 days following the transfer, Navy and Interior shall conduct a physical condition inspection of the Transferred Property to document the general physical appearance and condition of the Transferred Property at the time of transfer. Navy and Interior will jointly prepare a report to document their findings.

IX. **NOTICES/POINTS OF CONTACT.** For purposes of this MOA, the Interior point of contact for notices shall be the Refuge Manager, Vieques National Wildlife Refuge, and the Navy point of contact shall be the Remedial Project Manager or such other person as designated by the Atlantic Division, Naval Facilities Engineering Command.

X. **TORT CLAIMS.** Navy shall process and adjudicate all administrative claims and defend all litigation asserted under the Federal Tort Claims Act that arise from any activity of Navy with respect to East Vieques or any Environmental Contamination for which the Navy is responsible under this MOA. Navy will forward to an office designated by Interior any administrative claims arising from actions for which Interior is alleged to be responsible under the Federal Tort Claims Act. Interior shall process and adjudicate all administrative claims and defend all litigation asserted under the Federal Tort Claims Act that are not the responsibility of the Navy. Each party shall cooperate and assist the other in providing information relating to any such tort claims.

XI. **PUBLIC PARTICIPATION.** The parties recognize the importance of public involvement in the Environmental Contamination response process and in the Refuge-planning process. Information will be provided to the public, and public involvement will be sought, in accordance with existing laws, policies and procedures applicable to Navy and Interior actions taken pursuant to this MOA.

XII. **FUTURE DISPOSAL.** In the event that Interior receives authorization and intends to dispose of any lands on East Vieques, or is required to do so, Interior shall consult with Navy prior to any such disposal. Interior shall include in any instruments effecting such transfer or conveyance those terms, conditions, restrictive covenants, easements, reservations, or similar provisions on behalf of the United States that are necessary to prevent any derogation of the Land Use Controls or Navy's rights of access. If such disposal occurs, Navy shall retain the accountability on behalf of the United States to perform Response Actions for Environmental Contamination for which Navy is responsible under this MOA. Interior shall inform Navy promptly of any efforts or plans, of which is has knowledge of to dispose of any property on East Vieques.

XIII. ENFORCEMENT ACTIONS. It is the intent of the Parties to this MOA that Interior not be held responsible for responding to any administrative or legal action brought to enforce the requirements of applicable laws or regulations concerning Environmental Contamination or Munitions Response based on Interior's status as land manager. Each party shall cooperate with and assist the other in providing information relating to any such enforcement action.

XIV. FUNDING. Nothing in this MOA shall be construed as obligating funds in violation of the Anti-Deficiency Act, 31 U.S.C. 1341.

XV. DISPUTE RESOLUTION. The Parties shall attempt to settle disputes informally. If a dispute arises that is not resolved informally, the Parties shall use applicable procedures or authorities for the resolution of the dispute, which may include, but are not limited to, those provided in Executive Order 12146 and Executive Order 12580.

XVI. NO THIRD PARTY RIGHTS. This MOA is intended only to set forth the terms and conditions for the transfer of the property described herein, and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law by any person against the United States, its agencies, or any other person.

XVII. EFFECTIVE DATE, MODIFICATION, AND TERMINATION. This MOA shall become effective as of the date of any transfer under the authority of Section 1504 of the Act. Modifications may be proposed at any time by any Party, and shall become effective pursuant to the terms of such modifications, as agreed to by the Parties. This MOA shall remain in effect until such time as the parties mutually agree to its termination.

Craig Manson

Department of the Interior
H. Craig Manson
Assistant Secretary for Fish and Wildlife and and Parks

4-30-03
Date

Hansford T Johnson

Department of the Navy
Hansford T. Johnson
Secretary of the Navy
Acting

4/30/03
Date

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Attachment 1

Temporary Buildings, Structures, Equipment, Objects, and Debris to be Demolished/Removed

List of Buildings:

Bldg #	Description
4533	Bath House (temp)
4534	Dog Kennel (temp)
4535	NEX / MWR hut (temp)
4536	Mini-Mart hut (temp)
4537	BEQ E1-E4 (temp)
4538	BEQ E1-E4 (temp)

List of Structures:

Property #	Description
1017	Radar Trck Antna atop ROC
1018	M.W. Antenna atop ROC
1026	Old South small craft ramp
4510	Transportation/Dispatch Office
4539	Sentry House (temp)
4540	Observation Tower (temp)
4541	Observation Tower (temp)
4542	Observation Tower (temp)
4543	Observation Tower (temp)
4544	Observation Tower (temp)
4545	Observation Tower (temp)

List of Miscellaneous Structures, Equipment, Objects and Debris:

Medical structure
Puerto Diablo Security Structure
Red Beach Security Structure
Commemorative Marker (rock and plaque)
Tanks at OP-1 Filling Station (building 4703)
Large concrete culverts marking boundary of LIA (painted white)
Various conex boxes / trailers
All observation towers
All concertina wire
All furnishings (beds, lockers, tables) from OP-1 unless otherwise accepted
All furniture (beds, lockers, etc.) in the Security building (bldg. 4531) unless otherwise accepted
All refrigerators in BEQ buildings (bldgs. 4527 & 4530) unless otherwise accepted
Targets in the LIA (to be removed as part of the remedy)

EXHIBIT A

DESCRIPTION FOR EAST VIEQUES LAND TRANSFER

Beginning at a survey control point near the line between Florida ward and Puerto Real ward, said point being a drill hole in the center of a railroad iron. Said point also known as 'SUMMIT-2' and having a northing of 763,023.2548 and an easting of 994,077.5796 noted as the Point of Beginning on the plat labeled EAST VIEQUES LAND TRANSFER – BOUNDARY SURVEY. Thence S42°32'24"E 10,390.30' to Point # E-1, a 2" galvanized pipe set at the northeastern edge of the mangroves at Puerto Mosquito, the True Point of Beginning, having a northing of 755,367.6283 and an easting of 1,001,102.5145:

Thence N52°16'22"E 932.62' to Point # E-2, a concrete monument set; thence N00°18'16"W 5,740.13' to Point # E-3, a concrete monument set; thence N48°37'19"E 40.35' to Point #1, an iron rod and cap set; thence N54°48'35"E 2,895.39' to Point # E-8, a 2" pipe found; thence N53°50'44"E 223.50' to Point #2, an iron rod and cap set inside the base of a 2"galvanized pipe found; thence N14°29'17"E 171.76' to Point #2A, a 2" galvanized pipe found; thence N20°09'29"E 428.76' to Point #53, a 2" galvanized pipe found; thence N06°10'54"E 271.48' to Point #82, a 2" galvanized pipe found; thence N09°29'10"E 26.67' to Point #79, a 2" galvanized pipe found; thence N27°56'11"E 98.72' to Point #3A, a 2" galvanized pipe found; thence N79°23'33"E 138.12' to Point #4, a 2" galvanized pipe found; thence N80°57'57"E 84.01' to Point #5, a 2" galvanized pipe found; thence N76°09'10"E 296.48' to Point #6, an iron rod and cap set; thence N56°33'03"E 88.27' to Point #7, a concrete monument set; thence N13°34'51"E 86.62' to Point #8, a 2" galvanized pipe found; thence N21°17'05"W 287.46' to Point #9, a 2" galvanized pipe found; thence N19°51'28"W 282.04' to Point #10, a 2" galvanized pipe found; thence N13°17'54"E 183.24' to Point #11, an iron rod and cap set; thence N43°50'00"E 432.80' to Point #12, an iron rod and cap set; thence N56°40'51"E 114.79' to Point #13, an iron rod and cap set; thence N79°45'57"E 116.49' to Point #14, a 2" galvanized pipe found; thence S72°00'07"E 136.45' to Point #15, a 2" galvanized pipe found; thence S45°36'58"E 96.19' to Point #16, a iron rod and cap set; thence S78°19'11"E 350.36' to Point #18, a 2" galvanized pipe found; thence N58°23'27"E 26.36' to Point #19, an iron rod and cap set; thence N04°06'24"E 109.12' to Point #21, a 2" galvanized pipe found; thence N00°42'19"E 291.45' to Point #23, an iron rod and cap set; thence N38°20'42"E 78.81' to Point #24, an iron rod and cap set; thence N68°52'52"E 146.42' to Point #25, an iron rod and cap set; thence N09°08'40"E 47.90' to Point #26, an iron rod and cap set; thence N34°35'59"W 339.00' to Point #27, a 2" galvanized pipe found; thence N11°41'07"W 471.96' to Point #28, an iron rod and cap set; thence N11°03'55"W 101.31' to Point #29, a 2" galvanized pipe found; thence N43°11'29"E 125.34' to Point #30, a 2" galvanized pipe found; thence N76°20'34"E 205.34' to Point #31, an iron rod and cap set; thence N27°12'46"E 69.77' to Point #32, an iron rod and cap set; thence N08°51'01"E 213.46' to Point #33, an iron rod and cap set; thence N35°18'56"E 233.12' to Point #34, a 2" galvanized pipe found; thence N69°22'07"E 659.14' to Point #35, a 2" galvanized pipe found; thence N20°11'45"E 295.36' to Point #36, a 2" galvanized pipe found; thence N89°39'04"E 187.87' to Point #37, an iron rod and cap set; thence S69°24'08"E 65.15' to Point #38, an iron rod and cap set; thence N82°11'47"E 52.43' to Point #39, an iron rod and cap set; thence N52°08'19"E 105.07' to Point #40, a 2" galvanized pipe found; thence N79°18'47"E 325.85' to Point #41, a 2" galvanized pipe found; thence N39°46'32"E 521.25' to Point #42, a 2" galvanized pipe found; thence N10°21'09"W 85.96' to Point #4, a concrete monument set; thence N00°01'04"W 915.28' to Point #111, an iron rod and cap set on line with Points #3 and #4; thence continuing N00°01'04"W 652.48' to Point #113, an iron rod and cap set on line with Points #3 and #4; thence continuing N00°01'04"W 11.02' to Point #960, an iron rod and cap set on line with Points #3 and #4; thence continuing N00°01'04"W 485.55' to Point #16, an iron rod and cap set on line with Points #3 and #4; thence N08°52'46"E 2.89' to Point #15C, an iron rod found; thence continuing N08°52'46"E 121.14' to Point #14C, an iron rod found; thence N28°46'32"E 202.72' to Point #13C, a bent iron rod found; thence N56°10'59"E 238.09'to Point #12C, an iron rod found; thence N79°34'38"E 360.65'to Point #11C, an iron rod and cap set; thence N82°26'29"E 243.72' to Point #10C, an iron rod found; thence N43°15'07"E 195.99' to Point #9C, a point

(unable to set due to rubbish); thence N40°18'45"E 143.04' to Point #10E, a concrete monument set; thence N46°48'02"W 652.26' to Point #9E, an iron rod and cap set; thence N47°14'06"W 225.28' to Point #8E, an iron rod and cap set; thence N42°45'23"W 58.41' to Point #7E, an iron rod and cap set; thence N30°57'13"W 72.36' to Point #6E, an iron rod found and cap set; thence N10°07'22"W 107.33' to Point #5E, an iron rod found; thence N03°35'54"W 182.26' to Point #4E, an iron rod and cap set; thence N05°03'32"W 47.28' to Point #3E, an iron rod and cap set; thence N36°52'32"W 301.41' to Point #2E, an iron rod and cap set; thence N50°22'14"W 266.53' to Point #1E, an iron rod and cap set on line with Points #3 and #4; thence N00°01'04"W 21.11' to Point #3, an iron rod and cap set; thence N41°04'33"W 335.21' to Point #115, an iron rod and cap set; thence N28°13'29"W 213.53' to Point #116, an iron rod and cap set; thence N09°34'10"W 444.52' to Point #117, an iron rod and cap set; thence N30°47'27"W 105.76' to Point #118, an iron rod and cap set; thence N45°33'54"W 115.06' to Point #119, an iron rod and cap set; thence N41°01'14"W 236.50' to Point #120, an iron rod and cap set; thence N47°28'43"W 172.50' to Point #121, an iron rod and cap set; thence N33°13'00"W 41.11' to Point #122, an iron rod and cap set; thence N05°08'10"W 147.08' to Point #123, an iron rod and cap set; thence N30°52'01"W 88.79' to Point #124, an iron rod and cap set; thence N39°20'52"W 260.69' to Point #125, an iron rod and cap set; thence N19°38'32"W 198.01' to Point #126, an iron rod and cap set; thence N38°30'36"W 25.00' to Point #127, an iron rod and cap set; thence N57°24'06"W 77.80' to Point #128, an iron rod and cap set; thence N85°24'28"W 69.65' to Point #2, an iron rod and cap set; thence N05°39'31"E 179.89'to Point #1, an iron rod and cap set in concrete near the approximate edge of water of Sonda de Vieques; thence easterly along the approximate edge of water of said Sonda de Vieques to Punta Campanilla, to Punta Goleta, to Punta Bicacos and to Punta Salinas; thence southeasterly along the approximate edge of water to Punta Este; thence westerly along the approximate edge of water of the Caribbean Sea to Punta Carenero, around Ensenada Honda to Punta Conejo and around Puerto Ferro continuing along the approximate edge of water of said Caribbean Sea to a 2" galvanized pipe set at the northeastern edge of the mangroves at Puerto Mosquito, the True Point of Beginning.

Said parcel containing 638,990,784 square feet or 14,669.210 acres, which equates to 59,364,409.3 square meters or 15,103.927 cuerdas. Less and except the parcels herein described as follows:

First, beginning at a survey control point near the line between Florida ward and Puerto Real ward, said point being a drill hole in the center of a railroad iron. Said point also known as 'SUMMIT-2' and having a northing of 763,023.2548 and an easting of 994,077.5796 noted as the Point of Beginning on the plat labeled EAST VIEQUES LAND TRANSFER – BOUNDARY SURVEY. Thence S50°28'13"E 16,435.46' to an iron rod and cap to be set, the True Point of Beginning, having a northing of 752,562.4501 and an easting of 1,006,754.1703:

Thence S68°40'48"E 20.00' to an iron rod and cap to be set; thence S21°19'12"W 20.00' to an iron rod and cap to be set; thence N68°40'48"W 20.00' to an iron rod and cap to be set; thence N21°19'12"E 20.00' to an iron rod and cap to be set, the True Point of Beginning.

Said exception parcel, also known as U.S. Coast Guard Beacon Reservation, containing 400 square feet or 0.009 acres, which equates to 37.2 square meters or 0.009 cuerda.

Said East Vieques Land Transfer parcel containing a residual area of 638,990,384 square feet or 14,669.201 acres, which equates to 59,364,372.1 square meters or 15,103.918 cuerdas.

Second, that parcel known as Parcel C, containing 96.41 acres, more or less, as described in the Report of Excess filed by the Navy with the General Services Administration on 31 March 1993 and as reinstated with the General Services Administration as excess property at the request of the Department of Interior on or about 21 April 2003, a copy of which has been provided to the Atlanta office of the Fish and Wildlife Service.

Said East Vieques Land Transfer parcel containing a residual area of 14,572.791 acres, more or less,

DESCRIPTION FOR LIVE IMPACT AREA

Beginning at a survey control point in the Puerto Diablo ward, said point being a brass disk set in concrete. Said point also known as 'OP1-A' and having a northing of 765,473.5284 and an easting of 1,043,816.9636. Thence N64°13'11"E 3835.96' to a concrete monument set at the southwest corner of said Live Impact Area, the True Point of Beginning, having a northing of 767,141.8615 and an easting of 1,047,271.1266:

Thence N03°35'49"E 2,540.99' to a concrete monument set, having a northing of 769,677.8422 and an easting of 1,047,430.5379; thence continuing northerly to the approximate edge of water of Sonda de Vieques; thence northeasterly along said approximate edge of water to Punta Salinas; thence southeasterly along said approximate edge of water to a point at Tortuga Beach; thence southerly departing said approximate edge of water to a concrete monument set, having a northing of 768,500.5595 and an easting of 1,056,702.1832; thence S 00°27'24"E 2,476.27' to a concrete monument set, having a northing of 766,024.3680 and an easting of 1,056,721.9193; thence continuing southerly to the approximate edge of water of the Caribbean Sea; thence westerly along said approximate edge of water to a point at Bahia Salina del Sur; thence northerly departing said approximate edge of water to a concrete monument set, the True Point of Beginning.

Said parcel containing 39,985,149 square feet or 917.933 acres, which equates to 3,714,755.8 square meters or 945.135 cuerdas.

APPENDIX IV. SERVICE COMMENTS ON VIEQUES CULEBRA MASTER PLAN FOR SUSTAINABLE DEVELOPMENT

United States Department of the Interior
FISH AND WILDLIFE SERVICE
1875 Century Boulevard Atlanta, Georgia 30345
November 23, 2004

In Reply Refer To:
FWSIR4/CRF

Dr. Juan R. Fernandez
Comisionado
Oficina del Comisionado Especial para Vieques y Culebra
Avenida Fernandez Juncos #635
San Juan, Puerto Rico 00907

Dear Dr. Fernandez:

The Fish and Wildlife Service has reviewed the Master Plan for Sustainable Development of Vieques and Culebra and would like to offer the following comments for consideration during the preparation of any revised documents. Since there was a very limited time frame for review of these very substantial documents, the Service personnel conducting the review focused on the aspects of the Plan that might affect national wildlife refuge lands and Service trust resource on Vieques and Culebra.

General Comments: The background information for the document appears to be a compilation of information from numerous sources that do not always provide a consistent format or current information. For example, the maps from the U. S. Department of Energy indicating wind resources and transmission lines show National Park Service ownership of lands in Culebra and Navy ownership of lands in Vieques. While we recognize that the information was extracted from the referenced sources, it does not reflect current conditions and in some cases may provide the reader with incorrect perceptions of the current status of the lands. In order to provide a clear representation of the current conditions on the islands, we recommend that the plan include maps indicating the lands owned and managed by the Commonwealth of Puerto Rico, the Fish and Wildlife Service, the Municipalities of Vieques and Culebra and the Puerto Rico Conservation Trust. Other specially designated or unique resources that are important to the islands should also be indicated. These could include the Marine Reserve at Culebra, the Vieques Northwest Seagrass Beds, the bioluminescent bays at Vieques and important resource areas such as mangroves and coastal lagoons.

Zoning: The zoning classifications used on the maps should be defined in the text and a key should be provided for easy reference by the readers of the plan. The text notes that there are three new zones that were developed for this plan. These are "Distrito Ecoturistico" presumably "ECOT" on the maps and "Evaluacion de Recursos" presumably "ER" on the maps. The Vieques maps indicate an

area zoned "RD" located to the east of Isabel Segunda. This zoning is indicated as "RP" ("Reparcealacion y Desarollo") in Attachment 1. The "RD" zoning along with "ECOT" and five additional classifications in Attachment 1 are indicated as zoning classifications that have been developed and defined by Estudios Tecnicos for the purposes of this plan. The "ER" classification and definition; however, is not included in the attachment. In addition, there is no definition given in Attachment 1 for the resource protection ("PR") classification that is used for some of the refuge lands and lagoons. The lack of a key on the maps or in the adjacent text makes comprehension of the proposed zoning in the document difficult and confusing.

While there are numerous documents referenced and quoted in the Plan, there are other very relevant documents that are not included. As a result of the former federal ownership and transfers there are some unique legal constraints that have been placed of some of the lands. In Culebra, some of the lands were transferred to the Commonwealth with restrictions on the types of uses that could occur on them. The quitclaim deed that transferred lands in Culebra noted that the Commonwealth was required to obtain approval from the Secretary of the Interior before selling or otherwise disposing of the lands and it also restricted some areas for park and recreational uses only.

When the lands on Western Vieques were transferred from the Navy to the Municipality of Vieques, the Puerto Rico Conservation Trust and the Department of the Interior in 2001, the Navy prepared an Environmental Assessment and consulted with the Commonwealth regarding the zoning for the lands to be transferred. The zoning identified at that time provided for protection of sea turtle nesting beaches and known locations of threatened and endangered plants. The zoning classifications in the draft final Master Plan for Sustainable Development does not appear to consider these previous commitments for protection of these resources. We recommend that the zoning approved in 2001 be referenced and included as background for the development of this plan. The resource protection provided by the 2001 zoning should be maintained even if some of the other uses and classifications are modified.

The transfer documents and deeds for former federal lands should be provided in the attachments to this plan and referenced where appropriate. While the terms of the transfers for these areas do not preclude alternative uses and zoning classifications that might be appropriate, there are both legal issues and resource values that should be addressed prior to moving forward with any proposals for these areas.

Wildlife issues: The "Wildlife" sections of the documents provide only cursory references to the endangered and threatened species located on and around the islands. The Master Plan is proposing development and zoning classifications that could directly and indirectly affect the species and their habitats. While a few of the species are noted in the text, there is no discussion of the critical areas and habitats that are needed by these species. In order to help provide a basis for some of the zoning proposals in the document, we recommend that the documents include a table listing all of the Federal and Commonwealth protected species along with their status (Federally threatened or endangered or Commonwealth critical) and habitat requirements. Some of the species such as Goetzea elegans (endangered) and Stahlia monosperma (threatened), plant species found in Vieques, are located on lands that are proposed for ecotourism or agricultural zoning. Others such as the hawksbill sea turtle are known to nest on beaches that are adjacent to areas with proposed zoning of CR-1 and PDE (Plan de Desarrollo Especial) where certain types of development could occur. Consideration of the unique resources and habitats during this planning effort would facilitate an understanding of the concerns and restrictions that might apply to future development of these areas.

On and adjacent to Culebra there are several areas that have been designated as "critical habitat "by the U. S. Fish and Wildlife Service and the National Marine Fisheries Service because of their value for endangered and threatened sea turtle species. These areas include the beaches at Resaca, Larga, Brava, Culebrita and Cayo Norte and the sea grass beds for a distance of 5.6 km around the

island. In addition, the sea grass beds off the northwest coast of Vieques were designated as a Conservation Zone under an agreement between the Commonwealth and the Navy. As part of the transfer agreement, these sea grass beds were to continue to be protected and managed by the Commonwealth under the terms of a management plan among the Commonwealth, the Puerto Rico Conservation Trust and the U.S. Fish and Wildlife Service. That plan was completed in November of 2002 and should also be included as a reference for the Sustainable Development Master Plan.

National Wildlife Refuge Issues: The zoning indicated for most of the Culebra National Wildlife Refuge is "PR" indicating recognition of the current status as a refuge and the need to protect the resource values of that area. It was also noted that some of the offshore cays in Culebra (part of the refuge) are classified as CR-1. These cays would more appropriately be designated as PR along with the other refuge lands. The national wildlife refuge lands in Vieques; however, have been given a variety of classifications including ECOT, RD, CR-1, CR-H, B-2, ER and A-2.

The Service recognizes the efforts of the Vieques community to have the Navy leave and that there is interest in having the lands transferred to the people of Vieques; however, this is subject to a change of legislation and cannot be done by the Service. The Service has been mandated to manage the lands as a national wildlife refuge and believes that the conservation of the natural resources in this area plays a vital role in the ability to design and implement sustainable development alternatives in other areas of Vieques. We assume that the classifications given to the refuge lands in Vieques are an attempt to plan for the uses of the lands that could occur if the Congress of the United States decides to change the legislation that established the refuge and transfer it to the Commonwealth or municipality. It should be made very clear in the Master Plan for Sustainable Development for Vieques and Culebra, that the Fish and Wildlife Service is legally bound to manage the Vieques refuge under the terms of Refuge Administration Act and, with the exception of an area known as "parcel C", cannot take any action to transfer lands without specific legislation directing that action. Further, without such legislation, the Fish and Wildlife Service will continue to manage the lands for the benefit of the public. As a result of this restriction, it would be appropriate to indicate a zoning for all refuge lands as PR. If legislation is passed to change the status of the refuge, then it would be appropriate to consider other uses and classifications for those lands.

The zoning proposed for the Vieques refuge lands includes residential (RD) and agricultural (A-2) as well as ECOT, CR-1, B-2 and ER designations. The types of development that could normally be permitted within these zoning classifications such as; residential development, ecotourism lodges, and a variety of agricultural activities, would not normally be appropriate on a national wildlife refuge. In addition, the plan has suggested the potential for development of a wind farm on the Eastern portions of the refuge. Any proposed uses on the refuge must be compatible with the refuge purposes and other authorized and compatible activities. It was noted in the plan that the Refuge Manager must approve the uses on the refuge. While it is true that the Refuge Manager conducts the initial review to determine if a use is appropriate and compatible, the plan should also reflect that our Refuge Managers are bound by legal restrictions, regulations and policy that may preclude approval of many types of projects that are not related to the Service mission.

While there will be wildlife dependent and compatible activities permitted on the refuge and efforts are under way to maximize the clean up of contaminated areas to permit their management and use, the zoning of the refuge for residential development, tourist facilities(Paradors), agricultural uses and wind farms may create unrealistic expectations by the public.

The Service and cooperating agencies including the Commonwealth are currently in the process of developing a Comprehensive Conservation Plan (CCP) for the Vieques refuge. This plan will focus on the priority public uses for refuges. These are hunting, fishing, wildlife observation, wildlife

photography, environmental education and environmental interpretation. When determined to be compatible with the refuge purposes, these uses are given preference over other activities. In conjunction with the development of the CCP, the refuge will be preparing compatibility determinations for the priority public uses and any other activities that are proposed. The activities that will occur on the refuge will be guided by the CCP.

Summary: The draft Master Plan for Sustainable Development of Vieques and Culebra includes a great deal of information and recommendations to aid in the future development of these islands. As noted above, we believe that there are several additional documents and issues that deserve further consideration in the Plan. We greatly appreciate the opportunity to review and provide comments on this document. We are very interested and committed to cooperation with the Commonwealth and Municipal agencies in this planning effort and future endeavors. We are looking forward to continuing to work with you for the benefit of both the people and the natural resources of Vieques and Culebra.

Sincerely Yours;
Signed Sam D. Hamilton
Regional Director

APPENDIX V. REFUGE RESOURCE INFORMATION

SOILS

VIEQUES SOIL SERIES DESCRIPTIONS	
Map Symbol	**Description**
AmB AmC2	**Amelia gravelly clay loam** consists of deep, well-drained, moderately permeable soils with 2 to 5 percent slopes. This soil type has a low available water capacity and fertility, and a moderate shrink-swell potential. The chemical and physical properties of this soil type along with low rainfall in the area are severe limitations for farming.
Ce	**Cartagena clay** consists of deep, somewhat poorly drained, mildly alkaline, and slowly permeable soils with nearly level slopes. This soil has a high available water capacity, high shrink-swell potential, and slow runoff. This soil has severe limitations for farming because it is somewhat poorly drained, slowly permeable, and difficult to work.
Cf	**Catano loamy sand** consists of deep, excessively drained, rapidly permeable soils with nearly level slopes. This soil type has a low available water capacity, low shrink-swell potential, and low natural fertility and is not suited to crop cultivation.
CIB	**Coamo clay loam** consists of moderately deep to stratified, well-drained, moderately permeable soils with 2 to 5 percent slopes. This soil type has a moderate available water capacity, moderate shrink-swell potential, and high natural fertility; however, there are severe limitations for farming due to low rainfall in the area.
Cm	**Coastal Beaches** consists of narrow strips of light-colored beach sand that is saturated with seawater and contains many seashells and shell fragments. This land has no value for farming and most of it is devoid of vegetation, except for halophytic (salt-tolerant) vegetation.
DeE2 DgF2 Drf	**Descalabrado clay loam** and **Descalabrado and Guayama soils** consist of shallow, well-drained, moderately permeable soils with 20 to 60 percent slopes. This soil type has a moderate available water capacity, moderate shrink-swell potential, and medium natural fertility. Steep slopes, shallowness to bedrock, rapid runoff, low rainfall, and the hazard of erosion are severe limitations for farming in this soil type.
FrB	**Fraternidad clay** consists of deep, moderately well-drained, slowly permeable soils with 2 to 5 percent slopes. This soil type has a high available water capacity, very high shrink-swell potential, and high natural fertility. Slow permeability, poor workability, slope, and low rainfall are moderate limitations for farming. These limitations also affect land leveling and irrigation.
Md	**Made Land** consists of areas where the soil profile has been covered or destroyed by earthmoving operations. These areas generally have been graded for engineering purposes and are not suitable for agricultural purposes.

VIEQUES SOIL SERIES DESCRIPTIONS	
Map Symbol	**Description**
PdF	**Pandura-Very Stony Land complex** consists of moderately deep, well-drained, moderately rapid permeable soils with 40 to 60 percent slopes. This soil type has a low available water capacity, medium to rapid runoff, and high susceptibility to erosion. The steep, rocky, shallow nature of this soil type causes severe limitations for cultivation of crops.
PIB	**Paso Seco clay** consists of deep, moderately well-drained, slowly permeable soils with 0 to 5 percent slopes. This soil type has a high available water capacity, high shrink-swell potential, and moderate natural fertility. The soil's high shrink-swell potential and poor workability, and the adverse climate in the area are limitations for farming.
Po	**Poncena clay** consists of deep, moderately well-drained, calcareous, slowly permeable soils with nearly level slopes. This soil type has a high available water capacity, high shrink-swell potential, and moderate natural fertility. The soil's physical properties along with low rainfall for the area and seasonal high water table are severe limitations for farming.
PrC2	**Pozo Blanco clay loam** consists of deep, well-drained, moderately permeable soils with 5 to 12 percent slopes. This soil type has a moderate available water capacity, moderate shrink-swell potential, and medium natural fertility. This soil type has severe limitations for farming due to the slope.
Rs	**Rock Land** consists of areas where rock crops out on 50 to 70 percent of the surface. Loose stones are common on the surface, and very shallow soil material lies between the outcrops and stones. This soil type is in the mountainous part of the area, with slopes of 60-70 percent. This soil type has very little value for farming or engineering uses, and is restricted mainly to wildlife habitat.
Sm	**Saltwater Marsh** consists of wet, periodically flooded areas that are covered mainly by grass, cattails, brush, or other herbaceous plants. This soil type has severe limitations for farming because of the salinity of the water. These areas are best suited for wildlife, food, and cover.
Tf	**Tidal Flats** consist of areas slightly above sea level that are affected by seawater at high tide. This soil type has severe limitations for farming because of the salinity of the water. These areas are best suited for wildlife, food, and cover.
Ts	**Tidal Swamps** consist of areas that are covered with a thick growth of mangrove trees and are under salty water most of the year. This land type is not extensive and has no value for farming, but it serves as a breeding and feeding place for birds, oysters, and crabs.
VmE2	**Vieques loam** consists of moderately deep, well-drained, calcareous, moderately rapid permeable soils with 12 to 40 percent slopes. This soil type has a low available water capacity and medium natural fertility and is susceptible to erosion. This soil has severe limitations for farming because of the steep slope and high erosion rate.

FAUNA

Vieques Nacional Wildlife Refuge Fauna
Vida Silvestre de Vieques Nacional Wildlife Refuge

Amphibians and Reptiles / Anfibiosy Reptiles

Family	English Name	Spanish Name	Genus & Species
BUFONIDAE	Marine toad (I)	Sapo común	*Bufo marinus*
LEPTODACTYLIDAE	Coqui (U/P)	Coquí (U/P)	*Eleutherodactylus coqui*
	Churri coqui	Churrí	*Eleutherodactylus antillensis*
	Cochran's coqui	Coquí pitito	*Eleutherodactylus cochranae*
	White-lip frog	Sapito de labio blanco	*Leptodactylus albilabris*
BOIDAE	Ball python (I/P)	Piton real (I/P)	*Python reguis*
	Boa constrictor (I/P)	Boa constrictora (I/P)	*Boa constrictor*
	Virgin Island boa (P)	Boa de las Islas Virgenes (P)	*Epicrates monensis granti*
COLUBRIDAE	Puerto Rican racer	Alsophis de Puerto Rico	*Alsophis portoricensis aphantus*
TYPHLOPIDAE	Worm snake	Culebra ciega	*Typhlops hypomethes*
	Worm snake	Culebra ciega	*Typhlops platycephalus*
	Worm snake (P)	Culebra ciega (P)	*Typhlops richardi*
VIPERIDAE	Fer-de-Lance (P)	Fer-de-Lance (P)	*Bothrops asper*
AMPHISBAENIDAE	Legless lizard	Culebra de dos cabezas	*Amphisbaena caeca*
IGUANIDAE	Crested anole	Lagartijo común	*Anolis cristatellus*
	Culebra giant anole (P)	Lagarto gigante de Culebra (P)	*Anolis roosevelti*
	Garden anole	Lagartijo jardinero	*Anolis pulchellus*
	Giant anole	Lagarto verde	*Anolis cuvieri*

Family	English Name	Spanish Name	Genus & Species
	Tree anole	Lagartijo manchado	*Anolis stratulus*
	Green iguana (I)	Iguana verde (I)	*Iguana iguana*
GEKKONIDAE	Common dwarf gecko	Salamanquita común	*Sphaerodactylus macrolepis inigoi*
	Littoral gecko	Salamanquita de Roosevelt	*Sphaerodactylus roosevelti*
	Pigmy gecko	Salamanquita pigmea	*Sphaerodactylus Nicholsi townsendi*
	Common bent-toe gecko	Salamanquesa	*Hemidactylus mabouia*
SCINCIDAE	Slippery back skink	Santa Lucía	*Mabuya mabuya sloanii*
TEIIDAE	Common ground lizard	Siguana común	*Ameiva exsul*
TESTUDINIDAE	Antillean painted turtle	Jicotea	*Trachemys stejnegeri stejnegeri*
	Green sea turtle (M)	Peje blanco (M)	*Chelonia mydas*
	Hawksbill (M)	Carey (M)	*Eretmochelys imbricata*
	Leatherback (M)	Tinglar (M)	*Dermochelys coriacea*
	Loggerhead (M)	Cabezona (M)	*Caretta caretta*

Source: U.S. Navy Draft Environmental Impact for Vieques, 1979; Rivero, 1980; Pough, 1998; Saliva, 1994; Joglar, 2002; Puerto Rico Conservation Trust, 2002; Unpublished personal communications, 2005.

I= Introduced species (Especies introducidas)
M= Marine species (Especies marinas)
P= Probability that species occurs on refuge and/or have unconfirmed reports (Probabilidad que estas especies existan en el refugio y/o hay reportes aun no confirmados)
U= Species occurs in urban areas (Especies se encuentran en areas urbanas)

Birds / Aves

Family	English Name	Spanish Name	Genus & Species
ACCIPITRIDAE	Broad-winged hawk (P)	Guaraguo de bosque (P)	*Buteo platypterus*
	Osprey	Aguila pescadora	*Pandion haliatetus*
	Red tailed hawk	Guaraguao	*Buteo jamaicensis*
FALCONICODAE	American kestrel	Falcón común	*Falco sparverius*
	Merlin	Falcón migratorio	*Falco columbarius*
	Peregrine falcon	Falcón peregrino	*Falco peregrinus*
CATHARTIDAE	Turkey vulture (P)	Buitre (P)	*Cathartes aura*
STRIGIDAE	Puerto Rican screech owl	Múcaro de Puerto Rico	*Otus nudipes*
	Short-eared owl (P)	Múcaro real (P)	*Asio flammeus*
ALCEDINIDAE	Belted kingfisher	Martín pescador	*Ceryle alcion*
ANATIDAE	Blue-winged teal	Pato zarcel	*Anas discors*
	Lesser scoup	Pato pechiblanco	*Aythya affinis*
	Northern shoveler (P)	Pato cuchareta (P)	*Anas clypeata*
	Red-breasted merganser (P)	Mergansa pechiroja (P)	*Mergus serrator*
	Ruddy duck	Pato chorizo	*Oxyura jamaicensis*
	West Indian whistling duck	Chiriría nativa	*Dendrocygna arborea*
	White-cheeked pin tail	Pato quijada colorada	*Anas bahamensis*

Family	English Name	Spanish Name	Genus & Species
ARDEIDAE	Black-crowned night heron	Yerboa real	*Nycticorax nycticorax*
	Cattle egret	Garza Africana	*Bubulcus ibis*
	Great blue heron	Garzó cenizo	*Ardea herodias*
	Great egret	Garza real	*Casmoredius albus*
	Green-backed heron	Martinete	*Butorides striatus*
	Least bittern	Martinetito	*Ixobrychus exilis*
	Little blue heron	Garza azul	*Egretta caerulea*
	Snowy egret	Garza blanca	*Egretta thula*
	Tricolored heron	Garza pechiblanca	*Egretta tricolor*
	Yellow-crowned heron	Yerboa común	*Nycticorax violaceus*
PHOENICOPTERIDAE	Greater flamingo (P)	Flamenco americano (P)	*Phoenicopterus ruber*
PODICIPEDIDAE	Pied-billed grebe	Zaramago	*Podylymbus podiceps*
RALLIDAE	Clapper rail	Pollo de mangle	*Rallus longirostris*
	Sora rail	Gallito sora	*Porzana carolina*
	Common gallinule	Garalleta común	*Callinula chloropus*
	American coot	Gallinazo americano	*Fulica americana*
	Caribbean coot	Gallinazo del caribe	*Fulica caribaea*
RECURVIROSTRIDAE	Black-necked stilt	Viuda	*Himantopus mexicanus*

Family	English Name	Spanish Name	Genus & Species
CHARADRIIDAE	Black-bellied plover	Playero cabezón	*Pluvialis squatarola*
	Killdeer	Playero sabanero	*Charadius vociferous*
	Semipalmated plover	Playero acollarado	*Charadius semipalmatus*
	Snowy plover	Playero blanco	*Charadius alexandrinus*
	Wilson's plover	Playero marítimo	*Charadius wilsonia*
SCOLOPACIDAE	Common snipe	Becasina	*Gallinaso gallinaso*
	Greater yellowlegs	Playero guineilla mayor	*Tringa melanoleuca*
	Lesser yellowlegs	Playero guineilla menor	*Tringa flavipes*
	Least sandpiper	Playerito menudo	*Calidris minutilla*
	Ruddy turnstone	Playero turco	*Arenaria interpres*
	Semipalmated sandpiper	Playerito gracioso	*Calidris pusilla*
	Short billed dowitcher	Chorlo pico corto	*Limnodromus griseus*
	Stilt sandpiper	Playero patilargo	*Calidris himantopus*
	Spotted sandpiper	Playero coleador	*Actitis macularia*
	Willet	Playero aliblanco	*Catoptrophorus semipalmatus*
HAEMATOPODIDAE	American oyster catcher	Ostrero	*Haematopus palliatus*
LARIDAE	Laughing gull	Gaviota gallega	*Larus atricilla*
	Least tern	Gaviota chica	*Sterna antillarum*
	Roseate tern	Palometa	*Sterna dougallii*
	Royal tern	Gaviota real	*Sterna maxima*

Family	English Name	Spanish Name	Genus & Species
FREGATIDAE	Magnificent frigatebird	Tijereta	*Fregata magnificens*
PELICANIDAE	Brown pelican	Pelícano pardo	*Pelecanus occidentales*
PHAETHONTIDAE	Red-billed tropic bird	Rabijunco piquicolorado	*Phaethon aethereus*
	White-tailed tropic bird (P)	Rabijunco coliblanco (P)	*Phaethon lepturus*
SULIDAE	Brown booby	Boba prieta	*Sula leucogaster*
CAPRIMULGIFORMES	Antillean nighthawk	Querequequé Antillano	*Chordeiles gundlachi*
	Chuck-will's widow	Guabairo mayor	*Caprimulgus carolinensis*
COLUMBIDAE	Common ground drove	Rolita	*Columbina passerina*
	Mourning dove	Tórtola rabilarga	*Zenaida macroura*
	White winged dove	Tórtola aliblanca	*Zenaida asiatica*
	Zenaida dove	Tórtola cardosantera	*Zenaida aurita*
	Puerto Rican plain pigeon (P)	Paloma sabanera (P)	*Columba inornata wetmorei*
	Scaly napped pigeon	Paloma turca	*Columba squamosa*
	White crowned pigeon	Paloma cabeciblanca	*Columba leucocephala*
	Bridled quail-dove (P)	Paloma perdiz bigoteada (P)	*Geotrygon mystacea*
	Key west quail-dove	Perdiz grande	*Geotrygon chrysia*
	Ruddy quail-dove	Paloma perdiz rijiza	*Geotrygon montana*
CUCULIDAE	Mangrove cuckoo	Pájaro bobo menor	*Coccyzus minor*
	Yellow-billed cuckoo	Pájaro bobo piquiamarillo	*Coccyzus americanus*
	Smooth-billed ani	Judío	*Crotophaga ani*
PICIDAE	Puerto Rican woodpecker	Carpintero de Puerto Rico	*Melanerpes portoricensis*

Family	English Name	Spanish Name	Genus & Species
TROCHILIDAE	Antillean Crested Hummingbird	Zumbadorcito crestado	*Orthorhynchus cristatus*
	Green-throated Carib	Zumbador pechiazul	*Eulampis holosericeus*
EMBERIZIDAE	Adelaide's warbler	Reinita mariposera	*Dendroica adelaidae*
	Bananaquit	Reinita común	*Coereba flaveola*
	Black face grassquit	Gorrión negro	*Tiaras bicolor*
	Grasshopper sparrow	Gorrión chicharra	*Ammodramus savannarum*
	Greater Antillean grackle	Chango	*Quiscalus Niger*
	Shiny cowbird	Tordo lustroso	*Molothrus bonariensis*
	Yellow face grassquit	Gorrión barba amarilla	*Tiaras olivacea*
	Yellow shoulder blackbird (P)	Mariquita de Puerto Rico (P)	*Agelaius xanthomus*
	Yellow warbler	Canario de mangle	*Dendroica petechia*
ESTRILIDAE	Bronze mannikin	Diablito	*Lonchura cucullata*
HIRUNDINIDAE	Caribbean martin	Golondrina de iglesias	*Progne dominicensis*
MIMIDAE	Northern mickingbird	Ruiseñor	*Mimus polyglottos*
	Pearly eyed thrasher	Zorzal pardo	*Margarops fuscatus*
STURNIDAE	Hill myna	Maina de colinas	*Gracula religiosa*
TYRANNIDAE	Caribbean elaenia	Juí blanco	*Elaenia martinico*
	Gray kingbird	Pitirre	*Tyrannus dominicensis*
	Loggerhead kingbird	Clérigo	*Tyrannus caudifasciatus*
	Puerto Rican flycatcher	Juí de Puerto Rico	*Myarchus antillarum*
VIREONIDAE	Puerto Rican vireo	Bien-te-veo	*Vireo latimeri*

Source: U.S. Navy Draft Environmental Impact for Vieques, 1979; Raffaele, 1989; Saliva, 1994; Puerto Rico Conservation Trust, 2002; Oberle, 2003; National Geographic, 2004; Unpublished personal communications, 2005.

P= Probability that species occurs on refuge and/or have unconfirmed reports (Probabilidad que estas especies existan en el refugio y/o hay reportes aun no confirmados)

Fish / Peces

Family	English Name	Spanish Name	Genus & Species
SERRANIDAE	Rock hind	Cabramora	*Epinephelus adscensionis*
	Nassau grouper	Cherna	*Epinephelus striatus*
	Graysby	Cherna enjambre	*Epinephelus cruentatus*
	Coney	Mantequilla	*Epinephelus fulva*
	Red hind	Mero cabrilla	*Epinephelus guttatus*
	Red grouper	Mero guasa	*Epinephelus morio*
	Harlequin bass	Guaseta harlequin	*Serranus tigrinus*
	Butter hamlet	Vaca	*Hypoplectrus unicolor*
GRAMMIDAE	Fairy basslet	Gramma	*Gramma loreto*
APOGONIDAE	Flamefish	Cardenal candela	*Apagon maculatus*
	Belted cardinal fish	Cardenal listado	*Apagon maculatus*
	Belted cardinalfish	Cardenal listado	*Apagon townsendi*
PRIACANTHIDAE	Bigeye	Rey	*Priacanthus arenatus*
	Glasseye snapper	Toro	*Priacanthus cruentathus*
HOLOCENTRIDAE	Squirrelfish	Candil	*Holocentrus rufus*
	Dusky squirrelfish	Gallito	*Holocentrus vexillarius*
	Long jaw squirrelfish	Gallo	*Holocentrus adscencionis*
	Long spine squirrelfish	Gallo bocón	*Holocentrus marianus*
	Reef squirrelfish	Gallo de arrecifes	*Holocentrus coruscus*
	Black bar soldier fish	Toro	*Myripristis jacobus*

Family	English Name	Spanish Name	Genus & Species
POMADASYIDAE	White grunt	Boquicolorado	*Haemulon plumieri*
	Spanish grunt	Colombiano	*Haemulon macrostomum*
	French grunt	Condenado	*Haemulon flavolineatum*
	Cotton wick	Jeniguana	*Haemulon melanurum*
	Tomtate	Mulita	*Haemulon aurolineatum*
	Blue stripped grunt	Ronco amarillo	*Haemulon sciurus*
	Smallmouth grunt	Saboga	*Haemulon chrysargyreum*
	Margate	Viuda	*Haemulon album*
SPARIDAE	Jolt head porgy	Bajonado	*Calamus bajonado*
KYPHOSIDAE	Bermuda chub	Chopa blanca	*Kyphosus sectatrix*
MULLIDAE	Yellow goatfish	Salmonete amarrillo	*Mulloidichthys martinicus*
PEMPHERIDAE	Glassy sweeper	Barrigón clareado	*Pempheris schomburgki*
CHAETODONTIDAE	Four eye butterfly fish	Mariposa	*Chaetodon capistratus*
	Banded butterfly fish	Mariposa rayada	*Chaetodon striatus*
POMACANTHIDAE	Queen angelfish	Isabelita	*Holocanthus ciliaris*
	Gray angelfish	Isabelita gris	*Pomacantus arcuathus*
	Rock beauty	Isabelita medioluto	*Holocanthus tricolor*
	French angelfish	Isabelita negra	*Pomacantus paru*

Family	English Name	Spanish Name	Genus & Species
POMACENTRIDAE	Long fin damselfish	Damisela aletilarga	*Pomacentrus diencaeus*
	Three spot damselfish	Damisela amarrilla	*Pomacentrus planiformes*
	Cocoa damselfish	Damisela chocolate	*Pomacentrus variailis*
	Yellowtail damselfish	Damisela coliamarilla	*Microspathodon chrysurus*
	Blue chromis	Burrito	*Chromis cyanea*
	Beaugregory	Gregorio	*Pomacentrus leucostictus*
	Brown chromis	Jaqueda parda	*Chromis multileneata*
	Dusky damselfish	Leopoldito	*Pomacentrus dorsopunicans*
	Sargeant major	Sargento	*Abudefduf saxatilis*
	Night sargeant	Vieja prieta	*Abudefduf taurus*
LABRIDAE	Hogfish	Capitán	*Lachnolaimus maximus*
	Spanish hogfish	Loro capitán	*Bodianus rufus*
	Pudding wife	Capitán de piedras	*Halichoeres radiatus*
	Slippery dick	Doncella	*Halichoeres bivittatus*
	Yellow head wrasse	Doncella cabeciamarilla	*Halichoeres garnoti*
	Blue head	Doncella cabeciazul	*Thalassoma bifasciatum*
	Black ear wrasse	Doncella orejinegra	*Halichoeres poeyi*
	Clown wrasse	Doncella payasa	*Halichoeres maculipinna*
	Painted wrasse	Doncella pintada	*Halichoeres caudalis*
	Pearly razor fish	Navajón perlado	*Hemipteronotus novacula*

Family	English Name	Spanish Name	Genus & Species
SCARIDAE	Blue parrotfish	Brindao	*Scarus coeruleus*
	Stoplight parrotfish	Chaporra	*Sparisoma viride*
	Stripped parrotfish	Cotorro	*Scarus croicensis*
	Rainbow parrotfish	Guacamayo	*Scarus guacamaia*
	Midnight parrotfish	Judío	*Scarus coelestinus*
	Yellowtail parrotfish	Loro coliamarillo	*Sparisoma rubripinne*
	Redband parrotfish	Loro banda colorada	*Sparisoma aurofrenatum*
	Redtail parrotfish	Loro colirojo	*Sparisoma chrysopterum*
	Bucktooth parrotfish	Loro dientón	*Sparisoma radians*
	Princess parrotfish	Princesa	*Scarus taeniopterus*
	Queen parrotfish	Reina	*Scarus vetula*
BLENNIIDAE	Red lip blenny	Blenio Boquicolorado	*Ophioblennius atlanticus*
GOBIIDAE	Bridled goby	Gobio brida	*Coryphopterus glaucofraenum*
	Goldspot goby	Gobio dorado	*Gnatholepsis thompsoni*
	Sharknose goby	Gobio hocicudo	*Gobiosoma evelynae*
	Masked goby	Gobio mascara	*Coryphopterus personatus*
BALISTIDAE	Queen triggerfish	Peje puerco	*Balistes veluta*
	Black durgon	Japonesa	*Melichthys niger*
ACANTHURIDAE	Blue tang	Barbero	*Acanthurus coeruleus*
	Doctor fish	Cirujano	*Acanthurus chirurgus*
	Ocean surgeon fish	Médico	*Acanthurus bahianus*
MONACANTHIDAE	Orange spotted filefish	Lija motas naranja	*Cantherhinea pullus*

Family	English Name	Spanish Name	Genus & Species
OSTRACIIDAE	Smooth trunkfish	Chapín liso	*Lactophrys tirqueter*
TETRAODONTIDAE	Sharp nose puffer	Tamboril narizón	*Canthigaster rostrata*
DIODONTIDAE	Porcupine fish	Puerco espín	*Diodon hystrix*
SYNODONTIDAE	Sand diver	Doncella	*Snynodus intermedius*
MALACANTHIDAE	Sand tilefish	Jolocho	*Malacanthus plumieri*
BOTHIDAE	Peacock flounder	Lenguado lunado	*Bothus lunatus*
MURAENIDAE	Spotted moray	Morena moteada	*Gymnothorax moringa*
AULOSTOMIDAE	Trumpet fish	Trompetero	*Aulostomus maculatus*
CARANGIDAE	Blue runner	Cojinúa	*Caranx crysos*
	Bar jack	Guaymen blanco	*Caranx ruber*
	Greater amberjack	Medregal	*Seriola drumerili*
	Rainbow runner	Salmón	*Elagatis bipinnulata*
GERREIDAE	Yellow fin mojarra	Muniama	*Gerres cinereus*
LUTJANIDAE	Mahogany snapper	Arrayado de yerbas	*Lutjanus mahagoni*
	Schoolmaster	Pargo amarillo	*Lutjanus apodus*
	Mutton snapper	Sama	*Lutjanus analis*
	Yellow tail snapper	Colirrubia	*Ocyurus chrysurus*
SCIAENIDAE	High hat	Verdugo rayado	*Equetus acuminatus*
SPHYRAENIDAE	Great barracuda	Picúa	*Phyraena barracuda*
SCOMBRIDAE	Spanish mackarel	Sierra	*Scomberomorus maculatus*
DASYATIDAE	Southern ray	Raya	*Dasyatis americana*
MYLIOBATIDAE	Spotted eagle ray	Raya moteada	*Aetobatus narinari*
MOBULIDAE	Manta ray	Manta raya	*Manta birostris*

Family	English Name	Spanish Name	Genus & Species
CARCHARHINIDAE	Bull shark	Tiburón toro	*Carcharhinus leucas*
	Reef shark	Tiburón de arrecife	*Carcharhinus perezi*
	Lemon shark	Tiburón limon	*Negaprion brevirostris*
	Tiger shark	Tiburón tigre	*Galeocerdo cuvieri*
ORECTOLOBIDAE	Nurse shark	Tiburón gata	*Ginglymostoma cirratum*
SPHYRNIDAE	Great hammer head shark	Tiburón martillo	*Sphyrna mokarran*
	Smooth hammer head shark	Cornuda	*Sphyrna zygaena*
ALBULIDAE	Bonefish	Macabi	*Albula vulpes*
ELOPIDAE	Tarpon	Sábalo	*Megalops atlanticus*
CENTROPOMIDAE	Fat snook	Robalo	*Centropomus parallelus*

Source: U.S. Navy Draft Environmental Impact for Vieques, 1979; Peterson Field Guides-Atlantic Coast Fishes, 1986; Puerto Rico Conservation Trust, 2002; Unpublished personal communications, 2005.

Mammals / Mamiferos

Family	English Name	Spanish Name	Genus & Species
MOLOSSIDAE	Velvet free-tailed bat	Murciélago de techos	*Molossus molussus*
	Brazilian fee-tailed bat (P)	Murciélago viejo	*Tadarida brasiliensis*
NOCTILIONIDAE	Fishing bat	Murciélago pescador	*Noctilio leporinus*
PHYLLOSTOMIDAE	Cave bat (P)	Murciélago hocico de cerdo	*Brachyphylla cavernarum*
	Fruit bat	Murciélago frutero común	*Artibeus jamaicensis*
	Red fruit bat	Murciélago frutero nativo	*Stenoderma rufum*
VESPERTILIONIDAE	Big brown bat (P)	Murciélago alí-oscuro	*Eptesicus fuscus*
CANIDAE	Dog (F/I)	Perro	*Canis familiaris*
FELIDAE	Cat (F/I)	Gato	*Felis catus*
VIVERRIDAE	Mongoose (I)	Mangosta	*Herpestes javanicus*
EQUIDAE	Horse (F/I)	Caballo	*Equus caballus*
BOVIDAE	Cow (F/I)	Vaca	*Bos taurus*
MURIDAE	Mouse (F/I)	Ratón	*Mus spp.*
	Rat (F/I)	Rata	*Rattus spp.*
BALAENOPTERIDAE	Fin whale (M)	Ballena de aleta	*Balaenoptera physalus*
	Humpback whale (M)	Ballena jorobada	*Megaptera novaeangliae*
	Sei whale (M)	Ballena sei	*Balaenoptera borealis*
DELPHINIDAE	Atlantic Spotted Dolphin (M)	Delfin moteado	*Stenella frontalis*
	Bottle-nose dolphin (M)	Bufeo	*Tursiops truncatus*
	Short fin pilot whale (M)	Ballena piloto	*Globichephala macrorhyncus*
PHYSETERIDAE	Sperm whale (M)	Cachalote	*Physeter macrocephalus*
TRICHECHIDAE	Antillean manatee (M)	Manatí	*Trichechus manatus manatus*

Source: U.S. Navy Draft Environmental Impact for Vieques, 1979; Saliva, 1994; Mignucci, 2001; Puerto Rico Conservation Trust, 2002; Unpublished personal communications, 2005.

F= Feral species (Especies domesticas que retornan a un estado salvaje)
I= Introduced species (Especies introducidas)
M= Marine species (Especies marinas)
P= Probability that species occurs on refuge and/or have unconfirmed reports (Probabilidad que estas especies existan en el refugio y/o hay reportes aun no confirmados)

APPENDIX VI. WILDERNESS REVIEW

Wilderness Review
Vieques National Wildlife Refuge
May 10, 2005

The project leader for the Caribbean Islands National Wildlife Refuge, the manager of the Vieques National Wildlife Refuge, and members of the Vieques comprehensive conservation planning team met at the Vieques Refuge on May 10, 2005, to conduct the refuge's wilderness review. The review team included:

Susan Silander, Project Leader, Caribbean Islands National Wildlife Refuge
Oscar Diaz-Marrero, Refuge Manager, Vieques National Wildlife Refuge
Joseph Schwagerl, Deputy Project Leader, Caribbean Islands National Wildlife Refuge
Rosa Maria Quiles, Planner, Commonwealth of Puerto Rico, Department of Natural and Environmental Resources
Gisella Burgos, Outreach Specialist, Vieques National Wildlife Refuge
James Oland, Special Assistant, Region 4, Refuges

The wilderness review is a required component of the comprehensive conservation plan.
The Wilderness Act defines a Wilderness Area as an area of federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is managed so as to preserve its natural conditions and which:

1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;

2) has outstanding opportunities for solitude or primitive and unconfined type 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 unimpaired condition;

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;

5) is a roadless island; and

6) may contain ecological, geological, or other features of scientific, education, scenic, or historic value.

During the inventory phase of the wilderness review, the emphasis is on an assessment of wilderness character within the inventory unit. Special values (i.e., ecological, geological, scenic, and historical) should be identified, but are not required. The determination to recommend (or not recommend) a Wilderness Study Area to Congress for wilderness designation will be made through the comprehensive conservation plan decision-making process.

During the meeting, the team discussed the criteria for wilderness designation and reviewed maps, photographs, and personal knowledge for identification of potential wilderness study areas. The following is a summary of the determinations:

Western Vieques Refuge Lands

The western portion of the Vieques National Wildlife Refuge was transferred from the Navy to the Department of the Interior, Fish and Wildlife Service, in 2001. This parcel is approximately 3,100 acres. Former military uses included storage for munitions in bunkers, a communications facility at Monte Pirata, an open burn/open disposal site near Punta Boca Quebrada, and recreational uses at Punta Arenas (Green Beach). There are roads, power lines, water pipelines, bridges, remains of former agricultural facilities, bunkers, and communications facilities currently on the property. Prior to the military presence, the parcel was used extensively for agricultural purposes. While most of the western lands have been heavily impacted by agricultural and military activities, there are unique resources on the relatively inaccessible slopes of Monte Pirata and in the mangrove forests surrounding the lagoons.

Attached map from the Transfer Environmental Assessment shows the roads and sites of contamination on western Veiques. The areas indicated as “Conservation Zones” were transferred to the Fish and Wildlife Service and now constitute the western portion of the Vieques Refuge.

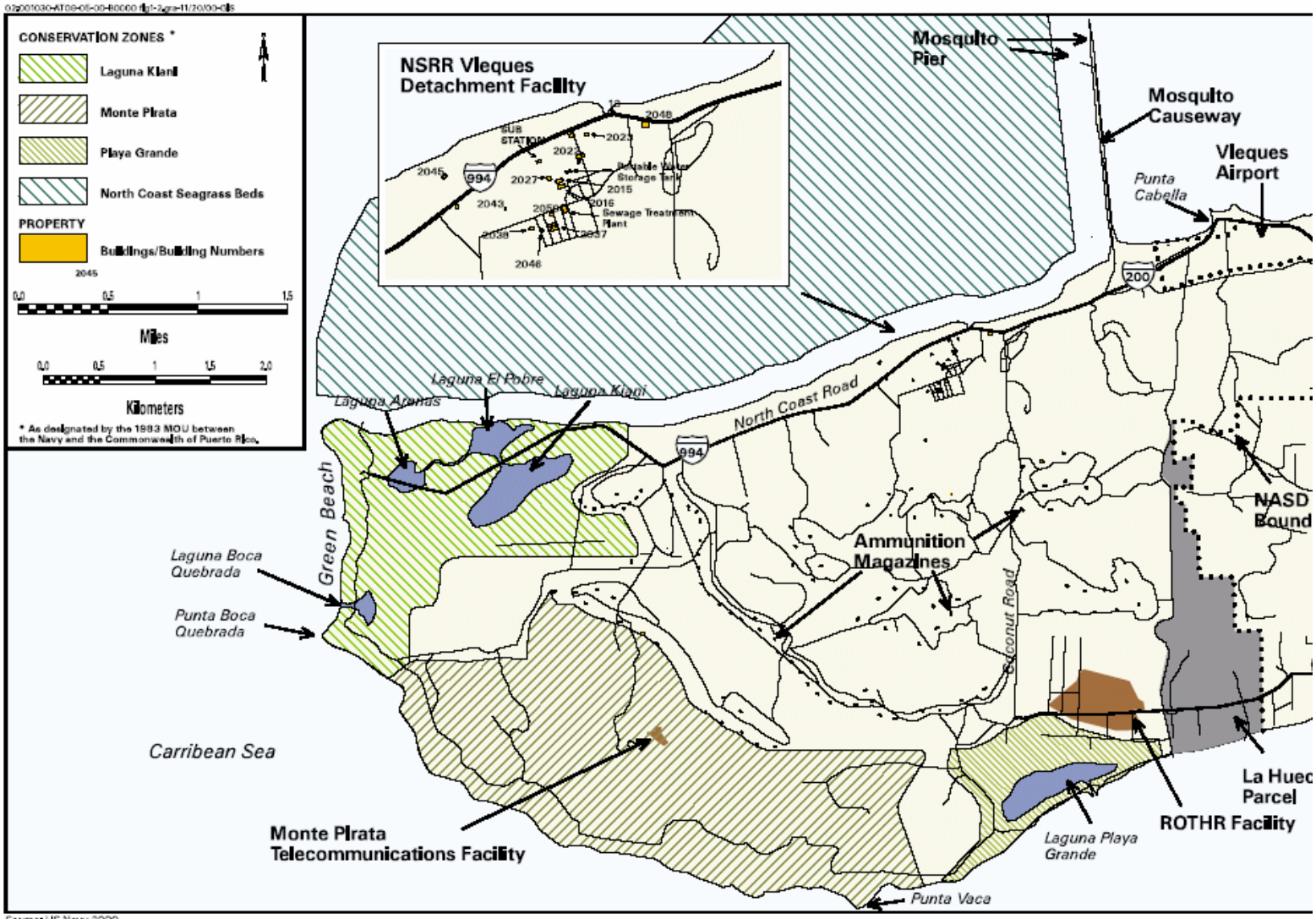
Eastern Vieques Refuge Lands

The eastern portion of the Vieques National Wildlife Refuge was transferred from the Navy to the Department of the Interior, Fish and Wildlife Service, in 2003. The eastern refuge is approximately 14,671 acres, including a 900-acre site known as the “Live Impact Area.” The eastern lands were used by the Navy and other military units for aerial bombing, ship-to-shore gun fire, artillery, and small arms practice and infantry maneuvers from the mid-1940s until they were transferred. Prior to the military uses, sugarcane production and other agricultural activities had brought about the clearing of most of the eastern refuge. Numerous roads throughout the refuge were established to provide access for both the agricultural and military activities. The Navy is still utilizing these roads for access to conduct clean-up from their former activities on these lands. In addition to the roads, there are numerous structures and artifacts from the military and former agricultural activities. The Observation Post, near the eastern end of the refuge, provided an overview of the range area where numerous pieces of old military equipment used for targets still remain. The major development on the eastern refuge is at Camp Garcia, the former Navy headquarters for activities on the eastern maneuver area. Although nearly all of the lands on eastern Vieques have been impacted, coastal lagoons, surrounding mangrove forests, beaches, and quebradas (i.e., intermittent streams) provide natural settings and habitats that can be enhanced or expanded through management activities. See attached maps and photograph.

Summary of Findings

There are no areas within the eastern or western Vieques Refuge tracts that would meet the criteria for wilderness study areas and, therefore, the wilderness review team recommends that no further consideration be given to wilderness designation for any portions of the Vieques Refuge.

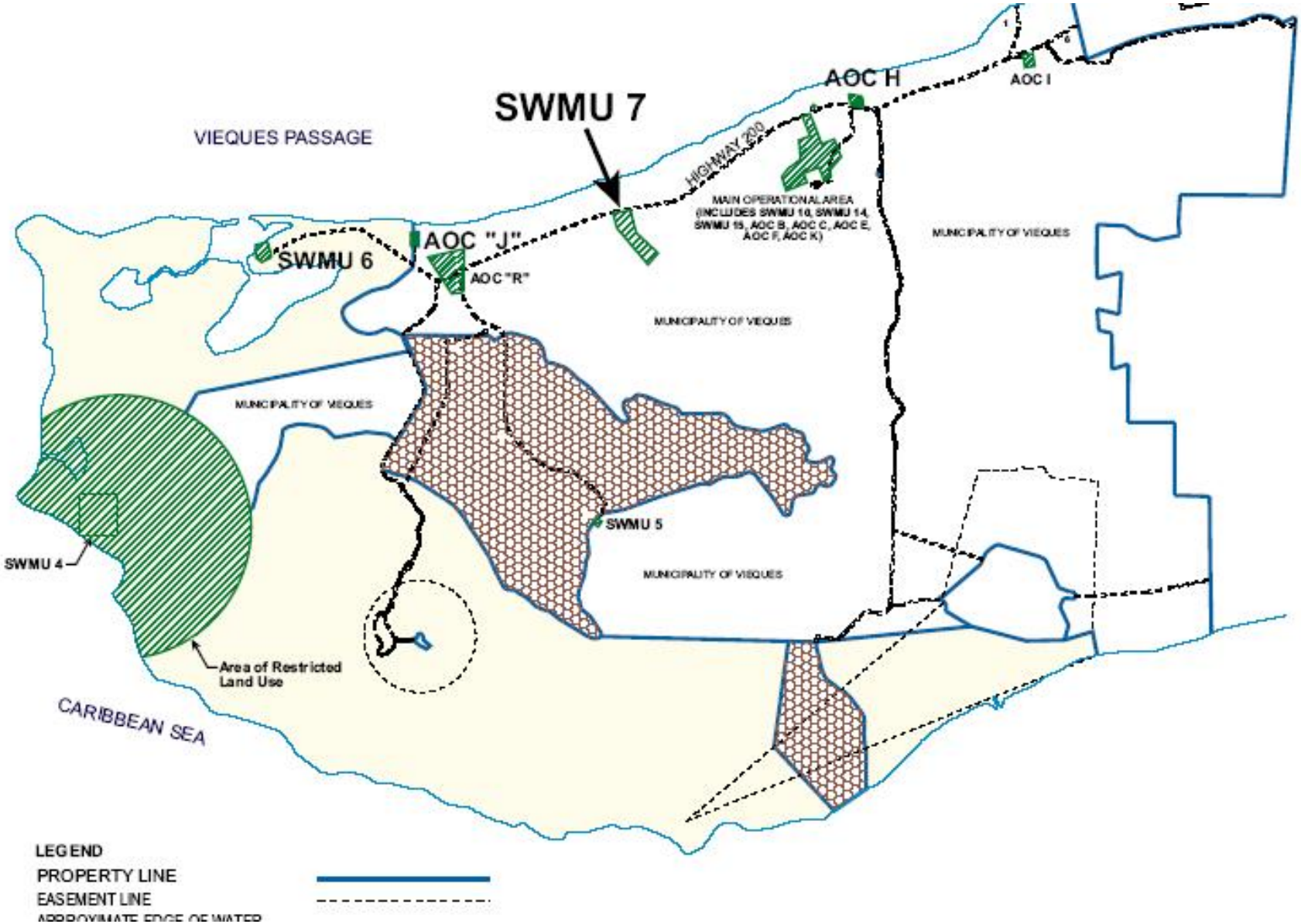
Western Vieques Map from NASD Transfer EA. Former conservation zones are now refuge lands.

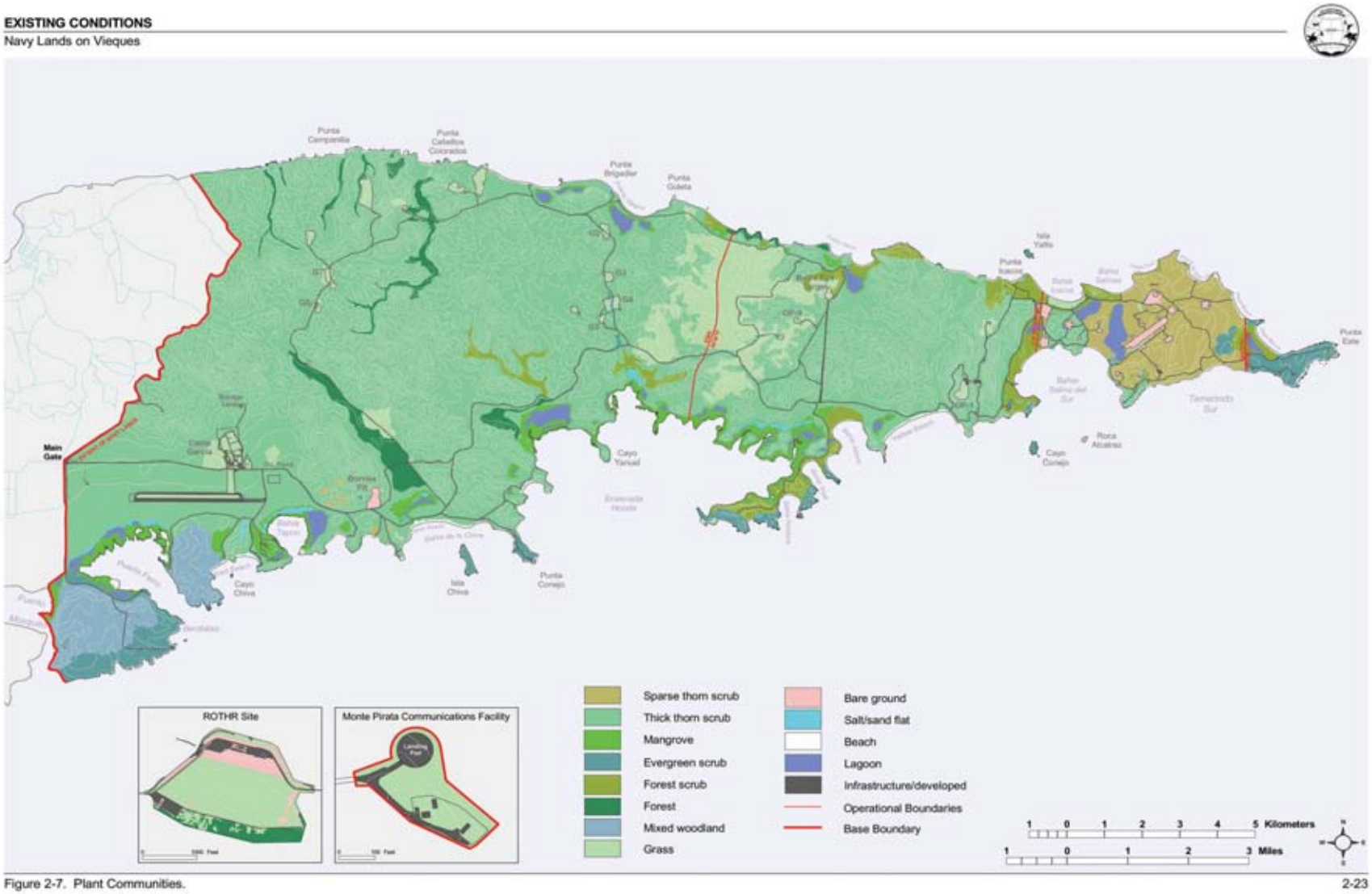


Source: US Navy 2000

Figure 1-2 FACILITIES AND FEATURES ON NASD PROPERTY VIEQUES, PUERTO RICO

Western Vieques Refuge with Solid Waste Management Units (SWMU 4 and SWMU 6)





Eastern Vieques Roads and Facilities from Navy, Integrated Natural Resource Management Plan 2003. Most of the thorn scrub area has been impacted by former agriculture as well as military activities.

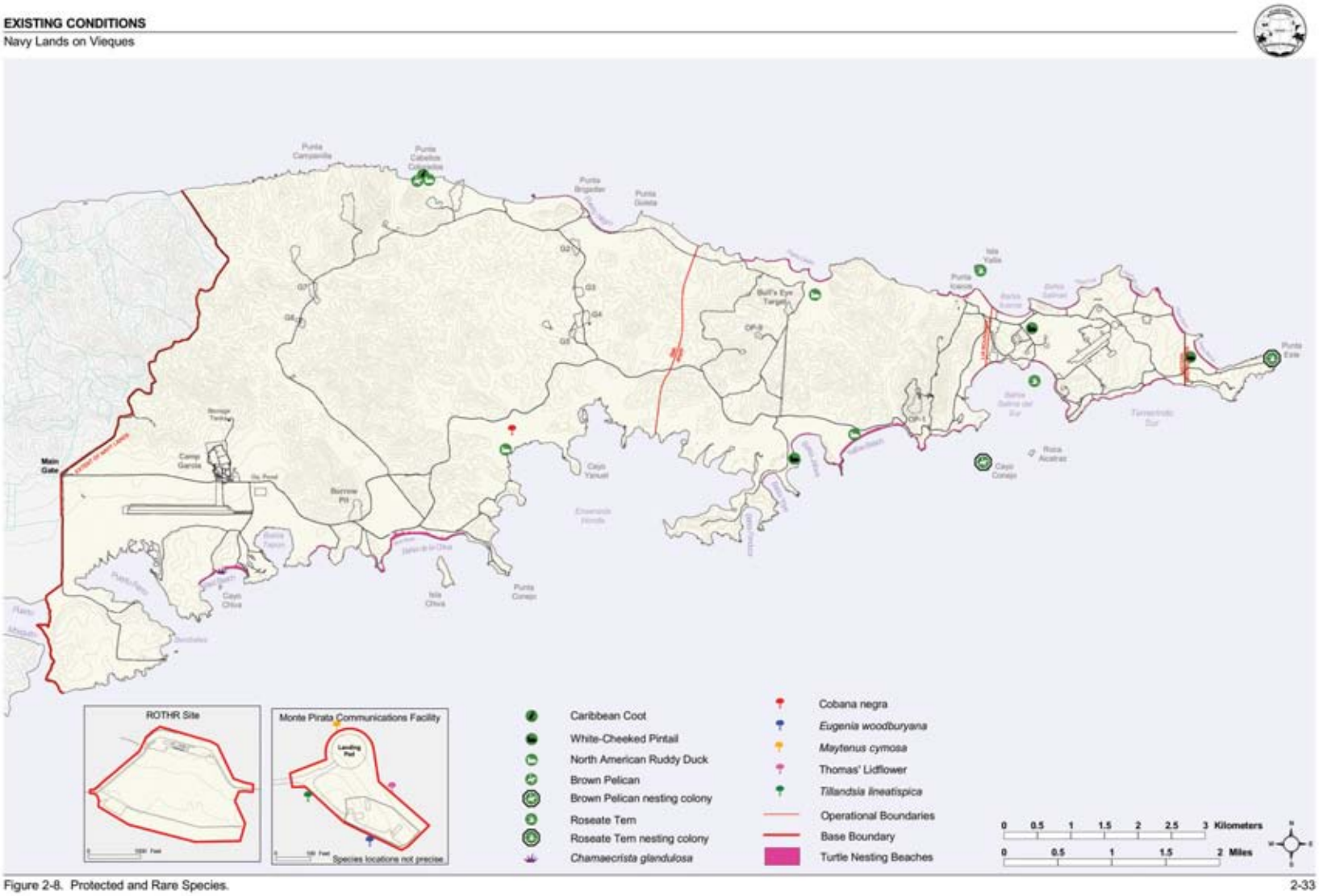
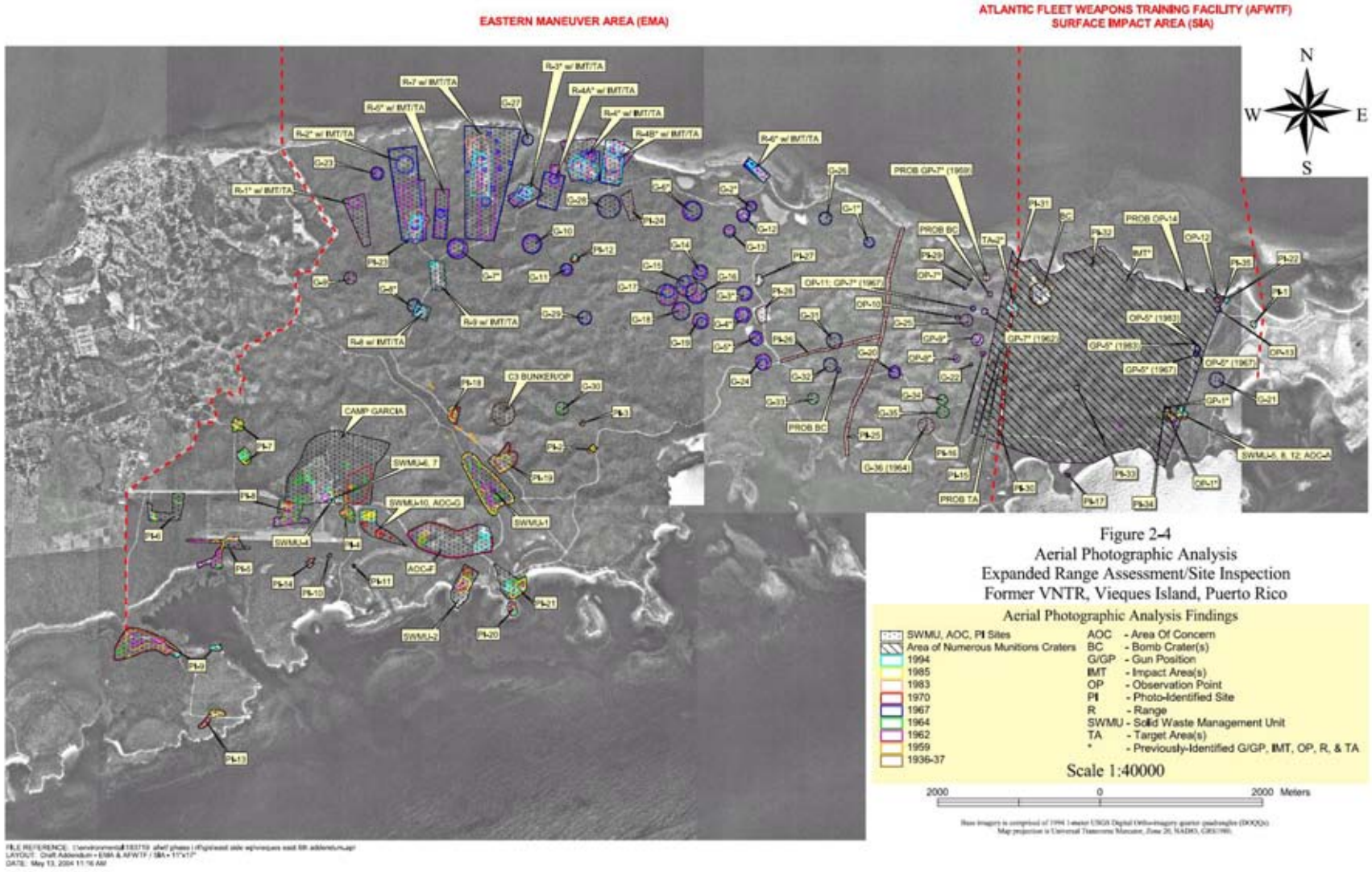


Figure 2-8. Protected and Rare Species.

2-33

Eastern Vieques Roads and Facilities from Navy, Integrated Natural Resource Management Plan 2003

Eastern Vieques Photo from Navy Expanded Range Assessment. Shows sites of military activities affecting eastern Vieques.



APPENDIX VII. DEMOGRAPHIC STATISTICS

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic Area: Vieques Municipio, Puerto Rico

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**9,106**	**100.0**
SEX AND AGE		
Male	4,512	49.5
Female	4,594	50.5
Under 5 years	711	7.8
5 to 9 years	763	8.4
10 to 14 years	792	8.7
15 to 19 years	689	7.6
20 to 24 years	565	6.2
25 to 34 years	1,090	12.0
35 to 44 years	1,067	11.7
45 to 54 years	1,111	12.2
55 to 59 years	549	6.0
60 to 64 years	506	5.6
65 to 74 years	686	7.5
75 to 84 years	432	4.7
85 years and over	145	1.6
Median age (years)	34.5	(X)
18 years and over	6,402	70.3
Male	3,098	34.0
Female	3,304	36.3
21 years and over	6,021	66.1
62 years and over	1,552	17.0
65 years and over	1,263	13.9
Male	569	6.2
Female	694	7.6
RACE		
One race	8,797	96.6
White	6,621	72.7
Black or African American	1,256	13.8
American Indian and Alaska Native	69	0.8
Asian	52	0.6
Asian Indian	38	0.4
Chinese	5	0.1
Filipino	-	-
Japanese	-	-
Korean	2	-
Vietnamese	6	0.1
Other Asian [1]	1	-
Native Hawaiian and Other Pacific Islander	-	-
Native Hawaiian	-	-
Guamanian or Chamorro	-	-
Samoan	-	-
Other Pacific Islander [2]	-	-
Some other race	799	8.8
Two or more races	309	3.4
Race alone or in combination with one or more other races: [3]		
White	6,844	75.2
Black or African American	1,446	15.9
American Indian and Alaska Native	108	1.2
Asian	68	0.7
Native Hawaiian and Other Pacific Islander	1	-
Some other race	997	10.9

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**9,106**	**100.0**
Hispanic or Latino (of any race)	8,870	97.4
Mexican	39	0.4
Puerto Rican	8,660	95.1
Cuban	7	0.1
Other Hispanic or Latino	164	1.8
Not Hispanic or Latino	236	2.6
White alone	182	2.0
RELATIONSHIP		
Total population	**9,106**	**100.0**
In households	9,094	99.9
Householder	3,319	36.4
Spouse	1,495	16.4
Child	3,277	36.0
Own child under 18 years	2,249	24.7
Other relatives	800	8.8
Under 18 years	422	4.6
Nonrelatives	203	2.2
Unmarried partner	147	1.6
In group quarters	12	0.1
Institutionalized population	1	-
Noninstitutionalized population	11	0.1
HOUSEHOLD BY TYPE		
Total households	**3,319**	**100.0**
Family households (families)	2,366	71.3
With own children under 18 years	1,071	32.3
Married-couple family	1,495	45.0
With own children under 18 years	665	20.0
Female householder, no husband present	698	21.0
With own children under 18 years	342	10.3
Nonfamily households	953	28.7
Householder living alone	886	26.7
Householder 65 years and over	394	11.9
Households with individuals under 18 years	1,296	39.0
Households with individuals 65 years and over	1,023	30.8
Average household size	2.74	(X)
Average family size	3.36	(X)
HOUSING OCCUPANCY		
Total housing units	**4,388**	**100.0**
Occupied housing units	3,319	75.6
Vacant housing units	1,069	24.4
For seasonal, recreational, or occasional use	496	11.3
Homeowner vacancy rate (percent)	1.2	(X)
Rental vacancy rate (percent)	8.5	(X)
HOUSING TENURE		
Occupied housing units	**3,319**	**100.0**
Owner-occupied housing units	2,659	80.1
Renter-occupied housing units	660	19.9
Average household size of owner-occupied units	2.66	(X)
Average household size of renter-occupied units	3.08	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

1

U.S. Census Bureau

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Vieques Municipio, Puerto Rico

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**2,526**	**100.0**
Nursery school, preschool	116	4.6
Kindergarten	136	5.4
Elementary school (grades 1-8)	1,387	54.9
High school (grades 9-12)	638	25.3
College or graduate school	249	9.9
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**5,572**	**100.0**
Less than 9th grade	1,591	28.6
9th to 12th grade, no diploma	1,176	21.1
High school graduate (includes equivalency)	1,477	26.5
Some college, no degree	482	8.7
Associate degree	282	5.1
Bachelor's degree	420	7.5
Graduate or professional degree	144	2.6
Percent high school graduate or higher	50.3	(X)
Percent bachelor's degree or higher	10.1	(X)
MARITAL STATUS		
Population 15 years and over	**6,847**	**100.0**
Never married	1,833	26.8
Now married, except separated	3,424	50.0
Separated	331	4.8
Widowed	578	8.4
Female	439	6.4
Divorced	681	9.9
Female	413	6.0
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**479**	**100.0**
Grandparent responsible for grandchildren	367	76.6
VETERAN STATUS		
Civilian population 18 years and over	**6,387**	**100.0**
Civilian veterans	554	8.7
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**2,484**	**100.0**
With a disability	229	9.2
Population 21 to 64 years	**4,667**	**100.0**
With a disability	1,516	32.5
Percent employed	25.4	(X)
No disability	3,151	67.5
Percent employed	39.3	(X)
Population 65 years and over	**1,280**	**100.0**
With a disability	739	57.7
RESIDENCE IN 1995		
Population 5 years and over	**8,441**	**100.0**
Same house in 1995	7,081	83.9
Different house in Puerto Rico in 1995	1,174	13.9
Same municipio	914	10.8
Different municipio	260	3.1
Outside Puerto Rico in 1995	186	2.2
United States	140	1.7
Elsewhere	46	0.5

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**9,106**	**100.0**
Native	8,983	98.6
Born in Puerto Rico	8,331	91.5
Born in United States	422	4.6
Born in U.S. Island Areas	204	2.2
Born abroad of American parent(s)	26	0.3
Foreign born	123	1.4
Entered 1990 to March 2000	39	0.4
Naturalized citizen	57	0.6
Not a citizen	66	0.7
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**123**	**100.0**
Europe	15	12.2
Asia	-	-
Africa	-	-
Oceania	-	-
Latin America	108	87.8
Northern America	-	-
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**8,441**	**100.0**
English only	1,221	14.5
Language other than English	7,220	85.5
Speak English less than "very well"	5,793	68.6
Spanish	7,220	85.5
Speak English less than "very well"	5,793	68.6
Other Indo-European languages	-	-
Speak English less than "very well"	-	-
Asian and Pacific Island languages	-	-
Speak English less than "very well"	-	-
ANCESTRY (single or multiple)		
Total population	**9,106**	**100.0**
Total ancestries reported	*7,024*	*77.1*
Arab	-	-
Czech[1]	9	0.1
Danish	-	-
Dutch	14	0.2
English	-	-
French (except Basque)[1]	9	0.1
French Canadian[1]	10	0.1
German	16	0.2
Greek	-	-
Hungarian	-	-
Irish[1]	7	0.1
Italian	11	0.1
Lithuanian	8	0.1
Norwegian	-	-
Polish	11	0.1
Portuguese	-	-
Russian	11	0.1
Scotch-Irish	-	-
Scottish	-	-
Slovak	-	-
Subsaharan African	10	0.1
Swedish	-	-
Swiss	-	-
Ukrainian	-	-
United States or American	153	1.7
Welsh	-	-
West Indian (excluding Hispanic groups)	110	1.2
Other ancestries	6,645	73.0

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

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U.S. Census Bureau

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Vieques Municipio, Puerto Rico

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**6,681**	**100.0**
In labor force	2,395	35.8
Civilian labor force	2,386	35.7
Employed	1,712	25.6
Unemployed	674	10.1
Percent of civilian labor force	28.2	(X)
Armed Forces	9	0.1
Not in labor force	4,286	64.2
Females 16 years and over	**3,425**	**100.0**
In labor force	921	26.9
Civilian labor force	921	26.9
Employed	637	18.6
Own children under 6 years	**690**	**100.0**
All parents in family in labor force	228	33.0
COMMUTING TO WORK		
Workers 16 years and over	**1,681**	**100.0**
Car, truck, or van - - drove alone	1,013	60.3
Car, truck, or van - - carpooled	357	21.2
Public transportation (including taxicab)	52	3.1
Walked	162	9.6
Other means	44	2.6
Worked at home	53	3.2
Mean travel time to work (minutes)[1]	17.0	(X)
Employed civilian population 16 years and over	**1,712**	**100.0**
OCCUPATION		
Management, professional, and related occupations	381	22.3
Service occupations	479	28.0
Sales and office occupations	281	16.4
Farming, fishing, and forestry occupations	34	2.0
Construction, extraction, and maintenance occupations	314	18.3
Production, transportation, and material moving occupations	223	13.0
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	29	1.7
Construction	249	14.5
Manufacturing	117	6.8
Wholesale trade	23	1.3
Retail trade	172	10.0
Transportation and warehousing, and utilities	91	5.3
Information	-	-
Finance, insurance, real estate, and rental and leasing	81	4.7
Professional, scientific, management, administrative, and waste management services	136	7.9
Educational, health and social services	374	21.8
Arts, entertainment, recreation, accommodation and food services	139	8.1
Other services (except public administration)	84	4.9
Public administration	217	12.7
CLASS OF WORKER		
Private wage and salary workers	861	50.3
Government workers	604	35.3
Self-employed workers in own not incorporated business	233	13.6
Unpaid family workers	14	0.8

Subject	Number	Percent
INCOME IN 1999		
Households	**3,330**	**100.0**
Less than $10,000	1,763	52.9
$10,000 to $14,999	481	14.4
$15,000 to $24,999	546	16.4
$25,000 to $34,999	264	7.9
$35,000 to $49,999	205	6.2
$50,000 to $74,999	35	1.1
$75,000 to $99,999	13	0.4
$100,000 to $149,999	6	0.2
$150,000 to $199,999	-	-
$200,000 or more	17	0.5
Median household income (dollars)	9,331	(X)
With earnings	1,678	50.4
Mean earnings (dollars)[1]	18,394	(X)
With Social Security income	1,118	33.6
Mean Social Security income (dollars)[1]	6,559	(X)
With Supplemental Security Income	48	1.4
Mean Supplemental Security Income (dollars)[1]	5,458	(X)
With public assistance income	848	25.5
Mean public assistance income (dollars)[1]	2,183	(X)
With retirement income	503	15.1
Mean retirement income (dollars)[1]	20,748	(X)
Families	**2,397**	**100.0**
Less than $10,000	1,126	47.0
$10,000 to $14,999	357	14.9
$15,000 to $24,999	407	17.0
$25,000 to $34,999	247	10.3
$35,000 to $49,999	205	8.6
$50,000 to $74,999	35	1.5
$75,000 to $99,999	3	0.1
$100,000 to $149,999	6	0.3
$150,000 to $199,999	-	-
$200,000 or more	11	0.5
Median family income (dollars)	11,036	(X)
Per capita income (dollars)[1]	6,562	(X)
Median earnings (dollars):		
Male full-time, year-round workers	15,222	(X)
Female full-time, year-round workers	13,378	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**1,453**	**60.6**
With related children under 18 years	1,050	75.2
With related children under 5 years	413	82.4
Families with female householder, no husband present	**552**	**82.5**
With related children under 18 years	412	88.8
With related children under 5 years	170	96.6
Individuals	**5,880**	**64.6**
18 years and over	3,677	57.5
65 years and over	659	51.5
Related children under 18 years	2,187	81.2
Related children 5 to 17 years	1,635	80.6
Unrelated individuals 15 years and over	666	61.1

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Vieques Municipio, Puerto Rico

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**4,388**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	3,734	85.1
1-unit, attached	476	10.8
2 units	77	1.8
3 or 4 units	73	1.7
5 to 9 units	17	0.4
10 to 19 units	-	-
20 or more units	11	0.3
Mobile home	-	-
Boat, RV, van, etc	-	-
YEAR STRUCTURE BUILT		
1999 to March 2000	48	1.1
1995 to 1998	464	10.6
1990 to 1994	576	13.1
1980 to 1989	840	19.1
1970 to 1979	875	19.9
1960 to 1969	866	19.7
1940 to 1959	573	13.1
1939 or earlier	146	3.3
ROOMS		
1 room	94	2.1
2 rooms	466	10.6
3 rooms	771	17.6
4 rooms	907	20.7
5 rooms	1,136	25.9
6 rooms	633	14.4
7 rooms	220	5.0
8 rooms	95	2.2
9 or more rooms	66	1.5
Median (rooms)	4.5	(X)
Occupied housing units	**3,319**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	306	9.2
1995 to 1998	569	17.1
1990 to 1994	455	13.7
1980 to 1989	733	22.1
1970 to 1979	625	18.8
1969 or earlier	631	19.0
VEHICLES AVAILABLE		
None	1,206	36.3
1	1,544	46.5
2	453	13.6
3 or more	116	3.5
HOUSE HEATING FUEL		
Utility gas	-	-
Bottled, tank, or LP gas	851	25.6
Electricity	882	26.6
Fuel oil, kerosene, etc	-	-
Coal or coke	-	-
Wood	-	-
Solar energy	30	0.9
Other fuel	-	-
No fuel used	1,556	46.9
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	230	6.9
Lacking complete kitchen facilities	66	2.0
No telephone service	692	20.8

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**3,319**	**100.0**
1.00 or less	2,780	83.8
1.01 to 1.50	298	9.0
1.51 or more	241	7.3
Specified owner-occupied units	**2,434**	**100.0**
VALUE		
Less than $50,000	870	35.7
$50,000 to $99,999	1,019	41.9
$100,000 to $149,999	147	6.0
$150,000 to $199,999	64	2.6
$200,000 to $299,999	93	3.8
$300,000 to $499,999	106	4.4
$500,000 to $999,999	17	0.7
$1,000,000 or more	118	4.8
Median (dollars)	60,900	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	166	6.8
Less than $300	37	1.5
$300 to $499	41	1.7
$500 to $699	15	0.6
$700 to $999	29	1.2
$1,000 to $1,499	17	0.7
$1,500 to $1,999	9	0.4
$2,000 or more	18	0.7
Median (dollars)	545	(X)
Not mortgaged	2,268	93.2
Median (dollars)	129	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	991	40.7
15.0 to 19.9 percent	245	10.1
20.0 to 24.9 percent	188	7.7
25.0 to 29.9 percent	133	5.5
30.0 to 34.9 percent	123	5.1
35.0 percent or more	571	23.5
Not computed	183	7.5
Specified renter-occupied units	**660**	**100.0**
GROSS RENT		
Less than $200	124	18.8
$200 to $299	154	23.3
$300 to $499	118	17.9
$500 to $749	10	1.5
$750 to $999	7	1.1
$1,000 to $1,499	-	-
$1,500 or more	-	-
No cash rent	247	37.4
Median (dollars)	264	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	69	10.5
15.0 to 19.9 percent	22	3.3
20.0 to 24.9 percent	53	8.0
25.0 to 29.9 percent	24	3.6
30.0 to 34.9 percent	7	1.1
35.0 percent or more	225	34.1
Not computed	260	39.4

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

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U.S. Census Bureau

APPENDIX VIII. PUBLIC PARTICIPATION

SUMMARY OF PUBLIC SCOPING COMMENTS AND ISSUES

Y - indicates comments favoring the activity
N - indicates comments opposed to the activity

Public Use, Programs and Access

- Hunting (Y/N)
- Fishing (Y/N)
  - Lagoons
  - Night (with permit)
- Crabbing (Y/N)
  - with permits
- Horseback riding (Y/N)
- Grazing (Y/N)
- Camping
  - with permits
  - educational groups
  - family-oriented
- Extended hours
- Access to additional areas of the refuge
- Beach use
- Passive activities - volleyball (Y/N)
- Environmental education and Interpretation of cultural/natural resources in different areas of the refuge
  - Volunteers or interpretive rangers (walk/talk)
  - Vieques residents, students
  - Educational activities with the community
- Kayaking/Canoeing
- Resource photography
- Wildlife observation
- Tours
- 4 Track (No)
- Rock climbing
- Surfing
- Reading
- Swimming
- Boating (Y/**N**)
  - Anchoring area
  - Monitor to reduce resource damage (e.g., sea turtle and manatee)
- Low cost entrance fee
- Area to play with dogs
- Lifeguards
- Tennis court
- Brochure/map
- Nude bathing
- Boat ramp

- Bike riding
- Running/jogging
- Planting and coconut collection
- Carrying capacity – to have the natural environment undamaged
- Jet ski (N)
- No fire/BBQ's
- Kite flying

Summary of Pubic Comments and Issues <u>Refuge Facilities</u>

- Use of roads (Y/N)
    - Eliminate off road vehicle use
- Scenic roads
- Road improvements
- Observation tower
    - Mount Pirata
- Shaded areas
- Gazebos
- Interpretive/educational signs on land and underwater
- Directional signs
- Brush removal
- Barrier removal
- Hiking trails through different terrain, long, short
- Biking trails
- Boardwalk
- Visitor Center/in collaboration with local agencies, groups
- Bathrooms/showers
- Morer trash cans
- Fish and Wildlife Service office on refuge
- Rehabilitate Camp Garcia for environmental education/historical seminars and eco-lodging
- OP-1(Observatory/Marine economics laboratory)
- Water available for hikers "oasis"

Summary of Pubic Comments and Issues <u>Commercial Activities</u>

- Vendors in refuge (Y/N)
    - Food
    - Souvenir shop/beach use items

- Ecotourism (Y/N)
    - Horseback riding tours
    - Natural and cultural resources tours
    - Agricultural tourism
- Logging

Summary of Pubic Comments and Issues <u>Security and Safety</u>

- Use of Bahía Puerto Ferro during hurricanes to protect boats
- Provide security to reduce theft
- Search and rescue in remote areas

Summary of Pubic Comments and Issues <u>Natural Resource Management</u>

- Invasive species
- Management of endangered species
- Monitor road and trail erosion especially if they are protected areas such as mangroves
- Reforestation with native species
- Agricultural projects
- Sea turtle investigation
- Plant nursery
- Species identification
- Areas to raise animals and plants
- Wildlife first
- Strong monitoring and evaluation program
- Program to minimize the impact of exotic species
- Identification of species/develop plan to ensure the health of the populations of imperiled species.
- Sea turtle nesting areas closed to the public
- Research permits
- Prohibit changing contour of land

Summary of Pubic Comments and Issues <u>Management of Cultural Resources</u>

- Cultural resource investigation
- Archaeology
- Restore archaeological facilities and historic monuments
    - Sugar mills, lighthouses, wells, and economic centers

Summary of Pubic Comments and Issues <u>U.S. Navy Activities</u>

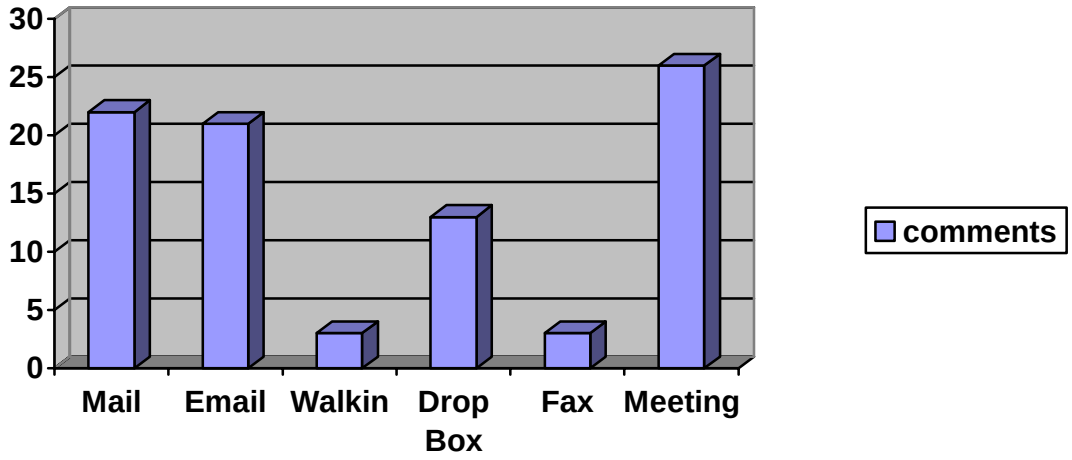
- Decontamination/cleanup
    - Delineate priority of cleanup-Navy RESPONSIBLE
    - Include plan to monitor and assess the cleanup progress
    - Clean-up level

Summary of Pubic Comments and Issues <u>Other</u>

- Return Ffish and Wildlife Service land to the municipal government of Vieques
    - 1940 law
- Return Fish and Wildlife Service land to “Fideicomiso Comunitario de Terrenos”
    - Amend law that established refuge
    - 900 wilderness area
    - Housing
- Access to and use of the landing strip or airport
- Planting/agriculture
- Aquaculture
- Ecotourism development
- Viequenses develop comprehensive conservation plan--not Fish and Wildlife Service
- Prohibit any military activities
- Not permit Fish and Wildlife Service activities
- Recruit Viequenses to help manage resources
- Plan intensive public use to have better clean-up
- Reduce refuge acreage

Groups
Municipal Government of Vieques
The Wilderness Society
Jose Marcano & Associates (did not submit comments)
Engineers, Architects, and Planners
National Oceanic and Atmospheric Administration – National Marine Fisheries Service
University of Puerto Rico-Humacao
Air Sunshine
Global Environmental Teaching- WI Center for Environmental Education
VCHT
Familia Viequense Pro Salud

Total Written Comments: ***78 total***
22 by mail
11 by email
3 by walk-in
23 by drop box
3 by fax
26 from meeting comments



49 individuals attended November 10th public meeting

Appendix IX Intra-Service Section 7 Consultation

Originating Person: Susan Silander
Telephone Number: 787/851-7258, ext. 238
E-Mail: Susan_Silander@fws.gov
Date:

Project Name: Vieques 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: Puerto Rico/Fish and Wildlife Service

III. Station Name: Vieques National Wildlife Refuge

IV. Description of Proposed Action (attach additional pages as needed):
Implementation of the Comprehensive Conservation Plan for the Vieques National Wildlife Refuge by adopting the preferred alternative that will provide guidance, management direction, and operation plans for the next 15 years.

V. Pertinent Species and Habitat:

A. Include species/habitat occurrence map:

SPECIES/CRITICAL HABITAT	STATUS[1]
Antillean Manatee	Endangered
Green Sea Turtle	Threatened
Hawksbill Sea Turtle	Endangered
Leatherback Sea Turtle	Endangered
Roseate Tern	Threatened
Brown Pelican	Endangered
Yellow-Shouldered Blackbird	Endangered
Stahlia monosperma	Threatened
Chamaecrista g. var. *mirabilis*	Endangered
Calyptranthes thomasiana	Endangered
Goetzea elegans	Endangered

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

VI. Location (attach map):

A. Ecoregion Number and Name: Caribbean

B. County and State: Vieques, Puerto Rico

C. Section, township, and range (or latitude and longitude):

D. Distance (miles) and direction to nearest town: Seven miles to the east of the main island of Puerto Rico

E. Species/habitat occurrence:

Details of species occurrence and habitat are provided in text of the comprehensive conservation plan. The following is a summary of occurrence:

Antillean Manatee – Known to frequent shallow coastal waters adjacent to Vieques, primarily in the northwestern part of the island, but have been observed as far east as Puerto Ferro on the south coast.

Green Sea Turtle – Known to nest on beaches in eastern Vieques. See attached map.

Hawksbill Sea Turtle – Known to nest on beaches in both eastern and western Vieques. See attached map.

Leatherback Sea Turtle – Known to nest on beaches in both eastern and western Vieques. See attached map.

Roseate Tern – Reported nesting near the eastern tip of Vieques in 2001.

Brown Pelican – Known to roost and feed in coves, inlets, and lagoons of Vieques. Known to nest on Cayo Conejo, a small island off the south coast of Vieques administered by the commonwealth.

Yellow-shouldered Blackbird – Known from historic records but no current sightings documented.

Stahlia monosperma – Known from the Laguna Kiani and Laguna Yanuel areas.

Calyptranthes thomasiana – Known from the summit of Monte Pirata in Vieques.

Chamaecrista glandulosa var. *mirabilis* – Reported from the Playa Caracas area in eastern Vieques but not relocated in recent years.

Goetzea elegans – Known from western Vieques in the lower portions of Monte Pirata.

VII. Determination of Effects:

A. Explanation of effects of the action on species and critical habitats in item V. B (attach additional pages as needed).

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Antillean Manatee	Disturbance from activities by staff and visitors associated with fishing facilities, such as boat ramps (i.e., increase in boats and potential impacts to seagrass beds).
Green Sea Turtle	Potential adverse impacts include disturbance by staff and visitors during nesting season; disturbance to nests/nesting habitat (e.g., vegetation removal) during management of lagoon openings; and disturbance to habitat during development of beach recreational facilities (e.g., gazebos, boat ramps, lighting, and impacts to seagrass beds). Beneficial effects include monitoring programs, planting of coastal vegetation, feral animal control, and education/outreach activities.
Hawksbill Sea Turtle	Disturbance by staff and visitors during nesting season, disturbance to nests/nesting habitat during management of lagoon openings, disturbance to habitat (vegetation removal, lighting) during development of beach recreational facilities such as gazebos. Beneficial effects include monitoring programs, planting of coastal vegetation, feral animal control, and education/outreach activities.
Leatherback Sea Turtle	Disturbance by staff and visitors during nesting season, disturbance to nests/nesting habitat during management of lagoon openings, disturbance of habitat (vegetation removal, lighting) during development of beach recreational facilities such as gazebos. Beneficial effects include monitoring programs, planting of coastal vegetation, feral animal control, and education/outreach activities.
Roseate Tern	Disturbance by staff during nesting season.
Brown Pelican	Disturbance by staff and visitors in foraging and roosting habitat.
Yellow-Shouldered Blackbird	No adverse effects to the species or their potential habitat anticipated.
Stahlia monosperma	No adverse effects anticipated. Trails, roads, and structures will be located so as to avoid impacts to the species. Beneficial effects include inventories to locate additional populations and the propagation and the establishment or enhancement of populations.

SPECIES/ CRITICAL HABITAT	IMPACTS TO SPECIES/CRITICAL HABITAT
Chamaecrista g. var. *glandulosa*	No adverse effects anticipated. Trails, roads, and structures will be located so as to avoid impacts to the species. Beneficial effects include inventories to locate additional populations and the propagation and the establishment or enhancement of populations.
Calyptranthes thomasiana	No adverse effects anticipated. Trails, roads, and structures will be located so as to avoid impacts to the species. Beneficial effects include inventories to locate additional populations and the propagation and establishment or enhancement of populations.
Goetzea elegans	No adverse effects anticipated. Trails, roads, and structures will be located so as to avoid impacts to the species. Beneficial effects include inventories to locate additional populations and the propagation and establishment or enhancement of populations.

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

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Antillean Manatee	Because the construction of boat ramps requires a permit from the Corps of Engineers, impacts from this type of activity will be evaluated upon application for the permit. Impacts to seagrass beds will be avoided.
Green Sea Turtle	Restrict access to nesting area areas by visitors to daylight hours, restrict activities in nesting habitat (e.g., beach umbrellas), and construct recreational facilities outside of nesting habitat. Accesses to beaches from roads through vegetation will be limited and those accesses eliminated will be revegetated. Lighting on those facilities that require nighttime lights (e.g., security lights) will be designed in such as way as to avoid lighting being visible from the beach. Impacts from management of lagoon openings will be avoided by monitoring nesting and timing of such activities. Horseback riding will not be permitted on beaches.
Hawksbill Sea Turtle	Restrict access to nesting areas by visitors to daylight hours, restrict activities in nesting habitat (e.g., beach umbrellas), and construct recreational facilities outside of nesting habitat. Accesses to beaches from roads through vegetation will be limited and those accesses eliminated will be revegetated. Lighting on those facilities that require nighttime lights (e.g., security lights) will be designed in such a way as to avoid lighting being visible from the beach. Impacts from management of lagoon openings will be avoided by monitoring nesting and timing of such activities. Horseback riding will not be permitted on beaches.
Leatherback Sea Turtle	Restrict access to nesting area areas by visitors to daylight hours, restrict activities in nesting habitat (e.g., beach umbrellas), and construct recreational facilities outside of nesting habitat. Accesses to beaches from roads through vegetation will be limited and those accesses eliminated will be revegetated. Lighting on those facilities that require nighttime lights (e.g., security lights) will be designed in such a way as to avoid lighting being visible from the beach. Impacts from management of lagoon openings will be avoided by monitoring nesting and timing of such activities. Horseback riding will not be permitted on beaches.
Roseate Tern	Because the location of the nesting area is to the east of the “Live Impact Area,” access by the public will be restricted. Staff will avoid nesting areas during the nesting season.

SPECIES/ CRITICAL HABITAT	ACTIONS TO MITIGATE/MINIMIZE IMPACTS
Brown Pelican	Educational/outreach panels or material will be prepared at areas utilized for fishing, indicating measure designed to protect the pelican (e.g., no discarding of fish lines or hooks).
Yellow-Shouldered Blackbird	N/A
Stahlia monosperma	N/A
Chamaecrista g. var. *glandulosa*	N/A
Calyptranthes thomasiana	N/A
Goetzea elegans	N/A

VIII. Effect Determination and Response Requested:

SPECIES/ **CRITICAL HABITAT**	**DETERMINATION[1]**			**RESPONSE[1]**
	NE	**NA**	**AA**	
Antillean Manatee		X		
Green Sea Turtle		X		
Hawksbill Sea Turtle		X		
Leatherback Sea Turtle		X		
Roseate Tern		X		
Brown Pelican		X		
Yellow-Shouldered Blackbird		X		
Stahlia monosperma		X		
Chamaecrista g. var. *glandulosa*		X		
Calyptranthes thomasiana		X		
Goetzea elegans		X		

[1]DETERMINATION/RESPONSE REQUESTED:
NE = no effect. This determination is appropriate when the proposed action will not impact directly, indirectly, or cumulatively, 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 or 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 X. Compatibility Determinations

Refuge Name: Vieques National Wildlife Refuge, Vieques, Puerto Rico

Date Established: May 1, 2001

Establishing and Acquisition Authorities: The refuge was established when approximately 3,100 acres were transferred by the Department of the Navy to the Department of the Interior, Fish and Wildlife Service under Section 1508, Title XV, Public Law 106-398, signed by President Clinton on October 30, 2000. A significant portion of land, approximately 14,573 acres, was added on April 29, 2003, under Section 1049, Title XV, Public Law 107-107, signed by President George W. Bush on October 30, 2002.

Other Applicable Laws, Regulations and Policies:

1. National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C.668dd-668ee].
2. Migratory Bird Conservation Act, as amended [16 U.S.C. 715-715d, 715e, 715f-715r].
3. Endangered Species Act of 1973, as amended [16 U.S.C. 1531-1544]
4. Public Law 106-398 of October 30, 2000.
5. Public Law 107-107 of October 30, 2002.
6. Memorandum of Agreement between the Department of the Navy and the Department of the Interior Concerning the Transfer of Lands of Vieques, signed on April 30, 2003.
7. Letter from Honorable Annabelle Rodriguez, Secretary of Justice, Commonwealth of Puerto Rico to Honorable Cesar Miranda, Secretary of the Governor, dated March 24, 2004, regarding the exclusive jurisdiction of the Commonwealth of Puerto Rico on the maritime terrestrial zone on Vieques Island.
8. Memorandum of Understanding between the Fish and Wildlife Service and the Commonwealth of Puerto Rico for Law Enforcement Assistance dated October 29, 2004.

Purpose of the Refuge: Section 1508 (d) of Public Law 106-398 dated October 30, 2000, established that the lands transferred to the Department of the Interior “shall be managed to protect and preserve the natural resources of the lands in perpetuity.”

National Wildlife Refuge System Mission: The mission of the National Wildlife Refuge System 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 Administration Act of 1966, as amended [16 U.S.C. 668DD-668ee])

Compatibility determinations for each description listed were considered separately. Although for brevity, the preceding sections from “Refuge Name” through “National Wildlife Refuge System Mission” are only written once within the Compatibility Determinations’ Section, they are part of each descriptive use/uses and become part of that compatibility determination if considered outside of the comprehensive conservation plan.

Description of Use: Wildlife observation, wildlife photography, and environmental education and interpretation

Currently, a large portion of the refuge that will be used for these activities is closed to public access due to the dangers from remaining military operations and unexploded ordnance. However, as these areas are cleaned of contaminants, cleared of unexploded ordnance, and made safe for public use they will become accessible and available for these types of use. Overall, the refuge is composed of natural habitats with a number of roads and trails crisscrossing large areas of undeveloped land on the island of Vieques. Within its jurisdiction, the refuge also contains a number of significant cultural, historical, and archaeological sites. In addition, the refuge is surrounded by beaches, has access to several bays, and manages approximately 90 percent of the mangrove areas and access to the majority of the lagoons on the island. Of the three bioluminescent bays on the island, two are completely surrounded by refuge lands, while the third is bordered by the refuge and the designated commonwealth conservation area.

Designated sites, kiosks, travel routes, trails, other facilities, and educational/interpretative signs in these areas are being addressed for these activities through the development of the comprehensive conservation plan. Through the planning process, the Service recognizes these needs and recommends solutions to improve public access and opportunities for nature-based non-consumptive activities. In addition, through the comprehensive conservation plan and interim management plans, the Service is addressing the need to develop separate compatibility determinations for guided/interpretative commercial outfitters, who wish to conduct nature-based tours (e.g., wildlife and plant) through hiking, photo safaris, kayaking, canoeing, bicycling, or horseback. Different criteria, conditions, and restrictions will have to be created for these activities depending on the mode of access and their potential adverse impact on the natural resources.

The proposed uses will allow the general public to use the Vieques National Wildlife Refuge for non-consumptive activities, such as wildlife observation, wildlife photography, and environmental education and interpretation. These activities are priority public uses on national wildlife refuges as identified in the National Wildlife Refuge System Improvement Act of 1997. Access to both the eastern and western tracts of the refuge would be allowed throughout the year during daylight hours when the refuge is open to the public, or after dark on a case-by-case basis, as authorized by the refuge manager.

The general public already employs various means (i.e., hiking, biking, horseback riding, kayaking, canoeing, and driving mopeds or cars) to access the refuge and to engage in wildlife dependent non-consumptive activities. Nature photography and wildlife observation, bird watching in particular, are already popular activities on the island of Vieques. Environmental education and interpretation activities continue to be developed by Service staff in an effort to increase the public's knowledge of plants, wildlife, ecology, national wildlife refuges, and land management. Through the implementation of the comprehensive conservation plan, the refuge will continue to enact programs for education and interpretation activities. Informational kiosks, interpretive panels, and various interpretive trails for self-guided walks, and structured outreach/education activities will be developed to facilitate nature photography and wildlife and plant observation.

The refuge staff anticipates that an increase in non-consumptive wildlife-dependent uses will occur over the next few years as the refuge improves facilities, and especially as the public and conservation groups become more aware of the excellent nature-related opportunities on the refuge. Access through, or entry to, all or portions of areas may be temporarily, or in specific

cases, permanently suspended by posting upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife populations, or public safety.

Availability of Resources: Portions of the refuge have been opened to the public since they were acquired. Thus, roads, access trails, parking lots, signs, and other infrastructure, as well as staff to enforce regulations and maintain these facilities, have been provided by the Service. The refuge is also working to develop and manage a volunteer program to successfully integrate the community and complement the implementation of environmental education, visitor use, and interpretation programs.

Anticipated Impacts of the Use: Access to and use of the refuge for non-commercial and non-consumptive activities, such as wildlife observation, nature photography, and environmental education and interpretation, poses minimal impacts to wildlife and plant species. Access for these types of activities is typically by individuals or small groups. Within the non-restricted areas of the refuge, depending on the mode of access and its potentially adverse impact on the natural resources, the refuge will post and restrict the type of use within the designated trails and areas. Within the designated routes of travel and in established parking lot areas there are barriers to prevent vehicles from driving onto the foot trails, and mangrove, beach, or environmentally sensitive areas. Although these prohibitions are currently posted on various points inside the refuge, the Service will need to identify and post more signs in certain environmentally sensitive areas to ensure compliance.

Throughout the areas opened to the public, and eventually the available cleared restricted areas of the refuge, there are a number of potential sites and trails for these activities to occur. However, they will only occupy small sections of land in strategically and biologically determined areas, thus leaving most of the refuge to be managed to protect and conserve the natural resources of these lands. Based on biological data, conservation management plans, unreasonable harassment of wildlife, or destruction of the habitat, the refuge manager may restrict the use or close some beaches and other areas to public use.

Wildlife Observation and Photography: These activities could result in some disturbance to wildlife, especially if visitors venture too close to tern nests, colonial nesting bird rookeries, or resting waterfowl and/or shorebirds during migration. The refuge will prohibit visitors from traveling in areas around nests, rookeries, and managed wetlands. The staff will locate the foot trails and photography blinds opened to pedestrian use to minimize disturbance that could occur in these sensitive areas. If the staff identifies unacceptable levels of disturbance at any time, the sites will be closed to public entry. Some minimal trampling of vegetation also may occur.

Construction of foot trails and photography blinds and upgrading refuge roads will alter small portions of the natural environment. Proper planning prior to construction and sediment retention and grade stabilization features will reduce negative impacts to wetlands, threatened and endangered species, and species of special concern. Impacts, such as trampling vegetation and wildlife disturbance do occur, but is presently not significant. Visitors could cause other potential negative impacts, such as violating refuge regulations, littering, or illegally taking plants or wildlife. These potential violations will be addressed through a combination of education, outreach, and law enforcement activities. Use of refuge roads, trails, and facilities by the public does incur added maintenance costs.

Environmental Education and Interpretation: Construction of facilities, such as kiosks, observations posts/towers, blinds, and interpretive trails with appropriate signage, will alter small portions of the natural environment on the refuge. Proper planning and placement of facilities

will ensure that they do not negatively impact wetlands, threatened or endangered species, or species of special concern. The refuge staff will obtain proper permits through the commonwealth and federal regulatory agencies, prior to construction, to ensure resource protection. The use of on-site, hands-on, action-oriented activities to accomplish environmental education and interpretive tours may impose a low-level impact on the sites used for these activities. These low-level impacts may include trampling of vegetation and temporary disturbance to wildlife species in the immediate area. Educational activities held off-refuge will not create any biological impacts on the resource.

Public Review and Comment: This compatibility determination is provided for public review and comment during the Draft Comprehensive Conservation Plan and Environmental Impact Statement comment period.

Determination (check one below):

____**Use is Not Compatible**

__X_**Use is Compatible with Following Stipulations**

Stipulations Necessary to Ensure Compatibility: 1) Harassment of wildlife and excessive damage to vegetation are prohibited; 2) Horseback riding, bicycling, and riding mopeds or motorcycles on the beaches and other environmentally sensitive areas are prohibited; 3) Access by motorized vehicles is only authorized on public roads and parking lots; 4) No bicycles, horses, or motorized vehicles may be left overnight on the refuge; 5) Any overnight use requires a special use permit issued by the refuge; 6) Any overnight use of any mode of transportation is allowed only on designated main roads, parking lots, and tie-down posts of the western tract of the refuge, and only by those individuals who will be conducting night fishing activities; 7) Rented bikes, horses, mopeds, and motorcycles brought by visitors onto the refuge for their use are permitted; 8) Providing outfitting or commercial services on the refuge requires a special use permit issued by the refuge; 9) All Puerto Rico and federal traffic laws must be obeyed; 10) Zoning of visitor activities by time and space, clustering public use facilities, proper monitoring, educating visitors, and enforcement will ensure compatibility with the purposes of the refuge and mission of the National Wildlife Refuge System; 11) Prior to construction, the refuge staff will obtain permits from local, state, and federal regulatory agencies to reduce the possibility of negatively impacting wetlands, cultural resources, or protected species; 12) Public use will be monitored to document any negative impacts, and if any become noticeable, the staff will take corrective action to reduce or eliminate the effects on wildlife; and 13) Major portions of the refuge will remain undeveloped without public interpretive facilities or access.

Justification: The National Wildlife Refuge System Improvement Act of 1997 identified wildlife observation, wildlife photography, and environmental education and interpretation as activities that the Service should provide and expand on refuges. It is through permitted, compatible public uses, such as these, that the public becomes aware of and provides support for national wildlife refuges. Educating and informing the public through structured environmental education courses; interpretive materials; and guided tours about migratory birds, endangered species, wildlife management, and ecosystems, will lead to improved support of the Service's mission to protect natural resources.

Mandatory 15-Year Re-evaluation Date: _____

Description of Use: Bicycling, Horseback Riding, Hiking, Jogging, and Moped/Motorcycle Riding

These uses will allow the general public access onto the refuge by hiking, walking, and jogging; bicycle; horseback; moped; and motorcycle for wildlife observation, wildlife photography, and recreation. Access to both the eastern and western tracts of the refuge will be allowed anytime of the year during daylight hours when the refuge is open to the public, or after dark, on a case-by-case basis, as authorized by the refuge manager. Activities on foot, bicycling, horseback riding, and the use of mopeds/motorcycles will be allowed on specified and designated roads, footpaths, and trails. Some of these designated travel routes will be accessible for all of these modes of transportation, while others will be posted as being specific to a certain activity (e.g., a hiking trail). Access through or entry on all or portions of individual areas may be temporarily suspended, by posting, upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife and plant populations, or public safety. Access for the general public onto the beaches and other potentially sensitive environmental areas is only allowed by foot travel.

Access to the refuge through designated travel routes provides the general public the opportunity to enjoy scenic views, diverse wildlife, and an array of plants and various habitats. This, in turn, allows for wildlife observation, wildlife photography, and environmental education and interpretation opportunities not usually available on adjacent municipal and private lands.

Availability of Resources: Portions of the refuge have been opened to the public since they were acquired. Thus, roads, access trails, parking lots, signs, and other infrastructure, as well as staff to enforce regulations and maintain these facilities, have been provided by the Service. Designated travel routes, trails, other facilities, and educational/interpretive signs in these areas are being addressed in the development of the comprehensive conservation plan. Through the comprehensive conservation planning process, the Service recognizes these needs and recommends solutions to improve public access opportunities. In addition, through this plan, the Service is addressing the need to develop a separate compatibility determination that may allow bicycle and horse rentals on the refuge and/or access for guided/interpretive commercial outfitters who wish to use this resource.

Anticipated Impacts of the Use: Access and use of the refuge for non-commercial use of mopeds/motorcycles, activities on foot, bicycling, and horseback riding on designated roads pose minimal impacts to plant and wildlife species on the refuge. Access for these types of activities is typically by individuals or small groups. Within the non-restricted areas of the refuge, the designated routes of travel end in established parking lot areas, which, in turn, have strategically placed barriers that prevent vehicles from being driven onto the foot trails, mangrove, or beach areas. Although these prohibitions are currently posted at various points inside the refuge, the refuge will need to identify and post more signs in certain environmentally sensitive areas to ensure compliance. Based on biological data, conservation management plans, unreasonable harassment of wildlife, or destruction of the habitat, the refuge manager may restrict the use or close some beaches and other areas to public use if it is determined that the use could have negative impacts on the resources, bird, and/or sea turtle nesting activities.

Bicycling: Damage to habitat by riding a bicycle on the designated main roads is minimal. Damage to the vegetation by individuals riding through designated, interpretive, and posted bike trails is minimal and temporary. Some erosion and widening might be expected on either side of the trails as part of the bike traffic. Regular preventive and corrective maintenance should be able to address this problem. There is some temporary disturbance to wildlife due to human activity on the land. The Service will invest in placing some bike security lock racks in certain designated

areas, such as parking lots or sections of the track where the biking trails end and the hiking trails or broad walks begin. These security lock racks will assist in providing the visitors with added security from theft and it will keep the bicycles from being locked to other Service structures or to trees and from being dragged across possible bird/sea turtle nesting beaches.

Most of the recreational bicycling use is from personally owned bikes or from rentals. The majority of riders tend to be visitors from the United States mainland or from Europe, hence according to the refuge visitation statistics, bike use should increase on the refuge between the months of November and April. Once interpretive signs and bike trails have been established on the refuge to facilitate wildlife/plant observations, photography, environmental education, recreation and exercise, it is expected that there will be an increase in their use by visitors from the main island of Puerto Rico between the months of May and July.

Horseback riding: Unlike other areas in Puerto Rico and the United States mainland, horseback riding is still one of the most frequently used modes of transportation on the island of Vieques. The majority of horseback riders using the refuge are local community members, many of whom have no other form of transportation to access opportunities to observe and enjoy wildlife-dependent activities. Damage to habitat by riding a horse on the designated main roads is minimal. Damage to the vegetation by individuals riding through designated interpretive and posted horse trails is minimal and temporary. Some erosion and widening might be expected on either side of the trails as part of the horse traffic. Regular preventive and corrective maintenance should be able to address this problem. Unlike bike riding, horses can easily access a number of areas where they would not get bogged down. Many of these areas are considered environmentally sensitive and horseback riding could create great damage to those habitats, hence it is imperative that the public be educated and encouraged to only use the designated roads, trails, and horse resting locations. In particular, horseback riding is off limits on beaches, and mangrove and riparian areas. Any riders who are traveling off these designated routes or are otherwise engaged in prohibited activities will be subject to potential violations and intervention from agency representatives (Fish and Wildlife Service, Department of Natural and Environmental Resources, and Puerto Rico police).

There is some temporary disturbance to wildlife due to human activity on the land. The Service will invest in placing some tie-down posts in certain designated areas, adjacent to parking lots or sections of the track where the horse riding trails end and the hiking trails or broad walks begin. These tie-down posts will assist in providing visitors with a safe place, away from traffic, to rest the horses while the visitors engage in other authorized activities. These posts will also keep visitors from securing their horses to trees and to other structures on the refuge. These tie-down sites should be in shaded and grassy areas that keep the horse dung from affecting other visitors to the refuge. In addition, the dung collected from these sites can be used as fertilizer for reforestation projects. The latter use will be discontinued if it is determined that doing so aids in propagating the seeds of introduced or exotic plants. Only horses that are controlled by a human rider or tied to a designated post are allowed to be inside the refuge, all loose and feral horses will be removed from Fish and Wildlife Service managed lands in accordance with Service regulations. Access to and from the refuge will only be allowed through the main entrances. Cattle guards will be placed on the roadway of these entrances to keep feral horses/cattle out, while a small side gate will be used by horseback riders.

Hiking, walking and jogging: Damage to habitat by hiking, walking, or jogging on the designated main roads is minimal. Damage to vegetation by individuals hiking, walking, or jogging through designated, interpretive, and posted hiking trails is minimal and temporary. Some erosion and widening might be expected on either side of the trails as part of foot traffic in

the area. Regular preventive and corrective maintenance should be able to address this problem. There is some temporary disturbance to wildlife due to human activity on the land. Once interpretive signs, hiking trails, and additional boardwalks have been established on the refuge to facilitate wildlife/plant observations, photography, environmental education, recreation and exercise, it is expected that there will be an increase in their use by local community visitors, as well as visitors from other areas. The most notable increase will be from November to April and also from May to July.

Moped and motorcycle riding: Mopeds used on the refuge are either privately owned or rented in the local community, while motorcycles are mostly privately owned. Both of these forms of transportation will have minimal damage to the habitat while traveling on the designated main roads. Traveling on a moped or a motorcycle is only permitted on the designated main roads and parking lots and is prohibited off road, on any other trails designated for other uses, and on the beaches or other environmentally sensitive areas. Just as with automobile traffic on the refuge, these motorized vehicles are also subject to all federal and commonwealth traffic laws and regulations. Moped and motorcycle riding is a mode of transportation to access the refuge and facilitates wildlife/plant observations, photography, environmental education, and recreation activities. With the increased availability of mopeds as an alternative to rental automobiles, it is expected that there will be an increase in their use by visitors from the main island of Puerto Rico, as well as visitors from other areas. The most notable increase will be from November to April and also from May to July.

Public Review and Comment: This compatibility determination is provided for public review and comment during the Draft Comprehensive Conservation Plan and Environmental Impact Statement comment period.

Determination (check one below):

___ Use is Not Compatible

_X_ Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: 1) Harassment of wildlife or excessive damage to vegetation is prohibited; 2) Horseback riding, bicycling, and riding mopeds or motorcycles on the beaches and other environmentally sensitive areas are prohibited; 3) Access by motorized vehicles is only authorized on public roads and parking lots; 4) No bicycles, horses, or motorized vehicles may be left overnight on the refuge; 5) Any overnight use of any of these modes of transportation is allowed on the designated main roads, parking lots, and tie-down posts of the western tract of the refuge, but only for those individuals who will be conducting night fishing activities; 6) Rented bikes, horses, mopeds, and motorcycles brought by visitors onto the refuge for their use are permitted; 7) All Puerto Rico and federal traffic laws must be obeyed.

Providing outfitting or commercial services on the refuge requires a special use permit to be issued by the refuge manager, as does any activities that require visitors to remain on the refuge overnight.

Justification: These uses have been determined compatible because they are considered compatible and acceptable alternate modes of transportation. They provide the means for the general public to access and travel on designated routes of the refuge for wildlife/plant observation, photography, environmental education, fishing, exercise, and recreation. It is

believed that if properly managed these activities will not interfere with the Service's work to protect and conserve natural resources. The level of use for these activities on the refuge is moderate to high, depending on the season. The associated disturbance to wildlife is temporary and minor. Although recreational horseback riding, bicycling, and moped or motorcycle riding are not priority uses on the refuge, under the conditions described above they are not detrimental activities. For a number of visitors, access to partake in fishing, wildlife observation, wildlife photography, and environmental education and interpretation, which are priority public uses, is only possible if they use one of the above-listed modes of transportation. Designated trails, boardwalks, or other sites set aside for horseback riders also provide the Service with specific areas and the opportunity to place educational/interpretive signs highlighting natural resources and their conservation needs. These uses also help fulfill the mission of the National Wildlife Refuge System.

Mandatory 10-Year Re-evaluation Date: _____

Description of Use: Kayaking and canoeing

Kayaking and canoeing allows the general public access through and around the refuge's lagoons, mangrove areas, bays, and beaches for wildlife observation, wildlife photography, and recreation. Access to both the eastern and western tracts of Vieques Refuge will be allowed anytime of the year during daylight hours when the refuge is open to the public, or after dark, on a case-by-case basis, as authorized by the refuge manager. Kayaks and canoes used by the general public for these recreational purposes can be transported through the refuge's designated travel routes on motorized vehicles that do not exceed the weight and size limits for the roads. Access through or entry on all or portions of individual areas may be temporarily suspended, by posting, upon occasions of unusual or critical conditions affecting land, water, vegetation, wildlife/plant populations, or public safety.

Currently, a large portion of the refuge that will be used for these activities is closed to public access due to the dangers from remaining military operations and unexploded ordnance. However, as these areas are cleaned of contaminants, cleared of unexploded ordnance, and made safe for public use, they will become accessible and available for these types of use. Overall, the refuge is surrounded by beaches, has access to several bays, and manages approximately 90 percent of the mangrove areas and the majority of the lagoons on the island. Of the three bioluminescent bays on the island, two are completely surrounded by refuge lands, while the third is bordered by the refuge and the designated commonwealth conservation area.

Availability of Resources: Portions of the refuge have been opened to the public since they were acquired. Thus, roads, access trails, parking lots, signs, and other infrastructure, as well as staff to enforce regulations and maintain these facilities have been provided by the Service.

Designated launch and recovery sites for kayaks and canoes, and other facilities, as well as educational/interpretive signs in these areas, are being addressed in the comprehensive conservation plan. Through the comprehensive conservation planning process, the Service recognizes these needs and recommends solutions to improve public access opportunities. In addition, through the comprehensive conservation plan, the Service is addressing the need to develop a separate compatibility determination that will allow kayak and canoe rentals on the refuge, as well as access for guided/interpretive commercial tour companies that wish to use the

refuge. Such activities will be closely coordinated with the Puerto Rico Department of Environmental and Natural Resources.

Anticipated Impacts of the Use: Access to the refuge for the purpose of launching non-commercial kayaks and canoes on designated roads of travel pose minimal impacts to plant and wildlife species. Access for kayaking and canoeing is typically by individuals or small groups. On average they transport one to four kayaks or one to two canoes on top of their motorized vehicles or tow them on small trailers. Within the non-restricted areas of the refuge, the designated routes of travel end in established parking lot areas, which, in turn, have strategically placed barriers that prevent vehicles from driving onto the foot trails, and mangrove or beach areas. Based on biological data, conservation management plans, unreasonable harassment of wildlife, or destruction of the habitat, the manager may restrict the use or close some beaches and other areas from this and other public use, if it is determined that they could have negative impacts on the resources, and bird and/or sea turtle nesting activities.

Damage to habitat by walking or dragging a kayak/canoe to and from the launch sites is minimal and temporary. Damage to mangrove and other wetland vegetation by individuals paddling through the areas is minimal and temporary. There is some temporary disturbance to wildlife due to human activity on the land and on the water (e.g., flushing wildlife from cover) however, the public access for kayaking and canoeing should not create unreasonable impacts.

Public Review and Comment: This compatibility determination is provided for public review and comment during the Draft Comprehensive Conservation Plan and Environmental Impact Statement comment period.

Determination (check one below):

____ Use is Not Compatible

__X__Use is Compatible with Following Stipulations

Stipulations Necessary to Ensure Compatibility: 1) Harassment of wildlife and excessive damage to vegetation is prohibited; 2) Driving, camping, and building fires on the beaches is prohibited; 3) Access by motorized vehicles is only authorized on public roads and parking lots; 4) No kayaks, canoes, or related equipment may be left overnight on the refuge; 5) Any overnight use requires a special use permit issued by the refuge; 6) Rented or owned kayaks/canoes brought by the visitors onto the refuge for their use is permitted; 7) Providing outfitting or commercial services on the refuge requires a special use permit issued by the refuge; 8) Activities/use of waterways and beaches will be conducted in accordance with the Department of Natural and Environmental Resources.

Justification: This use has been determined compatible because allowing the general public access through the Vieques Refuge to use kayaks and canoes for wildlife observation, wildlife photography, and recreation will not interfere with the Service's work to protect and conserve natural resources. The level of use for these activities is moderate on the refuge. The associated disturbance to wildlife is temporary and minor. Although recreational kayaking and canoeing are not priority public uses, under the conditions described above, they are not detrimental activities. Access for wildlife observation and photography, which are priority uses, allows visitors to enjoy the outdoors and wild lands. Designated launch and recovery sites also provide the Service with specific areas in which to place educational/interpretive signs,

highlighting natural resources and their conservation needs. These uses also help fulfill the mission of the National Wildlife Refuge System.

Mandatory 10-Year Re-evaluation Date: _____

Approval of Compatibility Determination

The signature of approval is for all compatibility determinations considered within the comprehensive conservation plan. If one of the described uses is considered for compatibility outside of the plan, the approval signatures become part of that determination.

Signature: _____
Refuge Manager Date

Review: _____
Regional Compatibility Coordinator Date

Review: _____
Refuge Supervisor Date

Concurrence: _____
Regional Chief Date

APPENDIX XI. Management Methods and Priorities

PARTNERS IN FLIGHT CONSERVATION RECOMMENDATIONS

Species of Conservation Importance in Bird Conservation Region 69—Puerto Rico and the Virgin Islands

Although recommendations and priorities regarding West Indian avifauna are not explicitly addressed in the body of this plan, the inclusion of material pertaining to the Commonwealth of Puerto Rico and the U.S. Virgin Islands was felt to be warranted for several reasons: their participation in U.S. Joint Ventures; their consideration in North American Wetland Conservation Act project funding; their inclusion as domestic partners under the Neotropical Migratory Bird Conservation Act; and the mandate for development of proposals under state wildlife grants to consider Partners in Flight (and other continental bird) planning guidance. Future planning efforts will benefit from the participation and insights of all West Indian partners, ultimately leading to an avifaunal analysis that considers the entire West Indies. Such an analysis will take considerable coordination and time, and is beyond the scope of the present plan. Nonetheless, we anticipate that the consideration given here to avifauna of Puerto Rico and the U.S. Virgin Islands might serve as a prelude for fully incorporating the highly vulnerable endemic avifauna of other West Indian islands into future plan versions.

Here, we merely note which of the 448 species originally considered in this plan and identified in the Partners in Flight Watch List also occur in Puerto Rico and the U.S Virgin Islands. How these species become incorporated into species priority lists for conservation attention mixed in with West Indian endemic species is still to be determined. Additionally, we indicate which endemic species found on these islands would warrant identification as Watch List or Stewardship species if the procedures and criteria used in this plan were to be extended to the West Indies. Note that many of the birds in the following lists are not adequately monitored throughout their respective distributions.

• Four breeding species and one wintering species currently on the PIF Watch List occur in BCR 69: White-crowned Pigeon, Mangrove Cuckoo, Antillean Nighthawk, Black Swift, and wintering Prairie Warblers.
• Six BCR 69 species would qualify for the Watch List under “multiple causes for inclusion”: Plain Pigeon (*Columba inornata*), Puerto Rican Parrot (*Amazona vittata*), Puerto Rican Nightjar (*Caprimulgus noctitherus*), White-necked Crow (*Corvus leucognaphalus;*; extirpated from both Puerto Rico and the U.S. Virgin Islands), Elfin-Woods Warbler (*Dendroica angelae*), and Yellow-shouldered Blackbird (*Agelaius xanthomus*). All of these species are in need of Immediate Action and all but one species (Elfin-Woods Warbler, which is a candidate for Federal listing) are already treated under the U.S. Endangered Species Act.
• Two BCR 69 species would qualify for the Watch List under “moderately abundant but undergoing declines or having high threat.” These are the Puerto Rican Vireo (*Vireo latimeri*) and the Greater Antillean Oriole (*Icterus dominicensis*).
• Two BCR 69 species would qualify for the Watch List under “restricted distributions and low population size.” These are the Lesser Antillean Pewee (*Contopus latirostris*) and the Adelaide’s Warbler (*Dendroica adelaidae*).

• Ten species endemic to Puerto Rico and the Virgin Islands would qualify as Stewardship Species for the West Indies: Puerto Rican Lizard-Cuckoo (*Saurothera vieilloti*), Puerto Rican Screech-Owl (*Otus nudipes*), Green Mango (*Anthracothorax viridis*), Puerto Rican Emerald (*Chlorostilbon maugaeus*), Puerto Rican Tody (*Todus mexicanus*), Puerto Rican Woodpecker (*Melanerpes portoricensis*), Puerto Rican Flycatcher (*Myarchus antillarum*), Puerto Rican Spindalis (*Spindalis portoricensis*), Puerto Rican Tanager (*Nesospingus speculiferus*), and Puerto Rican Bullfinch (*Loxigilla portoricensis*).

Continentally, these endemic species are considered secure as their Puerto Rican populations are considered secure. However, populations of Puerto Rican Screech-Owl and Puerto Rican Flycatcher occurring on the Virgin Islands are nearing extirpation or are extirpated. These two regionally endemic but locally extirpated species, along with White-necked Crow mentioned above, join other regional species of high concern or threat (e.g., Antillean Mango [*Anthracothorax dominicus*], Bridled Quail-Dove [*Geotrygon mystacea*]) in representing the highest territorial priority species in need of conservation attention.

ARCHAEOLOGICAL AND HISTORIC RESOURCE PROTECTION

ECOSYSTEM MANAGEMENT

The following is information extracted from the “Caribbean Ecosystem Plan” prepared by a team of Service biologists in October 2000. Although the plan was prepared prior to inclusion of Vieques lands within the Caribbean Refuges, as part of the U.S. Caribbean Ecosystem, management of these lands will be an integral part of the Service program for the Caribbean. The priorities and strategies developed for the “Ecosystem Plan” have been considered and, where appropriate, have been adopted and included in the Vieques Refuge Comprehensive Conservation Plan.

Ecosystem Description

The Caribbean Ecosystem area is a composite of islands centrally located in the Antilles Archipelago, which stretches from Cuba eastward to Puerto Rico and then in an arc to South America. These islands serve as resting and feeding sites for migratory birds utilizing the Atlantic Flyway. Since Puerto Rico is one of the last large land masses as the archipelago curves eastward, many migratory birds rest and feed here and then fly directly to South America with few or no land stops. The resting and feeding habitats for these birds in Puerto Rico and the U.S. Virgin Islands form a bottleneck for migratory birds. Puerto Rico, the U.S. Virgin Islands, and many other islands in the Antilles have seen a great reduction in freshwater wetlands, coastal salt flats and mangroves (important resources for waterfowl and migratory shore and wading birds) as a result of coastal development and agriculture.

St. Thomas, St. John, St. Croix, and 58 smaller islands and keys, most of which have been designated as wildlife reserves by the government, are included in the U.S. Virgin Islands. There are about 233 linear miles of shoreline, of which about 150 miles are sandy beaches important as sea turtle nesting habitat. St. Croix includes Sandy Point National Wildlife Refuge, the largest leatherback turtle nesting beach in U.S. ownership, and the offshore keys of Green Cay National Wildlife Refuge and Buck Island National Monument, which are important for the endangered St. Croix ground lizard, nesting sea birds, and turtles. St. John, mostly under National Park Service management, was designated as a Biosphere Reserve by the United Nations and Salt River Bay, St. Croix, the largest mangrove forest and lagoon in the U.S. Virgin

Islands, was designated as a Department of the Interior National Park Service Historic Landmark. Recently, the Coastal Wetland Conservation Program provided funding to acquire an additional 2.4 acres of mangrove forest at Salt River Bay.

In addition to the main island of Puerto Rico, the smallest and easternmost island of the Greater Antilles, the commonwealth also includes the islands of Culebra, Vieques, Caja de Muertos, Mona, and numerous smaller islands and keys. The commonwealth manages 17 forests, 7 natural reserves, and 4 refuges, more than 50 percent of which include coastal habitats, for a total of 93,000 acres and 400 linear miles of shoreline. Mangrove forests, coastal lagoons, *Pterocarpus* forests, seagrass beds, sea turtle nesting beaches, and coral reefs are among the most ecologically important coastal habitats. The Caribbean Islands National Wildlife Refuge manages 8 refuges in Puerto Rico and the U.S. Virgin Islands, totaling 5,573 acres, including 16 small islands and keys in Puerto Rico important for seabirds and sea turtles. The Caribbean National Forest is the only tropical forest managed by the USDA Forest Service and provides habitat for the federally endangered Puerto Rican Parrot. Together with the commonwealth's Guánica Forest, both are considered unique and have been recognized by the United Nations as Biosphere Reserves. The Forest Service designated the Río Abajo Commonwealth Forest as a National Forest Landmark and the National Oceanic and Atmospheric Administration designated Bahia de Jobos as a National Estuarine Research Reserve.

As a tropical environment supporting tremendous biodiversity, the Caribbean Ecosystem contains habitats ranging from rain forests to coral reefs, including dry and moist karst forests, mud and salt flats, mangrove forests, coastal lagoons, and seagrass beds. However, because of their small size and relative proximity to one another, the alteration or destruction of any portion of a single habitat type may have an incremental effect on several species, many of which are already federally threatened or endangered. Currently, 78 species (29 animals and 49 plants) are federally listed as threatened or endangered in Puerto Rico and the U.S. Virgin Islands. The increased number of species added in recent years and the large list of species of concern reflect the precarious state of the habitats and the detrimental effects of human impacts. In addition to the species for which the Service has direct trust responsibility, there are many other endangered species existing in the neighboring island nations of the Greater and Lesser Antilles, where similar habitat problems exist. Also, the coastal shelf habitat serves as a nursery for fishery resources of commercial, sport, and food web importance, under the primary jurisdiction of the National Marine Fisheries Service. Exploitation and degradation of these habitats have reduced the populations of many of these species to critical levels.

Habitat destruction is rampant in the Caribbean. Clearing for agriculture, unchecked urban development, and poor land uses have led to the virtual elimination of coastal forests and most of the inland forests. The remaining coastal hardwood forests are in danger from the continuing threat of destruction for coastal developments, primarily for tourism and marinas. The damming and channelization of the major rivers have reduced the water flow and altered the estuarine wetland's ability to filter contaminants and sediment, thus increasing siltation and destroying seagrass beds and coral reefs.

The Fish and Wildlife Service is recognized as a lead agency for the conservation of natural resources in the Caribbean Ecosystem. Working in cooperation with the commonwealth, territorial, other federal organizations, and the private sector, we have furthered our commitment and scope of influence beyond our boundaries by providing technical assistance and support. The Caribbean Ecosystem is not an isolated unit, but part of a larger chain of islands stretching from Florida to South America and sharing common waters that are suffering from the same human impacts and threats to their resources as Puerto Rico and the U.S. Virgin Islands, but

whose governments are as equally committed to conservation and protection of these unique resources. The Caribbean Ecosystem Team, through improved partnerships, has the opportunity to lead in the conservation of the biodiversity of the region, to continue to provide technical support on issues and trust responsibilities, and to function as a liaison between neighboring governments.

Team Mission

The Mission of the Caribbean Ecosystem Team is to restore, protect, enhance and conserve Caribbean fish and wildlife trust resources and their habitats for present and future generations. We will accomplish this through: (1) the development of partnerships with others; (2) adaptive management based on best available information and science; and (3) outreach.

Ecosystem Team Priority Issues (for a 5-year time frame)

The Caribbean Ecosystem Team met in April 1999, and identified 14 priority significant areas of concern. The team agreed to place highest attention on the first eight of these issues as there was a high level of team consensus on these issues:

1. Improving law enforcement capability
2. Protection of coastal resources
3. Minimize habitat loss and degradation
4. Sensitive species recovery
5. Protection of karst
6. Funding needs
7. Improving communications
8. Land acquisition
9. Improving biological capability
10. Habitat restoration
11. Establishment of partnerships
12. Control of invasive species
13. Riparian issues
14. Fisheries management

Using the above priorities, the team's committees met and developed the following strategic plan for guiding the team through the next 5 years.

Strategic Plan (for a 5-year period)

A. Coastal and uplands

Goal: Protect, restore, and enhance Caribbean ecosystems through minimizing habitat loss and degradation, improving land use practices, protecting rare and endangered species and their habitat, improving cooperation with other agencies, increasing law enforcement capabilities, and improving management of refuges.

Objective 1. Identification and collection of geographically specific data

Strategies:

- Identify sensitive areas adjacent to currently protected federal lands (refuges, National Park Service, USDA Forest Service, Department of Defense) for possible land acquisition or protection by other means. Process to begin with refuge lands.
- Identify rare habitat types and sensitive wetland areas in need of protection through the compilation of existing information and preparation of lists and maps.
- Obtain Puerto Rico Planning Board zoning maps through becoming a participant in MOU/MOA with the Board for access to information on the internet. (Ongoing)
- Conduct biological review with regional refuge biologist team to speed the comprehensive conservation planning process and provide direction for inventory and monitoring programs.
- Develop list of invasive species and develop plans for eradication and/or control on refuge lands and assist other agencies in implementing programs. Use GIS to develop presence/absence maps of nonnative, invasive species, beginning with refuge lands.
- Identify estuarine areas important to fisheries.
- Improve staff GIS capability by acquiring equipment and providing training for ecosystem team members. (Ongoing)

Objective 2. Promote better land use practices in order to protect important wildlife habitat, including threatened and endangered species.

Strategies:

- Develop standards for shade coffee plantations to improve/create wildlife habitat and present to USDA for adoption. (Ongoing)
- Identify and target one additional threatened and endangered species on private land for use/application of partners program.
- Develop package/standards for erosion control measures that would be consistent with providing protection of wildlife habitat.
- Promote land use practices in the Lajas Valley to benefit wetland systems through active participation in non-governmental organization, agency initiatives (Puerto Rico Planning Board, Department of Natural and Environmental Resources, Natural Resources Conservation Service).
- In order to better protect coral reefs and seagrass beds, identify problematic rivers in sensitive areas.

Objective 3. Protect rare, threatened, and endangered species and their habitats and migratory birds.

Strategies:

- Continue efforts towards land acquisition for Rio Encantado refuge, including identification of landowners. (Ongoing)
- Implement and promote a habitat conservation planning program in Puerto Rico. (Ongoing)
- Incorporate active management of threatened and endangered species into plan preparation for refuges.

- Develop and implement mechanisms for the protection of manatees, including inventorying speed zones, obtaining information from other agencies on areas of heavy boat use, and identifying feeding and calving areas.
- Increase level of coordination and implementation of conservation activities for sea turtles, including determination of level of use of beaches by sea turtles, utilization of tools such as HCP, section 7, partners to minimize impacts in specific geographic area.
- Develop propagation program for threatened and endangered plants. (Ongoing)

Objective 4. Protect and restore riparian and wetland systems from a watershed perspective.

Strategies:

- Conduct workshop and follow-up on natural river design. (Ongoing)
- Develop and promote a package for restoration of aquatic stream habitat (e.g., minimum flows and fishways).
- Develop and promote through available incentive programs criteria for restoration of reparian buffers.
- Nominate CRSF as a RAMSAR site.
- Identify and prioritize habitat restoration projects on refuge lands.

Objective 5. Increase law enforcement capabilities in the Caribbean.

Strategies:

- Staff wildlife inspector position in San Juan.
- Conduct law enforcement orientation (workshop) on wildlife laws and regulations.
- Evaluate need for additional special agent position (Habitat Conservation Plan and permit implementation).

B. Partnerships

Goal: Use partnerships to implement identified goals and objectives for the protection, enhancement, and restoration of fish and wildlife resources within the Caribbean Ecosystem.

Objective 1. Identify and implement potential partnerships in order to address specific goals and objectives identified in upland and coastal ecosystems.

Strategies:

- Identify potential partners within private and public sectors (state and federal agencies).
- Identify action items in coastal and upland systems, as well as in education/outreach, where partnerships are needed.
- Proactively invite the appropriate entities to be Service partners in specific tasks.
- Formalize partnerships through written documents (MOU, MOA, etc.)

- Establish partnerships with agricultural community in areas adjacent to Laguna Cartagena and Cabo Rojo National Wildlife Refuges.
- Assist in strengthening partnerships with refuge neighbors, and state and federal agencies in Culebra.
- Assist in strengthening partnerships with refuge neighbors, state, and federal agencies in St. Croix.

Objective 2. Use partnerships to exchange technical expertise and information between agencies.

Strategies:

- Conduct short-term details for cross-training.
- Conduct workshops between agencies on specific issues.
- Initiate interagency meeting to evaluate development projects with the Service, the Department of Natural and Environmental Resources, the Puerto Rico Planning Board, the Environmental Quality Board, and in the Virgin Islands.
- Provide opportunities and funds for training to staff of Puerto Rico/Virgin Islands agencies.
- Promote exchange of information on land management problems among the Service, the Department of Natural and Environmental Resources, the National Park Service, and non-governmental organizations.
- Look for internal/ecosystem partnership opportunities (i.e., mutual assistance).
- Intra-ecosystem short-term details (i.e., commitment to exchange personnel, possibly short-term (day) or longer term (several weeks), help cover vacations, etc.

Objective 3. Create international partnerships to exchange information on management/protection of Fish and Wildlife Service resources.

Strategies:

- Attend international meetings related to fish and wildlife resources of concern.
- Increase the participation from the ecosystem offices with different international affairs' activities in the Caribbean (i.e., migratory birds, sea turtles, fisheries, and coral reefs).
- Strengthen law enforcement collaboration and participation in international law enforcement.

C. Outreach and Education

Goal: Create awareness and understanding of the Fish and Wildlife Service role in the conservation and management of trust resources for the benefit of present and future generations.

Objective 1. Priority Issue: Improving law enforcement capability.

Strategies:

- Development of news releases (Note: This item will be a component of all the listed priority issues).
- Obtain and distribute the new “Buyer Beware/ Caribbean” brochure in Spanish. (Ongoing)
- Produce a permanent interactive illegal trade/CITES exhibit for the San Juan International Airport.
- Produce a video on sea turtle lighting disorientation and methods of minimization or prevention.
- Organize a minimum of two meetings per year with the Fish and Wildlife Service and local resource agencies concerning laws and current enforcement issues.
- Present workshops for Department of Natural and Environmental Resources’ officers on federal laws, or incorporate federal laws into the officers’ basic training.
- Work cooperatively with Department of Natural and Environmental Resources to produce an informational brochure or fact sheet concerning exotic pets.

Objective 2. Protection of Coastal Resources

Strategies:

- Produce and distribute a Fish and Wildlife Service video highlighting coastal resources and threats.
- Design and construct an informational kiosk for the Cabo Rojo Salt Flats.
- Organize a minimum of two meetings per year to discuss outreach needs with Department of Natural and Environmental Resources on Cabo Rojo Salt Flats.
- Develop general fact sheets on mangroves, seagrass beds, coral reefs, etc.
- Develop individual refuge fact sheets for Cabo Rojo Salt Flats, and Culebra and Sandy Point Refuges.
- Design and construct an interpretive nature trail at Sandy Point Refuge.

Objective 3. Reduce Habitat Loss and Degradation

- Develop a fact sheet on contaminant issues.
- Ensure that new “Partner’s” position (FTE) produces program information in Spanish.
- Ensure active participation on the part of the Fish and Wildlife Service in at least one annual beach clean-up.
- Develop poster, brochure/fact sheet on native river species. Develop training for natural river restoration practices.

Objective 4. Sensitive Species Recovery

Strategies:

- Develop a teacher training workshop on threatened and endangered species.
- Produce and distribute a Caribbean Ecosystem video. (Ongoing)
- Produce and distribute an endangered species power point presentation.
- Organize and open ecosystem library for Fish and Wildlife Service personnel. (Ongoing)
- Develop an ecosystem home page that highlights each field office. (Ongoing)

- Develop threatened and endangered species posters, brochures, and teachers' kits.
- Develop Puerto Rican Parrot educational material (e.g., poster, brochure, and color fact sheets).
- Turtle watch program, Sandy Point Refuge. (Ongoing)
- Sea turtle summer camp, Sandy Point Refuge.

Objective 5. Protection of Karst

Strategies:

- Develop informational fact sheet on the KARST. (Ongoing)
- Compile existing information and prepare a fact sheet for shade coffee vs. sun coffee. (Ongoing)
- Develop an outreach plan for Karst refuge acquisition process.

Objective 6. Funding Needs

Strategies:

- Establish an outreach specialist/volunteer coordinator (1) FTE for Caribbean Island National Wildlife Refuges.
- Establish an outreach specialist (PTE) for Sandy Point Refuge's turtle watch program and summer camp.
- Allocate time and provide funding for official personnel responsible for outreach/education within Puerto Rican Parrot Project.
- Identify and provide for individual field station funding needs for outreach/education.
- Establish funding for volunteer program.
- Provide computer access to all employees with Internet and e-mail capability.

Objective 7. Communications/Inreach

Strategies:

- Create a quarterly ecosystem electronic newsletter.
- Promote cross-training and short-term work details.
- Implement a training course at NCTC on basic communication skills for all employees.
- Monthly staff meetings for each field office (requisite).
- Need to receive Federal Aid reports sent to Ecological Services office and have early input on Federal Aid projects from Ecological Services office.

Objective 8. Land Acquisition

Strategy:

- Utilize news releases, Internet home page, and other sources to inform the public of completed land acquisition.

APPENDIX XII. Draft Community Interest Survey Conducted by University of Puerto Rico Sea Grant College Program

Survey Results Regarding Interest on the Part of the Vieques Community in the Use of the Vieques National Wildlife Refuge and the Potential of the Community to Participate with the Service in the Development and Implementation of the Comprehensive Conservation Plan for the Vieques National Wildlife Refuge

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March, 15, 2006

Acknowledgements

The completion of this project was made possible by the special efforts of many who deserve recognition. Several students that were responsible for the development of the questionnaire and data collection: Mayrim Bacó, Carlos Carrero, Melissa Lugo, Ricardo Ortega, Yahaira Hernández, María Fernández, Verónica Colón, Yadira Rodriguez, Norberto Medina and Prudencio Rodriguez.

We acknowledge the staff of the U.S. Fish and Wildlife Service who helped in so many ways: Oscar Díaz, Susan Silander and Gisela Burgos.

We are appreciative of the staff of the University of Puerto Rico Sea Grant College Program for their support and assistance. From start to completion this has been a team effort. Also we want to thank Dr. Walter Diaz from the Center for Applied Social Sciences for his assistance with the survey design and Vieques representative sample.

Finally, we need to acknowledge the respondents to the Vieques community who took the time to respond to this survey. Hopefully their efforts will ensure that the process to complete the Vieques National Wildlife Refuge Comprehensive Conservation Plan integrates the community sector.

RCS

MVP

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Introduction

Understanding of the people's perceptions and needs is an important first step in the development of appropriate programs for the conservation of nature. Conservation requires participation of the local communities, as they become the stewards of the resources, jointly with the government agencies chartered for that purpose. Identification of the key issues, perceived needs and the public opinion on the process is essential.

As part of a collaboration to assist the U.S. Fish and Wildlife Service in the development of the Comprehensive Conservation Plan (CCP) to guide the use of natural resources and the management of the Vieques Refuge at the island municipality of Vieques, the University of Puerto Rico Sea Grant College Program was funded to conduct a study to integrate knowledge from all community sectors of Vieques. Our study focused on a sample of the Vieques residents, who were interviewed to learn about their needs, potential and willingness to collaborate in the development of the CCP.

This report presents results from the survey of Vieques residents. Data collection began in February, 2005 and was concluded in May, 2005.

The key objectives of this project were the following:

1. Assess the potential and willingness of the community to participate in the: Co-management of the refuge, design of the Educational and Outreach Plan in reference to the wise use of the U.S. Fish and Wildlife Service Vieques Refuge and in the preparation of its Comprehensive Conservation Plan.
2. Identify actual uses of Vieques natural resources and the recreational and economic opportunities offered by these.
3. Identify the level of knowledge of the Vieques community regarding the Comprehensive Conservation Plan to be developed by the U.S. Fish and Wildlife Service and the process to develop it.

Methodology and sampling process

A multistage cluster sampling proceedure was applied to the Vieques population for this project. The sampling process consisted of four stages: census tracts, census blocks (inside tracts), housing units (inside blocks) and individuals (inside living units). The number of individuals to be interviewed, the sample number was of three hundred (n=300), equivalent to one interview for living quarter selected.

The first stage consisted of the selection of the census tracts. Since there are only four census tracts in Vieques, all tracts were included. In fact, this implies that each tract was assigned a selection probability of 1 (P=1).

Census blocks were selected inside each district and were assigned a proportional probability to size (or PPS) in relation to the amount of living units in Vieques. For example if a district has 25% of the housing units of Vieques, they will provide 25% of the sample .25 x 300 = 75 interviews. Having determined that each census block provides 10 living units to the sample, then we need to select 8 blocks from this hypothetical district.

To select the 10 blocks, these were ordered in ascending order based on the amount of living or housing units contained. Then, random numbers were assigned to each block according to the

amount of housing units per block. For example, if the block with the smallest amount of living units had 5, then numbers from 1-5 corresponded to this block. If the next block had 125 housing units, the numbers that corresponded were 6-130 successively. For the selection of 8 blocks, we generatde 8 random numbers to determine which were the selected blocks. If we picked number 127, we selected the second block since it contained the numbers up to 130.

Once the blocks were selected, we proceeded to select the housing units in the blocks. For this we utilize the method of systemmatic selection with an random starting point. The person interviewing the residents was provided with a map of the block with indications of where he or she had to start counting living units, a number that indicates the sampling interval (every how many living untis he will attempt an interview) and the number of the living unit in which he will attempt an interview. If the block had 100 living units and 10 interviews were required, then, the interval is of one of each ten living units. The random start is determined by generating a random number between 1 and 10. If we pick 6, this means that he will attempt an interview in the six living unit starting at the point where it was established to start counting living units. This means that he will attempt the first interview in the six living units, the next one will be in the 16 (6 + 10) successively.

Once the living unit is selected, the person to be interviewed is selected in an aleatory process. This is done by selecting the person whose birthday is closest to the date where contact with the living unit was made.

Example of maps and data base used for the calculations are included in an attachment.

Once all interviews were completed data was analyzed with SPSS PC.

Trips to Vieques	Dates	Participating Sudents
Trip number 1	February 4 – 7, 2005	Carlos Carrero * Melissa Lugo * Mayrim Bacó Ricardo Ortega * Yahaira Hernández * María Fernández ° Total of students: 6
Trip number 2	February18 – 21, 2005	Carlos Carrero * Melissa Lugo * Ricardo Ortega * Yahaira Hernández * María Fernández ° Total of students: 5
Trip number 3	March 4 - 7, 2005	Carlos Carrero * Melissa Lugo * Mayrim Bacó Ricardo Ortega * Yahaira Hernández * María Fernández ° Verónica Colón *** Total of students: 7
Trip number 4	March 11 - 14, 2005	Carlos Carrero * Melissa Lugo * Yahaira Hernández * María Fernández ° Sandra Lebrón Total of students: 5
Trip number 5	March 18 – 22, 2005	Carlos Carrero * Mayrim Bacó Ricardo Ortega * Yahaira Hernández * Verónica Colón *** Total of students: 5

Trips to Vieques	Dates	Participating S udents
Trip number 6	April 15 - 18, 2005	Yadira Rodríguez ** Norberto Medina Mayrim Bacó ** Total of students: 3
Trip number 7	April 22 – 25, 2005	Carlos Carrero * Melissa Lugo * Ricardo Ortega * Yahaira Hernández * María Fernández ° Verónica Colón *** Yadira Rodríguez ** Mayrim Bacó Norberto Medina Total of students: 9
Trip number 8	April 29 – May 2, 2005	Carlos Carrero* Melissa Lugo* Ricardo Ortega * Yahaira Hernández * María Fernández ° Yadira Rodríguez ** Mayrim Bacó Norberto Medina Toal of students: 8

- Graduate Students UPR - Río Piedras Campus

** Undergraduate Students the UPR - Mayagüez Campus

*** Graduate Students Interamerican University of San Germán

° UPRM Student Interchange Program - Spain

✓ Graduate Student UPR - Mayaguez Campus

♦ Bachelor Degree in Social Sciences UPR - Mayagüez Campus

★ Undergraduate Student UPR - Aguadilla Campus

Survey Design

A seven page questionnaire was designed based on questions developed by Sea Grant staff and graduate students from the University of Puerto Rico's School of Planning. Advice and suggestions for additional questions and their formatting were solicited from the U.S. Fish and Wildlife Service and UPR-Mayagüez Department of Social Sciences. The survey was conducted by 7 graduate students trained at the Center for Applied Social Research of the UPR-Mayagüez, Department of Social Sciences, and two undergraduate students with no previous experience in the interview process, who were trained by the principal investigators for this study.

The students initiated the interview by introducing themselves and explaining the purpose and objectives of the survey. If the person agreed to be interviewed then the questionnaire opened up with questions regarding socio-demographic data. First respondents were asked how long they had been living in Vieques. Second they were asked the name of the community where they lived. Third they were asked how long they had been living in this community. Fourth they were asked what they do for a living.

Next, people were asked if they knew of the existence of any community group or organization in Vieques. If the answer was positive they were asked to name the organization(s), what was their mission, needs and if they were members of this organization. Residents were asked what were the primary needs of Vieques natural resources and why. They were also questioned about the recreation spaces or facilities available to the Vieques community. Residents were asked specific recommendations regarding other recreational facilities and spaces besides the ones previously mentioned.

In the next section respondents were asked how much they knew about the Conservation Comprehensive Plan (CCP) for the Vieques Refuge and its implementation. They were also asked about what things should be included in the CCP and if they needed to learn more on this area. Respondents were also asked if they were interested in receiving information regarding what is the CCP for Vieques. Willingness to participate in the planning and development of the CCP, recreational facilities, cultural or commercial activities and why was also inquired. A request was made to prioritize the alternatives in which they were willing to participate. Finally, we were interested in knowing if they would like to be active in the development of community educational activities related to the CCP and the knowledge or abilities they were willing to provide.

Residents were questioned regarding their degree of satisfaction with respect to the state of Vieques natural resources and if they believed that the CCP would be of benefit for the Vieques community and why. They were also inquired with respect to what persons or organizations should be part of the development and implementation of the CCP. Information was requested regarding how the Vieques community could benefit from the management of the natural resources as proposed by the CCP.

Specifically, respondents were asked to enumerate examples of economic opportunities for the community, derived from the Vieques Refuge; what activities they practiced inside of the Vieques Refuge; what recreational activities they would like to practice in the refuge; and what activities they would like to practice in the refuge and were actually not allowed. They were also asked regarding their interest in using the refuge's natural resources.

Finally, residents were asked if they were interested in participating in public hearings about the conservation and use of Vieques natural resources and endangered species. As a last question they were asked regarding their interest in adding something to the interview.

After survey design was completed, the questionnaire was translated into English by personnel from the UPRSGCP. The translated version was revised to ensure that the questions held the same meaning in both versions. Any discrepancies were investigated, and when necessary, re-worded.

How this Report is Organized:

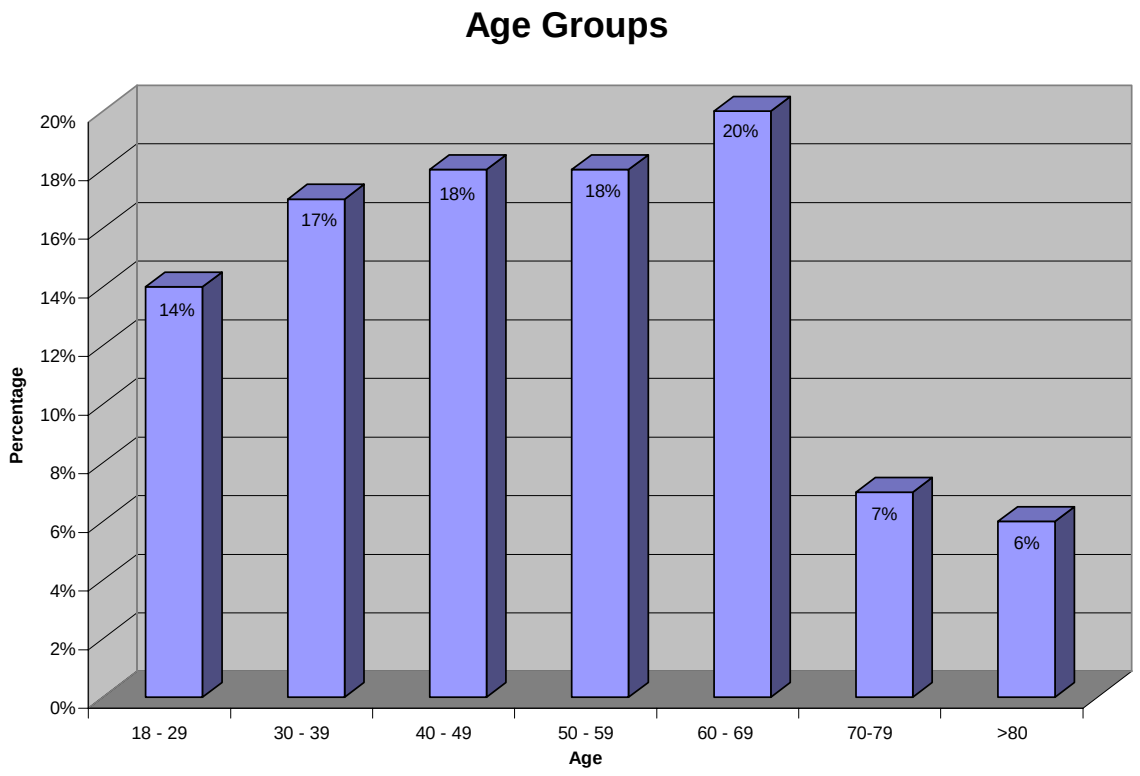
The report presents results from the survey of Vieques residents to assess the potential and willingness of the community to participate in the: Co-management of the refuge, in the design of the Educational and Outreach Plan in reference to the wise use of the U.S. Fish and Wildlife Service Vieques Refuge and in the preparation of its Comprehensive Conservation Plan. It identifies actual uses of Vieques' natural resources, the recreational and economic opportunities offered by these and the level of knowledge of the Vieques community regarding the Comprehensive Conservation Plan to be developed by the U.S. Fish and Wildlife Service and the process to develop it.

The report begins with a look at the socio economic characteristics of Vieques residents including their demographics. Next follows an examination of residents' knowledge regarding community organizations, outdoor recreation, and the CCP. This is followed by their willingness to learn and participate in the planning and implementation of the CCP, their degree of satisfaction regarding the state of Vieques natural resources and if they believed that the CCP would be of benefit for the Vieques community and why. This is followed by an outline of economic opportunities for the community derived from the Vieques Refuge, activities they practiced inside of the Vieques Refuge, recreational activities they would like to practice in the refuge, activities they would like to practice in the refuge and were actually not allowed and their interest in using the refuge's natural resources. Finally, their interest in participating in public hearings about the conservation and use of Vieques natural resources and endangered species are outlined in detail as well as personal commentaries added to the interview.

A technical appendix document includes English and Spanish versions of the questionnaire and presentation letter. Tabulated results to survey questions are presented and survey design is explained in detail.

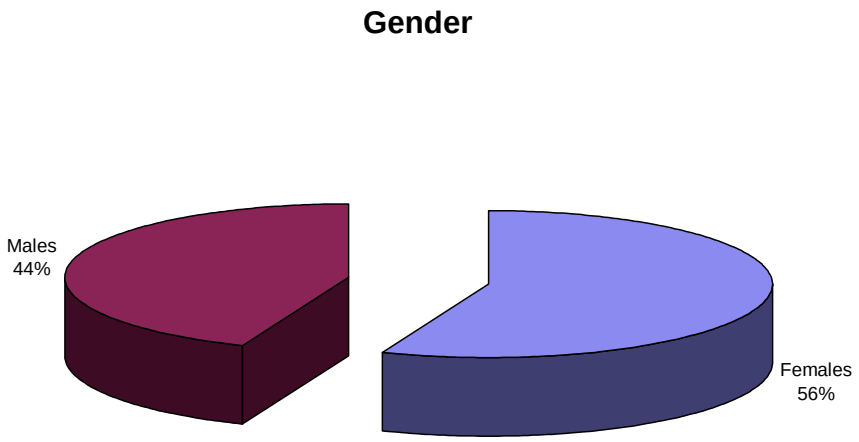
A Profile of the Residents of Vieques

In this section descriptive data on Vieques' residents interviewed are presented. Residents interviewed ranged in age from 18 to 99 years of age. Only 14% of the residents interviewed were older than 70 years of age. However the biggest range group interviewed (20%) consisted of people in the range of 60 to 69 years of age. Thirty five (35%) percent of the residents interviewed were older than sixty years of age. Almost fifty percent (50%) of the residents interviewed were 49 years or younger.



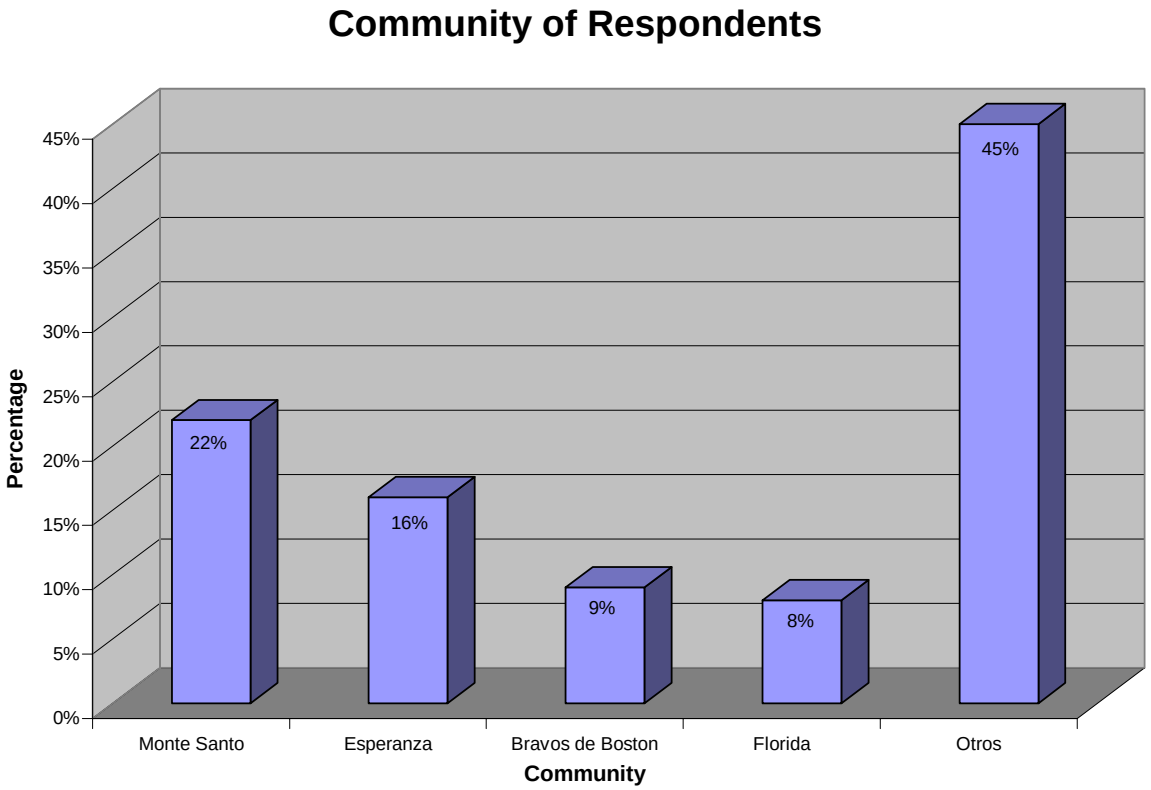
Gender of Respondents

Gender of respondents was well balanced having 56% females and 44% males.



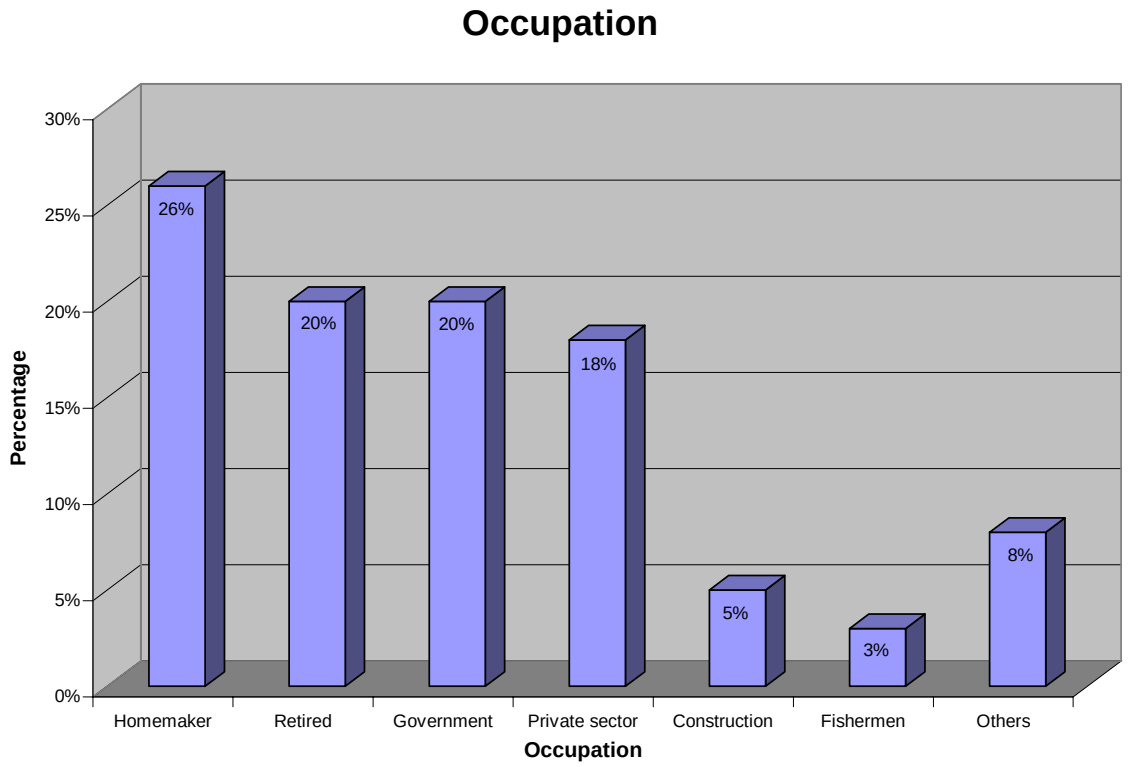
Community of Respondents

From the 393 persons interviewed the largest group was from Monte Santo 22%, followed by Esperanza with 16%, Bravos de Boston 9%, Barrio Florida 8% and Santa María, Leguilleu, La PRRA and Estancias de Isla Nena 4% each.



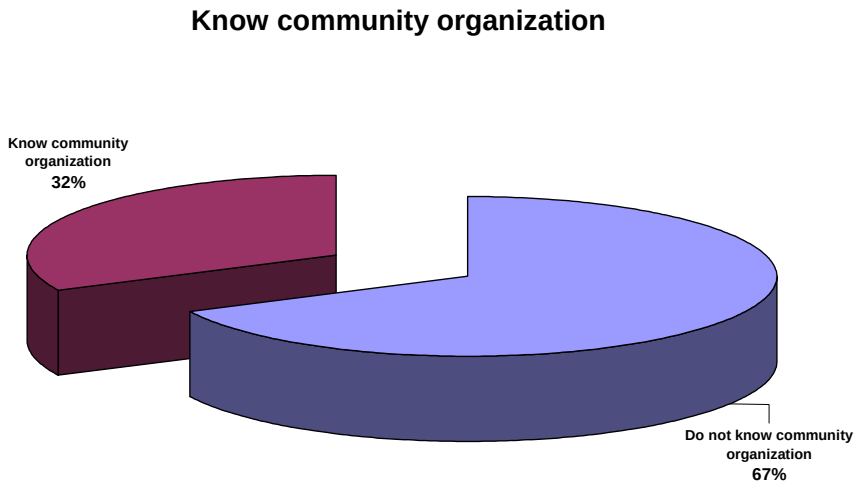
Occupation

Regarding occupation or employment 26% of the interviewees were housemakers, 20% were retired, 20% were employed by either the insular or municipal governments and 18% worked for the private industry. Most of the people interviewed were not employed, and did not work outside their homes. Another 5% worked in the construction industry and 3% were fishermen, the latter a key occupation in this insular setting. Forty percent (40%) of the Vieques residents interviewed were housemakers or retired allowing them more flexibility in the use of their leisure time. They are indeed potential collaborators in the process of conservation, and the design of strategies for the appropriate use of the natural areas. The occupation of the remaining 8% ranged from airplane mechanics to professional boxers.



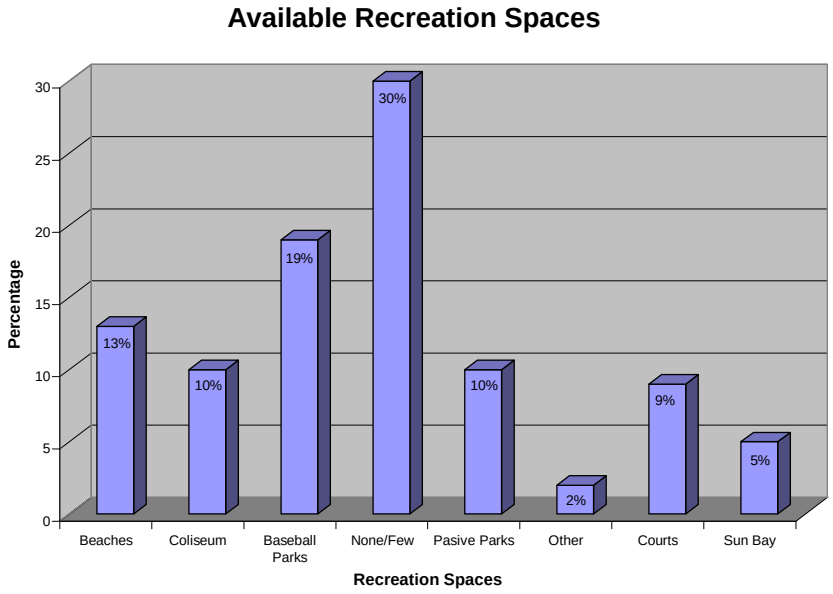
Knowledge about community organizations in Vieques

Almost seventy percent (67%) of the residents of Vieques interviewed for this study were not familiar with the existence of a community organization in Vieques. Only thirty two percent (32%) knew of at least one community organization in Vieques. This is a telling piece of information that may be used to design strategies for the networking of local communities and organizations, and individuals.



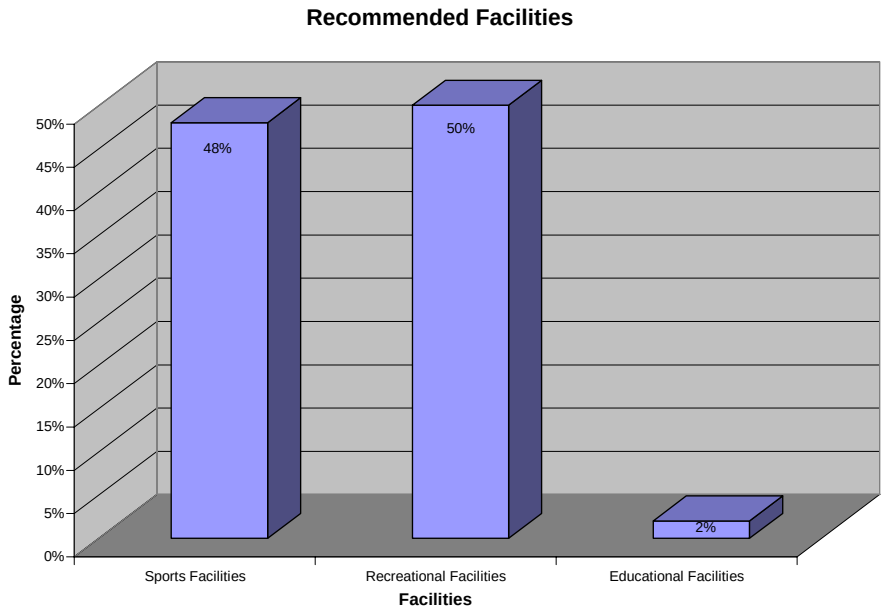
Availability of recreational spaces and facilities

Thirty percent (30%) of the respondents thought that Vieques does not have recreational spaces or facilities available for the community, or it has just a few. Twenty eight percent (28%) named the coliseum, baseball parks and basketball courts as the available spaces and facilities for recreation. Eighteen percent (18%) of those interviewed mentioned beaches, beach parks or public beaches ("*balnearios*"), or other resources related to the coastal and marine resources like el Malecón, la Esperanza, and the bioluminescent bay as the recreational spaces or facilities available to the community. Ten percent (10%) considered passive parks as the available recreation spaces or facilities. These responses underscore the public perception (also available in the main island of Puerto Rico) that recreational spaces consist of ballparks and basketball courts.



Recommended recreational spaces or facilities

Fifty percent (50%) of those interviewed pointed out that Vieques needed more recreational facilities while forty eight percent (48%) stated that Vieques needed more sports facilities. Only two percent (2%) thought that Vieques needs educational facilities.

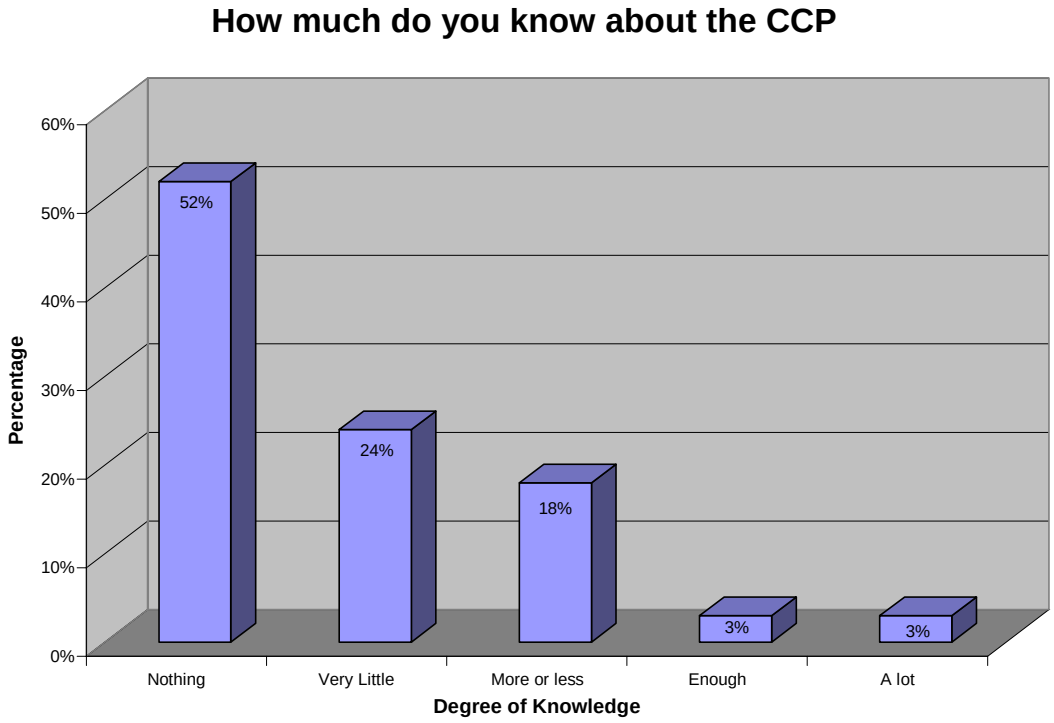


Knowledge of Vieques respondents regarding the Comprehensive Conservation Plan (CCP)

More than half of the respondents (52%) expressed a complete lack of knowledge regarding the CCP. Twenty four percent (24%) knew very little and 18% said they knew more or less. Six percent of respondents expressed they knew enough or a lot about the CCP. Our experience with responses to these types of questions suggests that the majority of the respondents do not have a basic knowledge of the CCP. Our best estimate is that at least 10% of the respondents have some knowledge of the CCP.

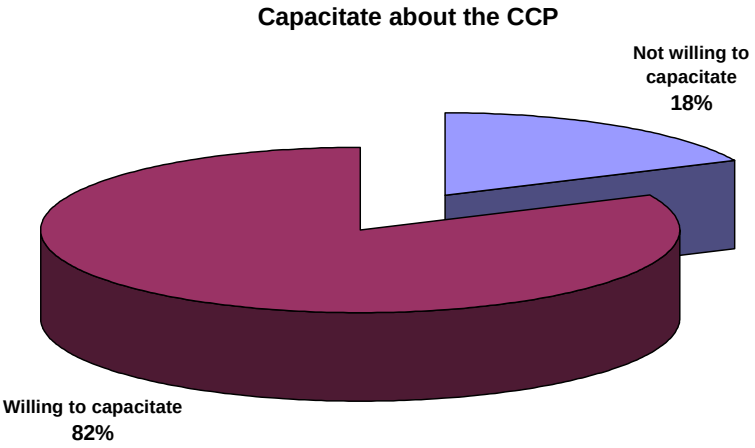
What should be included in the CCP?

Due to the general lack of knowledge in the community regarding the CCP only four percent (4%) of the respondents answered this question. Recommendations included to grow sugar cane, prohibit the sale of land to non residents and the distribution of the land among residents ("viequenses"). The results of the response to the question validate our estimate of 10% of the respondents having some knowledge of the CCP. This is an important finding that must help shape the educational strategies for the development of the CCP.



Interest to capacity building in matters related to the CCP

Eighty two percent (82%) of those interviewed were willing to engage in capacity building activities, in matters related to the CCP. These responses underscore the lack of knowledge and the need for an effective educational and information transfer program. Only eighteen percent (18%) expressed in a negative way regarding their education about the CCP.

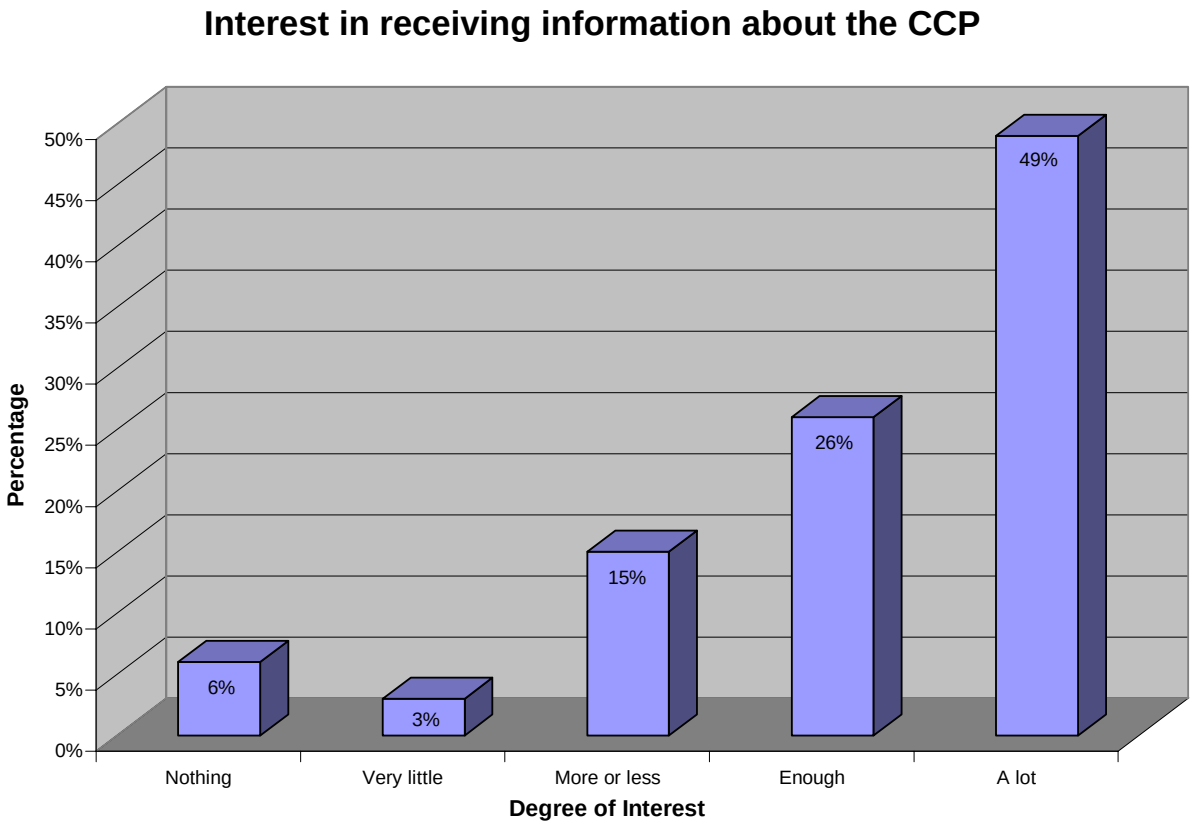


Why are you interested in learning or receive any capacity building about the CCP?

Answers to this question were varied. They included: 1) because there is no information available; 2) if the community is educated we can integrate; 3) there is a need to educate our youngsters; and 4) we need to be informed about what is happening in Vieques.

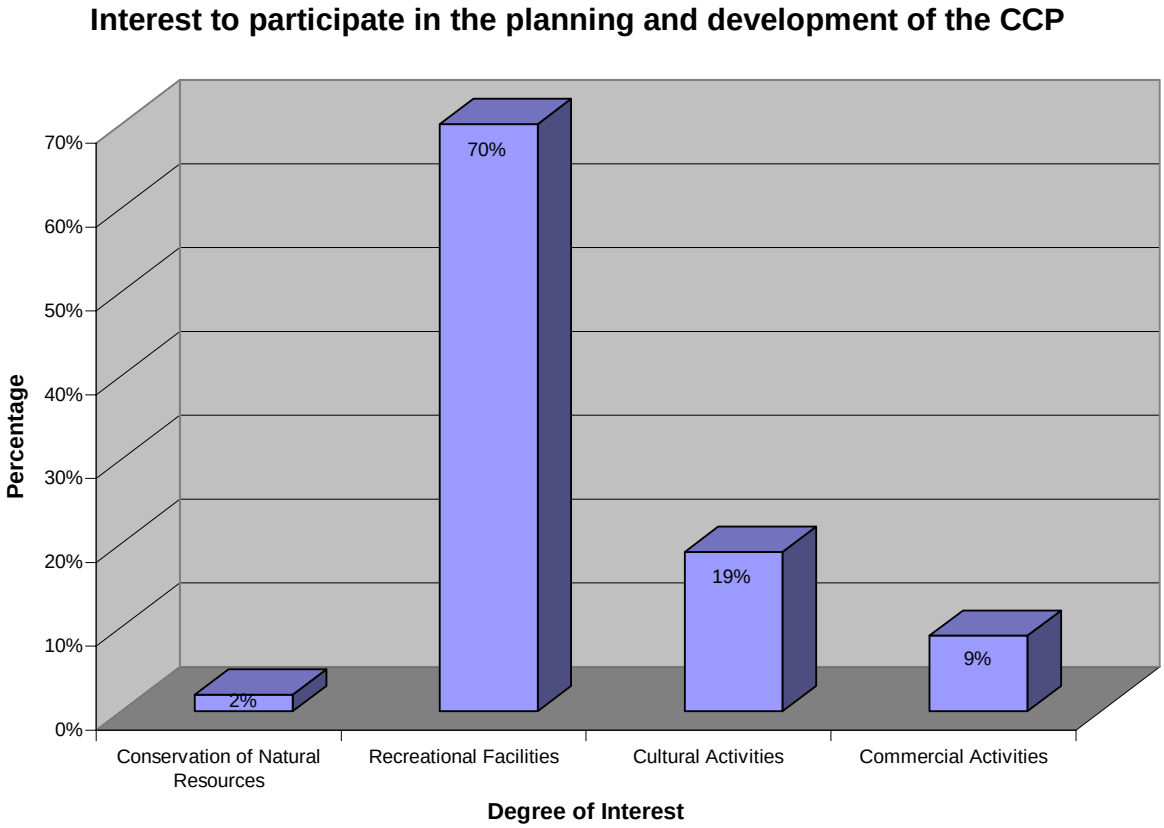
Are you interested in receiving information about the CCP.

Seventy five percent (75%) of those interviewed have a lot of interest (49%) and enough interest (28%) in receiving information about the CCP. Fifteen percent (15%) said more or less and nine percent (9%) said they had very little or no interest in receiving information about the CCP.



Interest of respondents to participate in the planning and development of the CCP, recreation facilities, cultural activities or commercial activities.

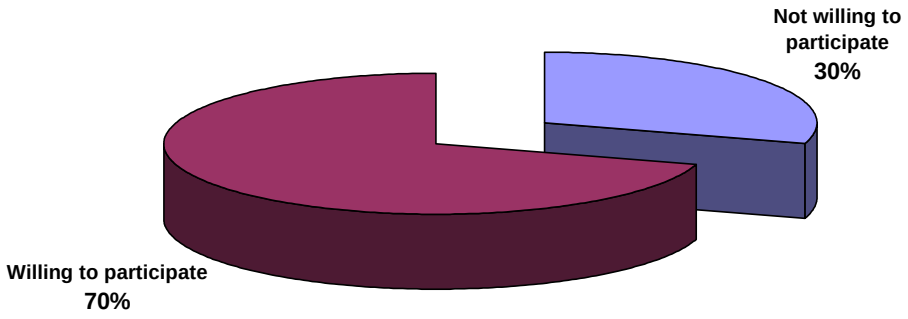
Seventy percent (70%) of respondents expressed an interest to participate in the planning and development of recreational facilities in Vieques. Twenty eight percent (28%) expressed an interest to participate in the planning and development of cultural and commercial activities in Vieques. However, only two percent (2%) of respondents expressed an interest to participate in the planning and development of the CCP.



Interest to participate actively in educational activities for the community

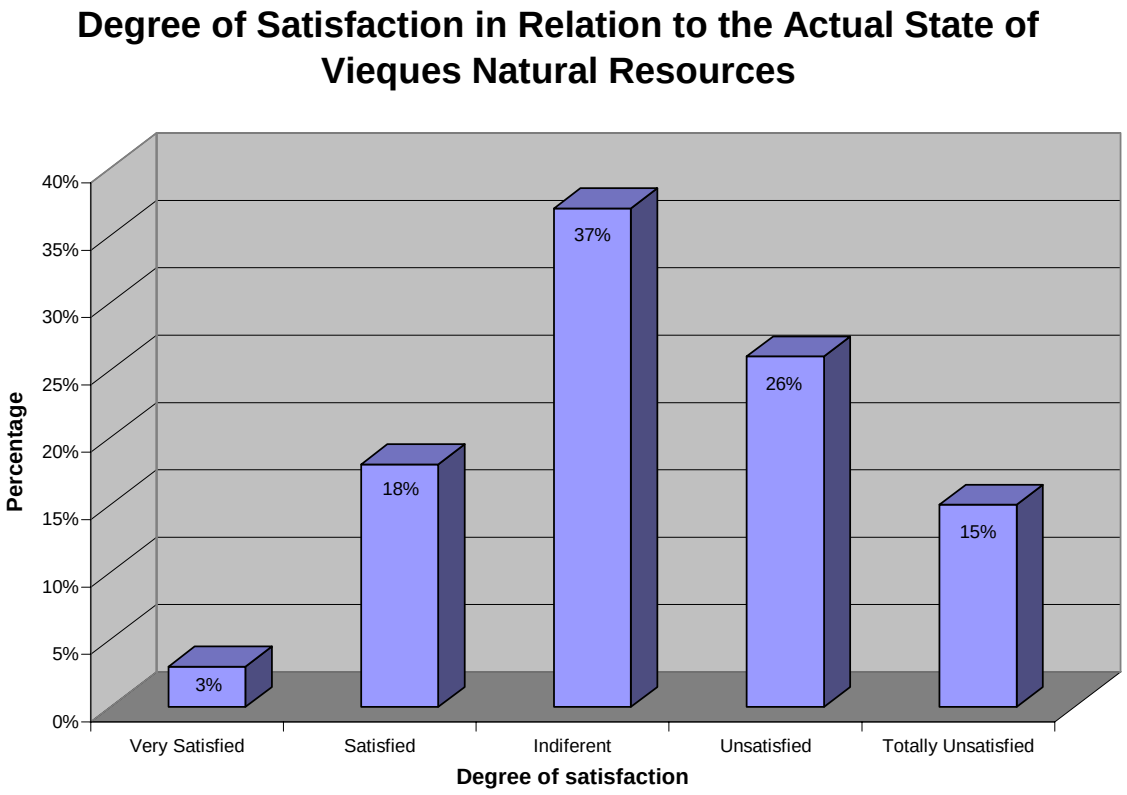
Seventy percent (70%) of those interviewed expressed interest to participate in educational activities for the community. Thirty percent (30%) expressed that they were not interested in participating in educational activities for the community.

Willingness to participate in educational activities for the community



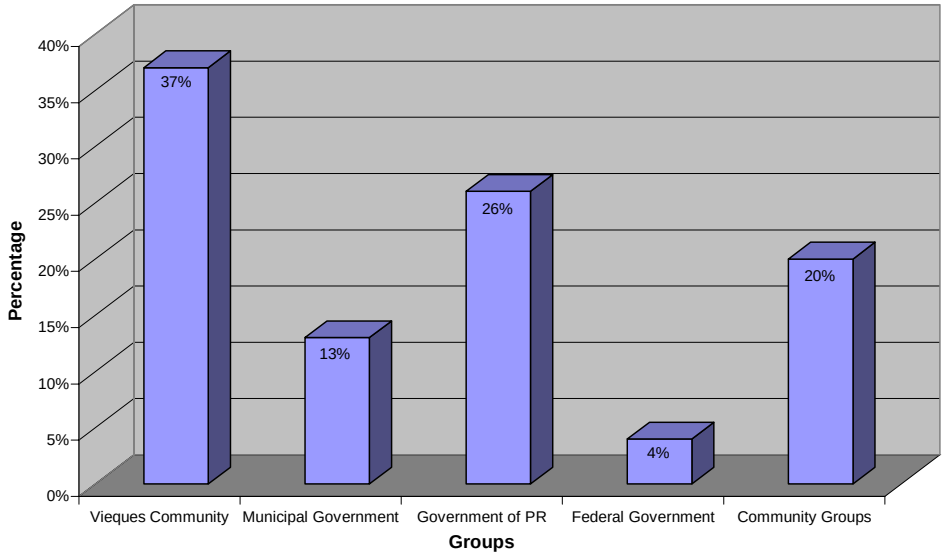
Degree of satisfaction regarding the actual state of Vieques natural resources

Forty one percent (41%) of Vieques residents interviewed expressed that they were unsatisfied (26%) or totally unsatisfied (15%) with the state of Vieques' natural resources. Unexpectedly, thirty seven percent (37%) of the respondents are indifferent to the state of their natural resources. More surprisingly was the fact that twenty one percent (21%) were either satisfied (18%) or very satisfied (3%) with the state of Vieques natural resources.



Environmental education, awareness of the natural resources and their potential in the wellbeing of the Viequenses must be in the first order of the agenda for the concerned agencies. Learning from the community is essential. However, there is an important road ahead in helping ***all the stakeholders*** learn about the ecosystems, the resources and their possibilities for sustainability in Vieques

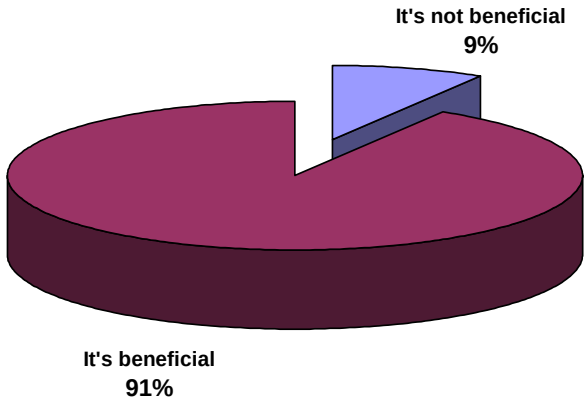
People or groups that should participate in the development of the CCP



Is the CCP beneficial to the community of Vieques

Ninety one percent (91%) of the Vieques community interviewed thinks that the CCP is beneficial to the community of Vieques. Only nine percent of the Vieques community interviewed thinks that the CCP will not be of benefit to the community. However, respondents do not know much about the CCP to properly answer the question.

Is the CCP beneficial to the Vieques community



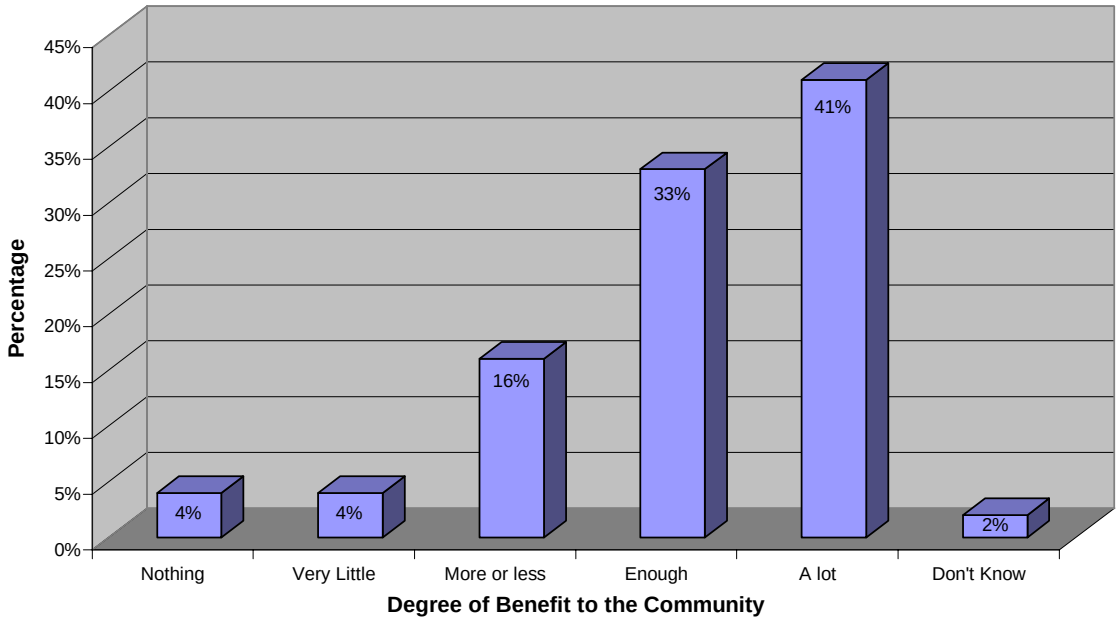
Who should participate in the development of the CCP

Thirty seven percent (37%) of those interviewed express that Vieques residents should participate in the development of the CCP. Twenty eight percent (28%) of respondents think that the government of Puerto Rico should participate in the development of the CCP. Twenty percent (20%) expressed that Vieques community groups should participate. Thirteen percent (13%) manifested that the municipal government should participate and only four percent (4%) thinks that the Federal Government should take part in the development of the CCP. Specifically the names of Ismael Guadalupe, Julián García, Prieto Ventura, Bob Rabin and Nilda Medina were mentioned in more than five occasions.

Benefits for the community of Vieques derived from the management of the natural resources proposed by the CCP

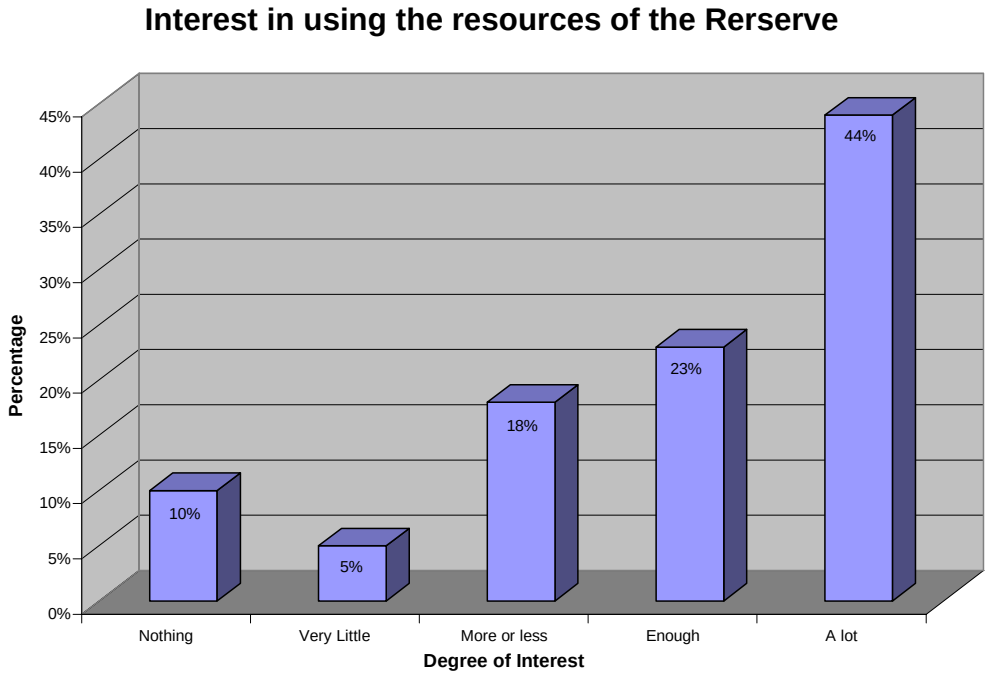
Seventy four percent (74%) of the Vieques community thinks that they can benefit a lot (41%) or enough (33%) from the management of the natural resources as proposed by the CCP. Sixteen percent (16%) responded that the community could more or less benefit from the management of the natural resources as proposed by the CCP. Eight percent (8%) responded that the community could only benefit very little (4%) or nothing at all (4%) and two percent (2%) does not know.

Degree of Benefit for the Community from the Management of the Natural Resources Proposed by the CCP



Interest in using the resources of the reserve.

When asked about their interest in making use of the resources of the reserve only fifteen percent (15%) of the community interviewed responded that they had no interest (10%) and very little interest (5%). Eighteen percent (18%) responded that more or less sixty seven percent (67%) said they had a lot of interest (44%) and twenty three percent (23%) answered enough.



Conclusions

There is a general interest in making use of the resources comprehended in the Vieques National Wildlife Refuge. Even though Vieques residents expressed a lack of knowledge regarding the CCP, they also believe that it will be beneficial for the community at large. In general, the community has a great interest to be capacitated in matters related to the CCP, and stated that the Vieques community, the municipal government, the government of Puerto Rico, the community groups and the federal government should participate in its development. However there is a high degree of apathy regarding the management of Vieques natural resources that needs to be attended.

The distribution of age groups is well balanced with 50% of respondents younger than 50 years of age and the other half older. This is an indication that recreational facilities and spaces need to be developed considering the particular characteristics and preferences of both age groups. Active and passive recreation opportunities need to be considered to comply with particular access needs and services, disabilities and preferences.

Gender of respondents was also well balanced and should also be taken into consideration at the planning and development stages of recreational facilities and spaces. Appropriate considerations need to be adopted with both groups since they have different needs and preferences. When planning the development of recreational facilities and spaces or the education and capacity building activities there are two groups of Vieques residents that compose 46% of the occupation category that need to be taken into consideration for the nature of their status. These are the retired persons and the homemakers. Both have flexible leisure time and special education needs and an extraordinary potential to provide volunteer services. This requires an effort from the U.S. Fish & Wildlife Service to train them.

Community organizations need to get their message more effectively to the community. Most of Vieques residents are not familiar with the community organizations, their mission or objectives. An effort needs to be made to reach the community and educate them regarding the conservation and wise use of their natural resources, potential for recreational and economic opportunities from these resources and other cultural and social initiatives. There is an opportunity to provide workshops to these groups regarding the marketing of their organization, provide them with educational materials and collaborate with them in their outreach efforts.

There is a lack of knowledge in the Vieques community regarding the availability of recreation spaces and facilities. Residents relate recreation spaces with courts, parks and sports. This can be the result of inadequate marketing and education efforts from the managers of the natural resources and the providers of recreational and educational services. There is a good opportunity for the municipal government of Vieques, the Department of Sports and Recreation, the Department of Natural and Environmental Resources (DNER), the Department of Education, community organizations and the USF&WS to educate the Vieques community regarding outdoor recreation opportunities offered by the natural resources of Vieques and a better use of their leisure time. If the community is not aware of the recreational opportunities offered by the natural resources they will not appreciate them or be concerned of its conservation. The concept of passive recreation, water sports, trails, contemplation of nature and outdoor education needs to be promoted in order to highlight the value of Vieques natural resources and conservation. Homemakers, retired persons and senior citizens are all potential users of the natural resources, and also important nodes in their households and communities, reaching children and other members of their communities.

There is a significant need for information regarding the CCP. Most of the respondents expressed a lack of knowledge about the CCP but at the same time were very interested in obtaining information and were willing to capacitate regarding this matter and to participate in the process. This is an excellent opportunity to develop an outreach campaign and disseminate education information regarding the CCP, its objectives and benefits offered to the community. This effort is guaranteed to be successful since more than 80% of the residents are willing to capacitate regarding the CCP. The community expressed a need for information availability, education for the youngsters, they want to be informed of what is going on regarding the CCP and the Refuge and specifically they want to be learn about the process in order to integrate. The community also expressed willingness to participate actively in education activities for the community.

A big part of the community is unsatisfied with the management of the natural resources. However there is a problem with regards to apathy and indifference from a significant part of the community. There is a need to educate the community regarding the management and conservation of their natural resources if we are to have a change of attitude toward Vieques most valuable asset. Outreach and education activities should be coordinated for this purpose and development and dissemination of information conducted. This effort needs to be coordinated by all federal and insular government agencies and non-governmental organizations with offices in Vieques in order to be effective. The CCP for the Vieques National Wildlife Refuge should be the first step towards educating the community and changing the attitude towards the natural resources and integrate them through active participation into the management of the natural resources.

Attachments

Census Tracts

TRACT	BLOCK	HSE UNIT	Interval (1:X)	Start	HU2	HU3	HU4	HU5	HU6	HU7	HU8	HU9	HU10
950100	1000	5	1	1	2	3	4	5	6	7	8	9	10
950100	1001	125	13	1	14	27	40	53	66	79	92	105	118
950100	1002	223	22	21	43	65	87	109	131	153	175	197	219
950200	2026	14	1	1	2	3	4	5	6	7	8	9	10
950200	3011	15	2	1	3	5	7	9	11	13	15	17	19
950200	2024	28	3	2	5	8	11	14	17	20	23	26	29
950200	1002	28	3	2	5	8	11	14	17	20	23	26	29
950200	1007	34	3	1	4	7	10	13	16	19	22	25	28
950200	3000	41	4	2	6	10	14	18	22	26	30	34	38
950200	3016	42	4	4	8	12	16	20	24	28	32	36	40
950200	1006	47	5	2	7	12	17	22	27	32	37	42	47
950200	3005	58	6	5	11	17	23	29	35	41	47	53	59
950200	3008	62	6	5	11	17	23	29	35	41	47	53	59
950200	2022	68	7	6	13	20	27	34	41	48	55	62	69
950200	1000	506	51	27	78	129	180	231	282	333	384	435	486
950400	3035	6	1	1	2	3	4	5	6	7	8	9	10
950400	2031	7	1	1	2	3	4	5	6	7	8	9	10
950400	2053	12	1	1	2	3	4	5	6	7	8	9	10
950400	1009	13	1	1	2	3	4	5	6	7	8	9	10
950400	1013	20	2	1	3	5	7	9	11	13	15	17	19
950400	1023	21	2	2	4	6	8	10	12	14	16	18	20
950400	3002	24	2	1	3	5	7	9	11	13	15	17	19
950400	3007	26	3	1	4	7	10	13	16	19	22	25	28
950400	1029	29	3	1	4	7	10	13	16	19	22	25	28
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950400	3001	30	3	1	4	7	10	13	16	19	22	25	28
950400	1071	35	4	2	6	10	14	18	22	26	30	34	38
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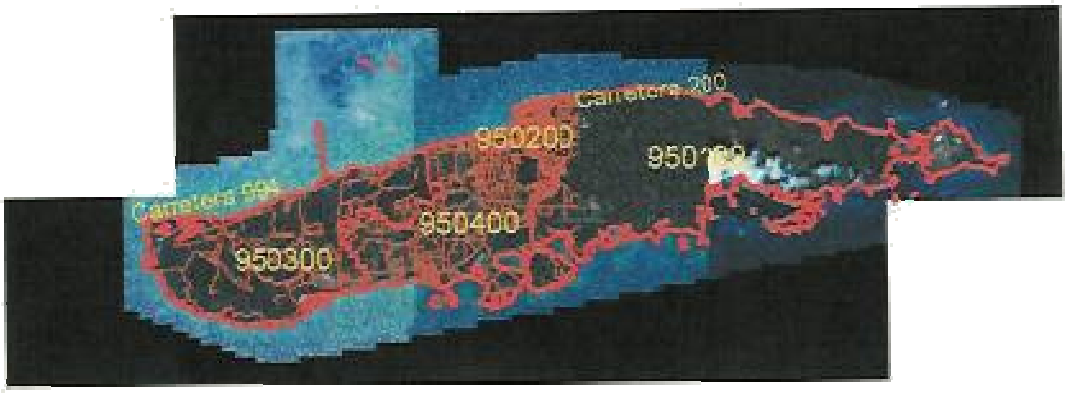
950400	3024	40	4	2	6	10	14	18	22	26	30	34	38
950400	2054	42	4	4	8	12	16	20	24	28	32	36	40
950400	2043	47	5	1	6	11	16	21	26	31	36	41	46
950400	3026	60	6	1	7	13	19	25	31	37	43	49	55
950400	2032	78	8	2	10	18	26	34	42	50	58	66	74

Vieques: Distritos censales



Vieques: bloques dentro de un distrito censal

Legend

Vieques_Tracts

Bloques censales

Vieques: vivienda

Legend

- Bloques censales
- Edificios
- Calles