Environmental Assessment for the Disposal of Naval Activity Puerto Rico
(formerly Naval Station Roosevelt Roads)

April 2007

Prepared by:

DEPARTMENT OF THE NAVY
Commander, Navy Installations

In compliance with Section 102(2)(C)
of the National Environmental Policy Act of 1969

Executive Summary

This Environmental Assessment (EA) evaluates the potential environmental impacts of the Department of the Navy's (Navy's) proposed action to dispose of approximately 8,435 acres of excess land at Naval Activity Puerto Rico (NAPR). The disposal of the NAPR property will be the responsibility of the Navy; redevelopment will be the responsibility of future owners of the property. The EA also evaluates the potential environmental impacts associated with reasonably foreseeable reuse and development of the disposed property to be accomplished by non-federal entities.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) guidance implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and Department of Navy regulations implementing NEPA (32 CFR 775).

Background

Naval Station Roosevelt Roads (NSRR) was used by the Navy to support its activities in the Atlantic Ocean and Caribbean Sea. On September 30, 2003, pursuant to Public Law 108-87, the Navy was charged to close and dispose of NSRR. Accordingly, on March 31, 2004, NSRR ceased operations as a Naval Station and was re-designated as NAPR. The property is currently in caretaker status.

The Commonwealth of Puerto Rico (the Commonwealth) created a Local Redevelopment Authority (LRA) to oversee the planning process for future private development of NAPR. The LRA developed the *Naval Station Roosevelt Roads Reuse Plan* (CB Richard Ellis *et al.* December 2004).

Description of the Proposed Action

The proposed action evaluated in this EA is the disposal of 8,435 acres of excess federal land at NAPR. This EA addresses only the environmental impacts of disposal to non-federal interests. Properties totaling approximately 230 acres would remain in federal ownership; however, operational responsibility for these parcels would be transferred by the Navy to other federal entities. Therefore, these lands are excluded from analysis in this EA.

Although the proposed action is the disposal of the excess 8,435-acre property at NAPR, reuse and redevelopment of the property by third-party entities would follow the disposal of NAPR. Therefore, the Reuse Plan, which provides the most current information regarding reasonable future-use scenarios, once transfer of ownership of the property is completed, has been incorporated into the EA.

The Reuse Plan categorized the proposed redevelopment into four distinct phases. The impacts associated with the proposed reuse, as defined by Phases I and II, are considered indirect impacts of reuse of the predominantly existing infrastructure of NAPR. CEQ regulations (40 CFR 1508.8[b]) cite growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate and related effects on air and water and other natural systems as examples of indirect impacts. The impacts associated with long-range future redevelopment (Phases III and IV) are based on expansion of the existing infrastructure at NAPR and unforeseen economic factors. This redevelopment and associated impacts are speculative at present and, therefore, are being considered as cumulative effects of the proposed action.

Alternatives

In accordance with CEQ regulations regarding the implementation of NEPA, the alternatives examined should include a range of reasonable alternatives, including the No-Action Alternative. Although the Navy's proposed action is disposal of the NAPR property, restrictions imposed on land use by the Navy may affect the long-term redevelopment potential for the property. Thus, the two alternatives contemplated for this document were: (1) Disposal with cleanup of property consistent with historical land uses and (2) Disposal with cleanup of property to be consistent with the Reuse Plan.

Because the Reuse Plan proposes reuse that is consistent with historical land uses, a decision was made that only one reasonable action alternative was available: Disposal of NAPR with restrictions necessary for consistency with the Reuse Plan. Consequently, this single alternative is evaluated and referred to as the Proposed Action Alternative throughout the remainder of this EA.

A No-Action Alternative was also considered in this EA and would entail placing NAPR in an inactive status but maintaining it for some potential future federal use. The NAPR property not transferred to other Federal agencies would be vacated, with no immediately identified reuse or redevelopment. The Navy would retain ownership and the burden of liability for property with no functional, operational, or strategic value. In addition, it would not support the local community impacted by the closure decision. Development of the Reuse Plan and realization of the anticipated economic recovery would not be feasible without disposal of the real property. Accordingly, the No-Action alternative is considered not practicable or reasonable and is not further evaluated in this EA.

Proposed Action Alternative

The proposed action alternative is the disposal of approximately 8,435 acres of the excess Navy property at NAPR. This disposal would be accomplished as a direct transfer of ownership subject to such restrictions on the property that are consistent with the historical use of the property. The Navy would conduct, or cause to be conducted, environmental cleanup of the property to a level consistent with its historic use and to be protective of human health and meet EPA's approval. Future landowners could expand the level of cleanup to allow for different land uses; however, they would be responsible for this additional cleanup as well as coordination with, and approvals by, the appropriate regulatory agencies (EPA, Puerto Rico Environmental Quality Board [EQB], etc.).

The LRA, in conjunction with the Puerto Rico Planning Board (PRPB) is developing a Special Zoning Plan for NAPR. Upon its adoption, this plan would serve as the official zoning of the property. Any future development projects proposed on former NAPR property would be reviewed by the PRPB to ensure that such development is consistent with the Special Zoning Plan.

Environmental Impacts

The Navy developed distinct parcels for possible disposal actions. In general, the parcels followed the various zones within the Reuse Plan and consist of lands for public sale, lands being transferred to the Commonwealth of Puerto Rico, and areas not being disposed, but whose ownership responsibility is being transferred to another federal agency. The parceling process took into consideration the Reuse Plan and areas identified in the Environmental Condition of Property Report as requiring some form of environmental remediation. Another consideration in developing the various parcel boundaries was to retain cleanup responsibility with one entity, either the Navy or a new owner.

The cleanup of contaminated sites at NAPR is primarily managed under the corrective action portion of the current RCRA Part B permit issued by EPA Region II. The Navy has submitted an application for renewal of the Part B permit. Since base operations requiring the Part B permit are no longer in operation, only the corrective action portion of the permit remains applicable. It is anticipated that the EPA will choose to convert the regulation of corrective action requirements from this permit to a RCRA §7003 Administrative Order on Consent (§7003 Order) prior to property transfer. The Navy and EPA are currently negotiating how this issue will be resolved.

A Memorandum of Agreement (MOA) between the Navy and the Puerto Rico State Historic Preservation Office (SHPO) has been executed. The MOA details which archaeological sites at NAPR will undergo data recover and to what level. In addition, it specifies the level of documentation needed for respective historic structures or the consultation process needed to establish the level of recordation. Through the execution of a MOA, and by implementing the stipulations of the MOA, the Navy meets their requirements under Section 106 of the NHPA.

A further consequence of the disposal of NAPR would be an increase in the private and commercial vessel traffic in the waters surrounding NAPR. Marine waters adjacent to NAPR support sensitive environmental resources such as essential fish habitat (e.g., coral reefs and sea grass beds) as well as threatened and endangered species, including sea turtles, the West Indian manatee, and the yellow-shouldered blackbird. Because of the speculative nature of the Reuse Plan, its full effects on listed species cannot be addressed. However, there are a number of conservation measures that Commonwealth and/or federal resource agencies could/may impose on non-federal own-

ers/developers before development-specific approvals or permits are issued. Implementing these conservation measures would be the responsibility of the new owner/developer, and the respective issuing agency would be responsible for ensuring that these recommendations are instituted. The Navy would no longer retain any ownership or control of these properties.

In consultation with the U.S. Fish and Wildlife Service (USFWS), the Navy has developed parcel-specific conservation guidelines that list species-specific conservation recommendations for future land owners to consider. This EA identifies the conservation guidelines to be provided to new owner(s)/developer(s) to offset potential impacts. Accordingly, during Section 7 consultation pursuant to the Endangered Species Act (ESA), USFWS based their determination for "not likely to adversely affect" on future landowners/developers implementing conservation measures included in the Special Zoning Plan.

With the completion of a MOA under National Historic Preservation Act requirements and completion of Section 7 requirements under the ESA, implementing the Proposed Action would not result in a significant impact to the environment. This EA, while addressing the disposal action, does not preclude the potential need for future review of specific components of the Reuse Plan pursuant to federal and Commonwealth laws. All Puerto Rican entities must comply with relevant federal laws and the Commonwealth's planning, zoning, and environmental laws and regulations.

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List of Acronyms and Abbreviations

ACM	asbestos-containing material
AFWTF	Atlantic Fleet Weapons Training Facility
AOC	Area of Concern
AQCR	Air Quality Control Region
BRAC	base realignment and closure
CAA	Clean Air Act
CAC	corrective action complete
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CES	Control of Erosion and Prevention of Sedimentation
CFMC	Caribbean Fishery Management Council
CFR	Code of Federal Regulations
CO	carbon monoxide
Commonwealth	Commonwealth of Puerto Rico
COPC	contaminant of potential concern
CWA	Clean Water Act
CZMA	Coastal Zone Management Act

List of Acronyms and Abbreviations (cont)

CMP	Coastal Management Plan
dB	decibel
dBA	A-weighted decibels
DHS	Department of Homeland Security
DLA	Defense Logistics Agency
DNER	(Puerto Rico) Department of Natural and Environmental Resources
DOI	Department of the Interior
EA	Environmental Assessment
ECP	Environmental Condition of Property
EDC	Economic Development Conveyance
EFH	essential fish habitat
EIS	environmental impact statement
EO	Executive Order
EPA	United States Environmental Protection Agency
EQB	(Puerto Rico) Environmental Quality Board
ESA	Endangered Species Act
ETA	early transfer authority
°F	degrees Fahrenheit
FAD	Friable, accessible, and damaged
FEMA	Federal Emergency Management Agency
FMP	Fishery Management Plan
GIS	geographic information system
gpm	gallons per minute
HAP	hazardous air pollutant
IRP	Installation Restoration Program

List of Acronyms and Abbreviations (cont)

JP	jet propellant (fuel)
km	kilometers
kV	kilovolt
kVA	kilovolt-ampere
LBP	lead-based paint
Ldn	day-night sound level
LRA	Local Redevelopment Authority
LUC	land-use control
m	meter
MEC	munitions and explosives of concern
$\mu g/m^3$	micrograms per cubic meter
mg/L	milligrams per liter
mgd	million gallons per day
MNA	monitored natural attenuation
MRP	Munitions Response Program
MSL	mean sea level
MWH	megawatts per hour
NAAQS	National Ambient Air Quality Standards
NAPR	Naval Activity Puerto Rico
Navy	United States Department of the Navy
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

List of Acronyms and Abbreviations (cont)

NOI	Notice of Intent
NOV	Notice of Violation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRDA	Natural Resources Damage Assessment
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review Program
NSRR	Naval Station Roosevelt Roads
O_3	ozone
PBC	Public Benefit Conveyance
PCBs	polychlorinated biphenyls
$PM_{2.5}$	fine particulate matter
PRASA	Puerto Rico Aqueduct and Sewer Authority
PREPA	Puerto Rico Electric Power Authority
PRIDCO	Puerto Rico Industrial Development Company
PRPA	Puerto Rico Ports Authority
PRPB	Puerto Rico Planning Board
PWD	Public Works Department
RBCs	risk-based concentrations
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SF	square feet
SHPO	State Historic Preservation Office
SIP	State Implementation Plan

List of Acronyms and Abbreviations (cont)

SO_2	sulfur dioxide
SWMU	solid waste management unit
SWP3	Storm Water Pollution Prevention Plan
THM	trihalomethane
UNEP	United Nations Environmental Program
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WWTP	wastewater treatment plant

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1 Proposed Action

1.1 Introduction

Pursuant to the United States Department of Defense Appropriations Act of Fiscal Year 2004 (Public Law 108-87), the United States Department of the Navy (Navy) has closed Naval Station Roosevelt Roads (NSRR) in Puerto Rico. Section 8132 (a) of Public Law 108-87 states that "[n]otwithstanding . . . any other provision of law, the Secretary of the Navy shall close Naval Station Roosevelt Roads, Puerto Rico, no later than 6 months after enactment of this Act." The Base Closure and Realignment BRAC Act of 1990 (BRAC Act) requires that a local redevelopment plan be treated as part of the proposed Federal Action and that the Secretary is to give deference to the redevelopment plan when carrying out an environmental assessment when considering property disposal decisions (BRAC Act Section 2905(7)(k)(ii) and (ii)). Accordingly, on March 31, 2004, NSRR ceased operations as a Naval Station. The base was re-designated as Naval Activity Puerto Rico (NAPR) to maintain a Navy presence and associated security during the disposal process (Figure 1-1). Public Law 108-87, Section 8132(b) further states that "[t]he closure provided for in subsection (a), and subsequent disposal, shall be carried out in accordance with the procedures and authorities contained in the Defense Base Closure and Realignment Act of 1990 (Title XXIX of Public Law 101-510; 10 U.S.C. 2687 note)."

Pursuant to the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508) and Navy regulations implementing NEPA procedures (32

CFR 775), the Navy has prepared this Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the disposal of NAPR.

The Commonwealth of Puerto Rico (the Commonwealth) created a Local Redevelopment Authority (LRA) to oversee the planning process for future private development of NAPR. The LRA developed the *Naval Station Roosevelt Roads Reuse Plan* (CB Richard Ellis et al. December 2004). The potential reuse of the property, as proposed in the Reuse Plan, is considered in the evaluation of the potential impacts of the alternatives, discussed in Section 4. The content of this EA is consistent with the relevant planning laws of Puerto Rico.

1.2 Background

NSRR was used by the Navy beginning in the early 1940s to support Navy activities in the Atlantic Ocean and Caribbean Sea as well as for communications and other activities and for support services for the Atlantic Fleet Weapons Training Facility (AFWTF) on the island of Vieques. Subsequent to the transfer of the AFWTF to the United States Department of the Interior (DOI) in 2003, Congress enacted Public Law 108-87 on September 30, 2003, charging the Navy with closure and disposal of NSRR in Puerto Rico.

As previously described, the Commonwealth created an LRA to oversee the planning process for future development of NAPR. The LRA is composed of representatives from Commonwealth agencies and led by the Puerto Rico Department of Economic Development and Commerce and the Puerto Rico Planning Board (PRPB). The Reuse Plan developed by the LRA serves as a guideline for potential future private development of NAPR.

1.3 Purpose and Need

The purpose and need of the proposed action is to implement Public Law 108-87 directing the disposal of NAPR, as described in Section 1.1 above. The disposal of the NAPR property will be the responsibility of the Navy; redevelopment will be the responsibility of future owners of the property. This EA is designed to assist the Navy in deciding the most appropriate process for the disposition of NAPR, with the Reuse Plan, as proposed by the LRA, incorporated into the impacts analysis of that disposal.

Source: Geo-Marine, 2005; ESRI, 2004

Figure 1-1
General Location Map
Naval Activity Puerto Rico

Recognizing that some type of reuse of NAPR would take place, this EA provides the decision-makers and the public with the information required to understand the potential environmental consequences of the disposal of NAPR in terms of the reasonable foreseeable reuse of the property. To that end, the proposed Reuse Plan inclusive of Phase II has been incorporated into the impacts analysis (Section 4) of the alternatives (described in Section 2). Foreseeable potential impacts that could result from redevelopment of the property pursuant to the proposed Reuse Plan are identified in this EA.

1.4 Description and Location of the Proposed Action

1.4.1 NAPR and the Surrounding Area

NAPR is located on approximately 8,665 acres on the eastern end of the island of Puerto Rico. This region of the island is predominantly rural with large sections of rangeland. El Yunque Caribbean National Forest is located approximately 15 miles (24 kilometers [km]) northwest of NAPR. The most developed areas in the immediate vicinity of NAPR are the community of Ceiba, with a population of 18,517, and the community of Naguabo, with a population of 23,753 (U.S. Census 2000), both located directly west and adjacent to NAPR (Figure 1-2). The city of Fajardo, with a population of 40,712 (U.S. Census 2004), is 5 miles (8 km) north of NAPR along Route 3.

NAPR also includes the nearby islands of Piñeros and Cabeza de Perro, which are located approximately 0.5 mile (0.8 km) east of NAPR in the Caribbean Sea. Piñeros Island is approximately 1 mile (1.6 km) by 0.5 mile (0.8 km) in size (310 acres), and Cabeza de Perro is a small island of approximately 0.25 mile (0.4 km) in diameter (30 acres) located 0.25 mile (0.4 km) east of Piñeros (see Figure 1-3).

1.4.2 Lands Addressed in the Environmental Assessment

This EA addresses only the environmental impacts of disposal to non-federal interests. Properties totaling approximately 230 acres would remain in federal ownership; however, operational responsibility for these parcels would be transferred by the Navy to other federal entities (Figure 1-3). Therefore, the following parcels are not part of the disposal action:

- **Bundy Area.** Approximately 125 acres of land in the Bundy area will be transferred to the U.S. Army to be used for training and administrative support facilities.

- **Waterfront Area.** Approximately one acre adjacent to the fuel pier will be transferred to the Department of Homeland Security (DHS) as a boat storage and operations area, and five acres will be transferred to the U.S. Army.

- **Airfield Facilities**. Approximately 10 acres, including a hangar and aircraft parking apron, will be transferred to the DHS.

- **South Delicias.** Approximately 30 acres, primarily constituting the former AFWTF Headquarters, will be transferred to the DHS.

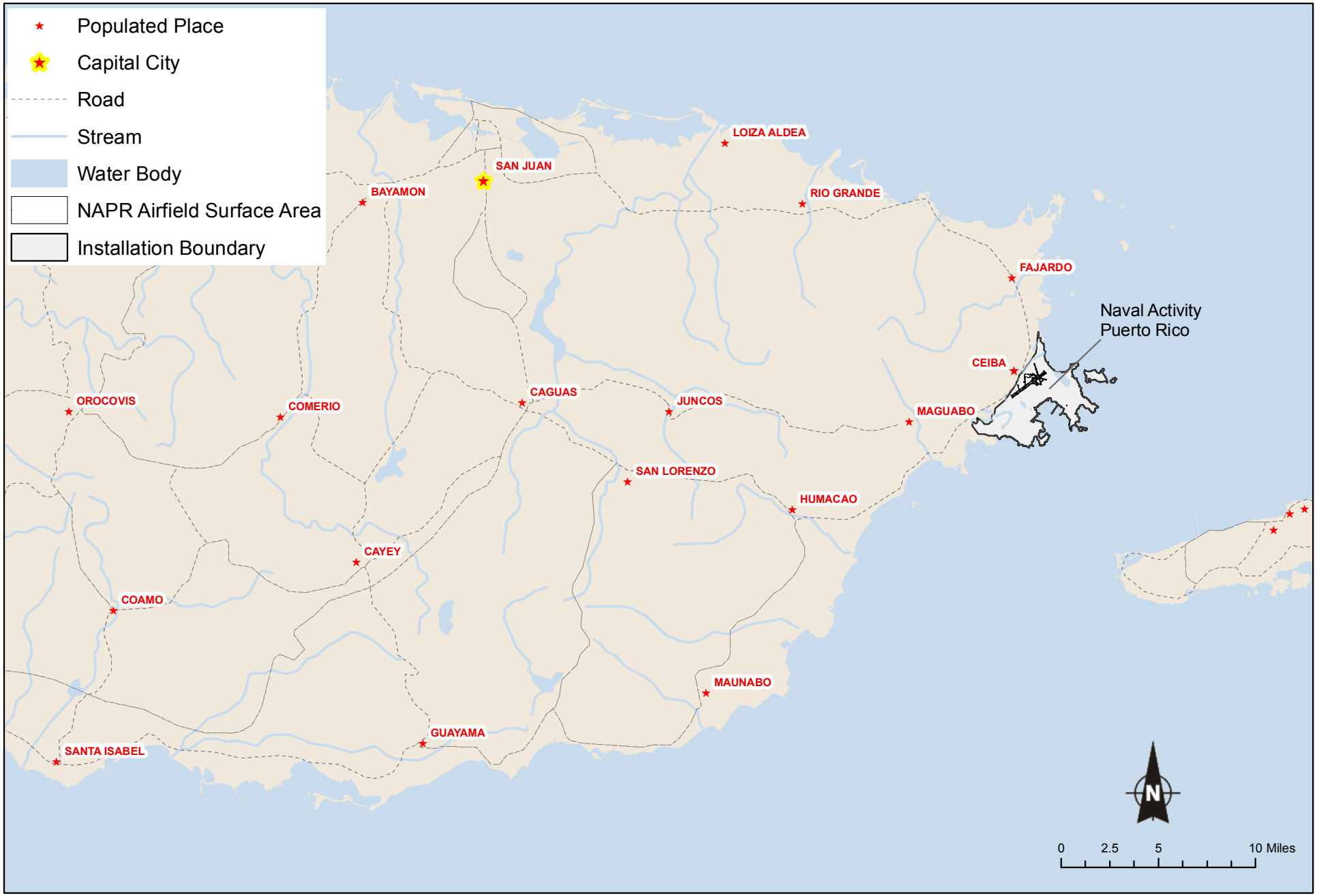
- **Punta Medio Mundo.** Approximately 60 acres containing the small arms range will be transferred to the DHS as an active small arms range.

The impacts of the federal transfer, combined with the potential long-term future use impacts of the non-federal disposal and reuse (Phases III and IV of the Reuse Plan), are discussed in Section 5, Cumulative Impacts.

1.5 Scope of the Environmental Assessment

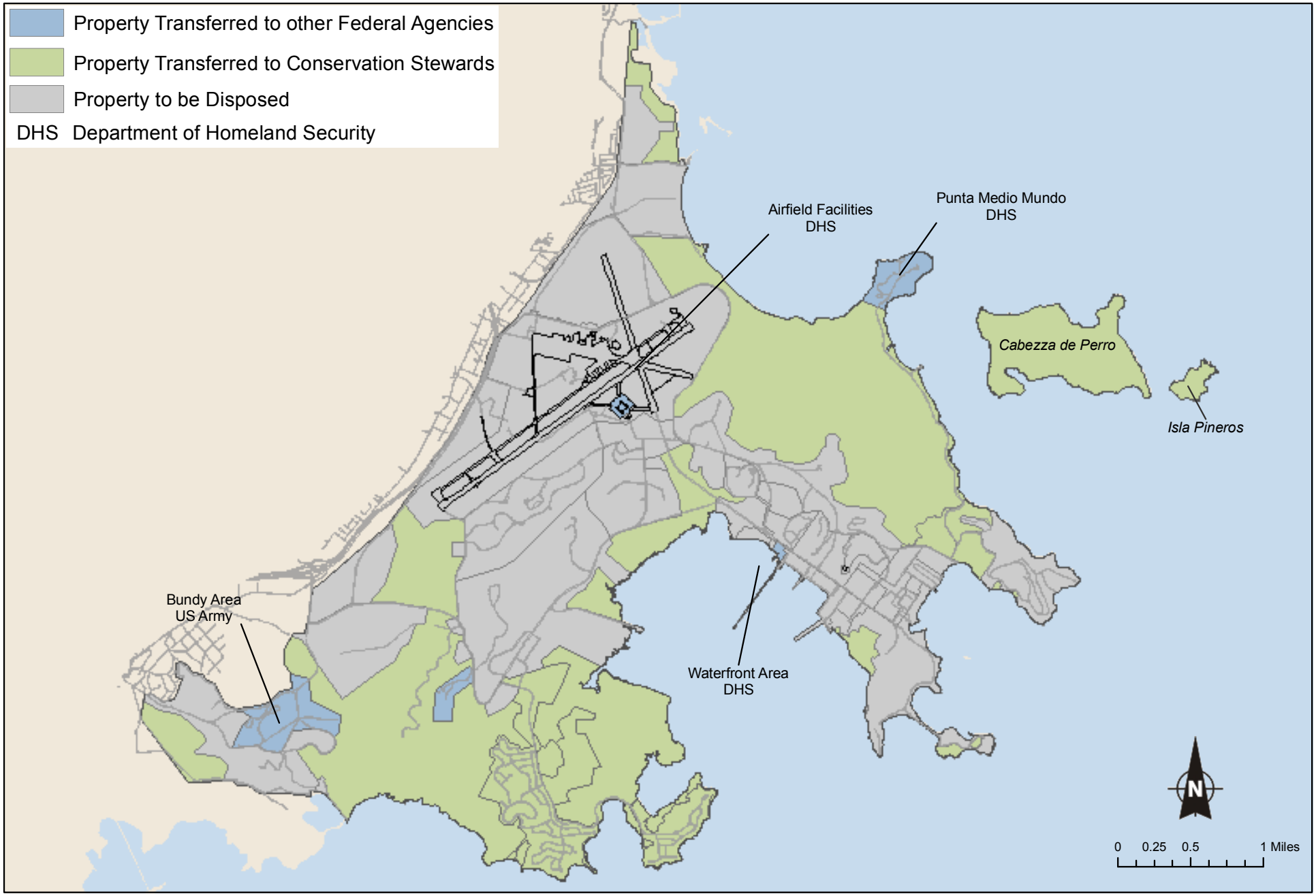
This EA is based on information obtained from review of existing information and documents (see Section 3); various site visits to NAPR conducted during 2004; meetings and telephone conversations with various individuals (see Section 7); and comment letters received during the public scoping period. This EA describes the existing environmental conditions in the planned land-transfer areas; identifies reasonable alternatives; evaluates the direct, indirect, and cumulative impacts that may result from the proposed disposal of NAPR; and identifies measures to minimize potential adverse effects.

Although the proposed action is the disposal of the excess 8,435-acre property at NAPR, reuse and redevelopment of the property by third-party entities would follow the disposal of NAPR. Therefore, the Reuse Plan, which provides the most current information regarding reasonable future-use scenarios, once transfer of ownership of the property is completed, has been incorporated into the impact discussion in Section 4. The Reuse Plan categorized the proposed redevelopment into four distinct phases (see Section 2.1.1 of this EA). The impacts associated with the proposed reuse, as defined by Phases I and II, are



Source: Geo-Marine, 2005; ESRI, 2004

Figure 1-2
Naval Activity Puerto Rico and Vicinity



Source: Geo-Marine, 2005; ESRI, 2004

Figure 1-3
Property to be Transferred to Other Federal Entities or Conservation Stewards
Naval Activity Puerto Rico

considered indirect impacts of reuse of the predominantly existing infrastructure of NAPR. CEQ regulations (40 CFR 1508.8[b]) cite growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems as examples of indirect impacts. The impacts associated with long-range future redevelopment (Phases III and IV), described in Section 4, are based on expansion of the existing infrastructure at NAPR and unforeseen economic factors. This redevelopment and associated impacts are speculative at present and, therefore, are being considered as cumulative effects of the proposed action.

The Navy is preparing an EA rather than an environmental impact statement (EIS) because the proposed action is not expected to have the potential to significantly affect the quality of the human environment. This determination is based on the following conclusions regarding reasonably foreseeable reuse:

- Pursuant to Public Law 108-87, the federal action of the Navy is the disposal of NAPR. Any follow-on redevelopment of the property by future owner(s) would be subject to review and approval by the PRPB and subject to Commonwealth environmental protection laws.

- Of the 8,435-acre property to be disposed of to non-federal entities, if the Reuse Plan would be implemented, only about 44% or approximately 3,690 acres would be designated for reuse (see Section 2.1). As discussed in the Commonwealth's Reuse Plan, reuse would generally be limited to low-density, residential and commercial, as well as recreational land uses aimed at maximizing use of existing infrastructure and minimizing impacts on natural resources.

- Commercial/industrial development projected for reuse under the preferred alternative would be restricted to previously disturbed and developed commercial/industrial areas.

The Navy prepared a *Final Phase I/II Environmental Condition of Property Report* (ECP) (U.S. Navy July 15, 2005) to document the environmental condition of the NAPR property prior to any disposal. This EA is based on the most current available data and information and reasonable assumptions regarding land use and other restrictions that may be implemented to protect human health and the environment as part of the property transfer.

1.6 Public Involvement

As part of the preparation of this EA, the Navy solicited public and agency involvement through the scoping process and interagency stakeholders meetings and distributed the Draft EA for public comment.

A Notice of Intent (NOI) to prepare environmental documentation for the disposal and reuse of NSRR was published in the *San Juan Star* (in English) on April 23, 24, and 25, 2004, and in the *El Nuevo Dia* (in Spanish) on April 24, 25, and 26, 2004. In addition, letters were mailed on April 21, 2004, to approximately 100 interested individuals, agencies, and organizations. The NOI solicited comments regarding the proposed land transfer and notified the public that it had a 30-day opportunity to review and comment on the draft proposed action. The public scoping/comment period ended on May 31, 2004. Comments received are summarized in Table 1-1.

Table 1-1 Issues Identified in Written Scoping Comments Received

Issue	Addressed in EA Section
Need to complete an environmental impact statement	1.5; 1.6
Need for community participation	1.6
Need to describe proposed future land uses	2.1.1; 3.1.1; 4.1.1
Evaluation of alternatives, including the No-Action Alternative	2
Consideration of ecotourism	2; 3.11; 4.11; 5
Consideration of historical and cultural resources	3.12; 4.12
Consider relocation of passenger and freight ferry facilities from Fajardo to NAPR	4.3; 4.11
Consult with the Department of Natural and Environmental Resources on the Puerto Rico Coastal Zone Management Plan	3.13; 4.13
List potential environmental permits applicable to proposed reuse	To be developed

In addition, the Navy held a stakeholders meeting on May 4, 2004, attended by, among others, representatives of the Puerto Rico Planning Board, the Department of Natural and Environmental Resources (DNER), the State Historic Preservation Office (SHPO), the Puerto Rico Environmental Quality Board (EQB), the U.S. Army Corps of Engineers (USACE), the Puerto Rico Ports Authority (PRPA), the U.S. Environmental Protection Agency (EPA), the LRA, and the United States Fish and Wildlife Service (USFWS). The purpose of the meeting was to solicit agency comments/input regarding the scope of the EA.

This Draft EA was published and distributed in English and Spanish. A Notice of Availability (NOA) for the public to review and comment on the Draft EA was published in the *San Juan Star* (in English) on January 8, 9, and 10, 2006, and in the *El Nuevo Dia* (in Spanish) on January 20, 21, and 22, 2006. The NOA notified the public that it had a 30-day opportunity to review and comment on the Draft EA, which was available for public review at the following repositories:

- Biblioteca Pública Municipal Alejandrina Quiñonez Rivera, Urbanización Rossy Valley No. 816, Calle Francisco Gautier, Ceiba, Puerto Rico; and
- Biblioteca Pública Carnegie, 7 Ponce de León Avenue, San Juan, Puerto Rico.

Notices also were available for viewing at the following website, which could be accessed by the public: www.cnrse.navy.mil. The public comment period ended on February 21, 2006 Comments were received from the U.S. Environmental Protection Agency (EPA), the local Communities of Ceiba, residents of Ceiba, and the Federal Aviation Administration (FAA), and NOAA Fisheries Service. All comments were reviewed and incorporated as appropriate into the Environmental Assessment. EPA comments included editorial changes and suggested changes in content concerning property disposal methods and connected action impacts. The comments received from the Local Communities of Ceiba included their concern regarding the Navy's implementation of the National Environmental Policy Act (NEPA), community inclusion in environmental cleanup, and incorporation of sustainable development practices in the implementation of the Reuse Plan. Residents of Ceiba provided comments concerning community participation and the documents evaluation of long-term effects. The FAA comments addressed issues associated with the transfer of the airfield including noise, hazardous waste, and property control. A comment received from NOAA Fisheries Service provided comments on Section 7 consultation on disposal and cleanup activities.

1.7 Future Actions

Currently, several issues related to specific aspects of implementing the LRAs Reuse Plan are speculative in nature; therefore, discussion of the potential impacts of reutilization would be speculative at this time. The key issues that will influence future implementation

of the Reuse Plan are identified in this EA in order to identify for the decision-makers those issues that are not susceptible to meaningful analysis at this time. Analysis of impacts associated with future development will need to be evaluated under federal and Commonwealth laws, as appropriate, by the entity or entities acquiring the property from the Navy when future development plans are no longer speculative. Once all of NAPR is disposed of by the Navy to the Commonwealth, the private sector, and other federal interests, the Navy cannot be responsible for or influence the reuse of the property.

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2 Alternatives

The Navy identified that the alternatives for the disposal of NAPR are simply to dispose of the property or retain the property in caretaker status. The development of the Reuse Plan for NAPR and how the Reuse Plan defines the limits of analysis of the potential impacts of the proposed action is summarized in Section 2.1. Sections 2.2 and 2.3 describe the action and no-action alternatives. Two alternatives were originally considered: (1) Disposal with cleanup of property consistent with historical land uses and (2) Disposal with cleanup of property to be consistent with the Reuse Plan. After careful consideration it became self evident that the Reuse Plan proposes reuse that is consistent with historical land uses, a decision was made that only one reasonable action alternative was available: Disposal of NAPR with restrictions necessary for consistency with the Reuse Plan. The disposal action alternative would involve transfer of the property with necessary Navy-imposed limitations on future reuse based on the respective level of cleanup undertaken.

In accordance with CEQ regulations regarding the implementation of NEPA, the alternatives examined should include a range of reasonable alternatives. Although the Navy's proposed action is disposal of the NAPR property, not its redevelopment, restrictions imposed on land use by the Navy may affect the long-term redevelopment potential for the property. A No-Action Alternative was also considered and would entail placing NAPR in an inactive status but maintaining it for some potential future use.

2.1 Development of the Reuse Plan

The Reuse Plan was developed by the LRA in the context of three key guiding policies. These policies emerged from site visits and analysis, community values

expressed at public hearings with the LRA and within the LRA, and from entities that submitted Notices of Interest for potential Public Benefit Conveyances (PBCs). The three guiding policies for the LRA's Reuse Plan are:

1. Support for the economic well-being of Puerto Rico;
2. Recognition of existing needs of the communities adjacent to NAPR; and
3. Emphasis on water-oriented uses.

2.1.1 Proposed Land Uses

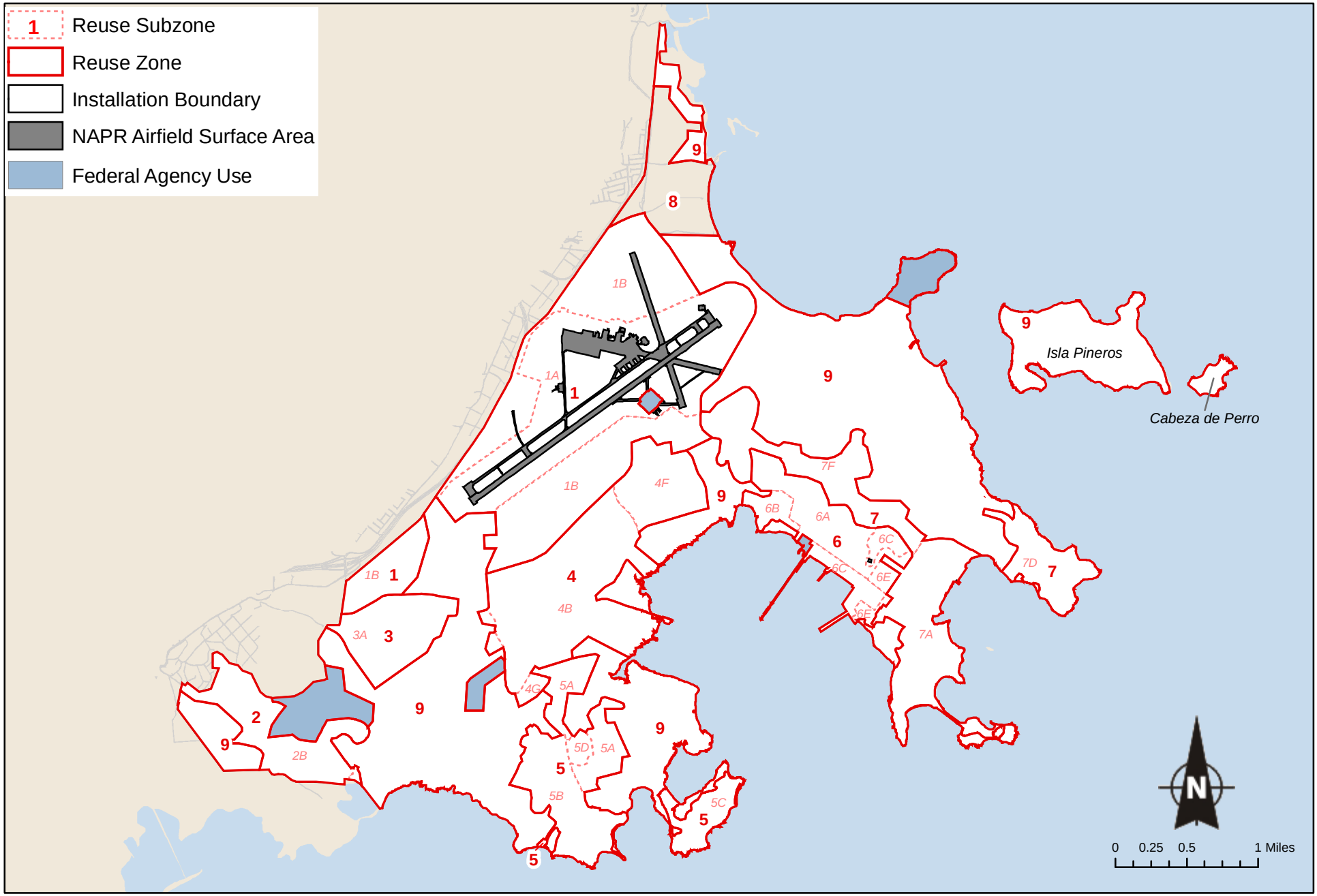
The Reuse Plan for NAPR was the result of the LRA's comprehensive analysis of the site's regional context; its existing natural conditions; existing infrastructure, facilities, and existing land uses; and the market demand for alternative uses as well as consideration of community input regarding uses and services that could be accommodated at NAPR. Preparation of the plan was driven by a primary goal of lessening the immediate negative economic impact of the base closure on the surrounding region while creating a dynamic reuse plan that would lead to the socio-economic development of the region and the Commonwealth of Puerto Rico.

The proposed uses incorporated into the Reuse Plan maximize the potential reuse of existing infrastructure and encompass six broad categories, as listed below:

1. Economic development;
2. Public, educational, and institutional uses;
3. Residential uses;
4. Open space and recreation;
5. Conservation; and
6. Tourism.

2.1.2 Phasing

The LRA's Reuse Plan divides the proposed NAPR land-use map into nine zones (see Figure 2-1). The proposed land uses, acreage, and development program (e.g., number of residential dwelling units, hotel rooms, building square footage, etc.) for each zone in is presented in Table 2-1. Table 2-1 is based on the final Reuse Plan as approved



Source: Geo-Marine, 2005; ESRI, 2004

Figure 2-1
Proposed Reuse Zones
Naval Activity Puerto Rico

by the Department of Housing and Urban Development. Although cited in the Final Reuse Plan, the acreage noted in the table may change slightly when the property is surveyed. Table 2-1 also provides preliminary estimates of total jobs (18,200 to 19,700) and total residents (6,257) upon a full 30-plus years of build-out.

Since NAPR's re-development is proposed to occur over a 34-year period, the Reuse Plan is divided into four phases: Phase I (years 2004-2005) consists of the public sale and disposal of the NAPR property. (It is anticipated that the implementation years for Phase I will be revised to reflect the revised publishing date of the Final Reuse Plan). During Phase II (years 2006-2013), the existing infrastructure would be utilized to the maximum extent. Figure 2-2 depicts how these areas at NAPR could be developed. Phase III (years 2014-2023) and Phase IV (years 2024-2037) propose redevelopment at a higher density and intensity than the existing land uses (Table 2-2). Anticipated full build-out of the proposed redevelopment would occur by 2037.

Figure 2-3 outlines the proposed reuse scenario at the time of full build-out. It is, by necessity, illustrative and would vary depending on actual market conditions, availability and commitment of funding, policy decisions by the Commonwealth of Puerto Rico, and the level of interest and commitment by private sector developers, investors, and users.

2.1.3 Infrastructure Improvements

The Reuse Plan assumes that during Phases I and II existing capacities would be adequate with only minor reconfigurations needed. Substantial infrastructure improvements would be needed to support the Reuse Plan through the completion of Phases III and IV, including significant road improvements and utility upgrades (water, sanitary sewer, storm drainage, electricity, and telecommunications).

Table 2-1 Proposed Reuse Zones and Land Uses at NAPR

Zone	Sub-Zone	Land Use	Acreage			Program			
			Vacant Developable Land[a]	Existing Development Available for Redevelopment[b]	Total Available for Reuse[c]	Program Description	Gross Acres	Projected Jobs at Full Build-out	Projected Residents at Full Build-out
1 Airport	1A	Airport	117.6	655.7	773.3	Commercial and general aviation; cargo	773.3	TBD	0
	1B	Industrial	768.3	93.0	861.3	6.9 million square feet (SF) industrial and manufacturing [d]	528.0	6,900	NA
	Subtotal		**885.9**	**748.7**	**1,634.6**				
2 Bundy	2A	Government/Institutional; Residential	48.8	56.8	105.6	50,000-120,000 SF learning center;	105.6	380	663
	2B	Moderate lodging; residential	11.4	12.6	24.0	200 guest rooms; 26-52 dwelling units	24.0	100	117
	2C	Moderate lodging; residential	18.6	14.6	33.2	200 guest rooms; 33-66 dwelling units	33.0	100	150
	2D	Sewage treatment plant	0.8	NA	0.8	No change in use	0.8	TBD	0
	Subtotal		**79.6**	**84.0**	**163.6**				
3 Golf course	3A	9-hole golf course	6.3	65.4	71.7	3A and 3B; 18-hole municipal golf course	166.8	15	NA
	3B	Additional 9 holes	81.6	13.5	95.1				
	Subtotal		**87.9**	**78.9**	**166.8**				
4 Downtown	4A	Residential	42.7	0.7	43.4	100 dwelling units	43.4	TBD	300
	4B	Mixed-use	24.1	6.7	31.8	150,000 SF commercial	15.0	600	NA
	4C	Residential	21.4	24.6	46.0	184 dwelling units	46.0	TBD	552
	4D	Mixed-Use	56.3	62.8	119.1	650,000 SF back office, call center, professional office, retail	119.1	2,600	NA
	4E	Residential	22.4	14.4	36.8	Possible reuse of recently built apartments (150 units); new construction of 80 dwelling units.	36.8	TBD	575
	4F	University Campus	88.2	77.4	165.6	900,000 SF classrooms, research labs, dormitories and other university support facilities	165.6	TBD	900
	4G	Public School	2.7	14.1	16.8	Reuse of existing elementary school as middle/high school	16.8	TBD	NA
	Subtotal		**258.8**	**200.7**	**459.5**				

Table 2-1 Proposed Reuse Zones and Land Uses at NAPR

Zone	Sub-Zone	Land Use	Acreage			Program			
			Vacant Developable Land[a]	Existing Development Available for Redevelopment[b]	Total Available for Reuse[c]	Program Description	Gross Acres	Projected Jobs at Full Build-out	Projected Residents at Full Build-out
5 Residential	5A	Master Planned Residential	120.0	36.0	156.0	5A, 5B, 5C; 1,200 dwelling units	156.0	TBD	3,000
	5B	Master Planned Residential	36.8	177.0	213.8	Included in 5A	213.8	TBD	included in 5A
	5C	Master Planned Residential	23.0	70.0	93.0	Included in 5A	93.0	TBD	included in 5A
	5D	Private School	0.1	21.9	22.0	Reuse of existing middle/high school as private bilingual school	22.0	50	NA
	Subtotal		**179.9**	**304.9**	**484.8**				
6 Port	6A	Industrial	33.2	40.7	73.9	Fuel tank farm	73.9	TBD	NA
	6B	Expanded recreational boat marina and water-oriented commercial (retail, restaurant, tourism)	3.9	36.3	40.2	250 slip marina; 10,000 SF water-oriented commercial	40.2	40	NA
	6C	Water-oriented commercial (retail, restaurant, tourism)	3.8	39.9	43.7	50,000 SF water-oriented commercial (phased)	43.7	100	NA
	6D	Hospital	4.7	22.5	27.2	Reuse of existing hospital	27.2	TBD	NA
	6E	Passenger/cargo ferry terminal and related uses	0.0	60.3	60.3	±300,000 SF commercial and warehouse space; ferry terminal	60.3	400	NA
	Subtotal		**45.6**	**199.7**	**245.3**				
7 Science Park	7A	Science Park	53.5	105.0	158.5	75 acres R&D = 800,000 - 1.1 million SF	75.0	2,500-4,000	NA
	7B	Science Park, Conference Center	76.1	66.2	142.3	Up to 250-room conference center with open space, passive park or golf course	142.3	250	NA
	7C	Science Park, Conference Center	13.3	7.0	20.3	Portion of conference center (sleeping and meeting rooms)	20.3	included in 7B	NA
	7D	Science Park, Conference Center	66.3	4.5	70.8	Portion of conference center (sleeping and meeting rooms)	70.8	included in 7B	NA
	7E	Science Park, Conference Center	40.0	8.5	48.5	Portion of conference center (sleeping and meeting rooms)	48.5	included in 7B	NA
	7F	Gateway to Science Park	158.1	14.6	172.7	1,250,000 SF R&D	115.0	4,200	NA
	Subtotal		**407.3**	**205.8**	**613.1**				
8 North Gate		Open space reserve	100.4	0.0	100.4	Gateway to base; open space	100.4	0	0
	Subtotal		**100.4**	**0.0**	**100.4**		100.4		
Subtotal Without Conservation Areas			**2,045.4**	**1,822.7**	**3,868.1**				

Table 2-1 Proposed Reuse Zones and Land Uses at NAPR

Zone	Sub-Zone	Land Use	Acreage			Program			
			Vacant Developable Land[a]	Existing Development Available for Redevelopment[b]	Total Available for Reuse[c]	Program Description	Gross Acres	Projected Jobs at Full Build-out	Projected Residents at Full Build-out
9 Conservation		Conservation Areas	0.0	0.0	0.0	Conservation	3,386.9	TBD	TBD
Total All Zones			**2,045.4**	**1,822.7**	**3,686.1**		**High**	**18,235**	**6,257**
							Low	**19,735**	

Source: CB Richard Ellis et al. cited in *Naval Station Roosevelt Roads Reuse Plan*, prepared for Local Redevelopment Authority & Department of Economic Development and Commerce, Commonwealth of Puerto Rico, September 21, 2004.

Notes:

[a] Vacant Developable Land = total acreage less: wetlands, mangroves, existing development, and undeveloped land with gradient greater than 15%.

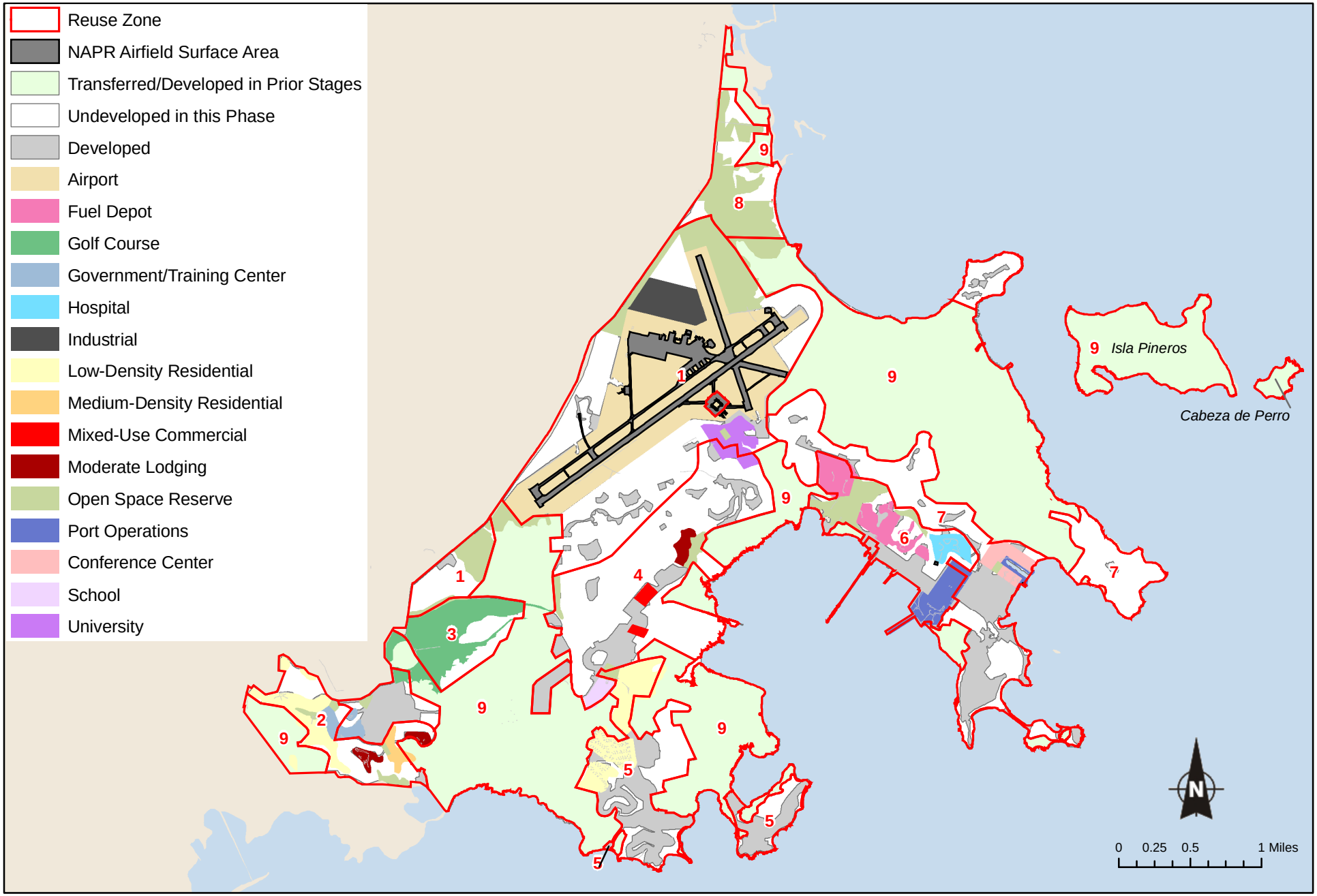
[b] Existing Development Available for Redevelopment = Existing Developed Acres less Operationally Significant Sites.

[c] Total Available For Reuse = Column D + Column E.

[d] 861.3 acres less 125.3 acres at the west end of the Runway 7-25 and less 208.3 acres east of Runway 18 = approx. 528 acres.

Key:

NA = Not applicable.
R&D = Research and development.
SF = Square feet.
TBD = To be determined.



Source: Geo-Marine, 2005; ESRI, 2004

Figure 2-2
Proposed Phase II Reuse Scenario
Naval Activity Puerto Rico

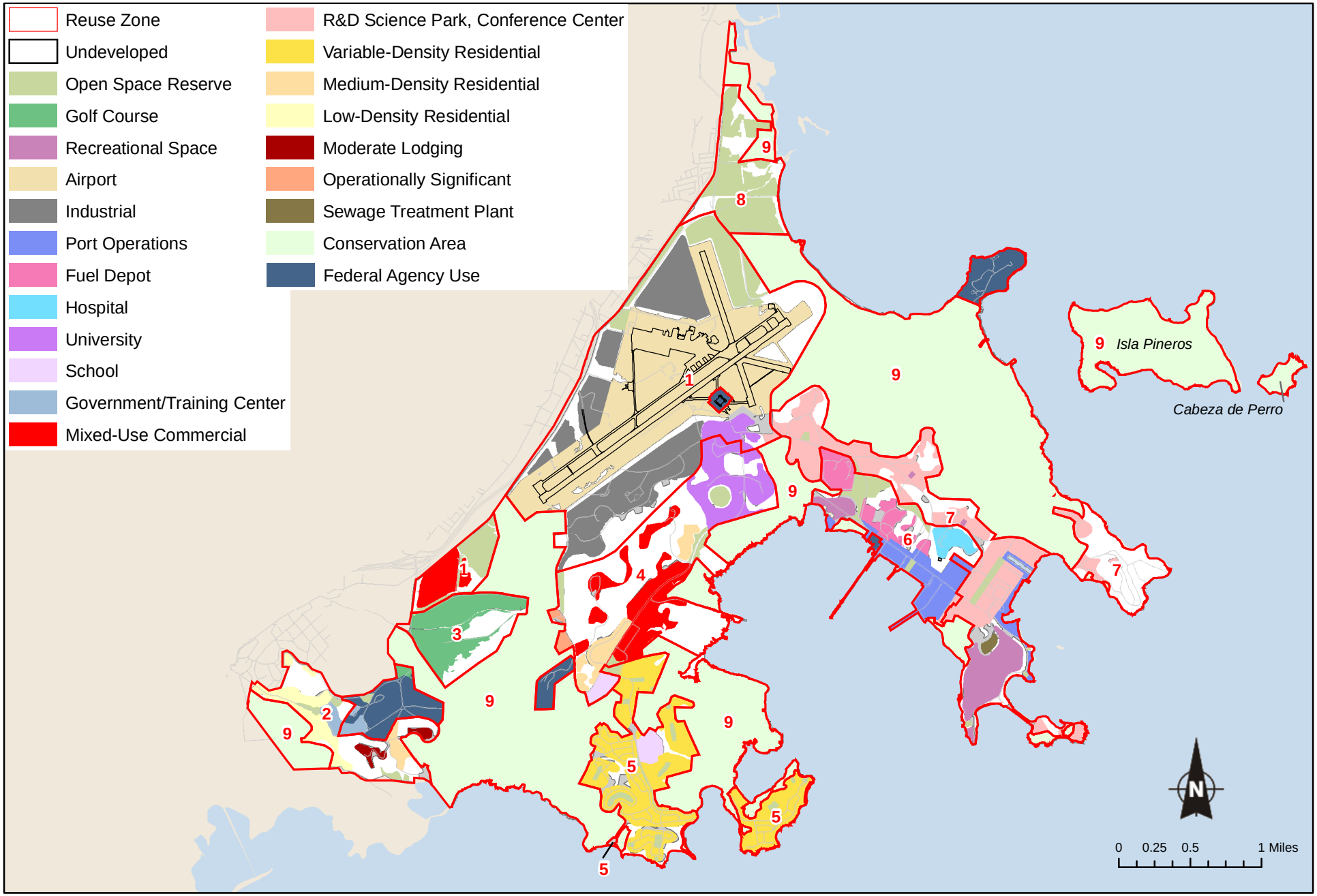
Table 2-2 Proposed Reuse Plan Phasing Program

Zone	Land Use	Square Feet	Comments
Phase I (Years 1-2; i.e., 2004-2005)			
Property transfer via Public Benefit and Economic Development Conveyances (PBCs and EDCs) completed and public sale process initiated.			
Phase II (Years 3-10; i.e., 2006-2013)			
1. Airport	Airport		Commercial and general aviation and cargo.
	Industrial/ Manufacturing/ Distribution	1,000,000	Includes space for lease and owner occupied.
2. Bundy	Moderate Lodging		±400 rooms.
	Residential		±300 dwelling units.
	Government/ Training Center	70,000 to 120,000	
3. Golf Course	Public Golf Course		Expand to 18 holes.
4. Downtown	Mixed Use	100,000	During early years of Phase II some reuse of existing buildings while the developer formulates a master plan for this area; includes reuse of 150 new dwelling units in Sub-zone 4E.
	University Campus	200,000	Occupancy of classrooms, laboratories, and dormitories during Phase II.
	Public School		Reuse of existing elementary school.
5. Residential	Residential		±500 dwelling units (DU) averaging 62 DU per year (assuming 50 per year for 4 years followed by 75 per year).
	Private School		Reuse of existing middle / high school.
6. Port	Marina		Utilized existing slips.
	Ferry Terminal, Light Cargo, and related uses		Operation of ferry terminal by Port Authority.
	Hospital		
	Fuel Tank Farm		Continued operation.
7. Science Park	Research and Development (Science Park)	100,000	100,000-square foot initial phase to accommodate potential users who have already expressed interest.
		250,000	Additional 50,000 square feet per year for Years 6 through 10.
8. North Entrance	Open space, beach and recreation		
9. Conservation	Conservation Areas		

Table 2-2 Proposed Reuse Plan Phasing Program

Zone	Land Use	Square Feet	Comments
Phase III (Years 11-20; i.e., 2014-2023)			
1. Airport	Industrial/ Manufacturing/ Distribution	2,500,000	163,000 square feet per year, plus three large users at 300,000 square feet each.
	Highway Commercial Retail	200,000	If allowed by Federal Aviation Administration.
4. Downtown	Mixed Use		±365 dwelling units.
	Mixed Use	300,000	Back office, call center, professional office, retail.
	University Campus	400,000	Additional occupancy of classrooms, laboratories, and dormitories.
5. Residential	Residential		±700 dwelling units.
	Golf Course		18-hole private course (optional)
6. Port	Waterfront Commercial	180,000	
7. Science Park	Research and Development (Science Park)	750,000	Additional 75,000 square feet per year for Years 11 through 20.
	Conference Center	250,000	±250 rooms, plus meeting facilities, open space, passive park, or golf course.
Phase IV (Years 21-34; i.e., 2024-2037)			
1. Airport	Industrial/ Manufacturing/ Distribution	3,500,000	14 years at 250,000 square feet per year.
	Highway Commercial Retail	300,000	If allowed by Federal Aviation Administration.
4. Downtown	Mixed Use	500,000	Back office, call center, professional office, retail.
	University Campus	300,000	Additional occupancy of classrooms, laboratories, and dormitories.
6. Port	Waterfront Commercial/ Small Cruise Ships	180,000	
7. Science Park	Research and Development (Science Park)	1,250,000	Approximately 100,000 square feet per year for 13 years.

Source: LRA: Cooper, Robertson & Partners; Moffatt & Nichol; CB Richard Ellis Consulting, as cited in *Naval Station Roosevelt Roads Reuse Plan*, prepared for Local Redevelopment Authority & Department of Economic Development and Commerce, Commonwealth of Puerto Rico, September 21, 2004.



Source: Geo-Marine, 2005; ESRI, 2004

Figure 2-3
Proposed Reuse Scenario at Buildout
Naval Activity Puerto Rico

2.2 Identification of Reasonable Alternatives

The process of identifying and selecting reasonable alternatives for the disposal of NAPR evolved during the completion of the ECP and Reuse Plan. The Navy originally considered two action alternatives: (1) Disposal with cleanup of property consistent with historical land uses, and, (2) Disposal with cleanup of property consistent with the Reuse Plan. Because the Reuse Plan proposes reuse that is consistent with historical land uses, a decision was made that only one reasonable action alternative was available: Disposal of NAPR with restrictions necessary for consistency with the Reuse Plan. The disposal action alternative would involve transfer of the property with Navy-imposed limitations on future reuse based on the respective level of cleanup undertaken. The Navy would impose those restrictions needed to protect human health and the environment and to be consistent with the proposed Reuse Plan for the property. Land-use controls (LUCs) would be instituted consistent with the future land use proposed by the Reuse Plan and as approved by the EPA.

2.3 Alternatives Evaluated in this EA

As previously stated, the primary goal of the LRA's Reuse Plan is to lessen the immediate negative economic impact of the base closure on the surrounding region. For that to occur, redevelopment must be completed in a timely fashion and avoid extensive delays associated with agency permitting requirements and site remediation activities. To that end, the LRA has worked diligently and closely with the Navy to develop a reuse scenario that maximizes existing infrastructure at NAPR while avoiding or accommodating areas constrained by significant natural resources, historic properties, and cleanup sites.

As a result of the close coordination between the LRA and Navy during the preparation of the Reuse Plan, each of the proposed land uses through Phase II are virtually consistent with existing land uses. For example, new residential and lodging development would be located within the existing Capehart and Bundy family housing areas and industrial development would be sited in an undeveloped area adjacent to the existing airfield. Other existing developed areas at NAPR, such as the airfield and fuel farm, would be transferred to new owners and maintained in their current use. Large tracts of undeveloped areas comprising sensitive natural resources would be designated

as conservation areas and protected from future development. Section 4.1 includes additional analysis regarding the compatibility of historical and proposed land uses.

Because the Reuse Plan was developed keeping the use of existing infrastructure and facilities in mind, the proposed reuse of land is very similar to historic uses before NSRR ceased operations. Moreover, since historic and proposed land uses are congruent, those restrictions that need to be instituted by the Navy would be nearly identical under both disposal alternatives. Consequently, these two action alternatives were combined into a single alternative for further evaluation and are referred to as the proposed action alternative throughout the remainder of this EA. No other reasonable alternatives for disposal of NAPR were identified as susceptible to a meaningful analysis. The following is a description of the proposed action alternative.

2.3.1 Proposed Action Alternative

The proposed action alternative is the disposal of excess Navy property at NAPR. This disposal would be accomplished as a direct transfer of ownership subject to such restrictions on the property consistent with the historic and proposed reuse of the property. The Navy would conduct, or cause to be conducted, environmental cleanup of the property to a level consistent with its historic use and to be protective of human health and meet EPA's approval. Future landowners could expand the level of cleanup to allow for different land uses; however, they would be responsible for this additional cleanup as well as coordination with, and approvals by, the appropriate regulatory agencies (EPA, Puerto Rico EQB, etc.) will be required after transfer as a result of the Navy action.

The Navy will be required to provide a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 covenant that warrants that all remedial action necessary to protect human health and the environment has been taken and that any additional remedial action found necessary after transfer is the responsibility of the federal government.

Additionally, there may be some temporary LUCs as a requirement of CERCLA's early transfer authority (ETA), which would allow the property to be transferred before the cleanup was complete. The ETA requires, in part, that the Section 120 covenant be deferred at the early transfer, with the early transfer being subject to rights of entry and use restrictions until the cleanup work is complete. Once the cleanup work has been

completed, the temporary rights of entry and use restrictions would be lifted and the permanent Section 120 covenant instituted.

The LUCs placed on specific land parcels (which could potentially limit future reuse activities beyond those proposed in the Reuse Plan) may be implemented contractually or through various deed restrictions as permitted by law. Not all parcels would have similar restrictions, and most parcels (i.e., those that were determined to be uncontaminated and those where all cleanup action has been completed to allow unrestricted future use) would be transferred without any deed restrictions. Ultimately, some parcels could have LUCs released upon completion of remediation activities (e.g., parcels transferred using CERCLA's early transfer authority). Other parcels may retain controls indefinitely or until future landowners institute additional corrective actions in order to support future changes in land use. Further changes to the LUCs could take place at a later date with the appropriate regulatory approvals but would be at the new owner's initiative and would be the new owner's responsibility to fund and implement.

The proposed action alternative would allow for disposing of the property in a manner virtually consistent with historic uses. The Navy would complete its cleanup responsibilities under applicable laws and regulations and would conclude other necessary consultations with regard to the disposal action (e.g., those required by the National Historic Preservation Act [NHPA] and the Endangered Species Act [ESA]). Once the property is transferred, the new landowner(s) would be responsible for complying with all applicable laws and regulations regarding any development actions. The Navy's federal obligations would be complete with respect to these consultation regulations.

2.3.2 No-Action Alternative

For the purpose of this EA, the following constitutes the No-Action Alternative: NSRR has been a closed facility as of March 31, 2004, and all Navy missions associated with Navy training have been relocated or terminated. The property has been re-designated as NAPR; however, the property remains U.S. government land. Under the No-Action Alternative, the Navy would not transfer the NAPR property. Federal agencies that have already expressed an interest in some reuse of portions of the property would be able to take or retain ownership of those parcels. The Navy would retain ownership of the remaining property; however, this property would not be required to

achieve any assigned mission, resulting in continued Navy management of the property as a closed facility in caretaker status.

The NAPR property not transferred to other Federal agencies would be vacated, with no immediately identified reuse or redevelopment. The Navy would retain ownership and the burden of liability for property with no functional, operational, or strategic value. In addition, it would not support the local community impacted by the closure decision. Development of the Reuse Plan and realization of the anticipated economic recovery would not be feasible without disposal of the real property. Accordingly, the No-Action alternative is considered not practicable or reasonable and is not further evaluated in this EA.

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3 Existing Environment

This section discusses the existing physical, natural, and human environments on the NAPR property. The baseline for the disposal of NAPR is a fully closed base with no military activities and/or residents located at any facilities at NAPR. However, where it is appropriate to show the historical capacities or usage requirements, data sources based upon years previous to the full closure of NSRR are used.

The following descriptions of the existing environment are based in part on information presented in the ECP (U.S. Navy July 15, 2005) for NAPR, which provided detailed descriptions of the environmental conditions on NAPR; the LRA Reuse Plan for NAPR (CB Richard Ellis December 2004); the *Draft Biological Assessment for Land Transfer of Naval Station Roosevelt Roads, Puerto Rico* (Geo-Marine, Inc. September 2005); and numerous Navy documents pertaining to NSRR. This information was supplemented by a January 2004 field reconnaissance, personal interviews with involved agencies, and more current historical information provided by various local, Commonwealth, and federal agencies and maintained by the environmental staff at NAPR's Public Works Department (PWD).

While the proposed action is the disposal of NAPR, this EA evaluates reuse of the NAPR property as the most plausible direct outcome of that disposal. Once transfer of the NAPR property is completed, the potential reuse scenarios for the property are extensive. The LRA Reuse Plan created by the Commonwealth of Puerto Rico (CB Richard Ellis *et al.* December 2004) provides a consistent measure of the potential for specific reuses and their impacts and was, therefore, used to guide the contents of this EA. Where appropriate, the baseline resources discussed here are described according to the reuse

zones and associated land uses described in the Reuse Plan. Some of the resources discussed in this EA do not pertain only to specific reuse zones, and so a more wide-ranging discussion of the existing environment has been included as well as the details that are pertinent to the Reuse Plan. Where appropriate, this approach was taken to minimize unnecessary redundancy within the resource description.

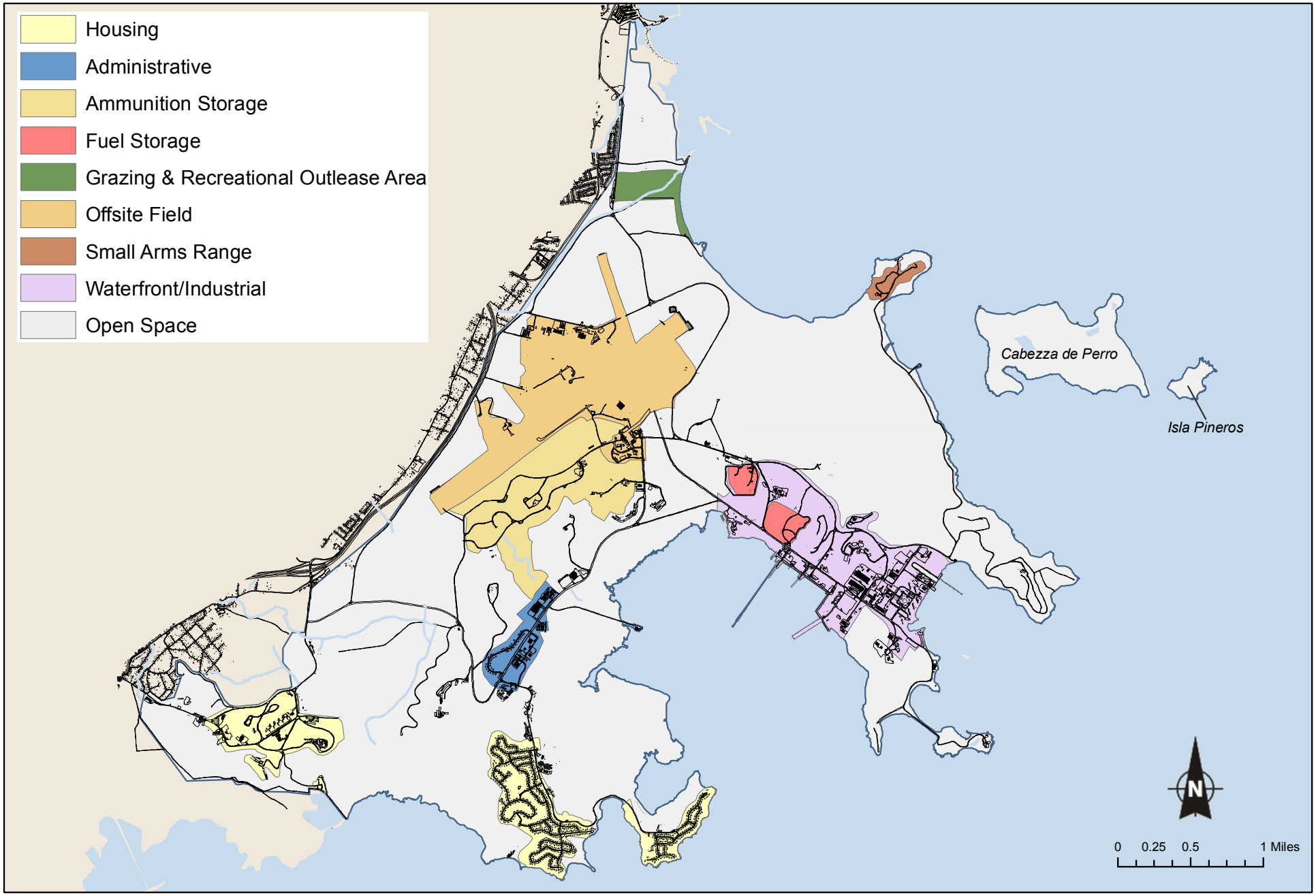
3.1 Land Use and Aesthetics

3.1.1 NAPR Land Use

The total land area encompassed by NAPR is approximately 8,665 acres. This total includes 8,365 acres on the eastern coast of mainland Puerto Rico and another 300 acres on the nearby islands of Piñeros and Cabeza de Perro (see Chapter 1, Figure 1-3). Land uses at NAPR can be classified into three broad categories: improved, semi-improved, and unimproved. Residential, commercial, industrial/military, recreational, institutional, infrastructure, and open space uses are found within these general land use categories. Figure 3-1 shows the historical land uses at NAPR.

Improved land includes areas that have been intensively developed and maintained for mission and operational or aesthetic needs. Approximately 30% of NAPR is improved lands (U.S. Navy 2004). Included in the improved land use category are housing and administrative areas (Capehart and Bundy), the airfield, Camp Moscrip, the waterfront area, and the downtown area. There are more than 1,600 buildings and structures within the improved land areas, totaling approximately 5,800,000 square feet. The largest single component within the improved lands category are residential uses, which comprise approximately 2.4 million square feet in more than 800 buildings. About 0.7 million square feet are in commercial, retail, and office space; 0.5 million square feet are industrial space; 0.5 million square feet are storage space; and 0.4 million square feet are educational, institutional, and public amenity purpose space (Reuse Plan [pp 30-31]). Infrastructure improvements commonly associated with improved land (i.e., roads, wastewater treatment plants, utilities, etc.) are also part of this land-use category.

Semi-improved lands are characterized as areas that require regular maintenance (although not to the same extent as improved lands) due to operational considerations. Approximately 17% of the total land area at NAPR is semi-improved lands. Included in this land-use category are an agricultural out-lease area, some operations areas



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-1
Historic Land Uses
Naval Activity Puerto Rico

(e.g., ammunition storage area, small arms range, and fuel storage areas), and infrastructure improvements associated with these areas (U.S. Navy 2004 [pp 2-4]).

Unimproved land at NAPR primarily consists of open areas comprising marine habitat, coastlines, mangroves, upland forests, wetlands, and infrastructure improvements associated with these areas (primarily utility rights-of-way). Included in the unimproved lands are Isla Piñeros and Cabeza de Perro. Unimproved lands account for the largest amount of land at NAPR, encompassing approximately 53% of NAPR's land mass.

The nine proposed reuse zones (see Chapter 2, Figure 2-1) at NAPR include a mixture of developed lands and open space areas. Land use features within the proposed reuse zones are briefly discussed below.

- **Zone 1.** Zone 1 includes the airfield and adjacent support facilities. Approximately half of the land area within this zone is currently developed. The airfield has an 11,000-foot primary runway that is oriented southwest to northeast and a 6,000-foot secondary runway that is oriented southeast to northwest. There is also a helipad at the airfield with two helicopter landing pads. Most of the aircraft support facilities (hangars, repair shops, and operations buildings) are north of the primary runway. Ammunition and weapons storage areas are south of the primary runway (Reuse Plan [p A-33]).

- **Zone 2.** Zone 2 is referred to as the Bundy area in the southwestern portion of NAPR. Approximately 25% of the land area within this zone is developed for multi-family housing and supporting facilities (fitness center, small theater, library, recreation field, wastewater treatment plant). Zone 2 also includes a number of small storage and office buildings (Reuse Plan [p A-34]).

- **Zone 3.** The only land use in Zone 3 is a 9-hole golf course. Zone 3 is in the southwestern portion of NAPR. The golf course covers approximately 40% of Zone 3. Floodwaters from the Rio Daguao seasonally impact the golf course property (Ecology and Environment, Inc. 1987 [pp 3-10 to 3-11]).

- **Zone 4.** Zone 4 is located in the central portion of NAPR between the eastern ridge of the Delicias Hills and the mangroves along the coast of Enseñada Harbor. This includes the downtown section of NAPR, of which about 25% is developed. Developed areas include a number of commercial and institutional buildings as well as new and recently renovated multi-family structures.

- **Zone 5.** Zone 5 is referred to as the Capehart area. Approximately 70% of this zone is developed for residential and associated uses (i.e., schools, community center, storage buildings). Smaller one- and two-family homes are located in the central portion of the zone, while much larger houses are located on the elevated waterfront property at the "boot" of the southern peninsula on Punta Casca.

- **Zone 6.** Zone 6 includes the developed waterfront area at NAPR bordering Enseñada Harbor. The waterfront is dominated by a 2,600-foot long fixed fuel pier. An associated fuel tank farm consisting of eight aboveground fuel storage tanks is located in the northern portion of Zone 6. Other water-related facilities in this zone include a 72-slip small-boat marina, a 1,200-foot long cargo pier, port operations buildings, various hauling facilities, and extensive bulkheading. Approximately 70% of the zone is developed for industrial land uses. Various institutional and commercial uses also are present, but to a much lesser extent. Specifically, the former base hospital is located at the upper portion of the surrounding hills in the eastern section of this zone.

- **Zone 7.** Zone 7 is adjacent to the waterfront area. Approximately 25% of this zone are developed. The developed areas are primarily located at Camp Moscrip, which includes numerous two-story military quarters buildings and adjacent support facilities, a dry-dock/pier, Army Reserve facilities, new administrative offices, and new barracks.

- **Zone 8.** Zone 8 comprises approximately low-lying pasture and wetlands on the northern side of the north gate. Roads and a small fish market comprise the only developed area in this zone. Ceiba Beach and a fishing pier are located at the water's edge of Zone 8 and are accessible by the public.

- **Zone 9.** Zone 9 contains undeveloped mangrove forests and wetlands.

3.1.2 Surrounding Land Uses

The area surrounding NAPR is rural with large sections of rangeland. Ceiba and Naguabo are the communities nearest to NAPR; Ceiba is to the west and adjacent to the property and Naguabo is located directly southwest of NAPR (see Chapter 1, Figure 1-2). Both areas are former agricultural towns that are now primarily residential with supporting small-scale retail and institutional facilities; there is little industry in either town. Relatively higher density urbanized development is present in the city of Fajardo, located approximately 10 miles north of NAPR along Route 3 (see Figure 1-2). Puerto del Rey, one of the Caribbean's major recreational marinas with 1,100 slips, is located south of Fajardo less than 3 miles north of NAPR. San Juan, the capital of Puerto Rico, is located approximately 40 miles to the northwest.

3.1.3 Easements and Restrictions

In addition to the five separate properties on NAPR, which will remain under federal ownership but for which operational responsibility will be transferred to other federal agencies, road and utility easements or use agreements may be required after transfer of

NAPR to accommodate operations on these properties, provide utilities, and ensure site access, security, and effective maintenance and operations.

The Navy may also require road easements or use agreements to access environmental remediation sites on NAPR. In addition, transient institutional controls or land use restrictions may be applied to remediation sites for the duration of all clean-up activities. More detailed information regarding site contamination and potential restrictions is provided below in Sections 3.2 and 4.2.

3.1.4 Local Land Use Plans and Land Development Regulations

As federal property, NAPR is not currently within the jurisdiction of the Commonwealth or a municipality for planning or zoning purposes. However, after transfer of the property, about 90% of the property will be physically located within the municipal boundaries of Ceiba, while the remainder will be within the municipality of Naguabo.

Under Puerto Rico Law Number 75 of June 1975, known as the "Planning Board Law," responsibility is assigned to the PRPB to guide development on the island in a way that promotes the general health, security, and well-being of the current and future residents of Puerto Rico. In accordance with this law, the PRPB and the Permits and Regulations Administration review proposed development projects on Puerto Rico to ensure that such projects are consistent with established zoning classifications and in compliance with applicable permit requirements.

The Municipal Reform of 1991 was adopted to decentralize the decision-making process from the central government to local municipalities (see Business Register http://www.busregister.com/prbusinfo/municipalities.asp). Law 81 of the Municipal Reform requires that each municipality prepare a Land Use Plan, subject to approval by the PRPB and the governor. Once a plan is approved, the law allows the municipality to solicit the transfer of planning and permitting processes in its territory from the PRPB and the Permits and Regulations Administration, respectively. None of the communities surrounding NAPR (i.e., Ceiba, Fajardo, Naguabo) currently have land use plans in place, which are required before a municipality can implement zoning regulations. Furthermore, none of these communities are expected to develop land use plans or implement zoning regulations in the near future due to a lack of staffing (Diaz 2004).

3.1.5 Aesthetics

Aesthetics at NAPR vary substantially between the developed and undeveloped portions of the property. The large amount of undeveloped land on NAPR, which includes unique natural communities, rolling topography, and extensive stretches of pristine coast, substantially contribute to the overall aesthetic value of the area. Developed areas are cleared and relatively utilitarian in appearance and any open space is generally maintained in turf grasses. From off-shore, NAPR appears as a set of functionally grouped structures, including piers, buildings, and roadways, set amidst a background of densely vegetated mountains and hills. Buildings used for administration, housing, and operations are generally low horizontal structures of one or two stories, whereas the larger hangars and maintenance structures are taller and more visible.

3.2 Environmental Contamination

This section describes the existing conditions at NAPR regarding potential environmental contamination that could be sources of releases to the environment. In order to identify all known areas of contamination, the Navy has conducted an ECP assessment. The results of this assessment are documented in the *Final Phase I/II Environmental Condition of Property Report, Former U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico* (U.S. Navy July 15, 2005).

The ECP report, which is incorporated into this document by reference, summarizes significant environmental condition of property information available from a number of existing information sources. These are reflected in the following specific environmental compliance program areas:

- Hazardous materials
- Hazardous waste
- Petroleum product management
- Underground and aboveground storage tanks
- Oil/water separators
- Air emissions
- Asbestos-containing material (ACM)

- Pesticides
- Polychlorinated biphenyls (PCBs)
- Medical wastes
- Munitions and Explosives of Concern (MEC)
- Lead-based paint (LBP)
- Water
- Wastewater
- Radioactive materials
- Solid waste
- Landfills

The purpose of the ECP effort was to document the existing environmental condition of property subsequent to the closure of Naval Station Roosevelt Roads on March 31, 2004 and prior to disposal. The ECP report discloses the available factual and environmentally relevant information gathered during this effort regarding the condition of the property. The ECP effort focused on all available information pertaining to current and past uses of the property, specifically focusing on activities that might pertain to the use, storage, release, or disposal of hazardous substances and petroleum products or their derivatives. The ECP effort included (but was not limited to) the following tasks:

- Review of current and historic operational records for any activity where hazardous materials or petroleum products were involved;
- Review of records pertaining to all recent and historic prior investigations and cleanup efforts regarding release or disposal of hazardous materials or petroleum products;
- Analysis of historic aerial photography;
- Interviews with current and former employees;
- Physical site inspections of property and improvements; and
- Sampling and analysis of soil and water from potentially contaminated sites.

Following the outline provided above, the ECP reviewed all available information in all environmental compliance program areas. This process resulted in the identification of new sites as well as known sites where remedial work has been ongoing. Figure 3-2 depicts all the sites identified by the ECP.

Based on this identification of sites, the NAPR property was then classified into the following three categories:

- **Category 1**: uncontaminated;
- **Category 2**: all necessary remedial actions have been taken;
- **Category 3:** additional investigation and/or cleanup work is required.

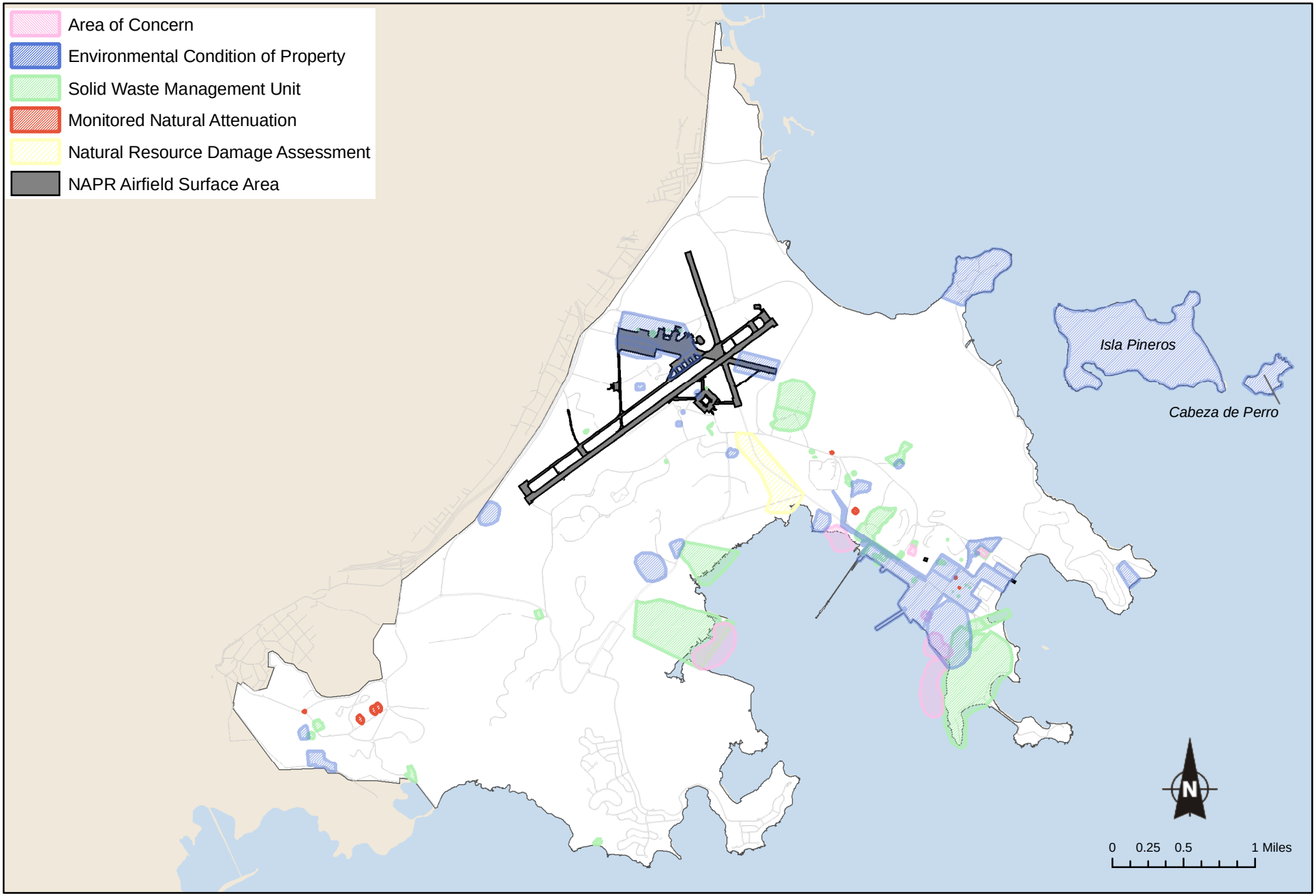
The vast majority of NAPR property falls into Category 1. Category 1 is defined as all property where no release is known or suspected to have occurred (i.e., all property not identified as a "site" by the ECP), as well as all sites identified by the ECP where a release was suspected but further investigation failed to produce confirmation of a release. Category 2 includes all sites where all necessary remedial actions have been taken in response to a release. An implemented remedy for Category 2 sites may or may not include a land use control. Category 3 sites require additional work and include newly identified sites as well as known sites where cleanup efforts are ongoing.

EPA uses the term "Corrective Action Complete" (CAC) to indicate that no additional investigation is required at a site. At NAPR, this includes all Category 1 and Category 2 sites. Figure 3-3 depicts these sites and further breaks them down into sites with residual land use controls (CAC with controls) and sites with unrestricted use (CAC without controls). Figure 3-4 depicts all sites with remaining cleanup requirements.[1]

3.2.1 Installation Restoration Program

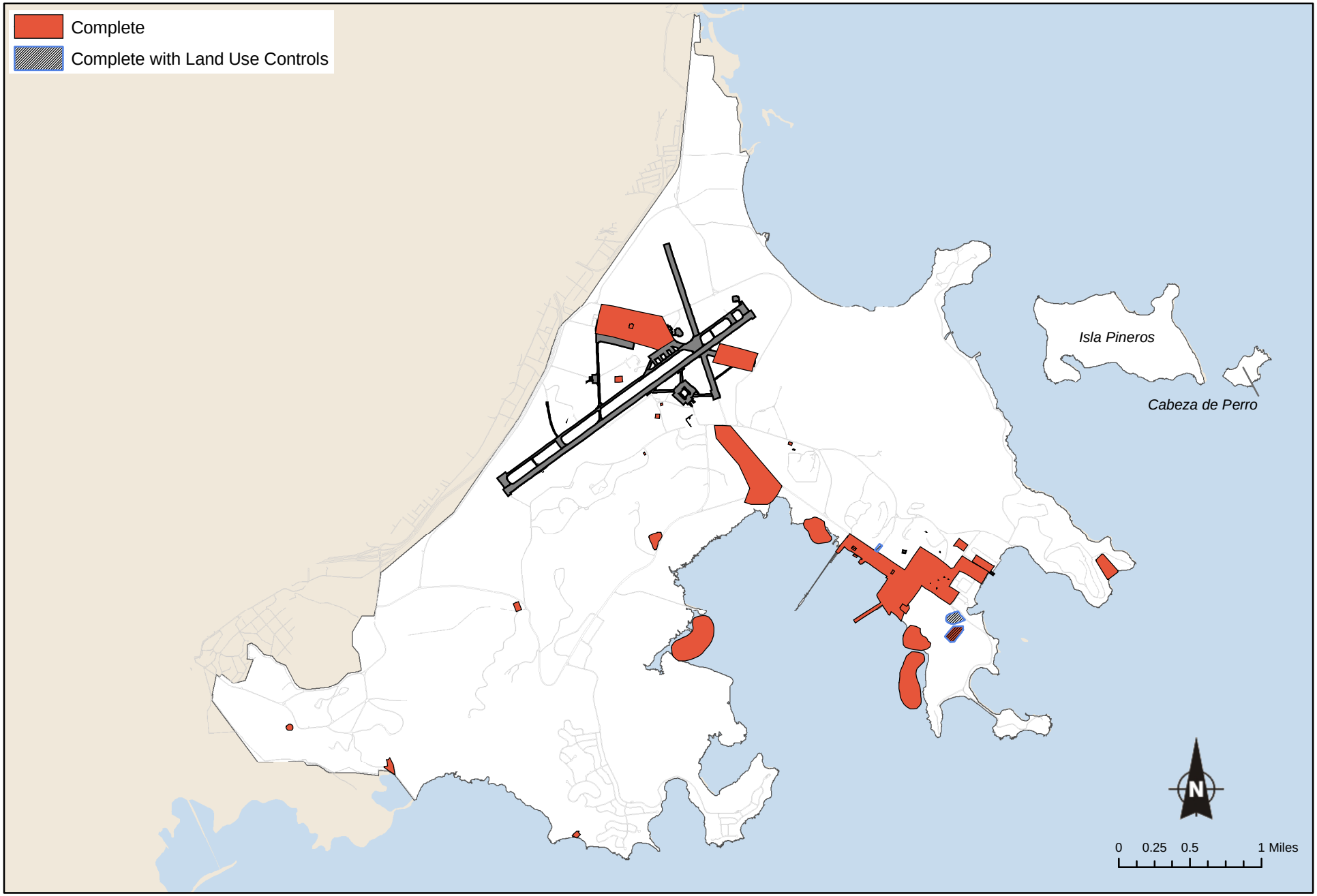
The ECP report identified a mature installation restoration program (IRP) at the facility administered under a Resource Conservation and Recovery Act (RCRA) Part B permit specifying corrective action. The current permit was issued by EPA on October 20, 1994 and addresses 55 solid waste management units (SWMUs), four areas of

[1] Information presented in Figures 3-3 and 3-4 is current as of publication of this EA. Ongoing work and negotiations with regulatory authorities may change the categories of sites.



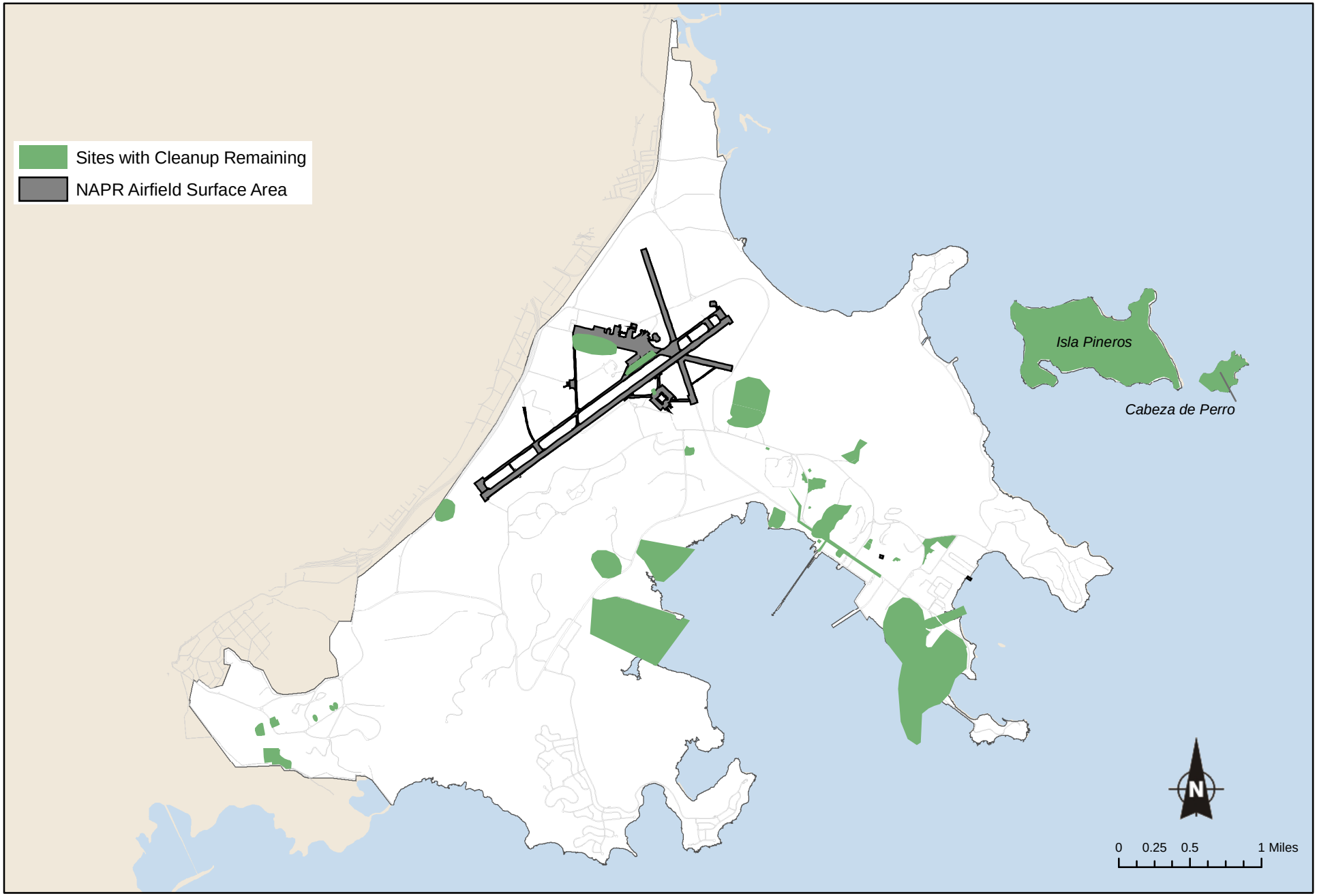
Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-2
Sites Identified by the ECP
Naval Activity Puerto Rico



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-3
Sites Where Cleanup Is Complete
Naval Activity Puerto Rico



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-4
Sites with Remaining Cleanup Requirements
Naval Activity Puerto Rico

concern (AOCs), and an additional unclassified site for a total of 60 sites. A permit renewal application was submitted in 2004 that proposes updated actions based on progress to date. The sites are in various stages of study and cleanup, ranging from preliminary investigation to remedial action complete. These sites are identified as SWMU and AOC sites on Figure 3-2. The current status of the 60 sites is as follows:

- 30 sites – corrective action complete;
- 9 sites – proposed for no further action (pending public review);
- 7 sites – proposed for no further action with land use controls (pending public review); and
- 14 sites – various stages of ongoing study and remediation.

Following the base closure, installation operations that required a RCRA Part B Permit have ceased, and the regulated units are now undergoing closure according to the permit requirements. Upon completion of closure, only the corrective action portions of the permit need to remain in force. The EPA has indicated its desire to convert the existing Part B permit into a §7003 Administrative Order on Consent to regulate the remaining corrective action tasks rather than processing the Part B permit renewal. EPA has prepared a draft §7003 Order and negotiations with the Navy are ongoing. As negotiations on the §7003 Order continue and ongoing cleanup work progresses, the status of sites will change. The final §7003 Order will reflect the most current information as of the date the Order is issued.

3.2.2 Tank Management Program and Petroleum Spills

The ECP identified eight storage tank sites where monitored natural attenuation (MNA) activities are ongoing, as required by the Storage Tank Management Division of the Puerto Rico EQB. These sites are identified as MNA sites on Figure 3-2. Three of the eight sites are included within a parcel that would remain under federal ownership. Caretaker status transfer to another federal agency is pending.

Aside from the MNA sites, other fuel spills/releases are being addressed by the IRP. In addition to both the tank management program and the IRP, a JP-5 jet fuel spill in 1999 resulted in impacts on a mangrove area located in the vicinity of Tow Way Drive and Enseñada Honda. Given the limited accessibility of the area, little cleanup was pos-

sible. A Natural Resources Damage Assessment (NRDA) for the impacted areas was conducted in 2002 and mitigation efforts are ongoing (U.S. Navy March 31, 2005).

3.2.3 New Sites

The ECP effort identified 23 new sites where activities may have resulted in spills or other releases to the environment. These 23 sites were not previously included in any investigation or remediation programs and are identified as ECP sites on Figure 3-2. The ECP included targeted sampling at 20 of the 23 sites in an attempt to confirm or deny if a release had occurred. Sampling was not conducted at three sites for various reasons (discussed below). Based on the sampling results, sites were either retained for further investigation and proposed for addition to the IRP or were proposed for no further action. These proposals were included in the 2004 permit renewal application and are reflected in the draft §7003 Order currently under negotiation. Of the 23 new sites identified by the ECP, 16 are proposed for further investigation and cleanup activities. The current status of all 23 sites is as follows:

- 14 sites – sampling results confirmed release; further action is required; proposed for addition to the IRP;
- 6 sites – sampling found no evidence of release; proposed for no further action;
- 1 site – not sampled; release presumed; proposed for addition to the IRP; area would remain under federal ownership; caretaker status transfer to another federal agency is pending;
- 1 site – not sampled; area would remain under federal ownership; caretaker status transfer to another federal agency is pending; site will remain an active small arms range, and there are no cleanup requirements while the site remains active; and
- 1 site – not sampled; proposed for addition to the IRP to be addressed under the Navy's munitions response program (MRP).

3.2.4 Identification of Uncontaminated Property

The Community Environmental Response Facilitation Act (CERFA) stipulates that the federal government must identify uncontaminated property prior to transfer. Uncontaminated property is defined as "real property on which no hazardous substances and no petroleum products or their derivatives were known to have been released or disposed

of" [42 USC 9620 (h)(4)(A)]. The law stipulates specific steps that must be taken in order to determine which property is uncontaminated. The ECP effort was designed to meet these statutory requirements for the identification of uncontaminated property. The CERFA Identification of Uncontaminated Property must be submitted to the appropriate state official, in this case the Puerto Rico EQB for concurrence. The Navy submitted the Identification of Uncontaminated Property to the Puerto Rico EQB on 21 March 2005. Comments from the Puerto Rico EQB on the CERFA Uncontaminated Property report were received in May 2005, and resolution of issues raised by these comments is ongoing.

3.2.5 Lead-Based Paint and Asbestos

As part of the ECP effort, detailed surveys of the installation were performed to document the current status of LBP and ACM within installation facilities. These surveys were performed in accordance with applicable regulations and industry standard practices. Three separate reports document this work conducted in support of the ECP effort and are incorporated into the ECP document by reference:

- *Final Asbestos Inspection Report for Non-Residential Buildings, Naval Activity Puerto Rico*, July 1, 2005 (includes bachelor housing);
- *Final Asbestos Inspection Report for Military Family Housing, Naval Activity Puerto Rico,* July 1, 2005; and
- *Final Lead-Based Paint/Risk Assessment Report for Military Family Housing, Naval Activity Puerto Rico,* July 1, 2005.

3.3 Infrastructure Facilities and Utilities

3.3.1 Potable Water Supply and Distribution

Potable water is obtained from the Rio Blanco River. According to an agreement between the Navy and the Commonwealth of Puerto Rico, the Navy can withdraw up to 7 million gallons of raw water per day from two intake points on the Rio Blanco, approximately 10 miles west of NAPR. However, these water rights will cease once the Navy no longer has a presence at NAPR. The average amount of water withdrawn from the Rio Blanco River by the Navy over a nine-month period has been recorded at 1.012 million gallons per day (mgd) (Reuse Plan [p A.b 15]).

From the intakes on the Rio Blanco raw water flows by gravity through an 11-mile, 27-inch reinforced concrete pipe to a 46.1-million gallon reservoir to the west of FDR Drive. The raw water is treated at the NAPR water treatment plant on Langley Drive, just north of the reservoir. The plant's maximum rated capacity is 4.0 mgd. The water treatment plant is operated as a conventional, rapid sand filter plant. The potable water distribution system at NAPR is extensive, including approximately 68 miles of distribution pipes, seven pump stations, and five storage tanks with a combined storage volume of 2.6 million gallons. The water treatment facility, reservoir, and distribution system were originally constructed in the 1940s. Major repairs and facility upgrades were completed at the treatment plant in 1976 and 1986 (U.S. Navy 2004 [pp 5-133 to 5-136]).

The water treatment system at NAPR is currently meeting all applicable regulations for finished water quality as mandated by the Puerto Rico Department of Health. Available water quality data indicate that the tested parameters on the raw water do not exceed EPA's limits for drinking water. No previous or ongoing violations have been reported for the water treatment system (U.S. Navy 2004 [p 5-136]).

3.3.2 Wastewater Treatment

Wastewater generated at NSRR was collected and conveyed to one of three wastewater treatment plants (WWTPs) on the property for treatment and final disposal:

- Bundy WWTP (permitted capacity of 0.65 mgd);
- Capehart WWTP (permitted capacity of 1.13 mgd); and
- Forrestal WWTP (permitted capacity of 1.01 mgd).

Each WWTP provides tertiary treatment before the treated effluent is discharged into the ocean via outfalls (U.S. Navy 2004 [p 5-137]). When NAPR was an active military base, the combined average daily treated flow from the three plants was approximately 1.3 mgd (Garcia 2004).

The wastewater collection system at NAPR consists of approximately 32.5 miles of gravity lines, 9.5 miles of force mains, approximately 906 manholes, and 28 pump stations. The wastewater system at NAPR also includes eight septic tanks that were installed in remote areas of NAPR where extension of the sewer system was not considered

to be economically feasible (U.S. Navy 2004 [p 5-143]). All eight septic tanks were operational as of December 2003.

3.3.3 Storm Water

There are more than 80 storm water outfalls in the mangrove areas and surrounding bays at NAPR. These outfalls receive flow from a system of drop inlets, drainage ditches, culverts, and pipes from both developed (industrial and residential) and undeveloped areas and sheetflow from both paved and unpaved areas. The vast majority of these outfalls are not regulated under the EPA's Multi-Sector General Permit program because they receive storm water from non-industrial activities or via sheetflow from non-industrial areas (U.S. Navy 2004 [pp 5-143 to 5-144]).

Six outfalls at NAPR are regulated under the EPA's Multi-Sector General Permit program. NSRR obtained initial permit coverage in 1995 and re-applied for the permit in 2000, which became effective upon submittal (U.S. Navy 2004 [p 5-143]).

Recent inspections conducted under NAPRs Storm Water Pollution Prevention Plan (SWP3) did not identify any significant sources of potential environmental contamination associated with storm water discharges, outfalls, or storm ditches on the property.

3.3.4 Solid Waste

The NSRR 2001 *Final Solid Waste Study* shows 1999 and 2001 estimates of total annual station generation of non-hazardous solid waste—before notification of station closure—at 13,582 tons. Before station closure and downsizing of station activities, solid waste was handled and transported by station personnel and private contractors within and from NSRR. Wastes that were recoverable or resalable, as well as oversized wastes, were collected by the Transportation Division and by various public works shops. Private contractors handled all recoverable wastes such as waste oil, dirtied fuels, batteries, tires, and scrap metals. The Defense Logistics Agency (DLA) handles resalable wastes. Since 1999, when a new cell at the landfill became operational, all other solid waste was disposed in the station's landfill.

3.3.5 Power

NAPR purchases electricity from the Puerto Rico Electric Power Authority (PREPA), which transfers electrical power to the property at two delivery points: two 38

kilovolt [kV] circuits and a single 38 kV circuit at the airfield. The 38 kV circuits serve 11 substations on the property and those substations in turn serve loads in their vicinity at 13.2 kV, 4.16 kV, and 480 kV (Reuse Plan [p A.b 22]). All loads on the distribution circuits can be fed from more than one substation.

In 2001, the maximum demand for the Daguao Service was estimated at approximately 15,788 kilovolt-amperes (kVA). Annual consumption was estimated at approximately 95,496 megawatts per hour (MWH). The airfield had a maximum demand of approximately 1,462 kVA and annual consumption of approximately 7,682 MWH.

Both underground and aerial power lines service the housing areas on NAPR. Underground conduits for cable and telephone are also in place for housing, but cables for these utilities were never installed.

3.3.6 Transportation

NAPR maybe accessed from the west via PR-3, a two-lane highway, and PR-53, a four-lane highway. Both roads extend in a southwest to northeast direction along the western boundary of the property. Primary roads within NAPR include Tarawa Drive, Forrestal Drive, Langley Drive, FDR Drive, Bennington Drive, and Boxer Drive. These roads are two lanes wide, paved, and allow access to nearly all areas of the property. Entry to NAPR is restricted to two gates:

- Gate 1 is at the north end of the property at the intersection of Tarawa Drive and Boxer Drive and is accessed via PR-3; and
- Gate 3 is south of the airfield at the east end of Bennington Road and can be accessed by both PR-3 and PR-53.

3.4 Topography, Geology, and Soils

3.4.1 Topography

The regional topography of NAPR consists of an interrupted, narrow, coastal plain with small valleys extending from the Sierra de Luquillo range. Elevations within NAPR range from sea level to approximately 297 feet (90.5 meters [m]) above mean sea level (MSL). Immediately to the west of NAPR, the hills rise abruptly to heights of 800 to 1,500 feet (244 to 457 m) above MSL. The tallest peak is approximately 1.2 miles (1.9 km) west of the NAPR boundary. There are a series of ridges on NAPR, two of which separate the airfield and the golf course (Zones 1 and 3) from the port-waterfront

(Zone 6), downtown (Zone 4), and Capehart (Zone 5 and a small section of Zone 9) areas. The third ridge exists in the Bundy area (Zone 2). Relief is low along the shoreline, which is characterized by lagoons and mangrove swamps (Defense Mapping Agency 1977 (Reuse Plan [p 58]). The nine zones can be distinguished by the topography of NAPR, as shown in Figure 3-5.

- **Zones 1 and 3.** The topography of Zones 1 and 3 (airfield and golf club areas) is characterized by flat areas nestled into a valley surrounded by the foothills of the coastal mountains to the north and the Delicias Hills to the south. Elevations range from 11 to 60 feet (10.6 to 18 m) above MSL. The area is gently sloping. The established elevation of the airfield is 38 feet (11.6 m).

- **Zone 2.** Elevations in Zone 2 (Bundy area) range from less than 10 to 192 feet (3 to 58.5 m) above MSL. Although the tops of hills have been cleared and leveled to accommodate development, grades exceeding 15% on the hillsides constrain development. The eastern and western periphery of Zone 2 are characterized by gently rolling hills and flat areas with slopes of 5% to 12%. Significant previous grading has altered much of the natural topography in the area.

- **Zone 4.** Zone 4 (downtown area) encompasses the northern and southern portions of the Delicias Hills, an undulating elevated ridge that buffers airport activity from the central portion of the site. Elevations in Zone 4 range from 16 to 297 feet (5 to 90.5 m) above MSL. The highest elevation occurs on the North Delicias Hill (see Figure 3-5). Development in the area is restricted to the hilltops and the foothill areas. Although the tops of the hills and foothills have been cleared and leveled to accommodate construction, the hillsides are sloped significantly enough to limit development. The periphery of Zone 4 is characterized by moderately steep hills and flat areas with slopes of 5% to 60%.

- **Zone 5.** Elevations in Zone 5 (Capehart area), which is located directly southeast of the Bundy area, range from between 16 to 100 feet (5 to 30.5 m) above MSL. Some hilltops have been cleared and leveled to accommodate construction, primarily housing. The hillsides are too steep to accommodate development. Significant previous grading has altered much of the natural topography of the area.

- **Zones 6 and 7.** The area that encompasses Zones 6 and 7 (port-waterfront and science park areas) is generally flat near the port-waterfront area, with steeper slopes encircling the Bahia de Puerca. A central ridge runs the length of the northern peninsula at NAPR, forming a natural division between the hills and the port-waterfront area. The area elevation ranges from less than 10 feet to 199 feet (3 to 61 m) above MSL. Topography has not been a constraint on industrial development in the port-waterfront area.

- **Zone 8 and 9.** Zone 8 (north gate area) consists of low-lying pastures and wetland areas. The land is adjacent to a large conservation area. Zone 9 (conservation area) also primarily consists of low-lying, nearly continuous undeveloped mangrove forests and wetlands on the mainland NAPR property. In addition, this zone includes three small islands (Isla Piñeros, Isla Piñerita, and Isla Cabeza de Perro) off the east coast of Punta Media Mundo.

3.4.2 Geology

The island of Puerto Rico is part of the Caribbean tectonic plate. An east-west trending spine of mountains (the Cordillera Central) forms the backbone of the island. These mountains are volcanic in origin, and the oldest rocks are Jurassic agglomerates (United States Geological Survey [USGS] 1979).

Puerto Rico is located within a seismically active zone. Earthquakes affecting the island are usually low to moderate-focus events; however, three destructive earthquakes have occurred on the island within the 120 years. Seismically active areas characterize the ocean floor east, west, and north of the island. NAPR is located in Seismic Zone 3, which presents a moderate earthquake hazard. (Zone 4 is the maximum seismic risk zone.)

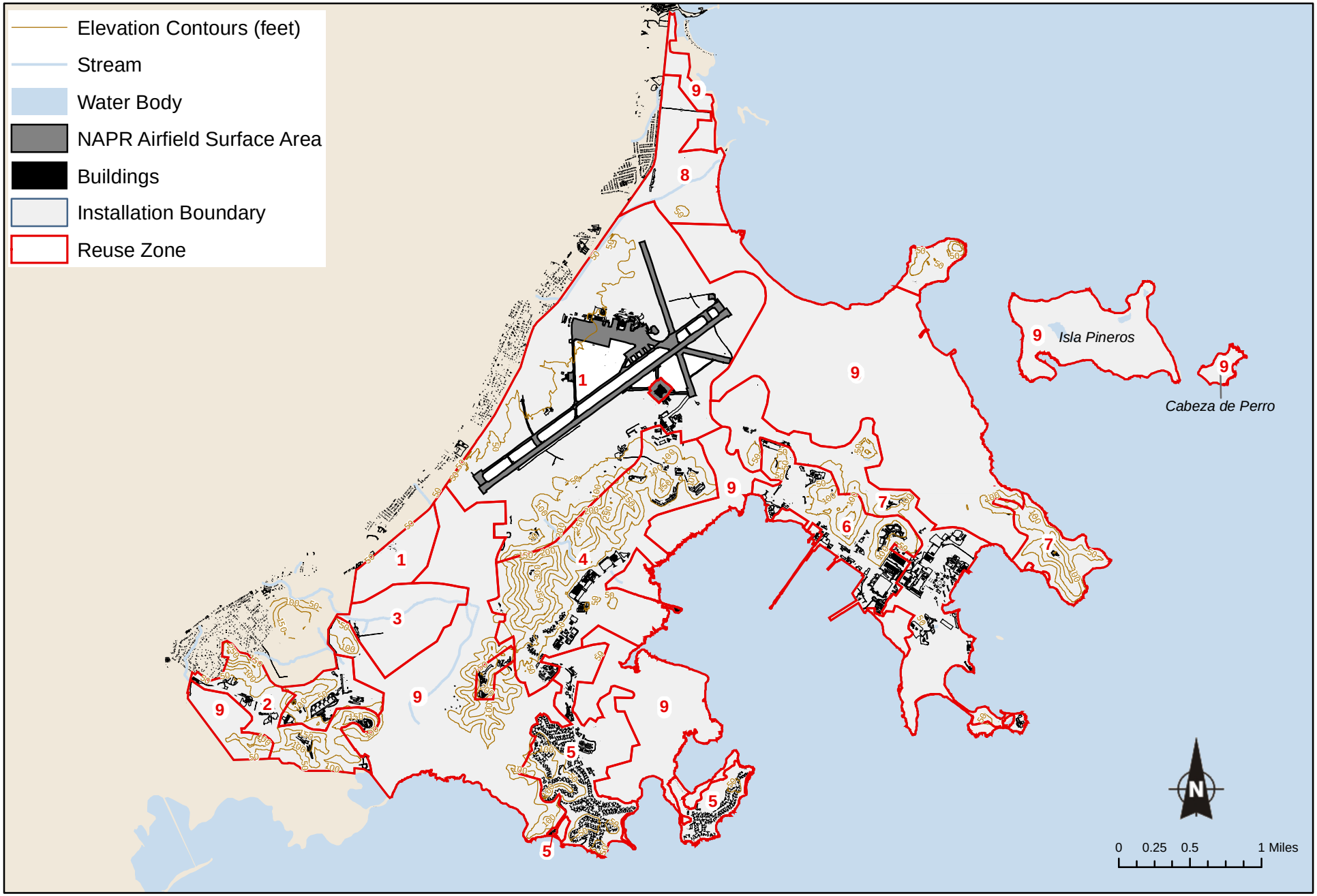
3.4.3 Soils

The soils at NAPR are primarily sediments of mixed origin or residuum from volcanic rocks (see Figure 3-6). Soil depths range from shallow (less than 1 foot [0.3 m]) to deep (more than 6 feet [1.8 m]). In general, the soils are nearly level to strongly sloping; poorly drained in low-lying areas and well drained on side slopes; and susceptible to erosion where slopes exceed 5%. Many soils of the area have a high shrink-swell potential.

3.5 Hydrology and Water Quality

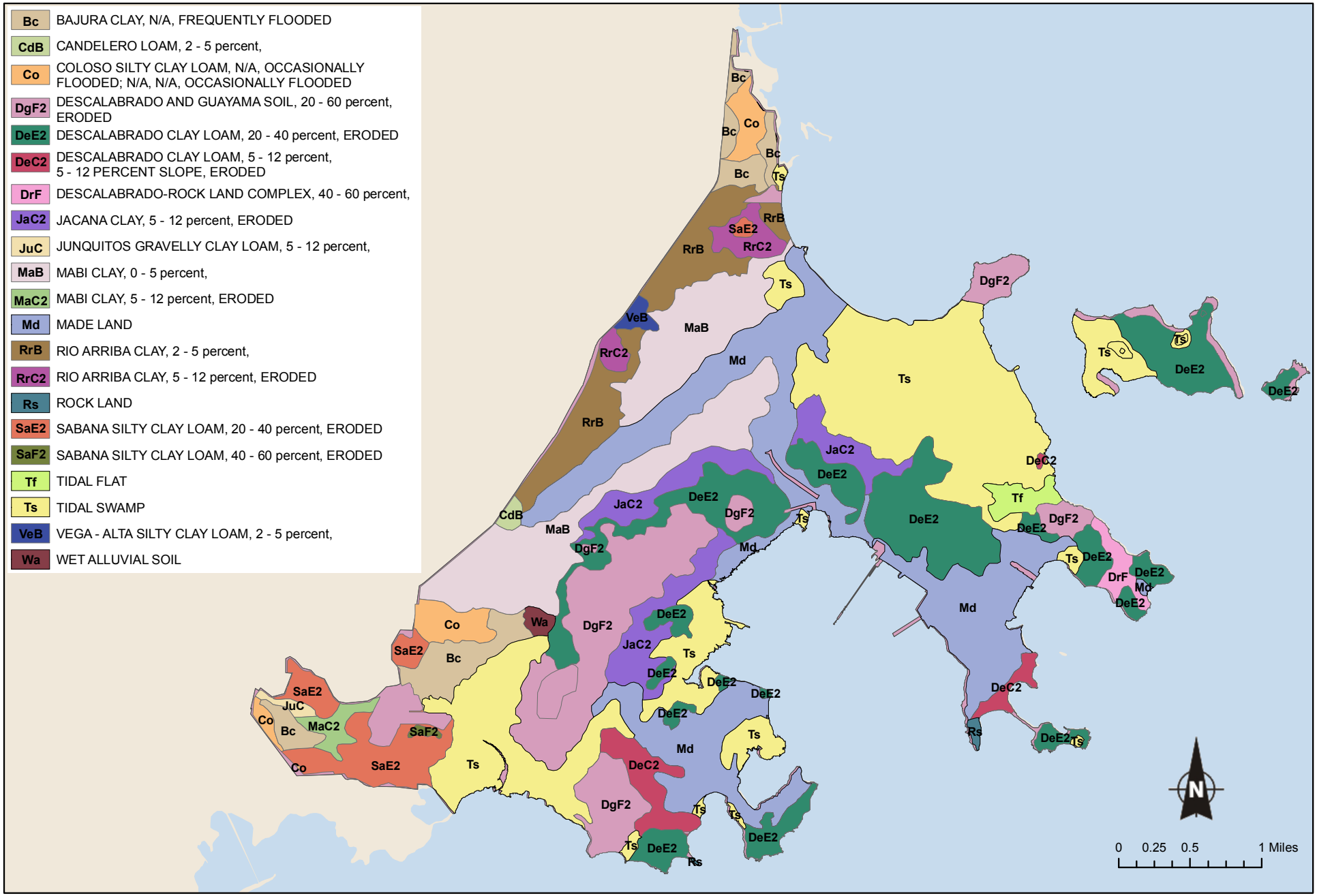
3.5.1 Surface Water

Several streams that originate in the foothills northwest of NAPR flow through NAPR and drain the lands that make up NAPR. These streams include the Rio Daguao and various named and unnamed creeks, and they are an important source of freshwater flow and nutrients to large marshes and the Daguao and Demajagua mangrove forests (U.S. Navy 1998). In addition to freshwater drainages, estuarine open water lagoons exist in association with the Los Machos mangrove forest.



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-5
Topography
Naval Activity Puerto Rico



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-6
Soil Classifications
Naval Activity Puerto Rico

The stream systems draining the NAPR are subject to dramatic flooding at any time of the year, but especially during rainy season. Moreover, development and changes in land use in upstream areas outside of NAPR as well as changes on NAPR lands directly affect the drainage systems flowing through NAPR (see Figure 3-7). Increased development adjacent to NAPR, in the town of Ceiba, has resulted in an increase in the amount of surface water runoff reaching NAPR and in ponding, erosion, and flooding, particularly in the vicinity of Boxer Drive (U.S. Navy 2004).

3.5.1.1 Rio Daguao Drainage System

The Rio Daguao is the largest river system that flows through NAPR. Its drainage basin covers about 4,380 acres (Ecology and Environment, Inc. 1987) and includes three primary channels: Rio Daguao, Quebrada Seca, and an unnamed tributary to Rio Daguao. The system flows through the southwest portion of NAPR and drains to the Daguao mangrove forest. An extensive area in the southwest portion of the site mapped as the 100-year flood zone is associated with Rio Daguao and its tributaries.

Rio Daguao originates in the hills northwest of NAPR, flows past the Ward of Daguao, enters NAPR in the south portion of the activity, and flows south to the Daguao mangrove forest, approximately 4 miles downstream from its source (Ecology and Environment, Inc. 1987). In the upper portions of the watershed, elevations range from 400 to 1,000 feet above sea level and the main channel is fed by small intermittent streams that drain steep hillsides, many of which have soils prone to rapid runoff and side slopes of 30% or greater (Ecology and Environment, Inc. 1987). Gutters, ditches, and paved areas within the Ward of Daguao and land cleared for pasture and development within the watershed contribute to accelerated runoff.

Quebrada Seca also originates in the hills northwest of NAPR and flows southeast to its confluence with Rio Daguao, south of Langley Drive. Elevations in this sub-basin range from near sea level to 1,000 feet above sea level and side slopes can reach 40% or greater (Ecology and Environment, Inc. 1987). Slopes at NAPR range from 30 feet above sea level to 3 feet, with slopes of 1% or less (Ecology and Environment, Inc. 1987). The town of Quebrada Seca is located within the drainage area for this channel. Development in the town, which extends up the side slopes, and cleared land contribute to water with high velocity and low concentration time in the channel (Ecology and Envi-

ronment, Inc. 1987). Much of the NAPR land within this sub-basin is within the 100-year flood plain (Ecology and Environment, Inc. 1987).

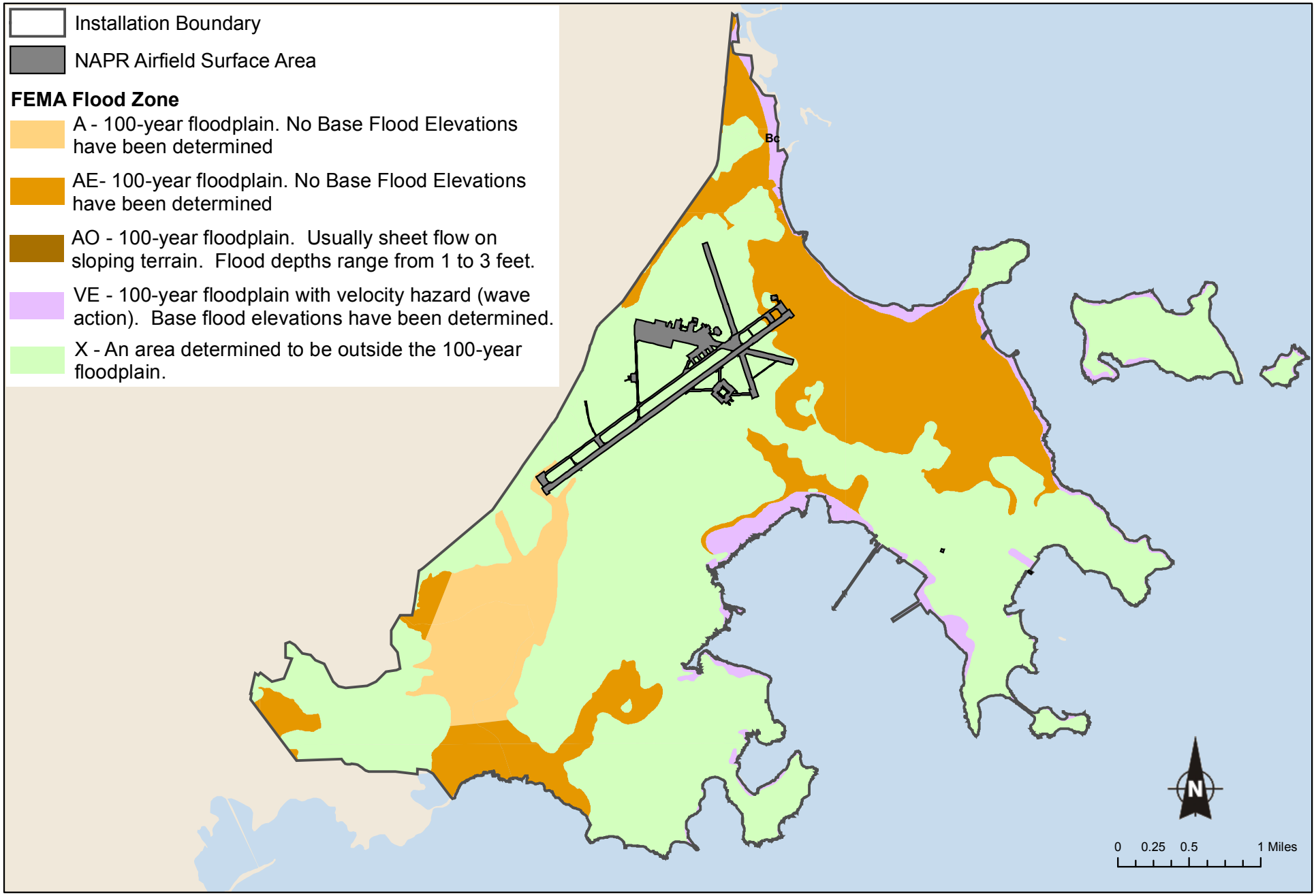
An unnamed tributary flows into Rio Daguao as it enters the Daguao mangrove forest at NAPR. Four intermittent stream channels enter NAPR (Ecology and Environment, Inc. 1987) and converge near the southwest end of Oftsie Airfield. These tributaries collect runoff from the southwest portion of Oftsie Airfield and from civilian areas northwest of NAPR before converging with Rio Daguao. Portions of Zones 1 through 5 and adjacent sections of Zone 9 are within the Rio Daguao drainage basin.

3.5.1.2 Quebrada Aquas Clara Drainage System

The Quebrada Aquas Clara drainage system flows through the northern portion of NAPR. The system includes two sub-basins, Quebrada Aquas Clara and an unnamed tributary, and drains approximately 1,320 acres of land (Ecology and Environment, Inc. 1987). The system also includes an extensive area designated as a 100-year floodplain.

This drainage system has been significantly altered from its natural course. Quebrada Aquas Clara originally flowed southeast, through the central portion of NAPR, to Enseñada Honda (Ecology and Environment, Inc. 1987). In association with the construction of Ofstie Airfield, Quebrada Aquas Clara was rerouted to flow through the northern portion of NAPR and empty into Puerto Medio Mundo (Ecology and Environment, Inc. 1987).

Quebrada Aquas Clara originates in the hills southwest of the community of Ceiba and flows northeast to the boundary of NAPR, then continues northeast along the north side of Boxer Drive before flowing through the Demajagua mangrove forest and into Puerto Medio Mundo. The majority of the sub-basin is civilian land west of NAPR. Elevations outside NAPR range from 50 feet to 900 feet above sea level, and slopes in the hillsides range from 30% to 50% (Ecology and Environment, Inc. 1987). The Ward of Aquas Claras covers the foot slopes and lowlands. Rapid runoff from the steep slopes, roadbeds, ditches, storm drains, and agricultural activities cause stream flow to concentrate quickly (Ecology and Environment, Inc. 1987).



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-7
Drainage and Floodplains
Naval Activity Puerto Rico

An unnamed tributary originates in the hills west of the community of Ceiba and joins Quebrada Aquas Clara near the intersection of Boxer Drive and Tarawa Drive. The combined streams flow east within the original channel of the unnamed tributary. Elevations outside NAPR range from 25 feet above sea level to 650 feet above sea level in the hills to the west. Slopes are from 2% to 5% in most of the sub-basin and from 20% to 35% in the western hills (Ecology and Environment, Inc. 1987). Urban and residential development and agricultural use in the area around Ceiba have increased the rate of run-off in this sub-basin. Portions of Zones 1 and 8 and adjacent sections of Zone 9 are within the Quebrada Aquas Clara drainage basin.

3.5.1.3 Quebrada Ceiba Drainage System

The Quebrada Ceiba drainage system comprises approximately 1,575 acres of land, including 50 acres at NAPR (Ecology and Environment, Inc. 1987). Quebrada Ceiba originates in the hills west of Santa Macia, flows east through Santa Macia and enters NAPR near the intersection of Route 979 and Los Machos Road. It continues northeast across the northernmost portion of NAPR, through the Demajagua mangrove forest and into Bahia Demajagua. The majority of the drainage basin is civilian land west of NAPR and includes steep slopes and densely developed valley areas (Ecology and Environment, Inc. 1987). The land at NAPR is within the 100-year floodplain, and land use within the civilian areas contributes to flooding. Portions of Zone 8 and adjacent sections of Zone 9 are within the Quebrada Ceiba drainage system.

3.5.1.4 Other Drainage

In the southwestern portion of the site an unnamed tributary to Quebrada Palma carries drainage off-site through civilian areas to the south. The tributary originates north of NAPR and flows south through NAPR lands in the vicinity of the Bundy area, then flows through civilian lands to Bosque Estatel de Ceiba. Portions of Zone 2 and adjacent sections of Zone 9 are within the Quebrada Palma drainage system.

Smaller drainages collect water from NAPR lands and channel it into the Los Machos mangroves and mangroves along Enseñada Honda. Drainage from the northeast portion of Ofstie Airfield flows east, via multiple channels, into the Los Machos mangrove forest. These features drain portions of Zones 1 and 7 and adjacent sections of Zone 9. Additional improved channels direct drainage from the central portion of Ofstie

Airfield (taking advantage of the original channel for Quebrada Aquas Clara) and from the NAPR downtown area, southeast into mangroves along Enseñada Honda. These features drain portions of Zones 1, 4, 6, and 7 and adjacent sections of Zone 9. Areas associated with these drainages and with the Los Machos mangrove forest and mangroves along Enseñada Honda are mapped as 100-year flood plain.

Isla Piñeros and Isla Cabeza de Perro lack fresh surface water sources. Isla Piñeros has three brackish water lagoons. The largest lagoon covers approximately 4.5 acres in the southwest portion of the island and is perennially flooded. An additional perennially flooded area covers approximately 1.9 acres in the northeast portion of the island and a third, intermittently flooded lagoon covers approximately 0.6 acres in the northeast portion of the island (Ecology and Environment, Inc. 1987). These islands are included in Zone 9. No areas within the 100-year floodplain are depicted on Federal Emergency Management Agency (FEMA) mapping for these islands.

NAPR also includes a concrete-lined, 46.1 million-gallon raw water reservoir, located to the west of FDR Drive. Water is stored at an elevation of approximately 47 feet MSL. The stored water is supplied via a transmission main from the Rio Blanco watershed, under a 1942 agreement. This agreement will be void with the Navy's disposal of NAPR. This manmade feature is within Zone 4.

Water Quality Classifications, Uses, and Standards – Surface Water

The EQB designates water quality classifications for Puerto Rico's coastal and estuarine waters, surface waters, and groundwaters, pursuant to the environmental laws of Puerto Rico. Water quality designations are specified in the Puerto Rico Water Quality Standards Regulation, as amended (Commonwealth of Puerto Rico Environmental Quality Board March 2003).

Coastal and estuarine waters at NAPR are designated as Class SB (Feliberty 2004). Class SB waters are "coastal waters and estuarine waters intended for use in primary and secondary contact recreation, and for propagation and preservation of desirable species, including threatened or endangered species" (Puerto Rico Water Quality Standards Regulation, Section 3.2.2 (A)). Section 3.2.2(B) lists the standards for dissolved oxygen, coliform, pH, color, turbidity, taste- and odor-producing substances, sulfates, and surfactants that must be met in order to ensure the desired use of these waters.

Surface waters at NAPR are designated Class SD (Feliberty 2004). Class SD waters are "surface waters intended for use as a raw source of public water supply, propagation and preservation of desirable species, including threatened or endangered species, as well as primary and secondary contact recreation." Primary contact recreation may be excluded in streams or stream segments that do not comply with standards for this classification (Puerto Rico Water Quality Standards Regulation, Section 3.2.4 (A)). Section 3.2.4(B) lists the standards for dissolved oxygen, coliform, pH, color, turbidity, total dissolved solids, taste- and odor-producing substances, total phosphorus, sulfates, surfactants, chlorides, pathogenic organisms, and total ammonia that must be met in order to ensure the desired use of these waters.

3.5.2 Groundwater

The majority of residents in Puerto Rico obtain their water supply from six surface water reservoirs. Although only about 16% obtain water from groundwater, the natural chemical quality of water in these aquifers is suitable for most uses. Groundwater is generally a calcium magnesium biocarbonate type, which causes the water to be very hard (U.S. Geological Survey 2002).

The principal aquifer in the NAPR area is an alluvial valley aquifer, consisting of beds of clay, sand and gravel, and rock fragments to a depth of 98 feet or less (Gomez-Gomez and Heisel 1980). Yield of wells in the alluvium are commonly 50 to 150 gallons per minute (gpm) (U.S. Geological Survey 2002).

Volcaniclastic, igneous, and sedimentary aquifers of Cretaceous and Tertiary age are also present in the area. Compared to the alluvial aquifers, these are of minor importance and yield because water is stored and transmitted in fractures in the rock. Wells completed in these aquifers typically yield less than 10 gpm (U.S. Geological Survey 2002).

Water Quality Classifications, Uses, and Standards - Groundwater

The EQB designates water quality classifications for Puerto Rico's coastal and estuarine waters, surface waters, and groundwaters, pursuant to the Environmental Policy Act (Law No. 9 of June 18, 1970, as amended). Water quality designations are specified in the Puerto Rico Water Quality Standards Regulation, as amended, March 2003.

Groundwaters at NAPR are designated SG2 (Feliberty 2004). Class SG2 waters "include groundwaters which due to high total dissolved solids concentration (concentrations greater than 10,000 mg/L [milligrams per liter]) are not fit as a source of drinking water supply even after treatment." No uses or standards are designated for Class SG2 groundwaters.

3.6 Climate and Air Quality

3.6.1 Climate

NAPR has a tropical-marine climate characterized by minimal temperature fluctuations, relatively moderate humidity, and frequent rain showers. The annual mean temperature is 79.9 degrees Fahrenheit (°F). July and August are the warmest months (82.4°F) and February is the coldest month (76.8°F). Easterly trade winds, which persist throughout the year, have a substantial moderating effect on the tropical heat. The relative humidity averages 65% to 78%.

Rainfall in Puerto Rico varies considerably from place to place but generally consists of brief showers that occur frequently throughout the year. The average annual rainfall on NAPR is approximately 58 inches. The rainy season is typically defined as May through November, when monthly rainfall averages between 4.08 and 7.64 inches. However, significant rainfall events have also been recorded during December (e.g., 16.05 inches in 1981, 10.11 inches in 1975). In addition, it should be noted that areas immediately west and north of NAPR routinely receive approximately 70 to 100 inches annually. These areas include portions of the Rio Daguao watershed, the lower part of which encompasses lands within NAPR (Ecology and Environment, Inc. 1987). The hurricane season is from June 1 through November 30; maximum winds exceed 95 knots during severe hurricanes. An average of two tropical storms per year occur in the general area of NAPR, one of which usually reaches hurricane intensity.

Rainfall on Piñeros and Cabeza de Perro islands generally consists of brief showers throughout the year. The average rainfall is approximately 50 inches; rain clouds approaching NAPR from the east tend to move in a path that takes them north of the islands.

3.6.2 Air Quality

The Clean Air Act (CAA) is the main federal statute governing the control of air pollution. The CAA designates six pollutants as "criteria pollutants": respirable particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide, lead, and ozone. Primary and/or secondary National Ambient Air Quality Standards (NAAQS) have been established to protect public health and welfare and to account for the effect of air pollution on soil, water, visibility, vegetation, and other materials exposed to air pollution. These standards are shown in Table 3-1. Areas where monitoring data show that one or more NAAQS are exceeded per year are designated as "non-attainment" for that pollutant.

The CAA requires state or local air quality control agencies to adopt State Implementation Plans (SIPs). An SIP prescribes measures to eliminate or reduce the severity and number of NAAQS violations and to achieve and/or maintain attainment of these standards. Typical SIP measures include permit regulations, emission standards for new or modified air pollution sources, and procedures for evaluating the impact of proposed emission sources. Major programs included in an SIP are the New Source Review (NSR) program (including prevention of significant deterioration review for sources located in attainment air quality areas); the Title V Operating Permit program for existing sources; and National Emission Standards for Hazardous Air Pollutants (NESHAPs), including maximum achievable control technology standards.

Table 3-1 National and Puerto Rico Ambient Air Quality Standards (40 CFR 50)

Pollutant	Averaging Time	Primary Standard (:g/m^3)	Secondary Standard (:g/m^3)
Ozone (O_3)	1 Hour	235	235
	8 hours	157	157
Carbon monoxide (CO)	1 hour	40,000	—
	8 hours	10,000	—
Nitrogen dioxide (NO_2)	Annual	100	100
Fine particulate matter ($PM_{2.5}$)	24 hours	65	65
	Annual	15	15
Lead	Calendar quarter	1.5	—
Respirable particulate matter (PM_{10})	24 hours	150	150
	Annual	50	50
Sulfur dioxide (SO_2)	3 hours	—	1,300
	24 hours	365	—
	Annual	80	—

NAPR is within the single air quality control region (AQCR) that covers Puerto Rico, including Vieques. Based on ambient monitoring data collected mainly in the vicinity of San Juan by the Puerto Rico EQB, the EPA classifies the AQCR as in attainment for all criteria pollutants (http://www.epa.gov/air/data/index.html). Therefore, air pollutant concentrations are considered to be below NAAQS for all criteria pollutants.

Under the 1990 CAA Amendments (42 United States Code [USC] 7476[c]), federal actions are required to conform to the applicable SIP. 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 (i.e., AQCRs where pollutant concentrations exceed NAAQS). Because Puerto Rico is classified as in attainment of the NAAQS for all pollutants, the General Conformity rule is not applicable in the Puerto Rico AQCR.

The major federal regulations potentially affecting NAPR (depending on the emission capacity of sources) are the Title V operating permit program, the NSR program, and New Source Performance Standards (NSPS) regulations for new or modified source construction. These federal regulations have been delegated to the Commonwealth of Puerto Rico, where the Puerto Rico EQB has the authority to administer the federal regulations. Puerto Rico's air quality regulations are contained in "Regulations for the Control of Atmospheric Pollution" promulgated by the EQB.

The Puerto Rico EQB issued a draft Title V Operating Permit, number TV9711-19-0397-0012, to NSRR in spring 2003. A final Title V Operating Permit has not yet been issued by the EQB.

NAPR has a wide variety of small emission sources, which operate intermittently, with no set operation schedule. Most emissions are generated by combustion sources powered by diesel, jet propellant (JP)-5, gasoline, or propane gas. During full station operations, the combined emissions from these combustion sources had the potential to emit more than 100 tons per year of nitrogen oxides (NO_x), CO, and volatile organic compounds (VOCs), making the former NSRR a major stationary source of criteria pollutants. The internal combustion generators that supply energy in emergencies are considered insignificant sources because each one operates less than 500 hours per year.

VOCs and hazardous air pollutants (HAPs) were also generated in painting activities, cleaning operations associated with aircraft and ship maintenance and repair, and other day-to-day activities. Significant emission units at NSRR included boilers, machine parts cleaning, engine testing, fuel storage tanks, and painting operations. Because of the reduction in station activity, many of the air emission sources associated with aircraft and boat maintenance have been discontinued.

As a condition of the permit, the former NSRR was required to retain records of all required monitoring data and support information for five years from the date of the monitoring sample, measurement, report, or application. There is no documentation of any current or previous Notice of Violation (NOV) issued to NAPR.

3.7 Noise

The inactivity at the airfield and port facilities, as well as the reduction of personnel and operational tempo at NAPR, have reduced the ambient noise levels to levels below that of the neighboring communities of Ceiba and Naguabo.

When the installation was in operation, noise was generally attributable to aircraft, vehicles, and watercraft. Operations at Ofstie Airfield were the major source of noise. Ofstie has one operational runway and two helipads. In calendar year 2000, more than 27,393 air operations were conducted at NSRR and included fixed-wing and rotary-wing arrivals, departures, patterns, and maintenance operations. The vast majority of the operations were conducted during the hours of 6:00 to 23:00; few operations were conducted during nighttime hours.

A 1997 noise study for NSRR updated an earlier 1986 study. The 1997 study shows that day-night sound levels (Ldn) on-base ranged from 60 to 85 A-weighted decibels (dB[A]) while the base was in operation. Noise levels in this range are typical for developed industrial areas. With the closure of NSRR, noise emissions at NAPR have been drastically reduced.

3.8 Terrestrial Environment

3.8.1 Vegetation

The coastal area of Puerto Rico near Ceiba, including NAPR, is classified as a subtropical dry forest ecological life zone (Ewel and Whitmore 1973). Historical land use of the property, which has included grazing and development associated with NAPR,

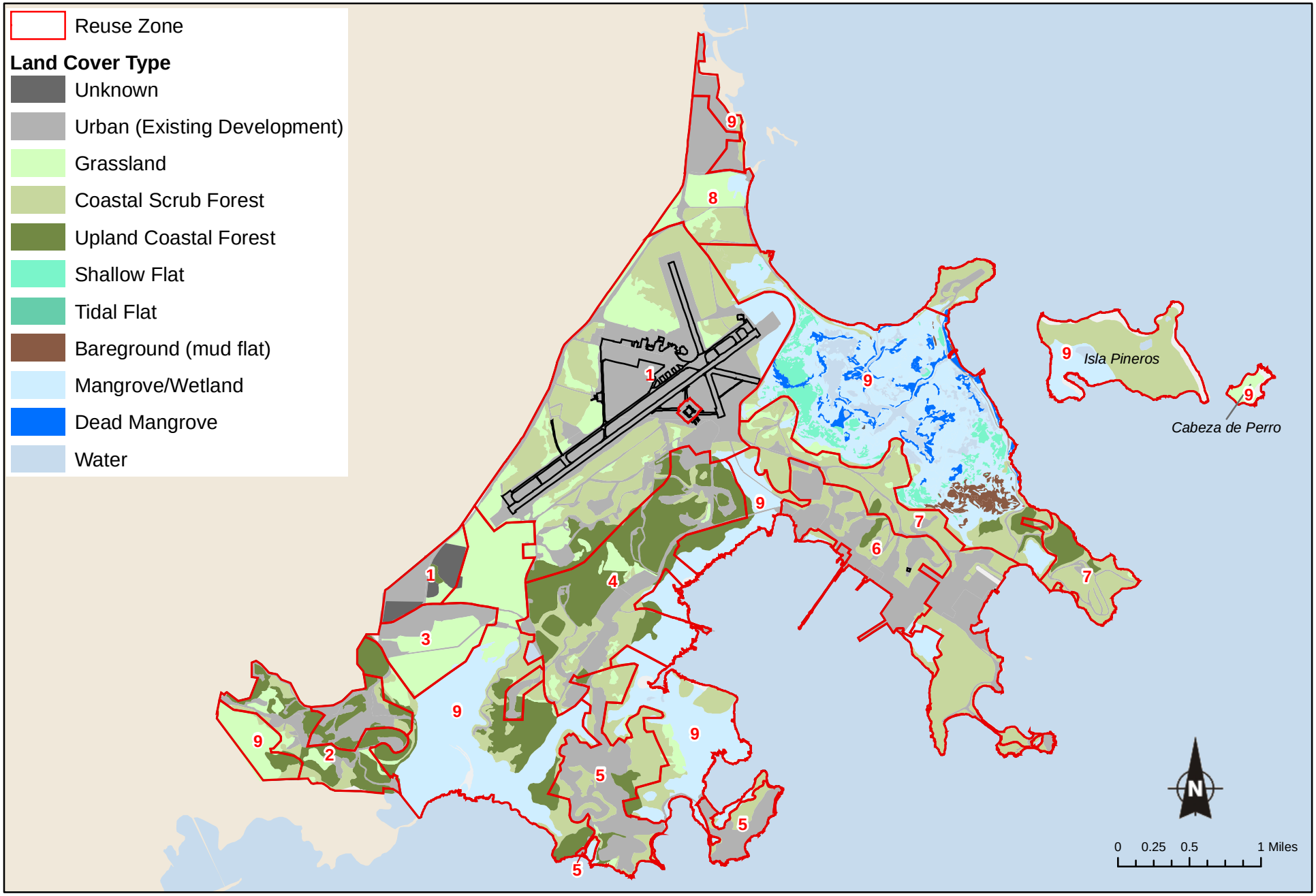
has lead to the replacement of the historic climax upland community with scrub/forest communities (see Figure 3-8).

Approximately 2,500 acres of land at NAPR have been developed and are currently maintained. The remainder of the base comprises unimproved (4,500 acres) and semi-improved (1,400 acres) areas with various terrestrial, marine, and transitional communities (U.S. Navy 2004).

Terrestrial communities at NAPR include coastal scrub forest, upland coastal forest, grassland, and freshwater wetlands (wet coastal scrub forest and wet meadow). Wetland communities—transitional areas between marine and terrestrial environments—have been divided into freshwater and tidal wetland communities. Freshwater wetlands have been included in this discussion of terrestrial communities. Tidal wetland communities are discussed as mangroves in Section 3.9, Marine Environment. Cover types at NAPR are depicted on Figure 3-8.

The majority of the undeveloped terrestrial areas at NAPR are characterized as coastal scrub forest communities. The secondary growth of thick scrub is dominated by leadtree (*Leucaena spp.*), box briar (*Randia aculeate*), sweet acacia (*Acacia farnesiana*), and Australian corkwood tree (*Sesbania grandiflora*) that grew in areas that were cleared for grazing prior to acquisition by the Navy. Tree species include ucar (*Bucida buceras*), sandbox (*Hura crepitans*), figs (*Ficus sp.*), flamboyant tree (*Delonix regia*), Puerto Rican royal palm (*Roystonea borinquena*), ginep (*Melicoccus bijugatus*), and Indian almond (*Terminalia catappa*) (U.S. Navy 1998). Tree heights rarely exceed 50 feet and the vegetation has minimal commercial value, but it does provide erosion protection and promotes groundwater recharge, providing valuable watershed protection (U.S. Navy 2004).

Coastal scrub forest is the dominant vegetative community on Isla Piñeros. Other communities on Isla Piñeros include mangroves, open water lagoons, and other tidal communities. Grassland is the dominant community at Cabeza de Perro. The vegetation in the zones at NAPR varies, depending on topography.



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-8
Vegetative Communities and Land Cover
Naval Activity Puerto Rico

- **Zone 1.** Zone 1 is dominated by the existing airfield. Undeveloped areas in Zone 1 include coastal scrub forest, grassland, and upland coastal forest.

  Some freshwater wetlands lie within the outline of Zone 1. Many of the wetlands are associated with drainage streams that enter the property from the developed areas to the west and are prone to flooding. (These surface water features are discussed above in greater detail in Section 3.5, Hydrology and Water Quality). These wetland areas have been excluded from Zone 1 and are included as part of Zone 9, the conservation areas. Scrub forests, which are not excluded from Zone 1, surround many of these wetland areas. Scrub vegetation helps to stabilize these areas and protect against erosion. Los Machos forest, a tidal wetland complex that includes mangroves, shallow flats, tidal flats, mud flats, and open water that are associated with Puerto Medio Mundo and Pasaje Medio Mundo, which lie along the eastern boundary of Zone 1. There is no undeveloped buffer in Zone 1 between existing development and these tidal and marine resources.

- **Zone 2.** Undeveloped areas include approximately upland coastal forest, grassland, and coastal scrub forest.

  No freshwater wetlands lie within the outline of Zone 2. However, freshwater wetlands lie along the west and northeast boundary of Zone 2. These wetland areas have been excluded from Zone 2 and are included as part of Zone 9, the conservation areas. The Daguao forest, a mangrove forest, lies along the eastern border of Zone 2 and is also included as part of Zone 9. Undeveloped grassland, scrub, and forest areas within Zone 2 act as a buffer between these sensitive resources and existing development.

- **Zone 3.** Undeveloped areas in Zone 3 include grassland, upland coastal forest, and coastal scrub forest.

  Freshwater wetlands lie along the northern, eastern, and southern borders of Zone 3, in association with the Rio Daguao drainage system. This is the largest freshwater wetland complex at the facility and is subject to flooding during storm events. (Surface water features are covered in greater detail in Section 3.5.1). These resources are included as part of Zone 9. Grassland, forest, and scrub vegetation in Zone 3 slow surface water runoff to these wetlands and to the Rio Daguao.

- **Zone 4.** Undeveloped areas in Zone 4 include upland coastal forest, scrub forest, and grassland.

  No freshwater wetlands lie within the outline of Zone 4. However, freshwater wetlands associated with the Rio Daguao drainage system lie along the western border of Zone 4. These freshwater wetland resources are included in Zone 9. Enseñada Honda and associated mangroves border Zone 4 to the east and the Daguao forest lies along the western border of Zone 4. Based on the outline of Zone 4 in the Reuse Plan, portions of the Enseñada Honda man-

groves in the vicinity of Langley Drive and portions of the Daguao forest in the vicinity of the elementary school are included within the outline of Zone 4. The remainder of the tidal communities adjacent to Zone 4 are included in Zone 9. Scrub and forest vegetation slow surface water flow and trap sediment and contaminants. Forest and scrub vegetation in Zone 4 act as a buffer zone for adjacent freshwater, tidal, and marine ecosystems. Vegetation slows surface water movement during storm events and allows excess surface water to infiltrate to groundwater. This infiltration provides protection against erosion on the slopes and protects the existing residential and commercial area at the foot of the slopes from potential flooding.

- **Zone 5.** Undeveloped areas include coastal scrub forest, upland coastal forest, and grassland.

  No freshwater wetlands lie within the outline of Zone 5. However, freshwater wetlands lie along the eastern boundary of Zone 5. These wetlands are part of a larger wetland complex that includes mangroves and open water areas associated with Enseñada Honda. Bahia Cascajo lies along the south border of Zone 5. The Daguao mangrove forest lies along the western boundary of Zone 5. The Reuse Plan indicates that portions of the Daguao forest in the vicinity of FDR Drive are included within the outline of Zone 5. The remaining wetland areas adjacent to Zone 5 are included in Zone 9. Forest and scrub vegetation in Zone 5 provide a buffer between existing development in Zone 5 and these sensitive wetland and marine ecosystems. (The marine environment is discussed in greater detail in Section 3.9.)

- **Zone 6.** Undeveloped areas include coastal scrub forest, upland coastal forest, and grassland.

  No freshwater wetlands lie within or adjacent to Zone 6. Enseñada Honda lies along the southern border of Zone 6. Mangroves associated with Enseñada Honda lie along the western and southeastern boundary of Zone 6. The Reuse Plan shows a small portion of the Enseñada Honda mangrove in the vicinity of Pier 3 within the outline of Zone 6. No buffer vegetation exists in Zone 6 between existing development and these marine and tidal ecosystems.

- **Zone 7.** Undeveloped areas include coastal scrub forest, upland coastal forest, and grassland.

  No freshwater wetlands lie within or adjacent to Zone 7. Zone 7 is bound to the north by the Los Machos forest, which is a tidal wetland complex that includes mangroves, shallow flats, tidal flats, mud flats, and open water and is associated with Puerto Medio Mundo and Pasaje Medio Mundo. Mangroves associated with Enseñada Honda lie along the western and southeastern boundary of Zone 7 and an additional mangrove area lies between Zone 7 and Bahia De Puerca. Marine environments adjacent to Zone 7 include Pasaje Medio Mundo, Bahia De Puerca, and Enseñada Honda. Areas within Zone 7 with scrub, forest, and grassland vegetation act as buffers for these sensitive tidal and marine ecosystems.

- **Zone 8.** Zone 8 is a mix of grassland, wet meadow, and wet coastal scrub forest communities, the majority of which are currently used for grazing. Existing development in this zone, approximately 7 acres, is limited to roadways.

  Freshwater wetlands exist within and adjacent to Zone 8. In addition, the Demajagua forest, a wetland complex that includes freshwater wetlands and mangroves in association with Puerto Medio Mundo, lies along the eastern border of Zone 8.

- **Zone 9.** Parcels at the mainland that are included in Zone 9 are primarily freshwater and/or tidal wetland communities (mangroves and flats). Existing development in Zone 9 is limited to roadways.

3.8.2 Freshwater Wetlands

Approximately 460 acres at the station are covered by palustrine habitat, which includes all freshwater wetlands. These wetlands include wet meadows and marshes dominated by cattails (Typha spp.) and grasses (Panicum spp. and Paspalum spp.) and wet coastal scrub forests (U.S. Navy 1998). The largest freshwater wetland is associated with the Rio Daguao drainage system in the southwest portion of the site. Other large freshwater wetlands are associated with Quebrada Aquas Clara, in the north portion of NAPR, and with an unnamed tributary to Quebrada Palma, in the southwestern portion of NAPR. Additional smaller freshwater wetlands are located around Oftsie airfield and at the landward edges of tidal wetland complexes. Wetlands are depicted on Figure 3-8; freshwater wetlands are depicted as wet meadow and wet coastal scrub forest. These freshwater wetlands serve as habitat for birds and reptiles, act as filters to trap sediments that could otherwise harm coral reefs and seagrass beds, and buffer the impact of flash flooding that results from steep slopes, torrential rains, and land use outside NAPR (U.S. Navy 1998).

3.8.3 Tidal Wetlands

The majority of Zone 9 can be characterized as tidal wetland communities. Tidal wetlands occur throughout the base and include shallow flats, tidal flats, mud flats, mangroves, dead mangroves, and open water areas. These habitats are discussed in Section 3.9.4 and are depicted on Figure 3-8.

3.8.4 Wildlife

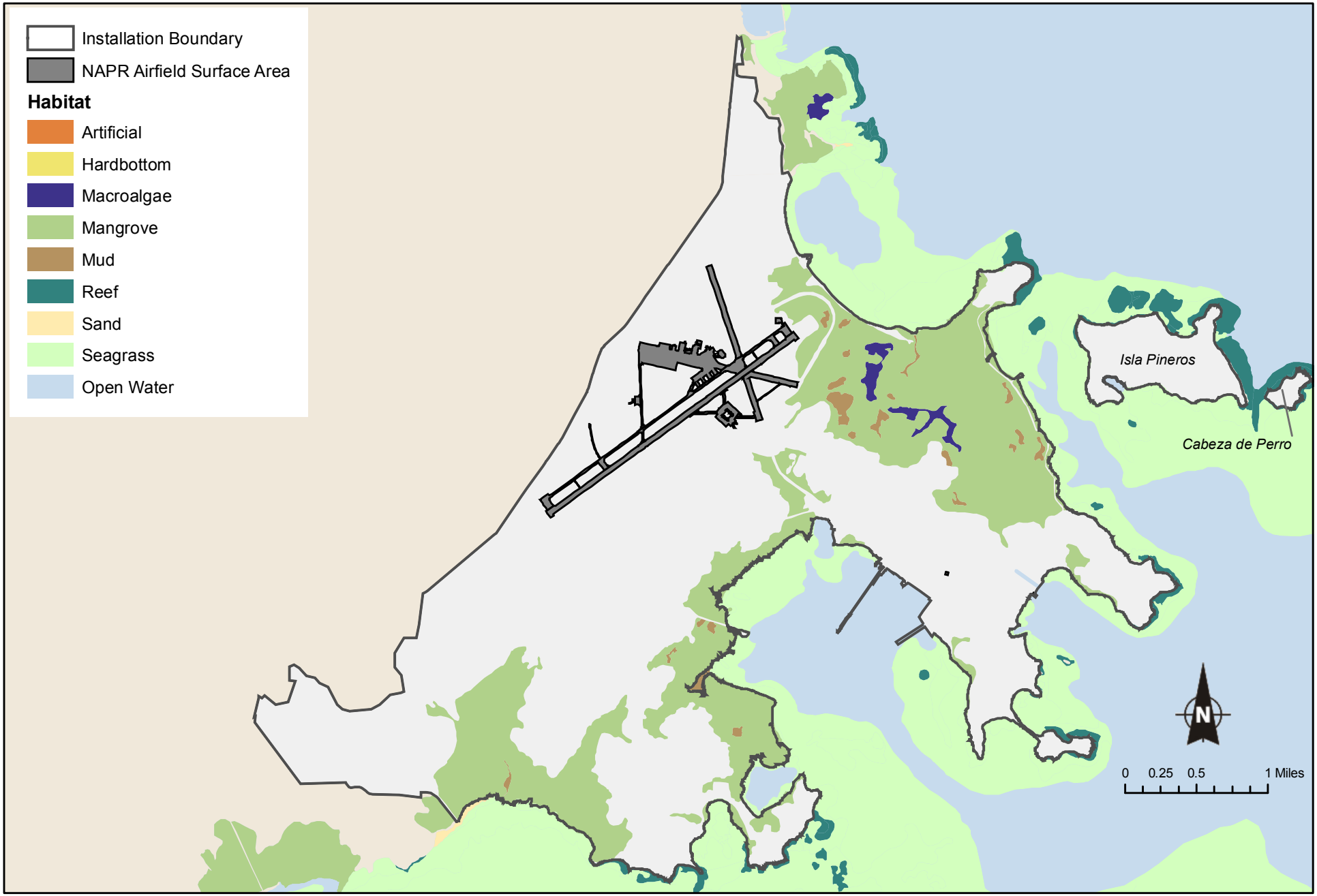
Wildlife at NAPR comprises multiple native reptile, amphibian, and avian species as well as a host of introduced mammal species. Approximately six species of snakes are known to occur at NAPR. Known snake species include the Puerto Rican boa (*Epicrates inornatus*), Virgin Island tree boa (*Epicrates monesis granti*), Puerto Rican racer (*Alsophis portoricensis*), Puerto Rican garden snake (*Arrhyton exiguum*), Virgin Island blindsnake (*Typhlops richardi*), and Puerto Rican wetland blindsnake (*Typhlops rostellatus*) (U.S. Navy 1998). A large mongoose population has reduced the reptile population. Multiple terrestrial and seabird species use the beach strand, grassland, upland forest, and mangrove forest habitats at the station. Numerous species of frogs and toads occur, including the coqui, a small tree frog. The mammal population is predominantly made up of introduced species that include mongoose, dogs, cats, Norway and grey-bellied rats, and mice (U.S. Navy 2004).

3.9 Marine Environment

The marine environment adjacent to NAPR is typical of tropical, shallow, coastal waters (U.S. Navy 1998). Such waters are characterized by warm temperatures (i.e., 75°F to 84°F); stable salinities of 35 parts per thousand or slightly higher; moderately high physical energy from waves, currents, and tides; clear water that allows deep light penetration; lower concentrations (relative to temperate waters) of dissolved nutrients; and a high diversity of habitats and species. Marine habitats in the vicinity of NAPR include open water, coral reefs, seagrass beds, sandy beaches, and mangroves. The distribution of these habitats surrounding NAPR are shown in Figure 3-9.

3.9.1 Coral Reefs

The hardbottom marine habitats of Puerto Rico have been separated into two categories by the Caribbean Fishery Management Council (CFMC) and the National Ocean Service Biogeography Program (National Oceanic and Atmospheric Administration [NOAA] 2000a). *Coral reef and colonized hardbottom,* one category, is defined as a calcium carbonate substrate created by reef-building corals and other organisms, with colonization by live coral. The second of the two categories is *uncolonized hardbottom habitat*, which is described as substrate composed of relict deposits of calcium carbonate



Source: Geo-Marine, 2005; ESRI, 2004

Figure 3-9
Marine Habitat
Naval Activity Puerto Rico

or exposed bedrock. Coral reef systems, including patch reefs, fringing reefs, and bank-barrier reefs, are usually dominated by one or more of the following stony coral genera: Acropora, Agaricia, Diploria, Montastrea, Porites, and Siderastrea (National Oceanic and Atmospheric Administration 2000a; Caribbean Fishery Management Council 1994; Cowardin *et al.* 1979). In contrast, sponges, soft corals, or algae dominate low-relief hardbottom communities; reef-building corals are present to a lesser extent (Cowardin *et al.* 1979).

The total reef area located within the territorial waters (waters within 3 nautical miles [5.6 km] of mainland Puerto Rico) is approximately 193 square miles (500 square kilometers) (National Oceanic and Atmospheric Administration 1998). Most of the coral reefs near NAPR are relatively small patch reefs (Pace and Vega 1988) (see Figure 3-9). According to Pace and Vega, two of the most diverse reefs are located east of the Cape-hart officers' housing complex and off the north shore of Piñeros Island. A joint 1994-1995, USGS and Navy project, the Sirenia Project, mapped the nearshore habitats along the eastern coast of Puerto Rico near NAPR. Table 3-2 lists all coral reef types within the waters surrounding NAPR and their associated acreage cover.

Table 3-2 Reef Habitat Types Present in Waters Surrounding Naval Activity Puerto Rico

Reef Habitat Type	Area (Sq. Ft.)	Area (Acres)
Colonized Bedrock	11,601,651.34	266.34
Linear Reef	3,640,369.31	83.57
Patch Reef (Aggregated)	6,363,618.51	146.09
Patch Reef (Individual)	7,603,479.80	174.55
Scattered Coral-Rock	227,937.18	5.23
Total		**675.78**

Source: NOAA Biogeography Program at: http://biogeo.nos.noaa.gov/products/benthic/htm/data.htm

Under Executive Order (EO) 13089 (Coral Reef Protection of June 11, 1998), U.S. federal agencies must identify actions that may affect U.S. coral reef ecosystems, use programs and authorities to protect and enhance the conditions of such ecosystems and, to the extent permitted by law, ensure that any authorized or funded actions will be carried out so as to not degrade the conditions of such ecosystems. U.S. coral reef eco-systems in Puerto Rico have also been designated as essential fish habitat (EFH) by the CFMC pursuant to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act.

In general, impacts on coral reefs and hard-bottom habitats may originate from human activity such as commercial and recreational fishing, upland deforestation (which results in siltation of reefs), pollution, and tourist-related activities such as anchoring, littering, trampling, and diver damage (National Oceanic and Atmospheric Administration 2000b). Caribbean reef ecosystems have also been impacted by natural disturbances such as hurricanes (Vicente *et al.* 1991) and algal blooms.

Coral reefs in Puerto Rico have been documented as the most rich in the U.S. Caribbean, with 237 coral-like species (Australian Institute of Marine Science 2004). The reefs considered the healthiest and most-developed reefs within Puerto Rico are along the western coast near Descheo Island. The reefs located along the eastern coasts of Puerto Rico are not as healthy nor as well developed, which can be attributed to factors such as environmental stresses from human activity. Another factor that has contributed to coral reef quality along the eastern coast is tropical cyclones. Typically, the reefs lying along the western coast of Puerto Rico are leeward of the island, which protects them from the peak wave energies of tropical cyclones. However, the eastern coast reefs are typically windward of the island and consequently bear the brunt of wave energy during a tropical cyclone. Smith *et al.* (1996) indicates that as much as 85% of live elkhorn cover on the reefs at nearby Buck Island was lost due to Hurricanes David and Frederic, with further immeasurable damage resulting from Hurricane Hugo. Elkhorn is the primary reef building coral in the Caribbean. The USGS reports indicate that Hurricane Hugo devastated the eastern-lying corals along Puerto Rico, while only minor impacts occurred along the western reefs. However, in spite of the devastation, some reefs in the eastern areas show signs of healthy re-growth.

3.9.2 Fish and Shellfish

The coastal waters of the Caribbean contain a diversity of fish. Approximately 350 species of fish are known to occur in the waters around Puerto Rico (Ecology and Environment, Inc. 1986). In general, the fish can be divided into three different associations, based on their preferred habitat. These associations include fish inhabiting the seagrass beds and sandflats, those inhabiting coral reefs, and open water or pelagic fish. There is overlap among the associations, as some fish in one association also use habitats in another. In the nearshore waters around nearby Vieques, the reef fish are the most diverse and abundant fish association. The Puerto Rico DNER is responsible for managing

fisheries in the coastal waters of Puerto Rico under Commonwealth Law No. 278 (November 29, 1998) and associated fisheries regulations and Administrative Orders.

Pursuant to the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq., Public Law 104-208) and Department of Commerce regulations (50 CFR 600.905 – 930), all activities or proposed activities, authorized, funded, or undertaken by a federal agency must consider adverse impacts on EFH. The Act defines EFH as the waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. An adverse impact as defined in the EFH rules is "any impact which reduces quality and/or quantity of EFH. . . . [and] may include direct, indirect, site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions." The November 1999 *Essential Fish Habitat Consultation Guidance* (National Marine Fisheries Service [NMFS] 1999) states that when an agency determines that its activities may have an adverse effect on EFH, consultation with the NMFS is required. Goals of the consultation process are to ensure that federal agencies consider the effects of their actions on important habitats and, as a result, contribute to the sustainable management of marine fisheries. The Navy conducted an EFH Assessment for the support of the disposal of NAPR in February 2005 (Geo-Marine, Inc. September 2005), which is included in this EA as Appendix B.

The CFMC has developed four fishery management plans for the Caribbean region: Spiny Lobster, Shallow Water Reef Fish, Corals and Reef Associated Plants and Invertebrates, and Queen Conch Fishery Management Plans (FMPs) (Caribbean Fishery Management Council 1996, 1994, 1985, and 1984). Since the development of the FMPs, the CFMC has identified EFH for numerous species. The ecologically diverse area encompassed by identified EFH includes habitat essential for fish spawning, breeding, feeding, and growth to maturity and consists of all waters and substrates surrounding NAPR, including coral reefs, seagrasses, and mangroves These habitats provide important spawning, nursery, forage, and refuge habitat for a variety of commercially and recreationally important finfish and shellfish, including juvenile and adult mutton snapper, juvenile yellowtail snapper, and adult squirrelfish (see Geo-Marine, Inc. September 2005 and the National Oceanic and Atmospheric Administration letter to the Navy, May 28, 2004, in Appendix A).

3.9.3 Seagrass Beds

Seagrass beds are among the most productive of all natural systems in the world (Wiley and Vilella n.d.). Seagrass beds are important in controlling and reducing erosion by trapping and consolidating bottom sediments with their extensive root and rhizome network. They also promote the accumulation of organic matter that is used by resident organisms. They provide nutrients, energy, and habitat (e.g., nursery grounds for larval and juvenile life stages) for fish and numerous marine invertebrates (Kaplan 1988; Vicente 1992). Seagrass beds are an important food source for various fish, sea turtles, and the endangered West Indian manatee (*Trichehus manatus*), which feeds on the roots, rhizomes, and leaves of seagrasses (Wiley and Vilella n.d.). As noted above, seagrass beds have been designated as EFH because they provide important spawning, nursery, forage, and refuge functions for a variety of commercially and recreationally important finfish and shellfish.

Seagrasses generally grow in protected areas such as bays or coves with slow currents and moderate wave action and are often found near protective barrier reefs (Kaplan 1988). Seagrass meadows in the Caribbean are frequently associated with coral reefs. In many cases seagrass meadows and coral reefs can be highly interconnected. By trapping sediments, seagrass meadows prevent sediment re-suspension and transport onto the adjacent reefs. In turn, reefs protect seagrass meadows by dissipating wave energy.

The four species of seagrasses that occur on the shelf surrounding the main island of Puerto Rico are turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and paddle grass (*Halophila decipiens)* (Kaplan 1988). Turtle grass is probably the most abundant seagrass species in Puerto Rico and its islands (Vicente 1992; Reid and Kruer 1998). The abundance of seagrass beds varies around the various coasts of Puerto Rico. There is very little seagrass growth (<5%) along the north and west coasts of Puerto Rico because of wave action, the narrow insular shelf, and silt-laden river runoff (Vicente 1992). There are large areas of manatee and turtle grass beds along the southwest, south, and east coasts of Puerto Rico where there is a wide, shallow shelf, a coastline protected from heavy wave action, and reduced river runoff (Vicente 1992). A large area of seagrass beds covers the seafloor between the southeast coast of Puerto Rico and Vieques (Reid and Kruer 1998).

Within the waters surrounding NAPR seagrass beds occur along most shorelines (see Figure 3-9). There are four main areas of seagrass beds: one in the lagoon north of

Los Machos mangrove forest; one encircling Isla Piñeros; another around the point of Isla Cabras and Enseñada Honda; and the fourth a broad area from Punta Cascajo south and east to Vieques.

The lagoon area seagrass beds are mostly continuous seagrass, with smaller amounts of seagrass beds of lesser percentages of cover. A sparsely covered seagrass bed along the beach area has approximately 10% to 30% cover. The seagrass beds around Isla Piñeros are mostly continuous seagrass beds. Very small areas of lesser seagrass cover occur nearer to the shoreline. The same can be said for the last two remaining seagrass bed areas.

The main sources of impact that threaten seagrasses and the seagrass habitat of Puerto Rico include raw sewage discharge, agricultural runoff, coastal construction (which creates turbidity that obstructs incident light), pipe placement (e.g., telephone, water, electricity), mechanical impacts (e.g., anchoring, propeller plowing/scarring, ship grounding), silt-laden runoff (from upland and coastal deforestation/land clearing), sand burial and turbidity following storms and hurricanes, and disease (Caribbean Fishery Management Council 1998; Sullivan-Sealy and Bustamante 1999).

3.9.4 Mangroves

Mangroves are collectively designated as an assemblage of salt-tolerant trees or bushes that colonize low energy depositional environments and waterlogged, oxygen deficient, and saline soils within the tropics (Cintrón 1987). Mangroves occur in all coastal regions of mainland Puerto Rico (Caribbean Fishery Management Council 1998). There are 35 square miles (92 square kilometers) of mangrove forest in Puerto Rico and its islands (Spalding *et al.* 2001).

Four species of mangrove trees occur in Puerto Rico: red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), black mangrove (*Avicennia germinans*), and button mangrove (*Conocarpus erectus*). The salt-tolerant mangrove trees grow in coastal and estuarine environments. Mangrove forests of Puerto Rico are classified as fringe, riverine, basin, or overwash types according to their position in the landscape and the pattern of water circulation (Lugo and Snedaker 1974, as cited in Pace and Vega 1988). The first three types are present on NAPR.

Mangrove forests contribute a vital component to the estuarine food chain through the decomposition of organic material and the release of organic and inorganic nutrients

(Cintrón 1987). In addition to a source of nutrition, mangrove roots and branches provide cover and protection for wildlife and fish/shellfish, particularly as spawning grounds and nurseries. Mangrove inhabitants include various invertebrates (e.g., sponges, crabs, tunicates, bivalves, and spiny lobsters) and fishes (e.g., bluestriped grunt, sailors choice, gray snapper, dog snapper, common snook, and jewfish). Mangroves aid in the prevention of coastal erosion and act as a buffer for major storm events. Additionally, mangroves filter upland runoff and thereby release higher quality water to the ocean. It was previously noted in this EA that the mangroves have been designated as EFH.

Mangrove forests comprise about 2,100 acres of NAPR (U.S. Navy 1996), i.e., approximately 14% of the mangrove forests in Puerto Rico (U.S. Department of the Interior 2004) (see Figure 3-9) and 25% of NAPR. Pace and Vega (1988) grouped the mangrove forests into five main tracts: Demajagua, Los Machos, Enseñada Honda, Daguao, and Isla Piñeros. Descriptions of these mangrove tracts are provided in Pace and Vega (1988).

The Los Machos mangroves are located in the northeast portion of NAPR and cover about 1,000 acres. This mangrove complex has been impacted over time by events such as base construction in the 1940s, construction of Lake Chamberlain Road (which reduced tidal circulation in the forest), oil spills, and hurricanes (U.S. Navy 1996). An ecological and hydrological restoration plan was developed for the mangrove complex in 1996 (U.S. Navy 1996). Los Machos mangroves are also the subject of a *Damage Assessment and Restoration Plan Environmental Assessment* (U.S. Navy October 2004). The plan was prepared to address the restoration of the natural resources and their functions that were damaged by a jet propellant-5 (JP-5) fuel spill that occurred in October 1999 at NSRR.

The main mangrove tracts have all been altered by human activities in some manner. Impoundment and dredge disposal are key contributors to mangrove alteration at NAPR. The Enseñada Honda mangrove tract has been impacted the most by dredge disposal. When harbor development began within Enseñada Honda in the 1940s, the dredge material was placed in the nearby mangrove forest, directly impacting approximately 40 acres of the mangrove forest. Subsequent dredge spoil was disposed by the Navy at permitted dredge spoil disposal sites.

3.10 Threatened and Endangered Species

Threatened and endangered species are typically found primarily in less disturbed and more unique communities. Federally listed and Commonwealth-listed plant and animal species found at NAPR are included in Table 3-3.

Table 3-3 Federally Listed and Commonwealth-listed Species on NAPR

Common Name	Scientific Name	Federal Status	Commonwealth Status	Habitat Requirements
Mammals				
West Indian Manatee	*Trichechus manatus*	E	E	Marine, estuarine, and freshwater habitats, especially calm coastal waters with seagrass beds
Reptiles				
Puerto Rican boa	*Epicrates inornatus*	E	E	Forested Areas
Hawksbill turtle	*Eretmochelys imbricata*	E	E	Marine areas
Leatherback turtle	*Dermochelys coriacea*	E	E	Marine areas
Green turtle	*Chelonia midas*	T	T	Marine areas
Loggerhead turtle	*Caretta caretta*	T	T	Marine areas
Virgin Islands tree boa	*Epicrates monensis granti*	E	E	Forested Areas
Birds				
Yellow-shouldered blackbird	*Agelaius xanthomus*	E	E	Mangrove forests-arid thickets.
Brown pelican	*Pelecanus occidentalis*	E	E	Salt bays, beaches, ocean areas
Peregrine falcon	*Falco peregrinus*	—	E	Nests on rocky cliffs
Least tern	*Sterna antillarum*	—	V	Sandy beaches of freshwater and bays
Piping plover	*Charadrius melodus*	T	T	Sandy beaches of freshwater and bays
Least grebe	*Tachybaptus dominicus*	—	T	Freshwater lakes streams, ponds and lagoons
West Indian whistling duck	*Dendrocygna arborea*	—	T	Fresh and salt water bodies, marshes, coastal forests
Caribbean coot	*Fulica caribaea*	—	T	Fresh and salt water bodies, marshes
Roseate Tern		T	E	
Snowy plover	*Charadrius alexandrinus*	—	V	Sandy beaches of fresh water and bays

Table 3-3 Federally Listed and Commonwealth-listed Species on NAPR

Common Name	Scientific Name	Federal Status	Commonwealth Status	Habitat Requirements
Plants				
Cobana negra	*Stahlia monosperma*	T	T	Coastal plains, associated with mangroves and immediately landward side of mangroves

Key:
C = Candidate.
E = Endangered.
T = Threatened.
V = Vulnerable.

3.10.1 Mammals

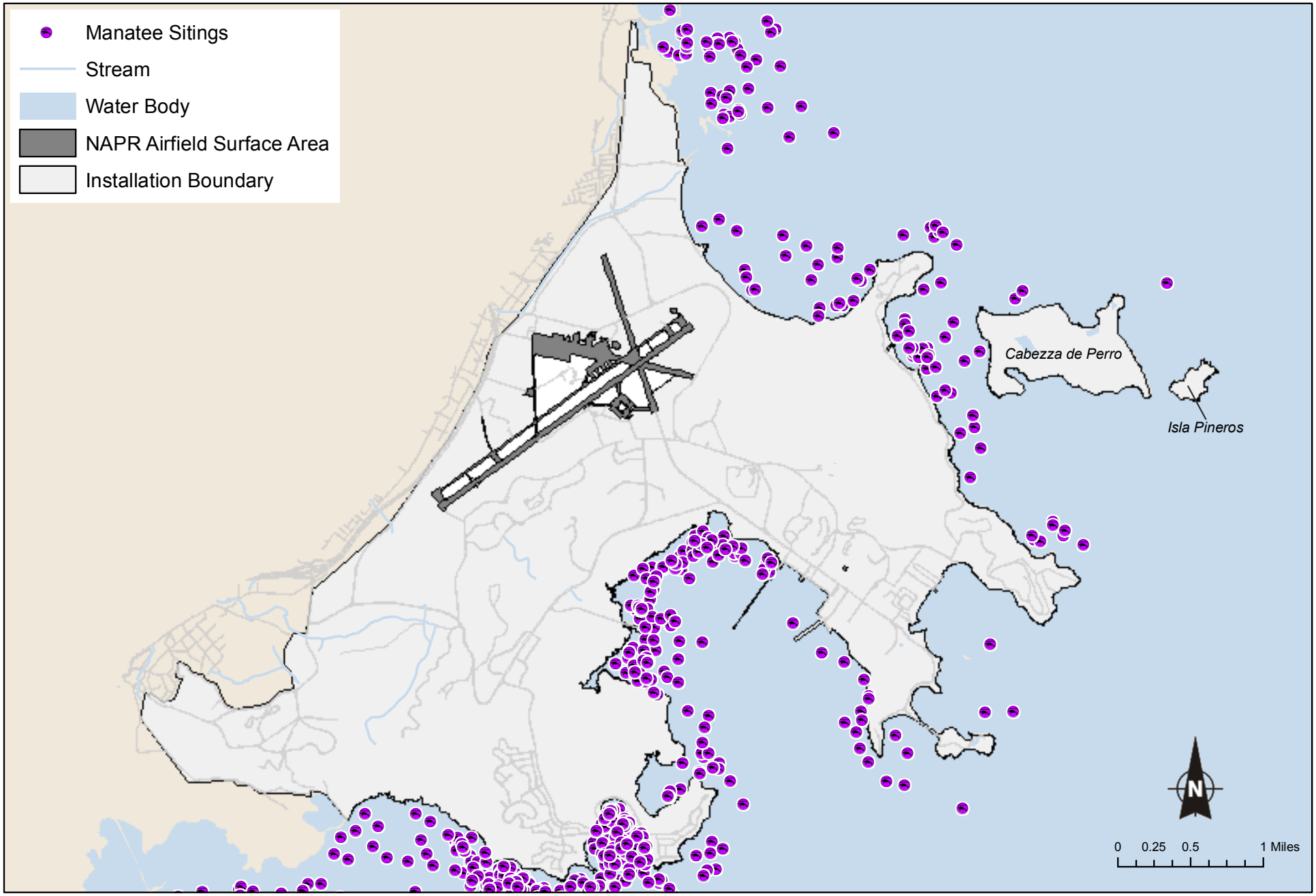
Marine Mammals

Marine mammals are protected under the Marine Mammal Protection Act of 1972 (USC 16, 31 §§ 1361-1421), and all federally listed endangered species, including marine mammals, are protected under the Endangered Species Act (16 USC §§ 1531-1544). Of the endangered/threatened marine mammals that may occur in Puerto Rico waters, only the West Indian manatee (*Trichechus manatus*) is known to occur in the waters of NAPR. The following marine mammals are listed by NOAA Fisheries as occurring in Puerto Rico (www.nmfs.noaa.gov/pr/species), but they are not discussed in further detail in this EA because they are not known to occur close to NAPR (and hence would not be adversely impacted by the proposed action): blue whale (*Balaenoptera musculus*), Caribbean monk seal (*Monachus tropicalis*), finback or fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*).

The West Indian manatee (*Trichechus manatus*), federally listed as endangered in 1985, is a large, slow-moving marine mammal with a preference for calm coastal waters with seagrasses and a source of freshwater. Manatees use seagrass beds for feeding and resting habitats; although they feed on various types of aquatic vegetation, seagrasses are their primary food source. Manatee habitat includes sheltered marine bays and shallow estuaries with access channels at least 6.6 feet (2 m) deep (Ecology and Environment, Inc. 2000). Manatees require abundant aquatic vegetation for feeding, proximity to deep channels for traveling, and quiet coves for shelter. A recovery plan was developed for the Puerto Rican population of manatees in 1986 that contains recommendations for research, conservation, and law enforcement (Rathbun and Possardt 1986).

Manatee populations in Puerto Rico waters have been documented in three aerial surveys conducted from 1978 to 1979, 1984 to 1985, and in 1993 (United Nations Environmental Program [UNEP] 1995); a radio tracking study conducted from 1992 to 1996 (Reid and Kruer 1998); and a year-long intensive study of manatee distribution and abundance (Woods *et al.* 1984). The majority of manatees seen were found along the southern and northeastern coasts of Puerto Rico, with one-third of the manatees occurring in the vicinity of NAPR (United Nations Environmental Program 1995). In the waters surrounding Vieques, one of the most heavily used areas is the extensive seagrass bed west of Mosquito Pier on the northwest end of the island (Reid and Kruer 1998; Geo-Marine, Inc. June 2004). Observations of manatee movements, using radio- and satellite-tracking devices, have revealed that some individuals move back and forth between eastern Puerto Rico and Vieques (Reid and Bonde 1993, as cited in Geo-Marine, Inc. June 2004). The number of manatees inhabiting the waters of Puerto Rico is not known, but the number of manatees counted during USFWS surveys has ranged from 43 to 101 (Geo-Marine, Inc. September 2005).

The *Manatee Assessment and Condition Summary for Naval Activity Puerto Rico, Interim Report* (Geo-Marine, Inc. June 2004) presents a map showing historical manatee sightings in eastern Puerto Rico, including Vieques. This figure, shown here as Figure 3-10, includes most of the monitoring studies mentioned above. Manatees are often concentrated at NAPR in the shallow coves and bays containing seagrasses (Geo-Marine, Inc. June 2004). Feeding manatees are most often recorded in Pelican Cove and Enseñada Honda, both of which contain seagrasses (see also Figure 3-9). Some of the data points in Figure 3-10 are from the USFWS; several records of manatees in Enseñada Honda were in the summary data provided by the USFWS to the Navy. These data included notes on the behavior of the manatees recorded. Out of nine recorded manatees sightings, three of the manatees were feeding, three were traveling, one was engaged in social behavior with two other manatees, and two were recorded as unidentified behaviors. One of the traveling manatees was swimming with a calf. Of six recorded sightings in Pelican Cove, two were traveling and four were feeding. Three of these records of manatees feeding involved multiple manatees (i.e., two to five individuals).



Source: Geo-Marine, 2005; ESRI, 2004; USFWS, 2005;

Figure 3-10
Historical Manatee Sightings
in Eastern Puerto Rico

During operation of NSRR, the ocean outfall from the Capehart WWTP was documented as a source of freshwater for manatees in the vicinity of the installation (as citied in Geo-Marine, Inc. June 2004: Powell *et al.* 1981; Rathbun *et al.* 1985; Lefebvre *et al.* 2001). Manatees have previously been observed using the Forrestal and Bundy WWTP outfalls for obtaining freshwater (Geo-Marine, Inc. June 2004). One potential concern related to the closure of NSRR was that the closure of the Capehart WWTP (and reduction and cessation of freshwater outflows) would potentially adversely affect the manatee. The Navy has coordinated with the USFWS on this issue, and the USFWS gave their approval for reduction of freshwater outflows. As of January 2005, freshwater outflow from the WWTP continued and was about 150,000 gallons per day. This flow is maintained primarily by the influx of rainwater into the system.

According to the USFWS *Recovery Plan for the Puerto Rico Population of the West Indian (Antillean) Manatee* (Rathbun and Possardt 1986), the potential sources of manatee mortality in Puerto Rico are different than those in Florida. The main source of manatee mortality from human actions in Florida is accidental boat collisions, while that in Puerto Rico is from entanglement in gill nets. The recovery plan notes that development and the related increase in boat traffic may have started affecting manatees along the southern coast of the island. The plan further states that there is no evidence that natural events (e.g., hurricanes), habitat loss, competition, disease, or natural predation cause significant mortality of manatees in Puerto Rico. A more recent report, however, indicated that from 1990 to 1995, collisions with watercraft accounted for the largest number of manatee deaths in Puerto Rico (Mignucci-Giannoni *et al.* 2000, as cited in Geo-marine, Inc. September 2005).

3.10.2 Reptiles

Four species of sea turtles and two snake species listed as federal and Commonwealth threatened and endangered species are known to occur at NAPR.

3.10.2.1 Sea Turtles

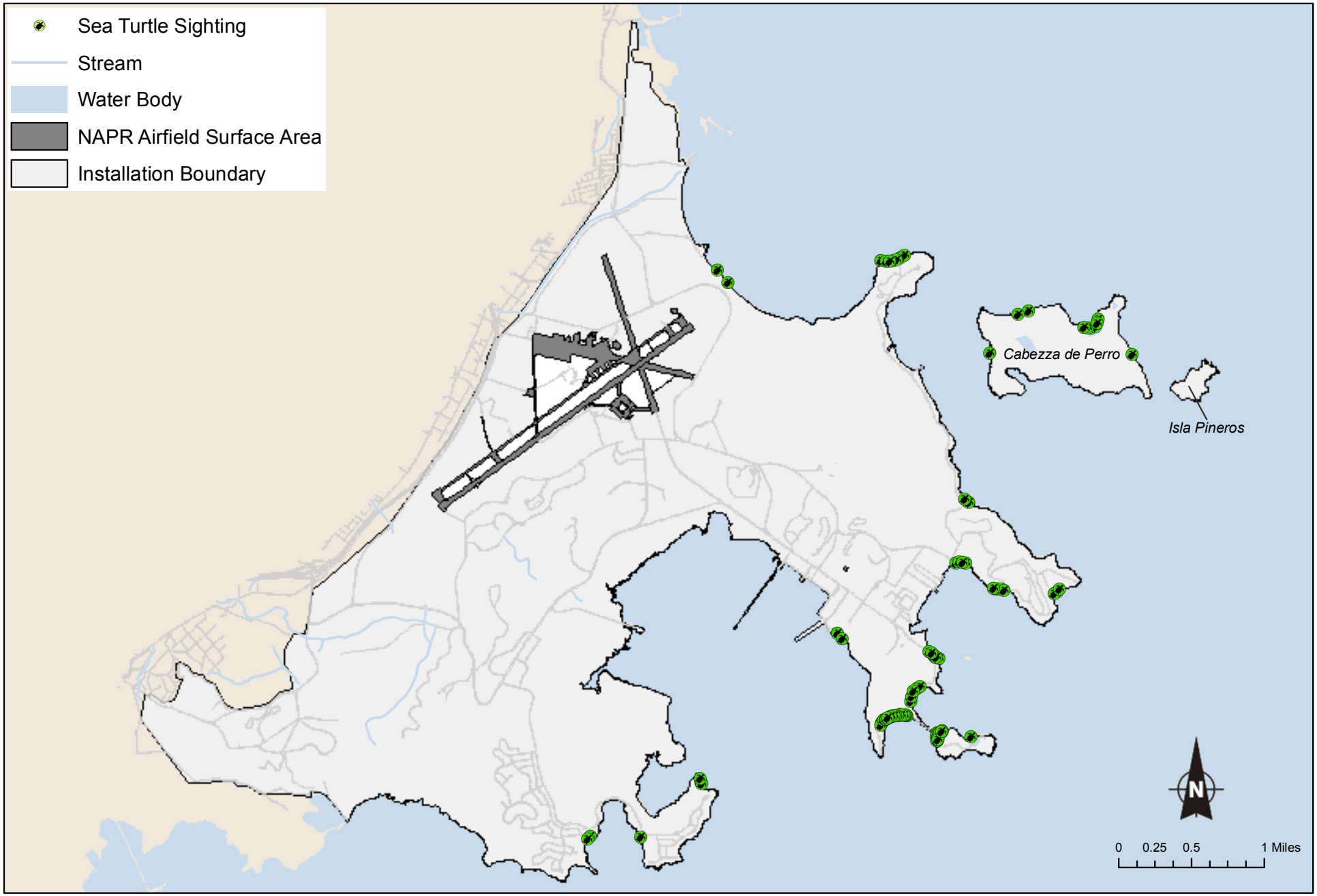
Four species of sea turtle—leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), and loggerhead (*Caretta caretta*)—may be found in the waters adjacent to NAPR. All four species are federally listed as endangered species and are protected under the 1973 ESA (16 USC 1531-1544). Sea turtles use shal-

low-water marine benthic habitats such as seagrass beds and coral reefs for foraging and resting. Each species has a different preferred diet, but as a group they consume plants and animals such as seagrasses, mollusks, crustaceans, tunicates, jellyfish, and fish. Adult female sea turtles emerge from the water to nest. Nests are generally laid on sandy beaches along the shoreline landward of the mean high water line.

Rathbun *et al.* (1985) conducted aerial surveys in 1984 and 1985 along the coast of Puerto Rico, including NAPR (Figure 3-11). One-quarter of the sea turtles observed around the coast of Puerto Rico were in waters adjacent to NAPR. Of the sea turtles identified by species, the green accounted for the vast majority of the sightings, followed by the hawksbill, loggerhead, and leatherback. According to Pace and Vega (1988), areas adjacent to NSRR that are most frequently used by sea turtles include the east shore of Enseñada Honda Bay, the north coast of Piñeros Island, and the mouth of Cascajo Bay (Pelican Cove). Twenty-four percent of the sea turtle sightings in the waters of NAPR were in Enseñada Honda (with the majority along the eastern shore between the marina and the mouth of the bay [Rathbun *et al.* 1985; U.S. Navy 1995]). Another twenty-seven percent of the sightings in the waters of NAPR were in the Medio Mundo Passage. In this area, sea turtles were observed near Punta Medio Mundo, Punta Puerca, and areas in between.

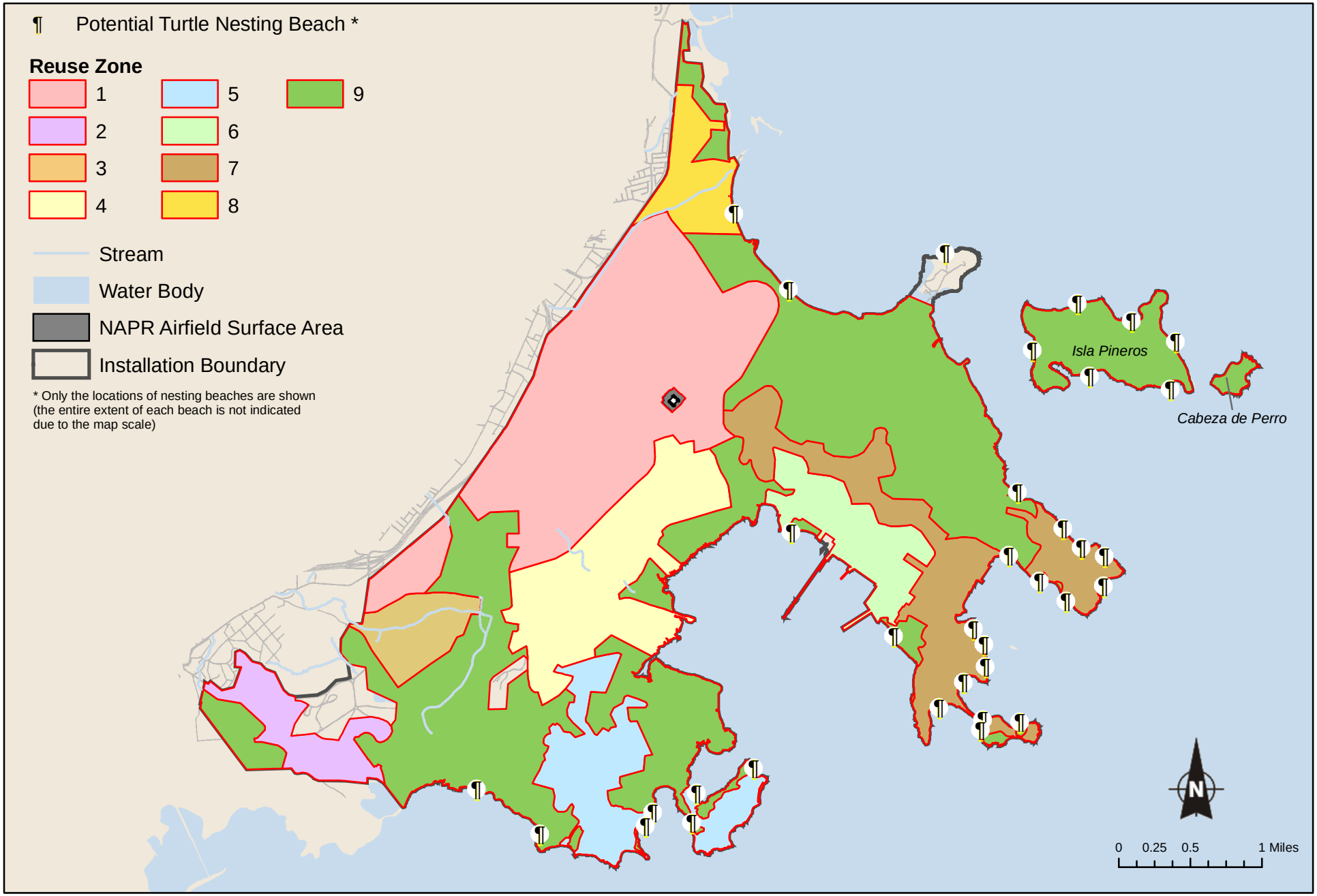
Potential sea turtle nesting beaches at NAPR, as well as the zones proposed for development under the Reuse Plan, are shown in Figure 3-12. According to this map (prepared by NSRR in 2000), much of the beach surrounding Piñeros Island is noted as excellent potential nesting habitat for hawksbill and leatherback sea turtles, and various locations along the shoreline of NAPR are noted as excellent, suitable, or marginal (only one beach) potential nesting habitat for these two species (Diaz March 31, 2000). Several stretches of beach along the shoreline of Enseñada Honda are noted as suitable potential nesting habitat.

In the past few years, the Navy has been conducting weekly nesting surveys on these 33 potential nesting beaches. Data from the 2002 survey (conducted from April to December) are discussed in this section; data from 2004 (fewer surveys, from January to April) have also been collected and are shown in Table 3-4. In 2002, approximately 73 sea turtle nests were recorded on NAPR beaches (Geo-Marine, Inc. September 2005). Of the nests identified according to species, 46 were hawksbill nests, 2 were leatherback nests, 1 was a green sea turtle nest, and 24 remained unidentified. Nests were recorded at



Source: Geo-Marine, 2005; ESRI, 2004; USFWS, 2005;

Figure 3-11
Cumulative Sea Turtle Sightings from March 1984 through March 1995 Obtained from Weekly Aerial Surveyes of the Former Naval Station Roosevelt Roads Naval Activity. Puerto Rico



Source: Geo-Marine, 2005; ESRI, 2004;

Figure 3-12
Potential Turtle Nesting Sites
Naval Activity Puerto Rico

12 of the 33 beaches; at some additional beaches only sea turtle tracks were recorded. As shown in Table 3-4 below, the vast majority of nests were recorded at beach #18 near the mouth of Enseñada Honda (to the northwest of Isla Cabras; see Figure 3-12 for beach locations) (Geo-Marine, Inc. September 2005). Depredation of 35 of the nests was noted. Six live turtles were also observed.

Table 3-4 Number of Nests Recorded on NAPR Beaches in 2002 and 2004 During Weekly Beach Surveys

Beach #	# of Nests in 2002	# of Nests in 2004
2	5	0
3	1	0
7	3	0
9	5	0
10	1	1
12	6	0
14	0	6
15	9	1
16	0	1
17	5	0
18	30	4
19	1	0
22	0	2
25	2	0
A	0	1
B	5	0
Total	**73**	**16**

Source: Geo-Marine, Inc. September 2005

3.10.2.2 Puerto Rican Boa

The Puerto Rican boa (Epicrates inornatus) exists only in Puerto Rico. The forested limestone hill area seems to be the boa's preferred habitat, but the species can be found in subtropical moist forests, subtropical wet forests, subtropical dry forests and occasionally in disturbed urban and suburban habitats (Tolson 2004). The boas use ground level retreats for sleeping during the day and apparently hunt most of their prey in nearby trees at night. Observations of captive specimens suggest that under natural conditions the diet of sub-adults and adults consists of birds, small mammals, and lizards. The feeding habits of the very young are unknown. Critical habitat has not been designated for this species (U.S. Fish and Wildlife Service 1986).

Four Puerto Rican boa sitings were reported at NAPR prior to 1999 and an additional four occurrences were reported between 2001 and 2003 (Geo-Marine, Inc. Sep-

tember 2005). Habitat assessments and nighttime surveys for Puerto Rican boa and Virgin Islands tree boa were conducted in 2004. All forested areas surveyed at the base presented a severely disturbed aspect with very young secondary growth (Tolson 2004). These recovering forested areas offer some habitat for the Puerto Rican boa. However, habitat is less than ideal in most places (Tolson 2004). The forest of Punta Cascajo, northwest of FDR Drive, offers the most suitable habitat at NAPR for the Puerto Rican boa, and the hills near South Delicias are expected to mature into excellent habitat for Puerto Rican boa. No Puerto Rican boas were found during 211 man-hours of surveys in potential boa habitat. A shed skin was found in an abandoned building at the NAPR Flying Center, where two sightings of the Puerto Rican boa have been reported (Tolson 2004). Puerto Rican boas apparently occur in low densities at NAPR (Tolson 2004).

3.10.2.3 Virgin Islands Tree Boa

The Virgin Island tree boa (Epicrates monensis granti) is commonly associated with subtropical dry forest, coastal forests, and mangrove habitats with an abundance of multi-trunk tree species with interlocking canopies (Tolson 2004). They hunt at heights from eye level to as high as 5 meters in scrub and coastal forests (Tolson 2004). During the day, these boas may seek concealment on the ground under rocks, logs, and loose sections of termite nests (Tolson 2004). The bulk of the boa's diet seems to consist of the lizard Anolis cristatellus. However, this boa may opportunistically consume small mammals and nestlings of small birds (see http://endangered.fws.gov/i/c/sac0q.html and http://ecos.fws.gov/species_profile/SpeciesProfile?spcodeC02E). Critical habitat has not been designated for this species (Geo-Marine, Inc. September 2005).

No historical or recent sitings of the Virgin Island tree boa have occurred at NAPR (Geo-Marine, Inc. September 2005). Habitat assessments and nighttime surveys for Puerto Rican boa and Virgin Islands tree boa were conducted in 2004. All forested areas surveyed at the base presented a severely disturbed aspect with very young secondary growth (Tolson 2004). While Puerto Rican boa were reestablished in previously disturbed areas, the Virgin Island tree boa seems to be able infrequently to re-colonize areas from which it has been extirpated (Tolson 2004). The Punta Puerco and Puerto Medio Muno coastlines offer the best habitat at NAPR for the Virgin Island tree boa (Tolson 2004). However, no Virgin Island tree boas were found during the field surveys of 2004. While populations of the Virgin Islands tree boa occur nearby in Rio Grande,

Playa Naguabo, and Humacao, this species' existence at NAPR is not confirmed (Tolson 2004).

3.10.3 Birds

Four federally and Commonwealth-listed threatened and endangered avian species are known to occur at or in coastal habitats adjacent to NAPR. An additional six species listed only by the Commonwealth are known to occur at the base.

Commonwealth-listed species at NAPR include peregrine falcon (Falco peregrinus), Least tern (Sterna antillarum), Least grebe (Tachybaptus dominicus), West Indian whistling duck (Dendrocygna arborea), Caribbean coot (Fulica caribea), and snowy plover (Charadrius alexandrinus). The peregrine falcon typically nests on cliffs, bridges, tall buildings, and other tall structures. Because these features are not at NAPR, peregrine falcons are not expected to nest at NAPR and use is expected to be limited to transient individuals. The West Indian whistling duck uses mangroves and other forested wetlands. The Least grebe and Caribbean coot are found in freshwater habitats on lakes, marshes, swamps, and ponds and on rivers, streams, and other habitats with emergent vegetation and occasionally in brackish water, where they feed on aquatic vegetation and small invertebrates. Snowy plover and Least Terns nest and feed on sandy beaches and mudflats.

3.10.3.1 Yellow-shouldered Blackbird

The USFWS (http://endangered.fws.gov/i/b/sab5u.html) notes that "the yellow-shouldered blackbird (*Agelaius xanthomus*) is endemic to Puerto Rico and nearby Mona Island. While once widespread throughout Puerto Rico, the species is now limited to three areas: the coastal southwestern area; a small coastal eastern area; and Mona Island. . . . Studies by Post and Wiley of southwestern Puerto Rico, the population center for the species, indicated that during the nesting season (May to September) most of the birds stay either in the mangrove zone or the arid coastal fringe. Nesting occurs in mangroves along the coast and on small off-shore islands. Other nesting habitat includes large deciduous trees, primarily oxhorn bucida (Bucida buceras) in dry lowland pastures; coconut trees (*Cocos nucifera*); royal palms (*Roystonea borinquena*); and on Mona, the sheer coastal cliffs which surround the island. . . . One of the principal reasons for the decline is attributed to parasitism by the shiny cowbird (*Molothrus bonariensis*), which lays

its eggs in the blackbird's nest and sometimes punctures the host's eggs." Other reasons for decline include introduced pest species (black rat, Norway rat, and mongoose), disease (fowl pox), and habitat loss. Habitat modification and destruction from hurricanes and other natural events have eliminated both foraging and nesting areas. "Today, an important factor is the threatened loss of habitat, especially the coastal and offshore island mangroves where about 86 percent of the nesting now occurs."

In 1976, the entire land area at NAPR was designated as critical habitat for the yellow-shouldered blackbird. The yellow-shouldered blackbird population at NAPR, the second largest population in Puerto Rico in 1976, declined by 97% from 1976 to 1982. The species was believed to be absent from NAPR following Hurricane Hugo in 1989. However, several incidental sitings from 1993 to 1999 and four yellow-shouldered blackbird nests found in the summer of 1999 prompted the Navy to conduct detailed surveys for the species in 2000, 2002, and 2004. Survey data revealed an increase in yellow-shouldered blackbird observations from 1995 through 2000 and a decline from 2000 through 2004. The number of documented nesting pairs fell from five in 2000 to one unconfirmed nest in 2004. No observations of yellow-shouldered blackbird were recorded during post breeding surveys at NAPR, but incidental observations have been recorded (Geo-Marine, Inc. September 2005).

3.10.3.2 Brown Pelican

The USFWS (http://endangered.fws.gov/i/b/sab2s.html) notes that "the brown pelican (Pelecanus occidentalis) is found along the coast in California and from North Carolina to Texas, Mexico, the West Indies and many Caribbean Islands, and to Guyana and Venezuela in South America. Feeding occurs primarily in shallow estuarine waters with the birds seldom venturing more than 20 miles out to sea except to take advantage of especially good fishing conditions, and even then it is rare to find one more than 40 miles out. Sand spits and offshore sand bars are used extensively as daily loafing and nocturnal roost areas. The preferred nesting sites are small coastal islands which provide protection from mammal predators, especially raccoons, and sufficient elevation to prevent wide-scale flooding of nests. . . . Of the factors impinging upon the U.S. Caribbean subspecies, food is the most influential. The timing and success of the breeding cycle and the pronounced seasonal fluctuations of pelican numbers in the region appears to be closely tied to alternating, yet unpredictable, periods of food abundance and scarcity. Although the

nucleus of the breeding population is located in the U.S. Virgin Islands, pelicans of both age classes migrate to Puerto Rico post-season, presumably to exploit more predictable food resources associated with extensive estuarine and mangrove systems. Young pelicans will often remain in Puerto Rico for 5 years until they reach maturation. Adults remain there until they meet pre-breeding nutritional requirements and return to breeding colonies in Puerto Rico and the U.S. Virgin Islands. . . . Among the most serious man-induced threats to the Caribbean subspecies are poaching of eggs, young, and adults; human disturbance; entanglement in fishing gear; and loss or degradation of mangrove forests."

No critical habitat is designated for the species at NAPR, on adjacent cays, or in nearby coastal waters (Geo-Marine, Inc. September 2005). The brown pelican appears to be a common seasonal resident at NAPR and in the surrounding coastal waters (Geo-Marine, Inc. September 2005). Small numbers, primarily juveniles, were seen day-roosting, feeding, and resting irregularly in onshore and near-shore habitats at NAPR. However, no brown pelican nesting colonies were found at NAPR or on the small cays nearby (Geo-Marine, Inc. September 2005).

3.10.3.3 Piping Plover

The USFWS (http://pipingplover.fws.gov/overview.html) notes that "the piping plover (Charadrius melodus) breeds on coastal beaches from Newfoundland to North Carolina and winters primarily on the Atlantic Coast from North Carolina to Florida, although some migrate to the Bahamas and West Indies." No critical habitat for piping plover has been designated in Puerto Rico (Geo-Marine, Inc. September 2005).

The piping plover was observed during migration but was not known to nest at NAPR, as noted in the 1987 Land Management Plan for Naval Station Roosevelt Roads (Ecology and Environment, Inc. 1987), but no specific siting information was recorded. No piping plover observations were reported at NSRR during the 1990s or during sea turtle nesting surveys conducted in 2002 and 2004 (Geo-Marine, Inc. September 2005). The occurrence status at NAPR is expected to be limited to vagrants; a vagrant species occurs less frequently than once every 10 years (Geo-Marine, Inc. September 2005).

3.10.3.4 Roseate Tern

"In the Caribbean, the roseate tern [Sterna dougallii dougallii] breeds from Florida through the West Indies to islands off Central America and northern South America. . . . Roseate terns breed primarily on small offshore islands, rocks, cays, and islets. Rarely do they breed on large islands. They have been reported nesting near vegetation or jagged rock, on open sandy beaches, close to the waterline on narrow ledges of emerging rocks, or among coral rubble" (http://endangered.fws.gov/i/b/sab6h.html). Critical habitat has not been designated for this species (Geo-Marine, Inc. September 2005).

No historic evidence is available to indicate whether the roseate tern has ever nested at NAPR and no roseate tern observations have been noted in or over coastal waters adjacent to NAPR. No roseate terns were spotted during the 2002 and 2004 boat and pedestrian surveys of sea turtle nesting beaches at NAPR. The nearest active roseate tern colony likely occurs on the eastern end of Vieques (more than 20 miles [32 km] east of NAPR) (Geo-Marine, Inc. September 2005). Although the occurrence of the roseate tern at NAPR has never been documented, the species should be considered accidental at NAPR because the species could be pushed into nearby coastal waters or inshore during a hurricane.

3.10.4 Plants

Cobana Negra

Cobana negra (*Stahlia monosperma*), a medium-sized evergreen tree that reaches 25 to 50 feet (8 to 16 m) in height and 1 to 1.5 feet in diameter, is found on the edge of salt flats in brackish, seasonally flooded wetlands. Its associates are black mangrove and buttonwood mangrove. A Cobana negra tree was identified in a mangrove stand near the Coast Guard (old ammunition) pier in Enseñada Honda in 1989 (Vicente *et al.* 1989). In August 2004, Geo-Marine, Inc. conducted rare species surveys at NAPR and identified a single individual of this species in a coastal scrub forest area west of American Circle (Geo-Marine, Inc. September 2005).

3.11 Socioeconomics

3.11.1 Population and Housing

Population

NAPR is located within the municipal boundaries of Ceiba and Naguabo. The local region for the area surrounding NAPR is the Fajardo/Ceiba Region, which represents eight municipalities: Ceiba, Fajardo, Humacao, Las Piedras, Loiza, Luquillo, Naguabo, and Rio Grande.

The eight municipalities of the Fajardo/Ceiba Region represent 7% of the total population of Puerto Rico, while the five municipalities that comprise the San Juan Region account for 28% of the total population (Reuse Plan). The 1990 and 2000 population of Puerto Rico, the San Juan Region, and the Fajardo/Ceiba Region is presented in Table 3-5.

Table 3-5 Population for Puerto Rico, San Juan, and Fajardo/Ceiba Regions

	1990	2000	% Change
Puerto Rico	**3,522,037**	**3,808,610**	**0.8%**
San Juan Region	**1,024,406**	**1,050,346**	**0.3%**
Fajardo/Ceiba Region	**252,801**	**280,075**	**1.0%**
Ceiba	17,145	18,004	0.5%
Fajardo	36,882	40,712	1.0%
Humacao	55,203	59,035	0.7%
Las Piedras	27,896	34,485	2.1%
Loiza	29,307	32,537	1.1%
Luquillo	18,100	19,187	0.6%
Naguabo	22,620	23,753	0.5%
Rio Grande	45,648	52,362	1.4%

Source: CB Richard Ellis *et al.* September 21, 2004 (i.e., Reuse Plan).

The average growth of the Fajardo/Ceiba Region (1.0%) slightly outpaced the Commonwealth of Puerto Rico (0.8%), and the San Juan Region (0.3%). It is anticipated that this higher local growth rate will continue through 2025 (see Table 3-7 below), with a projected increase in population from 2000 to 2025 of 0.5%, compared with 0.4% for the Commonwealth and 0.2% for the San Juan Region (Reuse Plan).

Housing

The existing housing stock at NAPR includes 801 single and multi-family residential facilities comprising 2,417,010 square feet. The majority of single-family houses (676 of 801) are small, with low-sloping built-up roofs and ranging in size from 1,600 to 2,000 square feet. Of the 676 single-family dwellings, 319 have been recently renovated. Another 98 buildings consist of small multi-family dwellings designed to accommodate two to eight families, and the remaining 27 buildings are large-scale multi-family (see Table 3-6). All of these units are vacant due to the closure of NSRR.

Table 3-6 Existing Housing Statistics at NAPR

Housing Type	Number of Units	SF (in thousands)	% of Total
Single Family	676	1,233	51%
Small Multi-Family	98	474	20%
Large Multi-Family	27	710	29%
Total	**801**	**2,417**	**100%**

Source: CB Richard Ellis *et al.* September 2004 (i.e., Reuse Plan).

The housing resources in the Fajardo/Ceiba Region include 107,915 units as of 2000, which represents approximately a 2.4% average annual growth over the 1990 stock of 85,142 housing units. From 1990 to 2000 the number of housing units grew faster than the region's population, creating an excess of housing units. The Region's vacancy rate of 16% was higher than the island average of 11%. Table 3-7 depicts population and housing projections for Puerto Rico and select municipality regions.

Table 3-7 Population and Housing Projections (2000-2025)

Region	2000 - 2005[1]	2005 - 2010	2010 - 2015	2015 - 2020	2020 - 2025	Total 2000 - 2025
Puerto Rico						
New Residents	123,865	92,283	80,376	61,714	42,145	400,383
Average Annual Growth	0.6%	0.5%	0.4%	0.3%	0.2%	0.4%
New Housing Units[2]	41,565	30,967	26,972	20,709	14,143	134,357
Fajardo/Ceiba Region[3]						
New Residents	11,534	9,208	7,427	5,922	4,017	38,108
Average Annual Growth	0.8%	0.6%	0.5%	0.4%	0.3%	0.5%
New Housing Units[2]	3,870	3,090	2,492	1,987	1,348	12,788

Table 3-7 Population and Housing Projections (2000-2025)

Region	2000 - 2005[1]	2005 - 2010	2010 - 2015	2015 - 2020	2020 - 2025	Total 2000 - 2025
San Juan Region[4]						
New Residents	18,189	7,540	11,368	6,758	6,004	49,859
Average Annual Growth	0.3%	0.1%	0.2%	0.1%	0.1%	0.2%
New Housing Units[2]	6,104	2,530	3,815	2,268	2,015	16,731

Source: CB Richard Ellis *et al.* September 2004 (i.e., Reuse Plan).

Notes:
[1] These figures are based on the estimated population as of July 1, 2000, as provided by the Puerto Rico Planning Board.
[2] Based on the island-wide average of 2.98 persons per household.
[3] Includes the following municipalities: Ceiba, Fajardo, Humacao, Las Piedras, Loiza, Luquillo, Naguabo, and Rio Grande.
[4] Includes the following municipalities: San Juan, Bayamon, Carolina, Guaynabo, Catano, and Trujillo Alto.

3.11.2 Economy, Employment, and Income

Economy

The primary economic sectors of the local economy of the Fajardo/Ceiba Region include tourism, marinas and ports, and industrial and retail uses.

- **Tourism.** Although tourism in Puerto Rico represents a small segment of the economy when measured in terms of direct expenditures by non-resident tourists, its overall importance and impact is much greater in terms of employment and income multipliers. There were approximately 4.4 million visitors to Puerto Rico during fiscal year 2002. These visitors spent nearly $2.4 billion during their time on the island. Total direct, indirect, and induced employment in the tourism industry during fiscal year 2002 was just over 56,000 persons (Reuse Plan).

  The northeast region of Puerto Rico is one of the premier destinations on the island because it is close to El Yunque National Park and the sister islands of Vieques and Culebra (known as the Spanish Virgin Islands) and because of the large number of golf courses and marinas. Several well-known hotels are located in the Fajardo/Ceiba Region, including the Westin Rio Mar Beach Resort and Ocean Villas in Rio Grande and the Wyndham El Conquistador Resort and Las Casitas Village in Fajardo (Reuse Plan).

- **Marinas and Ports.** The eastern region of Puerto Rico is often referred to as the Gold Coast for its numerous beaches, resorts, and many ports and marinas for boating activities. Table 3-8 lists several marinas in eastern Puerto Rico and their associated boat capacity. There are additional planned expansions at several marinas in eastern Puerto Rico that would increase their capacity by almost 1,000 slips, or 26% (Reuse Plan).

  NAPR has an existing marina that includes 72 boat slips and 25 moorings. Use of the marina has historically been limited to Navy personnel. Each boat slip is approximately 12 feet wide and most are approximately 31 feet long,

with a few in the range of 17 to 35 feet. The facility is generally in good condition as it is relatively new (Reuse Plan).

Table 3-8 Marinas in the Eastern Region of Puerto Rico

Marina Name	Wet Slips	Dry Stacks	Total Spaces
Puerto Chico	278	276	554
Sea Lovers	110	0	110
Villa Marina	266	576	842
Puerto del Rey	1,000	524	1,524
El Conquistador	22	0	22
Isleta Marina	240	0	240
Palmas del Mar	230	0	230
Roosevelt Roads	72	0	72
Total	**2,218**	**1,376**	**3,594**

Source: CB Richard Ellis *et al.* September 2004 (i.e., Reuse Plan).

- **Industry.** The industrial market in Puerto Rico is characterized primarily by owner-occupied manufacturing facilities (including, in particular, pharmaceuticals) and for-lease properties owned by the Puerto Rico Industrial Development Company (PRIDCO). PRIDCO estimates that it owns approximately 88% of the total industrial space available for lease in Puerto Rico. As of April 1, 2004, PRIDCO owned approximately 24.8 million square feet of industrial buildings. Of this total, approximately 75% was leased, with much of the vacant inventory being either reserved for prospective tenants or under negotiation for lease (Reuse Plan). With the moderately high current and projected occupancy rates, PRIDCO has plans for new construction to increase their inventory and their presence in the industrial sector.

- **Retail.** Driven by consistently strong sales, Puerto Rico's retail market experienced a development boom in the 1990s, with about 11 million square feet of new retail space constructed between 1996 and 1999. The market is dominated by shopping centers with big box retailers as anchor tenants, and demand for retail space in Puerto Rico continues to be strong. Although development has stalled since the expansion period of the 1990s, the island-wide vacancy rate is approximately 5% and rental rates have been stable (Reuse Plan).

  As shown in Table 3-9, retail sales in Puerto Rico increased 46% between 1992 and 1997, the most recent years for which data were available. Humacao and Fajardo have both the highest number of establishments and sales within the Fajardo/Ceiba Region.

Table 3-9 Comparison of Total Retail Sales, Puerto Rico, 1992 and 1997

Retail Category	1992 (millions)	1997 (millions)	Change
Building Materials	$616	$973	58.0%
General Merchandise	$1,503	$2,230	48.4%
Food	$2,960	$3,621	22.3%
Automotive Dealers	$1,688	$3,396	101.2%
Gasoline Service Stations	$711	$1,141	60.5%
Apparel and Accessories	$1,205	$1,414	17.3%
Home Furniture	$772	$1,119	44.9%
Eating and Drinking	$934	$1,445	54.7%
Drug and Proprietary	$657	$897	36.5%
Misc. Retail	$661	$853	29.0%
Total	**$11,707**	**$17,088**	**46.0%**

Source: CB Richard Ellis *et al.* September 2004 (i.e., Reuse Plan).

Employment and Income

Employment statistics by industry and occupation for the Commonwealth of Puerto Rico, the Fajardo/Ceiba Region, and the municipalities that comprise the Region are presented in Table 3-10. The distribution of employment remains fairly even between the different geographic areas. The five major employment industries in the Fajardo/Ceiba Region are education, health and social services (18.3%), manufacturing (15.3%), retail trade (11.2%), public administration (12.1%), and construction (10.7%) (Reuse Plan).

Table 3-10 Employment by Industry

Industry	Puerto Rico		Fajardo/Ceiba	
Employed Population 16+	930,865	100%	64,158	100%
Employment by Industry				
Education, health, and social services	179,374	19.3%	11,731	18.3%
Manufacturing	125,450	13.5%	9,818	15.3%
Retail Trade	109,339	11.7%	7,207	11.2%
Public Administration	99,268	10.7%	7,742	12.1%
Construction	80,288	8.6%	6,878	10.7%
Prof., scientific, admin, waste mgmt	62,994	6.8%	3,525	5.5%
Arts, accommodation, and food services	60,873	6.5%	5,631	8.8%
Other services (except public admin)	50,123	5.4%	3,240	5.1%
Finance, Insurance, Real Estate	46,353	5.0%	2,308	3.6%
Wholesale Trade	40,518	4.4%	1,882	2.9%
Trans. and Warehousing, and utilities	39,509	4.2%	2,505	3.9%
Information	20,877	2.2%	1,074	1.7%
Ag, forestry, fishing/hunting, and mining	15,899	1.7%	617	1.0%

Table 3-10 Employment by Industry

Industry	Puerto Rico		Fajardo/Ceiba	
Employment by Occupation				
Sales and office	260,317	28.0%	16,637	25.9%
Management, professional, and related	255,417	27.4%	14,583	22.7%
Service	150,657	16.2%	12,180	19.0%
Production, trans. and material moving	141,327	15.2%	10,989	17.1%
Construction, extraction, and maintenance	112,776	12.1%	9,392	14.6%
Farming, fishing and forestry	10,371	1.1%	377	0.6%

Numerous large companies in Puerto Rico contribute to the industrial sector and general employment within the Commonwealth. These companies are primarily in three major categories: (1) pharmaceuticals and biotechnology; (2) medical instruments; and (3) electronics. Based upon estimates from the Department of Economic Development and Commerce for the Commonwealth of Puerto Rico, since 2002 recent investments from eighteen selected major companies totaled $2.1 billion and committed more than 5,000 jobs (Reuse Plan).

The Commonwealth of Puerto Rico had a relatively high unemployment rate (7.8%) in 2000 and a low median household income ($14,412) when compared with the mainland United States. Similarly, the median household income and unemployment rates for the municipalities in the Fajardo/Ceiba Region is in most instances comparable to the Commonwealth statistics (see Table 3-11). However, the municipalities of Loiza, Luquillo, and Naguabo are considerably lower than the median household income for the entire island.

Table 3-11 Median Household Income, Unemployment, and Poverty Figures by Municipality (2000)

	Median Household Income	Unemployment Rate	Population with Income Below Poverty	Percent Below Poverty
Puerto Rico	**$14,412**	**7.8%**	**1,818,687**	**48.2%**
Fajardo/Ceiba Region	–	–	–	–
Ceiba	$16,440	7.0%	6,479	38.6%
Fajardo	$15,410	7.7%	17,045	42.1%
Humacao	$14,345	7.3%	27,690	47.2%
Las Piedras	$14,622	9.1%	16,226	47.3%
Loiza	$11,200	9.8%	19,394	59.7%
Luquillo	$13,631	9.5%	10,203	51.7%
Naguabo	$11,461	7.9%	13,051	56.0%
Rio Grande	$15,006	8.0%	24,130	46.6%

Source: CB Richard Ellis *et al.* September 2004 (i.e., Reuse Plan); U.S. Census Bureau 2004.

In addition, the percentage of individuals living below poverty in Puerto Rico is nearly 50%. In the Fajardo/Ceiba Region, the percent living below poverty ranges between 39% and 60%, with the highest number of identified individuals residing in Loiza, Luquillo, and Naguabo (Reuse Plan; U.S. Census Bureau 2004).

Taxes and Revenue

The property of the former NAPR has not been subject to property taxes during its ownership by the United States government. Table 3-12 and Table 3-13 present the basic revenue and expenditure streams for the municipalities of Ceiba and Naguabo, respectively. (The percent of total column shows the basic sources of revenue for the municipalities and where the funds received are spent.) Some categories were combined or organized by general category to afford a certain level of comparison between the municipalities. The major source of revenue in each municipality is from intergovernmental revenue, either from the Commonwealth or through benefits from the United States government. Expenditures are more evenly distributed across government agencies and expenses.

Table 3-12 Municipal Revenues for Ceiba and Naguabo (2002-2003)[1]

	Ceiba		Naguabo	
Revenue Description	2002-2003	%	2002-2003	%
Municipal Patents	565,000	9%	0	-
License Interest and Surcharges	1,130	<1%	0	-
Other Local Taxes	200	<1%	0	-
Property Taxes	328,022	5%	1,537,154	15%
Construction/Business Taxes	700,000	11%	667,204	6%
Licenses and Permits	2,500	<1%	387,432	4%
Compensation	541,122	8%	0	-
Intergovernmental Income	3,160,491	48%	5,317,712	50%
Federal Assistance	0	-	2,470,568	23%
State Compensations	85,000	1%	0	-
Transportation Services	5,000	<1%	0	-
Fines	5,000	<1%	0	-
Investment Interests	50,000	1%	0	-

Table 3-12 Municipal Revenues for Ceiba and Naguabo (2002-2003)[1]

Revenue Description	Ceiba		Naguabo	
	2002-2003	%	2002-2003	%
Incidental Income	200,000	3%	0	-
Rents	15,000	<1%	86,996	1%
Other Miscellaneous	860,642	13%	84,798	1%
Totals	**6,519,108**	**100%**	**10,551,864**	**100%**

Source: Municipality of Ceiba, Municipality of Naguabo.

Note:
[1] For the purpose of this table, some revenue categories were combined and may not appear to precisely correspond with the municipal records.

Table 3-13 Municipal Expenditures for Ceiba and Naguabo (2002-2003)[1]

Expenditure Description	Ceiba		Naguabo	
	2002-2003	%	2002-2003	%
Mayor and Municipal Legislature	487,631	7%	733,273	6%
General Government	2,298,199	35%	4,939,665	39%
Public Safety	573,209	9%	411,172	3%
Public Works	1,542,304	24%	845,910	7%
Culture and Recreation	509,167	8%	184,623	1%
Health and Sanitation	329,023	5%	113,852	1%
Solid Waste Disposal	–	–	866,753	7%
Human Services and Welfare	338,931	5%	1,763,421	14%
Urban Development	–	–	2,113,686	17%
Office of Emergency Management	230,306	4%	–	–
Department of Public Relations	210,338	3%	–	–
Debt Service: Principal	–	–	350,000	3%
Debt Service: Interest and Other Charges	–	–	158,477	1%
Capital Outlay	–	–	54,779	<1%
Total	**6,519,108**	**100%**	**12,535,611**	**100%**

Source: Municipality of Ceiba, Municipality of Naguabo.

Note:
[1] For the purpose of this table, some expenditure categories were combined and may not appear to precisely correspond with the municipal records.

3.11.3 Community Services and Facilities

Police

The area surrounding NAPR is within the jurisdiction of a combination of either the Commonwealth Police Department or one of the two nearby municipal police departments (Ceiba or Naguabo). It is estimated that these police departments account for approximately 170 total officers locally. This equates to approximately 4.1 police officers per 1,000 local residents.

Fire

NAPR was formerly responsible for its own fire protection. There is one fire department each located in Ceiba and Naguabo, with approximately 20 total full-time firefighters stationed locally. This equates to approximately 0.5 firefighters per 1,000 local residents.

Hospitals/Medical Facilities

The one existing hospital located at NAPR is a three-story, 130,000 square foot facility with a 36-bed capacity. The Puerto Rico Health Department reports that the Eastern Region of the island is lacking in certain types of hospital and medical facilities. In particular, Ceiba has no medical facilities such as emergency rooms, hospitals, rest homes, home care providers, diagnostic and treatment centers, rehabilitation centers, ambulatory surgery centers, laboratories or blood banks. There is also no hospital in Naguabo and only one diagnostic/treatment center (Reuse Plan). The nearest hospital is located in Fajardo.

Schools

NAPR has two schools—one elementary and one middle/high school. The specific size and capacity of the schools is noted below in Table 3-14.

Table 3-14 Size and Capacity of NAPR Schools

	Elementary School	Middle/High School
Classrooms	58	46
Permanent	41	38
Temporary	17	8
Size (in square feet)	85,280	52,255
Capacity (no. of students)	900	600

Source: CB Richard Ellis *et al.* September 2004 (i.e., Reuse Plan).

The Ceiba school district has 1,179 elementary students in three schools, 573 junior high students in one school, 484 high school students in a single school, and 62 special education students for a total of 2,298 students. It reports that there is insufficient space at the junior high level and that the high school does not currently offer vocational courses (Reuse Plan).

The Naguabo school district has 2,464 elementary students in 10 schools, 1,044 junior high students in four schools, and 717 high school students on one campus. Like Ceiba, Naguabo reports that it needs more facilities at the junior high level and that its high school does not offer vocational courses but wishes to do so (Reuse Plan).

3.12 Cultural Resources

3.12.1 Historic Buildings

Table 3-15 identifies 36 buildings/structures located at NAPR that are eligible for listing in the National Register of Historic Places (NRHP), either individually or as contributing elements to the Ammunitions Storage District or the Administration and Barracks District. These resources were evaluated as part of a comprehensive architectural survey conducted in 2000 and 2001, the findings of which are documented in the *"Architectural Resources Inventory and Evaluation, Naval Station Roosevelt Roads Ceiba, Vieques and Culebra, Puerto Rico."* The Puerto Rico State Historic Preservation Office (SHPO) concurred with the findings of this report in correspondence dated March 3, 2003. Housing resources were evaluated in "*Family Housing at the U.S. Naval Station Roosevelt Roads, Ceiba, Puerto Rico*" (March 6, 1998). That report concluded that none of the family housing is NRHP-eligible and the SHPO concurred with these findings in a letter dated April 13, 1998.

Table 3-15 Individually Eligible Buildings/Structures Located Outside Historic Districts

Building	Year	Original Use
Structure 844, Bolles Dry Dock, 1943		
Building 38, Bombproof Generator Plant, 1944		
Building 256, Communication Center		
Building 504, Bombproof Telephone Building		
Contributing Buildings Administrative and Barracks District		
78	1943	Marine Barracks
201	1943	Marine Galley and Mess Hall
202*	1943	Marine Barracks
203	1943	Marine Barracks
Contributing Buildings within the Ammunitions Storage District		
300	1943	Inert Magazine
301	1943	Small Arms Storage
302	1943	Small Arms Storage
303	1943	Small Arms Storage

Table 3-15 Individually Eligible Buildings/Structures Located Outside Historic Districts

Building	Year	Original Use
305	1943	Fuse and Detonator Magazine
306	1943	Fuse and Detonator Magazine
307	1943	Fuse and Detonator Magazine
308	1943	Fuse and Detonator Magazine
309	1943	Fuse and Detonator Magazine
310	1943	Fuse and Detonator Magazine
311	1943	High Explosive Magazine
312	1943	High Explosive Magazine
313	1943	High Explosive Magazine
314	1943	High Explosive Magazine
358	1943	Small Arms Magazine
Contributing Buildings within the Ammunitions Storage District		
359	1943	Small Arms Magazine
360	1943	Small Arms Magazine
384	1958	High Explosive Magazine
764	1962	Magazine
765	1962	Magazine
766	1962	Magazine
1665	1967	Ready Issue Magazine
1666	1967	Ready Issue Magazine
1667	1967	Ready Issue Magazine
1668	1967	Arms Storage Magazine
1681	1969	Arms Storage Magazine
1682	1969	Arms Storage Magazine
1682A	1990	Arms Storage Magazine

* Resource is considered individually eligible.

3.12.2 Archaeological Resources

The Navy conducted station-wide archaeological surveys in three phases from 1994 through 1996. More than 25% of the Naval Station was surveyed as part of this initiative, resulting in the identification of 27 archaeological sites. An additional four sites were identified during a survey conducted in the summer of 2004. Of the 31 sites identified to date that lie within the area to be disposed, 19 sites have been determined to be eligible and three sites are classified as potentially eligible for listing in the NRHP. The remaining sites have been determined to be not eligible for listing. The remaining 79 acres at the installation, which were identified as being relatively undisturbed and having a moderate to high potential for the presence of archaeological resources, were surveyed in mid-2005. The survey effort identified three additional sites as eligible for the National Register of Historic Places.

In a letter dated August 31, 2004, the Puerto Rico SHPO concurred that the Navy had completed identification and evaluation efforts for aboveground architecture, and with the work completed in the summer of 2004 the Navy has met the requirements for identifying archaeological resources as required under 36 CFR 800.4(a) through (c).

3.13 Coastal Zone Management

Pursuant to the Coastal Zone Management Act (CZMA) of 1972, the Commonwealth of Puerto Rico has a federally approved Coastal Management Plan (CMP). The CMP defines the coastal zone, identifies the existing sensitive ecosystems within the coastal zone, highlights potential threats resulting from development, and outlines programs and policies designed to manage and protect this sensitive area. The coastal zone in Puerto Rico extends from the seaward boundary of the territorial sea (approximately 9 nautical miles) to 3,283 feet (1,000 m) inland from the ocean shoreline and further inland, as necessary, to include important natural coastal systems located landward of the zone's 3,283-foot (1,000-m) boundary. The coastal zone includes islands, intertidal areas, salt marshes, saltwater wetlands, beaches, and freshwater wetlands.

The purpose of the Puerto Rico CMP is to guide development of public and private property and water activities in the designated coastal zone. Commonwealth agencies principally responsible for enforcing compliance with planning and permitting in the coastal zone are the PRPB and the Puerto Rico DNER. The PRPB has the authority to issue development permits throughout Puerto Rico, including the maritime zone; it also issues federal consistency certifications for activities affecting coastal uses and resources. The Puerto Rico DNER is responsible for granting mining concessions and franchises for the use of surface and ground waters; the management of the maritime zone, coastal waters, and submerged lands; and the management of forests and the regulation of sand extraction, hunting, and fishing. The Division of Coastal Zone within the Puerto Rico DNER is responsible for administration and coordination of the CMP. In coordination with the U.S. Army Corps of Engineers (USACE), the PRPB and Puerto Rico DNER have developed a joint application process to assist individuals applying for permits for activities that will affect the coastal resources, including the issuance of a certificate of coastal consistency with the Puerto Rico CMP.

Lands owned by the federal government are excluded from the defined coastal zone. However, as required by Section 307(c) of the CZMA, any federal activity that di-

rectly or indirectly affects any land or water use or natural resource of the coastal zone must be consistent with the CMP to the maximum extent possible.

4 Environmental Consequences

4.1 Land Use and Aesthetics

The proposed disposal action would result in the disposal of 8,435 acres of the NAPR property from federal to private ownership. The remaining 230 acres would remain in federal ownership. However, operational responsibility of these parcels would transfer from the Navy to other federal entities. It is assumed that the portion of NAPR disposed of to private ownership would be redeveloped as provided for in the Reuse Plan prepared by the LRA. As required by NEPA, a federal agency proposing an action must evaluate the environmental effects (impacts) that could reasonably be anticipated to be caused by or result from the proposed action. This section describes the potential environmental consequences associated with disposal and reuse of NAPR property transferred to non-federal entities.

As discussed in Section 1.6, the impacts associated with reuse of the property through 2013 (i.e., Phases I and II) under the Reuse Plan are considered indirect impacts of the proposed action. These impacts are described at a general level of detail, consistent with the level of detail found in the Reuse Plan. However, the magnitude of redevelopment beyond Phase II (i.e., Phases III and IV full build-out to 2037) would be a function of economic factors and other factors that, with the exception of certain Navy-imposed restrictions, would be beyond the control of the Navy. As such, the ultimate redevelopment of the property through Phase IV of the Reuse Plan is considered to be speculative at present; therefore, the proposed reuses defined in Phases III and IV of the Reuse Plan have been evaluated as unforeseeable, long-range implications of the proposed action and are evaluated as cumulative impacts in Section 5 of this EA.

In addition, those properties that will be transferred from the Navy's operational responsibility to other federal agencies are excluded from further impact analysis because these properties will remain under federal laws and regulations. These properties are discussed within the context of cumulative impacts.

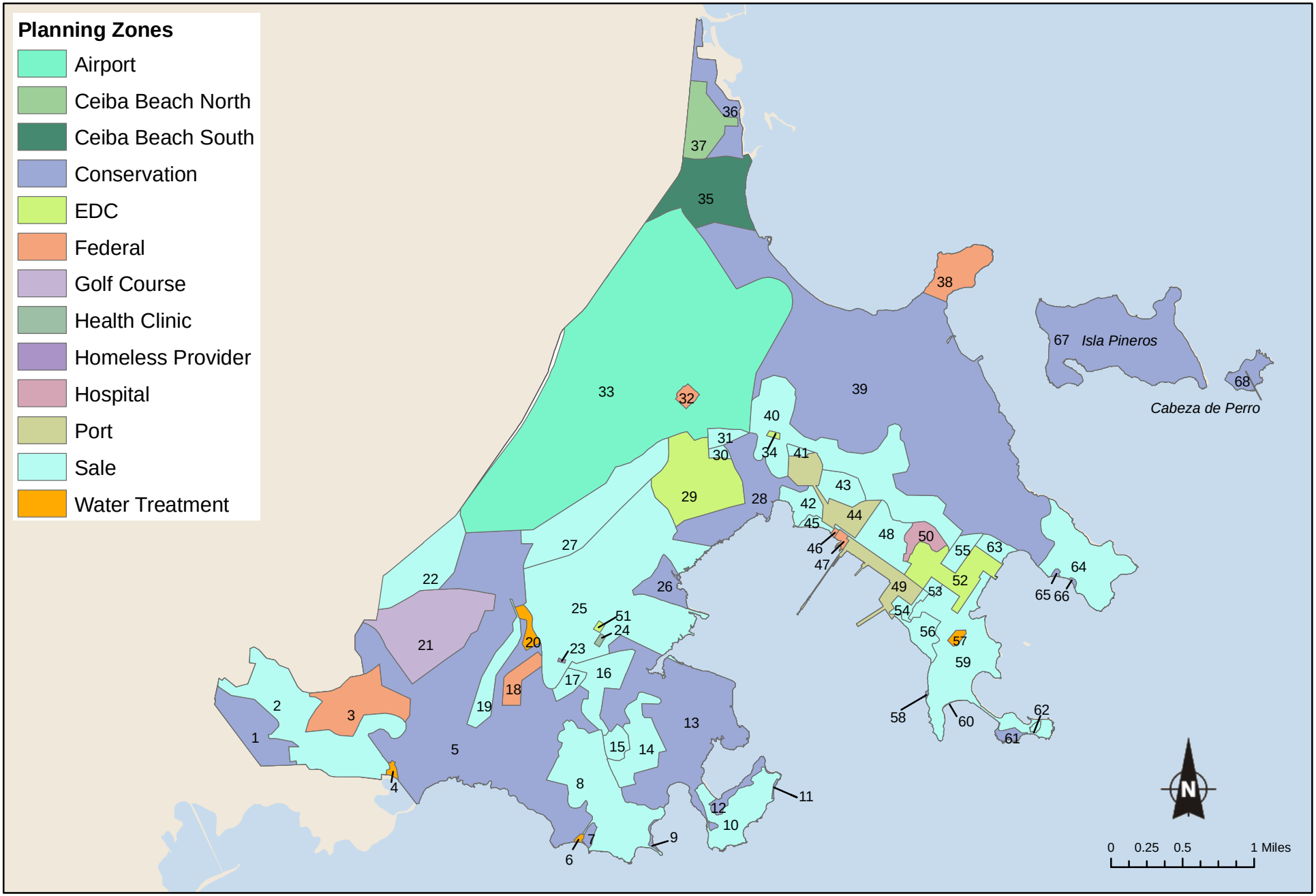
4.1.1 Land Use

The disposal of NAPR would result in long-term changes to development controls, property ownership, and site access. Navy disposal of NAPR would result in 230 acres of property being managed by other federal agencies and 8,435 acres placed in the ownership of public (Commonwealth) and private sector entities. For the purposes of disposal, Navy subdivided NAPR into 68 distinct parcels (Figure 4-1). The boundaries of these parcels were specifically selected so that sites with remaining environmental contamination would be managed under a single disposal action to facilitate cleanup. Navy would no longer manage or control activities that would occur on the land and the public would have unrestricted access to the property via the existing transportation system.

In a letter dated December 2, 2005 (Appendix A), the Department of Economic Development and Commerce (DEDC) indicated that the department, through the LRA is working on a Special Zoning Plan for Portal del Futuro (the NAPR property), which the LRA will present to the PRPB for approval (this will also require approval of a Strategic Environmental Impact Statement by the Puerto Rico EQB). It is anticipated that the PRPB would adopt the proposed Special Zoning Plan. Upon its adoption, this plan would serve as the official zoning of the property. Any future development projects proposed on former NAPR property would be reviewed by the PRPB to ensure that such development is consistent with the Special Zoning Plan. Under this plan, in the near-term, through Phase II, NAPR would be developed in a manner similar to the historic condition. Thus, the nature of the zoning regulations and classifications that would be adopted and enforced by the PRPB is an important factor in encouraging beneficial land uses and limiting potential internal land use inconsistencies associated with reuse of the property.

Direct impacts related to implementing the Reuse Plan through Phase II were evaluated based on whether:

- Reuse would be compatible with historical land uses on NAPR;



Source: Geo-Marine, 2005; ESRI, 2004

Figure 4-1
Parcel Index Map
Naval Activity Puerto Rico

- Reuse would be compatible with land uses adjacent to NAPR; and
- Reuse would significantly alter the aesthetic quality of the NAPR property.

Internal Land Use Consistency

Table 4-1 provides a summary of the internal land use consistency assessment completed for the proposed action alternative.

Table 4-1 Proposed Land Uses through Phase II of the Reuse Plan

Zone	Historical Land Use	Proposed Phase II Land Use	Increase in Developed Area (%)	Internal Land Use Consistency
Zone 1	Airfield; Open Space	Airport; Industrial; Open Space	9%	Compatible
Zone 2	Residential; Open Space	Residential; Institutional; Open Space	24%	Potentially Incompatible
Zone 3	Golf Course; Open Space	Golf Course; Open Space	111%	Compatible
Zone 4	Mixed-Use Commercial; Institutional; Residential; Open Space	Mixed-Use Commercial; Institutional; Open Space	17%	Potentially Incompatible
Zone 5	Residential; Institutional; Open Space	Residential; Open Space	16%	Compatible
Zone 6	Industrial; Institutional; Open Space	Industrial; Transportation; Open Space	17%	Compatible
Zone 7	Institutional; Residential; Industrial; Open Space	Research and Development; Conference Center; Open Space	5%	Compatible
Zone 8	Agricultural; Recreational; Open Space	Agricultural; Recreational; Open Space	0%	Compatible
Zone 9	Open Space	Conservation	0%	Compatible

As shown, proposed land uses in Zones 1, 3, and 5 through 9 were determined to be compatible with historical land uses. Some potential internal land use inconsistencies were identified for proposed development in Zones 2 and 4. The following is a brief discussion of the internal land use assessment within the development zones on NAPR.

- **Zone 1**

  The existing airfield in this zone is proposed for use as an operating cargo and passenger airport. It is expected that the existing airfield would be transferred to the PRPA, which would allow for a self-sufficient airport operation. The PRPA is currently drafting a master plan for the airfield facility. Transfer of the airfield to the PRPA for use as a cargo and passenger airport would be consistent with the historical land use in Zone 1.

  A 75-acre industrial complex is also planned in a currently undeveloped portion of the property. The industrial development would likely be located in the high noise zones associated with operation of the airport; however, this type of development is generally considered compatible with high noise zones around airfields (U.S. Navy 1998).

  A large open space reserve is proposed north of the airport in an area comprising natural vegetation communities. Protection of the natural resources in this area is considered a positive direct land-use impact of the proposed action alternative.

  The DHS would obtain control of approximately 10 acres in this zone, including a hangar and aircraft-parking apron to accommodate their direct access to the site. Continued use of the airfield for aircraft operations would be consistent with the planned DHS use of the property. As such, no adverse impacts related to internal land use inconsistencies are anticipated.

- **Zone 2**

  Approximately 300 dwelling units and moderate lodging facilities with approximately 400 rooms are proposed in this zone, as well as a 70,000 to 120,000 square foot learning/government training center. This proposed development would occupy areas that are currently developed primarily for multi-family residences and approximately 80 acres of adjacent undeveloped land. With the exception of an approximately 125-acre parcel where control would be transferred to the U.S. Army for the development of training and administrative support facilities, lands adjacent to this zone are planned to remain undeveloped due to various development constraints (i.e., slopes, wetlands). Consequently, the proposed land uses in Zone 2 would be compatible with the surrounding land use.

  New residential and lodging facilities are planned for an area within Zone 2 that is within the 60 to 65 dB and 65 to 70 dB noise zones associated with former military airfield operations (Reuse Plan; U.S. Navy March 2003). This area is affected by aircraft noise because of its location downwind of the main airfield runway and because of the absence of topographical barriers, present on other portions of NAPR, that reduce noise levels. Of the existing residential areas on the property, this area in Zone 2 has been identified as the location most affected by aircraft noise (Reuse Plan). Future noise levels experienced by residents or transient visitors within this zone would ultimately depend on the type and number of aircraft using the airport. Based on the poten-

tial for high noise levels to affect this portion of the property, the proposed land uses may be incompatible with the planned use of the airfield as a passenger and cargo airport. Further discussion of potential noise impacts related to airport operations is provided in Section 4.7.

- **Zone 3**
  An 88-acre expansion of the existing golf course is proposed within Zone 3, which would be compatible with the existing use of the property as well as the surrounding internal land uses.

- **Zone 4**
  Most of the proposed development within this zone would occupy existing facilities or occur in currently developed areas. For example, the existing elementary school would be reused, as would 150 recently constructed dwelling units. Mixed-use development comprising commercial, retail, and community development is also planned in the existing downtown area of the property. Each of these uses would be compatible with existing and planned internal land uses.

  A University Research Center is also planned in the northern portion of Zone 4 immediately adjacent to the airfield. Classrooms, labs, and dormitories would be occupied initially during Phase II of the Reuse Plan. This use would involve various buildings and other infrastructure that had previously been used to support the airfield operations. Due to its location immediately adjacent to the airfield, the university would be subject to potentially significant aircraft noise. This area was in the 70 to 75 dB noise zone when the airfield was formerly used to support military training (Reuse Plan; U.S. Navy March 2003). Future noise levels encompassing the planned institutional development would ultimately depend on the type and number of aircraft that would be using the airport. Based on the potential for high noise levels to affect this portion of Zone 4, the proposed University Research Center may be incompatible with the planned use of the airfield as a passenger and cargo airport. Further discussion of potential noise impacts related to airport operations is provided in Section 4.7.

- **Zone 5**
  Planned land use in this zone includes redeveloping existing residential areas and constructing new residences on approximately 59 acres of undeveloped land. Reuse of the existing middle/high school in this zone is also planned. Lands adjacent to Zone 5 are planned to remain undeveloped and preserved as conservation areas. Consequently, the proposed residential and institutional land uses within this zone would be compatible with existing and planned land uses.

- **Zone 6**
  Proposed development in this zone through Phase II would primarily involve the reuse of existing facilities to improve site access and to complement other land uses on the property. For example, Pier 3 would be reused as a passenger

ferry and light cargo terminal while the existing hospital would be used to provide medical services for local residents. Reuse of the fuel storage areas is also planned to support future operations at the airport as well as planned maritime shipping activities. Each of these proposed land uses would be compatible with existing and planned uses on the property.

A contiguous open space reserve and recreation area is also proposed within Zone 6. This area would provide direct access to the waterfront and occupy significant acreage between and around the fuel storage and delivery facilities, thereby screening these areas from potential future development. Protection of the natural resources in this area is considered a positive direct land use impact of the proposed action alternative.

The DHS would maintain an approximately one-acre area adjacent to the fuel pier for a boat storage and operations facility. This use would be consistent with the planned use of the surrounding waterfront as a passenger ferry and light cargo terminal.

- **Zone 7**
  Planned land use in this zone includes the early development stages of a science park. Initial construction of the science park is planned along the waterfront and would primarily occupy previously developed areas comprising the former Camp Moscrip. This development would be consistent with the existing and planned surrounding land uses.

- **Zone 8**
  Zone 8 is planned entirely as a public open space reserve and conservation area. This use would ensure that existing access to the public beach is maintained and allow enhanced recreational opportunities. Consequently, designation of this zone as an open space reserve and conservation area is considered to have a positive direct land use impact.

- **Zone 9**
  This entire zone, which comprises approximately 3,500 acres of undeveloped land, including approximately 2,100 acres of contiguous mangrove forests and wetlands, is proposed as a conservation area in its entirety. Permanent protection of sensitive natural resources in this area would represent a significant contribution to on-going regional conservation initiatives in Puerto Rico.

External Land Use Consistency

Implementing the Reuse Plan would result in the development of uses compatible with those adjacent to NAPR. Recreation, open space reserves, and industrial land uses are planned for areas adjacent to the primarily residential and undeveloped lands west of NAPR. The proposed industrial land would be buffered from off-site land uses by an open space reserve, which would prevent land use conflicts.

The redevelopment of NAPR would influence the future growth pattern of the nearby municipalities of Ceiba and Naguabo by providing a variety of commercial, service, and industrial employment activities rather than the singular former use of the property as a military base. As development increases on the NAPR property, off-site development would be expected to reflect more urban intensities and densities rather than the current rural residential setting. However, such land use changes would be considered long-term and beneficial impacts in that they would provide considerable economic benefits for communities in eastern Puerto Rico. Therefore, no significant adverse impacts on land use from implementing the proposed action alternative would be expected.

4.1.2 Aesthetics

Implementation of the Reuse Plan through Phase II would minimally change the overall aesthetic features of the NAPR property. All of the proposed new development would occur within or immediately adjacent to areas that are already developed; therefore, clearing the vegetated areas would be minimized and fragmentation of undeveloped areas avoided. Landscaping and sensitive design considerations in the development of new structures, which would likely be required in order to comply with specific zoning and site development regulations, could further minimize aesthetic impacts.

The most significant and visible aesthetic features on the property (i.e., mangrove forests and steep-sloped upland coastal forests) would either be permanently protected through designation as Conservation Areas or remain undeveloped. As such, implementation of the Reuse Plan through Phase II would not significantly affect the existing visual or aesthetic quality of the NAPR property.

4.1.3 Light Emissions

Airports are illuminated by various types of lighting that could potentially disturb nearby residential areas. Those lights include runway and runway approach lights and taxiway lights, all of which are critical to the safe operation of the airport. Only in unusual circumstances, as for example when high-intensity strobe lights would shine directly into residences, would airport-related light emissions be considered sufficient to warrant special study. The existing airfield operated with similar lighting requirements for military operations until 2004. New development to the west of the airfield, where

such impacts would be expected, has not occurred since the cease in military operations. It is not expected that lighting systems from the proposed airfield operations will have an impact on existing residences. Proposed development on the NAPR property should take into account the airport lighting requirements.

4.2 Environmental Contamination

Sites with remaining environmental contamination at NAPR fall into the following categories:

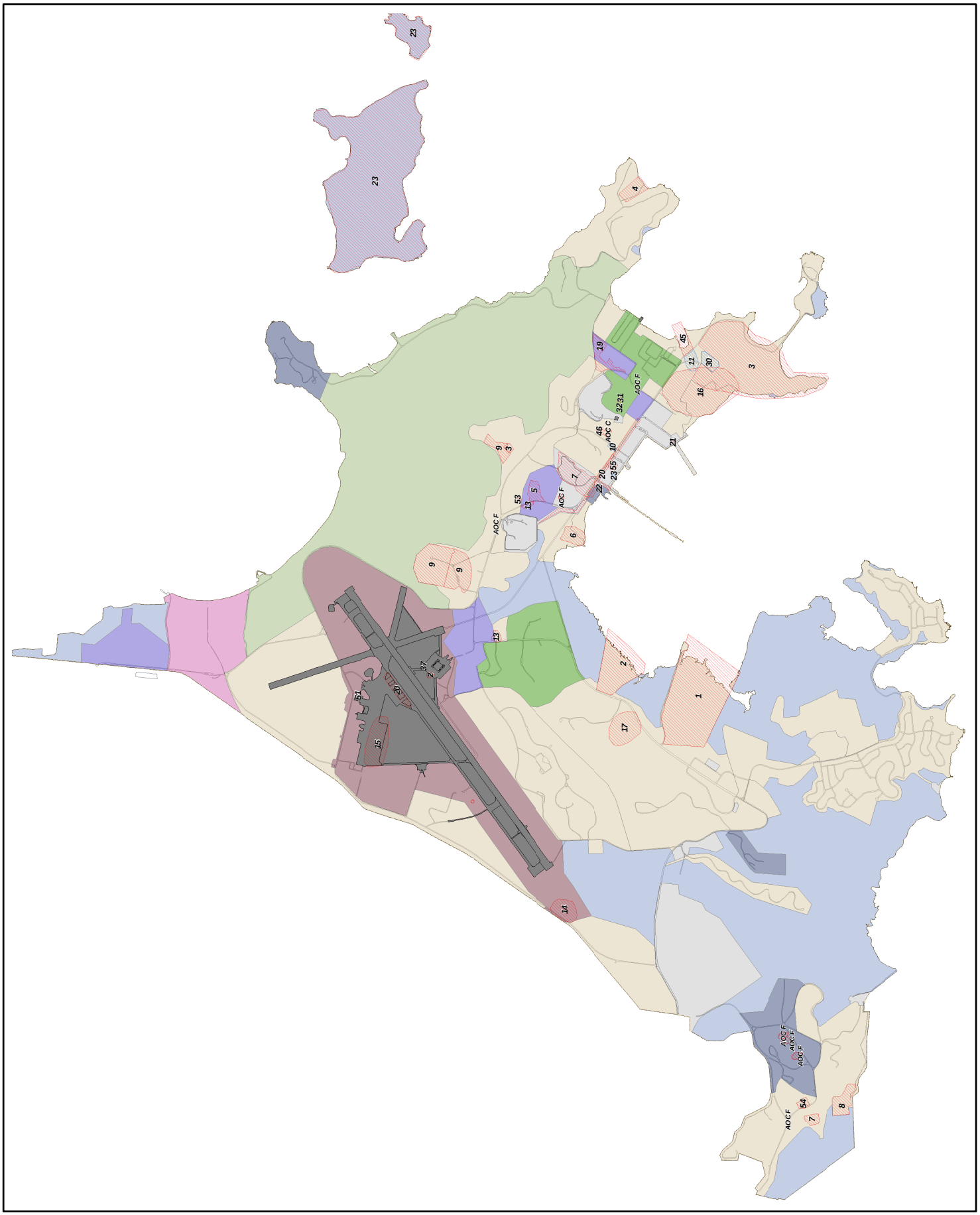
- RCRA sites, including IRP sites and all SWMUs, AOCs, and ECP sites;
- CERCLA sites;
- Tanks, including MNA sites;
- NRDA areas, including the 1999 JP-5 fuel spill area and associated mitigation;
- LBP areas, including LBP concerns associated with buildings designed for family housing; and
- ACM, including ACM concerns associated with all installation buildings.

Based on the Reuse Plan and the ECP, the Navy developed distinct parcels for possible disposal actions. In general, the parcels followed the various zones within the Reuse Plan and consist of lands for public sale, lands being transferred to the Commonwealth of Puerto Rico, and areas not being disposed but whose ownership responsibility is being transferred to another federal agency. The parceling process took into consideration the Reuse Plan but goes one step further in combining areas identified in the ECP as requiring some form of environmental remediation. Another consideration in developing the various parcel boundaries was to retain cleanup responsibility with one entity, be it the Navy or a new owner. Figure 4-2 depicts the parcels as they relate to the remaining sites of environmental concern, including sites with land use controls (Category 2 sites classified as CAC with controls) as well as sites with remaining cleanup requirements (Category 3 sites). Most of the contaminated sites are located in three distinct areas:

- The waterfront along the northeast side of Enseñada Honda, which was the major industrial area of NSRR and is designated for similar port and fueling facilities in the Reuse Plan;

Overview of Parcels and Sites with Remaining Environmental Concerns

Figure 4-2



- The airfield and surrounding facilities, which would remain airfield-oriented; and

- The developed area northwest of Enseñada Honda, which contained the Navy Lodge, exchange mall, commissary, bowling alley, gas station, mini-mart, etc., and is designated as a "downtown area" in the Reuse Plan.

The cleanup of contaminated sites at NAPR is primarily managed under the corrective action portion of the current RCRA Part B permit issued by EPA Region II (SWMU, AOC, ECP sites). The Navy has submitted an application for renewal of the Part B permit. Since base operations requiring the Part B permit are no longer in operation, only the corrective action portion of the permit remains applicable. The EPA has chosen to convert the regulation of corrective action requirements from this permit to a RCRA §7003 Administrative Order on Consent (§7003 Order) prior to property transfer. The Navy and EPA are currently negotiating how this issue will be resolved.

Under the §7003 Order, EPA is the lead agency for all cleanup actions and is the decision-making authority regarding remedy selection. Property that is subject to cleanup requirements of the permit (order) may be transferred prior to completion of cleanup under CERCLA early transfer authority, pursuant to the governor's approval of the early transfer. Upon property transfer, LUCs appropriate to individual sites would be imposed as necessary to ensure the protection of human health and the environment. These restrictions may be viewed as interim, pending completion of cleanup activities. Upon EPA approval of the completion of cleanup at a site, the Navy would modify or remove these LUCs in accordance with the EPA-approved final remedy.

Proposed Action

Under the proposed action, some parcels could be transferred with LUCs. Implementing this alternative would result in the following:

- Contaminated sites could be transferred earlier under the ETA.

- All sites would be cleaned up to meet historic land uses, defined as former NSRR operations. Thus, an industrial site would be cleaned to industrial risk-based levels.

- The Navy may choose to retain cleanup or pass cleanup responsibility on to the new owner. The Navy would be replaced by the new owner of the permit (or §7003 Order) for those sites where cleanup responsibility is passed to a new owner. The Navy would retain ultimate CERCLA liability in all cases.

- Sites previously completed with LUCs in place would not be reopened but transferred "as-is."

- The new owner could choose to take action to support removing LUCs. This would be between the new owner and the EPA. Reuse/redevelopment activity would be limited only by the specified LUCs and/or the new owner's schedule to reduce or remove the LUCs.

Under the proposed action, cleanup responsibility for parcels containing sites with remaining cleanup requirements could be handled in two ways: (1) cleanup responsibility would be transferred to the new owner, or (2) the Navy would retain cleanup responsibility. At sites where cleanup responsibility is passed to the new owner, a prerequisite to transfer would be establishment of an acceptable regulatory mechanism between EPA and the new owner. Each new owner of a parcel where there are remaining cleanup requirements and/or LUCs will get a §7003 Order specifically pertaining to the parcel in question. If the Navy is retaining the cleanup, the §7003 Order for the parcel would be held by the Navy.

The Navy could pass cleanup responsibility to new owners with all parcels to be sold to the public or, if retained as federal property, ownership would be transferred to another federal agency. The Navy would retain cleanup responsibilities for sites contained within parcels that are to be conveyed to recipients via PBCs and Economic Development Conveyances (EDCs). The Navy would also retain cleanup responsibility at sites where contaminants are known or suspected to cross multiple parcel boundaries (based on best available information, as presented in the ECP report), regardless of ultimate parcel ownership.

If the new owner is to perform cleanup, the new owner would be responsible for establishing goals with the EPA and completing cleanup according to the specific requirements of their own §7003 Order, which they would negotiate with the EPA prior to transfer. Cleanup goals would be risk-based and established based on the owner's selection of future use, as approved by the EPA. Where the Navy is performing cleanup, the Navy would identify future use as aligned with current use (i.e., former NSRR opera-

tions), as approved by the EPA. New owners wishing to change that use (i.e., to lift any remaining use restrictions) would be responsible for performing any additional work necessary to achieve that goal, as required by the EPA.

The Navy would retain cleanup responsibility for the RCRA site of Piñeros and Cabeza de Perro Islands under the MRP. Under RCRA, Navy conducts the cleanup as lead agency with EPA oversight. Cleanup goals would be designed to meet reasonably anticipated future land use as a wildlife refuge within the constraints of technological feasibility.

Similarly, additional cleanup activities are ongoing for MNAs under the regulation of EPA. The cleanup responsibilities would be retained or passed to the new owner as described for RCRA permit sites as described above.

Mitigation activities associated with the NRDA would continue under Navy responsibility. Because this mitigation is in lieu of site cleanup, no additional cleanup of the spill area would be performed.

LBP in housing has been inventoried and risk assessments prepared according to Federal Property Management Regulations. Similarly, ACM in buildings has been inventoried. Because future owners may choose to reuse buildings in their current configuration, significantly remodel, or demolish buildings to make way for new development, installation structures would be transferred to new parcel owners "as-is." New owners would be required to complete any necessary abatement activities as identified in the LBP and ACM inventories to ensure compatibility with use. A small quantity of friable, accessible, and damaged (FAD) ACM was identified during the ACM survey, and the Navy plans to complete abatement of this material prior to property transfer.

Implementing the proposed action with respect to environmental contamination would not result in a significant impact on the environment. In fact, this alternative offers several operational or functional advantages. The cleanup would be controlled by the end users with the appropriate level of cleanup being determined between EPA and the new owner, based on the property owner's desired reuse. In addition, this alternative would allow for rapid redevelopment, with sites being available for reuse as soon as a new owner is established. A new owner accepting cleanup responsibility could tailor redevelopment plans and schedules, taking into consideration remediation requirements, cost requirements, and operable development opportunity. Implementing this alternative

would allow the Puerto Rico citizenry an opportunity to reap any potential social, economic, and/or recreational benefit.

4.3 Infrastructure and Utilities

4.3.1 Potable Water Supply and Distribution

It is anticipated that the water supply and distribution system would be transferred to the Puerto Rico Aqueduct and Sewer authority (PRASA) during Phase I of the Reuse Plan. PRASA would be responsible for obtaining a National Pollutant Discharge Elimination System (NPDES) permit and for maintaining the potable water supply and distribution system to meet the standards and treatment requirements under the Safe Drinking Water Act (SDWA), as implemented by the Puerto Rico Department of Health. This law provides for the establishment of primary standards for the protection of the public health and secondary standards relating to the taste, odor, and appearance of drinking water. However, should the PRASA not take over the facilities, these facilities would be closed in accordance with the §7003 Order. The Commonwealth would assume responsibility for supplying potable water. As of December 2003, the water treatment system was meeting all applicable standards for water quality (U.S. Navy March 31, 2005), although recent monitoring data for the treatment plant indicated high levels of trihalomethanes (THMs) (Reuse Plan). THMs are formed when chlorine, which is used as a disinfectant, reacts with organic substances naturally occurring in the raw water. All enforceable maximum contaminant levels for particular contaminants in drinking water, including THMs, would need to be met by PRASA.

The reservoir, treatment plant, pump stations, and distribution lines are considered to be in good working order (e.g., no deficiencies or obvious defects; maintenance records are complete and up-to-date; intended function is performed adequately, etc.), and the treatment plant has adequate capacity to accommodate the peak potable water demand and fire protection that would be needed for the development proposed through Phase II (Reuse Plan). The maximum daily required flow of 4.0 mgd capacity of the treatment plant would not be exceeded during Phase I and Phase II of the Reuse Plan, with a projected workforce of 5,000 and residential population of 2,850 (see Section 4.11, Socioeconomics), considering that the average daily flow of the treatment plant when NAPR was active was 1.0 mgd with a population of more than 7,000 persons. De-

pending on the location of the new development with respect to existing water mains and the elevation of the new development, new water mains and booster pump stations may be required. In addition, the components of the system would need to be evaluated for compliance with applicable municipal codes.

A new water main may be required to accommodate industrial development north and south of the existing runway in Zone 1 and in Zone 5 under Phase II. No indirect effects on area resources are anticipated with installation of new water mains. Any installation of new water mains in Zones 1 and 5 should be planned to avoid removal of large vegetation (e.g., trees) in the open space reserves also proposed in these zones, as well as the wetlands south of the airfield in Zone 1, to the extent practicable. If avoiding wetlands is not feasible, installing water mains may require a permit under Section 404 of the Clean Water Act (CWA).

4.3.2 Wastewater Treatment

It is anticipated that the Bundy, Capehart, and Forrestal WWTPs and the wastewater collection and conveyance system at NAPR would be transferred to PRASA during Phase I of the Reuse Plan. PRASA would be responsible for maintaining the wastewater treatment system to meet the standards and treatment requirements of a Section 402 Clean Water Act NPDES permit. The permit would contain limits on pollutant discharge and specify monitoring and reporting requirements and other provisions to ensure that the discharge from the wastewater treatment plants would not affect water quality standards of the receiving waters. However, should the PRASA not take over the facilities, these facilities would be closed in accordance with the §7003 Order. The Commonwealth would assume responsibility for supplying wastewater treatment facilities.

The existing NPDES permit (#PR0020010) for NAPR WWTPs expired in January 2003. However, the Navy filed an application for a permit renewal six months prior to its expiration, and as a result the permit has continued to be operational under an Administrative Continuance. The permit could be directly transferred to PRASA along with transfer of ownership of the wastewater treatment plants, provided PRASA adopts the application for renewal of the permit as its own. However, depending on the uses ultimately served by the WWTPs, PRASA may need to supplement the permit (O'Brien 2005). Specifically, most of the wastewater treated at NAPR has been domestic waste-

water. Minimal discharges of industrial wastewater were received at the Forrestal WTTP. Depending on the type and intensity of industrial development realized in Zone 1, conditions of the NPDES permit may need to be amended to provide for pretreatment of industrial discharges.

The WWTPs, pump stations, and collection and conveyance lines are considered to be in good working order (e.g., no deficiencies or obvious defects; maintenance records are complete and up-to-date; the intended functions perform adequately, etc.) with a few exceptions for some individual components of the system. The existing wastewater treatment system has adequate capacity to accommodate the proposed level of development through Phase II of the Reuse Plan, with upgrades necessary only to support collection and conveyance from new development areas. The permitted capacity of the treatment plants (0.65 mgd for the Bundy plant, 1.13 mgd for the Capehart plant, and 1.0 mgd for the Forrestal plant) would not be exceeded during Phase I and Phase II of the Reuse Plan, with a projected workforce of 5,000 and residential population of 2,850 (see Section 4.11, Socioeconomics), considering that the average daily treated flow from the three plants was approximately 1.3 mgd when NAPR was active and had a population of more than 7,000 persons. However, the components of the system would need to be evaluated for compliance with the municipal code (i.e., use of PVC pipes).

To accommodate planned development, a new sewer main may need to be installed. No indirect effects on area resources are anticipated with the installation of new sewer mains. Any installation of sewer mains in Zones 1, 2, 5, and 7 would be planned to avoid removal of large vegetation (e.g., trees) in the open space reserves also proposed for these zones as well as in the wetlands south of the airfield in Zone 1, to the extent practicable. If avoiding wetlands is not feasible, installing water mains may require a permit under Section 404 of the Clean Water Act.

4.3.3 Storm Water

Proposed development activities would result in a slight increase in clearing and in impervious surfaces at NAPR, which in turn could modify the patterns and amount of storm water runoff generated. If uncontrolled, storm water runoff has the potential to adversely affect water quality in the quebradas, mangroves, and marine environments at and adjacent to NAPR through the introduction of sediments, particulates, and toxins.

NPDES storm water permits from the EPA and Control of Erosion and Prevention of Sedimentation (CES) permits from the EQB would be required for construction activities at NAPR or for disturbances to less than 1 acre that are associated with a larger common plan for development. (NPDES permits also are required for disturbances to more than one acre of land.) Large construction activities in Puerto Rico are eligible for coverage under EPA's NPDES General Permit for Storm Water Discharges Associated with Construction Activity. This permit requires developing and implementing a storm water pollution prevention plan using best management practices to minimize pollutants in storm water runoff. For soil disturbance of more than 9,688 square feet (900 square meters) of land, CES permits require that a soil erosion and sedimentation control plan be prepared and implemented. Compliance with these permit requirements would ensure that storm water is adequately controlled at all construction sites. Consequently, no significant adverse impacts related to storm water runoff are anticipated from implementation of the Reuse Plan.

As discussed in Section 3.3.3, six outfalls at NAPR are regulated under EPA's Multi-Sector General Permit Program. Automatic transfer of permit coverage under 40 CFR 122.61(b) is not allowed for Multi-sector General Permits. New owners may be required to obtain Multi-Sector General Permits or Individual Permits from the EPA for the six outfalls that are currently covered under the NAPR Multi-Sector General Permit or any other outfalls that would receive storm water from industrial activities or sheet flow from industrial areas. In some instances, it may be necessary for new property owners to prepare a spill pollution prevention plan as a condition of the NPDES permit.

4.3.4 Solid Waste

Disposal of NAPR property would result in the transfer of solid waste management from on-base facilities to off-base facilities. The existing landfill at NAPR would be closed in accordance with RCRA. Therefore, solid waste generated by the land uses proposed at NAPR would be the responsibility of the local municipalities (e.g., Ceiba, Naguabo) using existing facilities currently operated by Landfill Technologies, Inc. Landfill Technologies, Inc. manages municipal solid waste for a population of approximately 187,185 (including the municipalities of Fajardo, Ceiba, Naguabo, and other private and government agencies). Redevelopment of NAPR is projected to increase the

population by 2,850 (see Section 4.11, Socioeconomics), which is less than 2% of the population currently being served.

Based on the projected population growth of 2,850 persons and a waste generation rate of 0.7 tons/year/capita (Puerto Rico Authority for Solid Waste August 2004), which averages all residential, commercial, and industrial non-hazardous solid waste for a municipality, an estimated 1,995 tons of solid waste would be generated annually. This would add approximately 1% to the municipal solid waste currently managed by Landfill Technologies, Inc. Therefore, the proposed redevelopment of NAPR under Phase I and II is not projected to significantly impact solid waste management facilities.

4.3.5 Electric Power Systems

The disposal and proposed redevelopment of NAPR under the proposed action alternative would not significantly impact the electrical power demand or distribution systems at NAPR. The existing system is adequate to meet the demand of users during the redevelopment proposed under Phases I and II of the Reuse Plan. PREPA, which currently supplies power to NAPR, would likely acquire the electrical power distribution system, including eleven substations.

The substations and distribution lines are considered to be in fair to good working order (e.g., no deficiencies or obvious defects; maintenance records are complete and up-to-date; intended functions are performed adequately, etc.), although these systems may need to be upgraded to current standards upon integration into the PREPA system (Reuse Plan). In addition, with the transfer, PREPA would need to secure the substations and provide vehicle access. The maximum demand of 15,788 kVA and 1,464 kVA, respectively, for the incoming 38 kV circuits (Daguao and airport service lines) when NAPR was active with a population of more than 7,000 persons would not be met during Phase I and II of the Reuse Plan, with a projected workforce of 5,000 and residential population of 2,850 (see Section 4.11, Socioeconomics). However, PREPA would need to provide investments in stepping down the power to meet the redevelopment plans. An estimated 7,450 linear feet of distribution lines and two new substations are proposed to support the Reuse Plan through Phase II.

4.3.6 Transportation

Marine Transportation

Phase II of the Reuse Plan includes the reuse of the recently upgraded Pier 3 at the northeast portion of Enseñada Honda as a new passenger and light cargo ferry terminal with service to Vieques, Culebra, and the U.S. Virgin Islands. The ferry would likely be operated by the PRPA. Ferry service is currently provided from the eastern end of Puerto Rico via a pier in Fajardo, approximately 10 miles north of NAPR. This service is substandard due to unreliable scheduling, outdated ferry equipment, and deteriorating infrastructure at the Fajardo terminal and pier (Reuse Plan). A modern passenger ferry terminal on the NAPR property would represent a major improvement to the island's transportation infrastructure. The USACE has previously issued construction and use permits for the existing facilities along the waterfront at NAPR. Therefore, changes to uses that include intensity and operations would require users to obtain a new permit from USACE.

Land Transportation

Implementation of the proposed action is not expected to result in significant impacts on the land transportation system. Existing developed areas at NAPR are fragmented throughout the property and are connected by a network of mostly two-lane roads. Since the Navy's facilities were spread throughout the property, roadways currently extend into each zone considered for reuse; therefore, there is no immediate need to construct new roads to access development sites. Preliminary investigation of the transportation network at NAPR indicates that most of the roads are in fair to good condition with a considerable amount of serviceable life remaining (Reuse Plan).

Given the conceptual nature of the proposed reuse, it is not possible to accurately identify the roads and intersections that would be most affected by new development. Detailed site drawings would be needed to analyze potential congestion areas and determine level of service for various roadways. However, based on the following, implementation of the proposed action alternative is not expected to result in significant transportation impacts.

- **The existing roadway network has adequate capacity.**
  Existing roadways were sufficient to support the flow of traffic when NAPR was active and had a population of more than 7,000 persons. The NAPR property would have a resident population of 2,850 and a total workforce of 5,000 at the completion of Phase II of the Reuse Plan (see Section 4.11). Considering that the number of vehicle trips following Phase II redevelopment of NAPR would not be significantly greater than when NAPR was active, the roadway network would have adequate capacity to support the level of planned development.

- **Traffic would be distributed over a number of roadways.**
  Consistent with the existing land use pattern, planned development at NAPR is spread throughout the property either within or adjacent to currently developed areas. No single portion of the property is targeted for high-density or multi-use development. Consequently, traffic would tend to be distributed over a number of roadways, which would limit the potential for reduced levels of service or areas of congestion.

- **The increase in traffic would be incremental.**
  The increase in traffic would be incremental as individual developments are approved and constructed. This would allow developers and review agencies (e.g., PRPB and the Permits and Regulations Administration) sufficient time to consider traffic issues related to individual projects and implement appropriate measures to ensure adequate traffic flow.

- **Planned roadway improvements would mitigate potential traffic congestion and improve traffic flow.**
  Planned roadway improvements at NAPR through Phase II of the Reuse Plan include construction of a new overpass access to the airport off PR-53; construction of an approximately 2,800-foot-long, four-lane "Airport Boulevard" from the new overpass access; and expansion of Langley Drive and Antietam Road from two to four lanes. Constructing a direct access route from PR-53 to the planned passenger/cargo airport would significantly minimize the potential for congestion on roadways entering NAPR. In addition, the flow of traffic on internal roadways would be improved by the expansions of Langley Drive and Antietam Road.

4.4 Topography, Geology, and Soils

Construction, operation, and maintenance of the proposed redevelopment through Phase II of the Reuse Plan would have minimum potential impacts on local topography and soils. Because there would be no need for blasting bedrock or major excavation during proposed construction activities, no widespread impacts on local geology are expected. In addition, because the Reuse Plan incorporates measures to minimize development in steep areas, major re-grading activities are also unlikely.

Adverse impacts on local topography would be minor and limited to areas in which landscape grading is required to ensure proper drainage or to areas in which landscape contouring is required to implement erosion control measures. No significant topographic features or areas with steep slopes that require extensive grading exist in the redevelopment areas.

One of the primary concerns regarding future development projects would be soil erosion and sedimentation. Impacts on erodible soils resulting from clearance of vegetation and landscape grading activities would be short-term and moderate. Moderate impacts on soils are expected to occur in areas where the soil erosion potential is high. The soil survey indicates that areas where redevelopment would occur through Phase II of the Reuse Plan are underlain by approximately 178 acres of land with highly erodible soils. These areas of highly erodible soils include 60 acres in Zone 2, 50 acres in Zone 6, 25 acres in Zone 4, 22 acres in Zone 5, approximately 10 acres in each of Zones 1 and 3, and 0.8 acre in Zone 7. No highly erodible soils would be disturbed in Zone 8.

Soil erosion and sedimentation impacts on highly erodible soils would be minimized by implementing soil erosion, storm water runoff, and sediment control measures required under federal and Commonwealth law (as described below), including use of appropriate best management practices during clearance and construction activities (e.g., clearing only small tracts of land at one time and minimizing the length of time that cleared areas would be void of vegetation).

Large construction activities would be subject to EPA's NPDES storm water permit requirements, which are designed to minimize soil erosion from storm water runoff. As defined in 40 CFR 122.23 (b)(14)(x), projects that include clearing, grading, and excavation activities that would disturb more than five acres of land or that would disturb less than five acres but which are part of a larger common plan of development, would require an NPDES storm water permit. Large construction activities in Puerto Rico are eligible for coverage under EPA's NPDES General Permit for Storm Water Discharges Associated with Construction Activity. This permit requires developing and implementing a storm water pollution prevention plan using best management practices to minimize pollutants in storm water runoff.

Although proposed redevelopment would be designed to minimize impacts to soil resources and to protect sensitive ecological areas, land larger than 0.22 acre probably

would be developed. Therefore, in compliance with Commonwealth of Puerto Rico environmental laws, any development project that involves clearing or soil disturbance of more than 0.22 acre (9,688 square feet [900 square meters]) would require a Permit for Control of Erosion and Prevention of Sedimentation. This permit is issued by the Puerto Rico EQB and would need to be obtained by any party proposing a specific redevelopment activity. To meet the requirements of this permit, a Soil Erosion and Sedimentation Control Plan would be required for each proposed redevelopment project in excess of 0.22 acre to prevent and minimize impacts on soils. The plan would identify soil erosion measures and best management practices to minimize sedimentation and to ensure that the effects of construction and maintenance of the proposed projects on soil erosion and sedimentation would be minor. The developers would be responsible for obtaining construction permits and for implementing erosion and sediment controls.

4.5 Hydrology and Water Quality

4.5.1 Surface Water

Grading and clearing activities during construction of the planned developments could affect surface water. Potential impacts would be associated with alteration of natural drainage systems, changes in surface runoff patterns, soil erosion and sedimentation, and introduction of contaminants. Impacts on surface waters could also potentially occur during the operation of the new facilities.

As discussed in Section 3.5.1, development and changes in land use in the areas surrounding NAPR have resulted in an increase in the amount of surface water reaching NAPR, and as a result the surface waters at NAPR are subject to ponding, erosion, and dramatic flooding. Currently, the majority of the area surrounding surface water features is undeveloped. Existing vegetation in these areas slows flow velocity and stabilizes stream banks, which attenuates flooding, increases groundwater recharge, and offers some protection against erosion. These vegetated areas also act as filters that trap sediments and contaminants.

The majority of redevelopment through Phase II is within areas that were previously developed, thereby minimizing impacts on these undeveloped buffer areas. However, new development in Zones 1 through 7 could affect vegetative communities and wetlands that act as buffers between existing development and the surface waters at

NAPR. (A more detailed discussion of impacts on vegetation is provided in Section 4.8, Terrestrial Environment.)

- **Rio Daguao Drainage System**
  The majority of new development through Phase II would occur in the areas immediately adjacent to the airport in Zone 1. New industrial development planned for this area extends up to the boundary of freshwater wetlands associated with unnamed tributaries to Quebrada Seca and the downstream portions of the Rio Daguao drainage system. It is assumed that this type of land use would result in much of the affected area being converted from natural vegetation to impervious surfaces. The removal of vegetation and the addition of impervious surfaces has the potential to exacerbate flooding and erosion problems in the Rio Daguao drainage system and to result in the introduction of pollutants from paved areas. New residential development planned for Zones 4 and 5 would occur immediately adjacent to the Daguao mangrove forest. Development in these areas would result in alteration of runoff patterns and the flow of surface water in this area. Removal of the vegetative buffer between existing development and this sensitive community has the potential to result in impacts on water quality in the mangroves and in the marine waters beyond the mangroves.

  Any planned development at the southwest end of the runway would result in alteration of the 100-year flood plain.

- **Quebrada Aquas Clara Drainage System**
  Planned new industrial development adjacent to the north end of the runway, in Zone 1, would result in potential impacts on Quebrada Aquas Clara. The removal of vegetation and addition of impervious surfaces would likely affect surface water hydrology and quality as described above for the Rio Daguao drainage system. No other development is planned within the Quebrada Aquas Clara Drainage System. No impacts on the 100-year flood plain are anticipated as a result of planned development through Phase II.

- **Quebrada Ceiba Drainage System**
  The land at NAPR within the Quebrada Ceiba Drainage System is included in Zone 8. No development is planned for Zone 8 through Phase II of the Reuse Plan. Therefore, no impacts on the Quebrada Ceiba Drainage System or the 100-year flood plain are anticipated through Phase II.

- **Other Drainage**
  Residential development in Zone 2 would occur immediately adjacent to the freshwater wetlands associated with the unnamed tributary to Quebrada Palma that flows through NAPR. Development has the potential to result in impacts on water quality associated with removal of the vegetative buffer between development areas and the wetland and with changes in surface water flow patterns that would result from development up to the boundary of the wetland

area. No impacts on the 100-year flood plain are anticipated in association with development in the vicinity of Quebrada Palma.

New university and mixed density residential development in Zones 4 and 5 would occur up to the boundary of the mangrove forests associated with Enseñada Honda. This development would result in potential impacts on surface water flow and water quality resulting from changes in surface water flow and the removal of vegetative buffers.

Each of the potential impacts on surface water discussed above would be minimized or mitigated through the use of best management practices during construction; through development and implementation of storm water pollution and prevention plans for development; and through appropriate treatment prior to discharge of contaminants. Any required development permits would be the responsibility of the developer. These include but are not limited to NPDES storm water permits from the EPA and CES permits from the EQB for construction activities at NAPR. NPDES permits are required for disturbance of more than one acre of land or disturbance of less than one acre that is associated with a larger common plan for development. Large construction activities in Puerto Rico are eligible for coverage under EPA's NPDES General Permit for Storm Water Discharges Associated with Construction Activity. This permit requires developing and implementing a storm water pollution prevention plan using best management practices to minimize pollutants in storm water runoff. For soil disturbance of more than 9,688 square feet (900 square meters) of land, CES permits require that a Soil Erosion and Sedimentation Control Plan be prepared and implemented.

With implementation of the above best management practices and storm water treatment measures, construction and operation of the facilities proposed through Phase II of the Reuse Plan are not expected to result in significant adverse impacts on surface water.

4.5.2 Groundwater

As discussed in Section 3.5.2, it is unlikely that aquifers at NAPR would provide an adequate quantity for use as a water supply, and the water quality classification indicates that the groundwater is not fit as a source for drinking water supply. Therefore, it is assumed that redevelopment would not involve significant withdrawal of groundwater for a water supply.

Construction and operation of new facilities have the potential to result in impacts on groundwater recharge and discharge and on water quality. The addition of impervious surfaces associated with new development would create a barrier between groundwater and surface water that may result in alteration of groundwater recharge and discharge patterns. This is of particular concern in Zone 1, where industrial development is likely to result in a significant increase in impervious surfaces surrounding drainage channels that are already subject to flooding. (Approximately 27% of undeveloped land in Zone 1 would be modified through new industrial development.) The existing vegetation in these areas slows surface water, which increases the potential for groundwater recharge. The addition of impervious surface without the development and implementation of a storm water management plan that replaces the groundwater recharge function would exacerbate existing groundwater/surface water exchange problems in this watershed. The potential for discharge of contaminants and their introduction to groundwater in association with construction and operation of new development, particularly industrial facilities, also exists.

Impacts on groundwater would be minimized or mitigated through compliance with NPDES and CES permit requirements, which require using best management practices during construction and developing and implementing storm water pollution and prevention plans for new development. Based on the anticipated compliance with these permitting programs by future developers, construction and operation of the facilities proposed through Phase II of the Reuse Plan are not expected to result in significant adverse impacts on groundwater.

4.6 Air Quality

Transfer of the NAPR property likely would result in negligible direct impacts on air quality. Since NAPR is a closed facility, emissions generated at NAPR after disposal would be expected to increase with reuse of the property, resulting in a slight reduction in air quality. In general, air emissions from the facilities at NAPR during the proposed reuse through Phase II are not expected to increase above the levels of the former NSRR.

Impacts on air quality due to reuse and/or redevelopment of the disposed land may occur within certain land use categories. In general, the greater the degree of development of land areas for human habitation or commercial use, the greater the air quality

impact would be. Until specific redevelopment plans defining specific facilities to be constructed are developed, only general statements about potential air quality impacts can be made based on proposed land use categories.

Proposed uses such as the airfield, port, or other industrial operations likely would result in the most emissions and air quality impacts relative to other potential land uses such as residential housing, tourism, or conservation. Air pollutant emissions of fugitive dust and engine exhaust likely would occur during any construction projects associated with the proposed reuses. As these areas come into routine use, emissions associated with daily civilian activity would begin. These emissions generally would include heavy equipment exhaust from demolitions, vehicle exhaust for residential areas, and small quantities of air pollutants released from light commercial facilities that may be developed. Light commercial facilities could include gasoline stations, dry cleaners, and other operations serving the public. In general, these types of air pollutant sources are small and distributed over a developed area. Development with this characteristic tends to result in negligible or minor impacts on air quality because any facilities producing emissions are not densely concentrated in one area. The effect of these actions is not expected to adversely affect the region's designation as an attainment area.

4.7 Noise

4.7.1 Proposed Action Alternative

The direct impact of the proposed action would be a general increase in the ambient noise levels at NAPR because NAPR is currently a closed facility. The airport consultant for the Puerto Rico Port Authority has developed a set of anticipated noise contours for the proposed Roosevelt Roads International Airport in the initial year of operations (2013). The complete noise analysis can be found in Appendix C. The projected 2013 noise contours are shown on Figure 4-3. Depending on the final type of aircraft and number of air operations that would be conducted at the airfield beyond the base year, additional noise level studies and environmental impact analysis may be required. Care should be taken that the proposed land uses in the vicinity of the airfield incorporate the appropriate noise attenuation measures. Vehicle traffic or occasional operation of equipment such as backup electrical generators may generate noise. The noise levels

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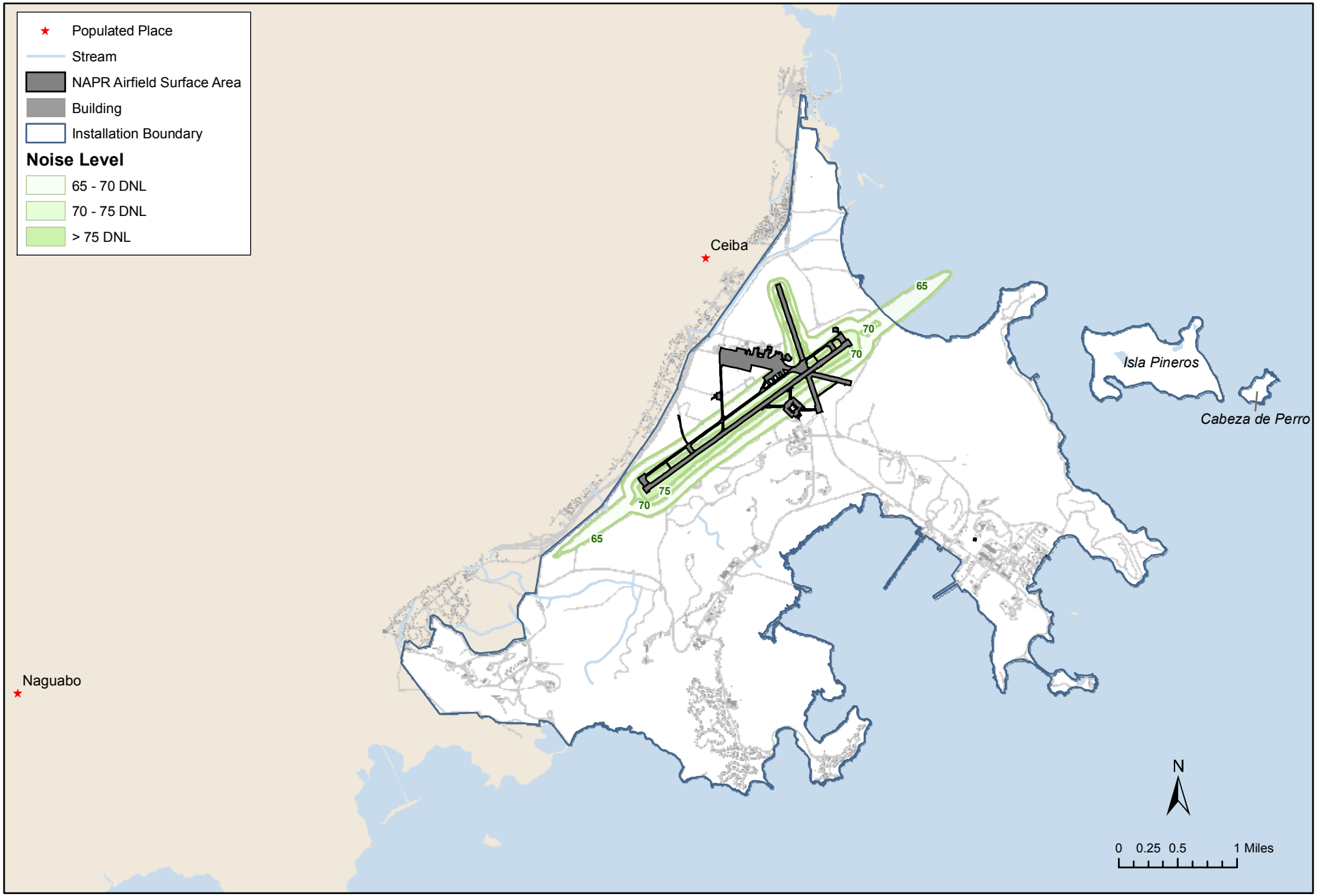


Source: Geo-Marine, 2005; PBS&J Caribe Engineering, 2007 ESRI, 2004.

Figure 4-3
Projected 2013 Noise Contours
for Roosevelt Roads International Airport

would not exceed historic levels and are not expected to adversely impact future development on the disposed land.

Most noise impacts associated with the disposal of NAPR are considered indirect impacts. That is, the potential noise-generating activities would be the result of redevelopment of the transferred land.

Indirect noise impacts could result from several land uses. The management of conservation zones or other conservation-oriented uses would not be expected to result in any significant noise-generating activities because of the low-impact nature of this land use. Operation of the airfield and port areas, particularly in the early stages of redevelopment when demolition and construction projects would be conducted, would result in noise impacts in the vicinity of these transport hubs. Construction noise associated with the development in non-conservation areas would cause temporary, short-term noise impacts in localized areas. Residential and/or light commercial development in certain areas potentially would generate noise commonly associated with this land use type, such as vehicle traffic noise and various noises generated by fans, air conditioners, and home maintenance equipment. Low-density developed urban areas may experience average sound levels ranging from 45dB to 50 dB. More concentrated urban development may cause sound levels approaching 60 decibels or higher (EPA 1978).

4.7.2 Long-Range Implications

The long-range impacts on ambient noise through Phase IV of the Reuse Plan are currently not quantifiable. The single largest contributor to ambient noise emissions at NAPR is the airfield. The type of air operations conducted (passenger, cargo, jet vs. turboprop, number of daily flights, etc.) will play a role in defining the noise contours for the airfield. Until these factors are known, a conclusion of the anticipated noise impacts would be speculative. It is anticipated, however, that the noise levels associated with aircraft activity on the airfield would not likely reach a level that would extend the contours beyond airport property until commercial/air carrier jet activity begins and significantly increases, which is currently forecast to occur sometime after 2012.

4.8 Terrestrial Environment

4.8.1 Vegetation

Impacts on terrestrial habitat resulting from implementing the Reuse Plan through Phase II would be minimized by using previously developed areas and by siting new development immediately adjacent to previously developed areas. Redevelopment activities would occur primarily in areas that were previously developed and, as a result, impacts on terrestrial vegetative communities would be minimal. However, in some areas new development would be within or immediately adjacent to sensitive stream, wetland, or marine resources.

Proposed construction activities could result in the long-term loss or alteration of up to approximately 8% of the undeveloped land at the base. However, this is a maximum impact acreage based on the proposed outline of development areas. In some areas impacts would likely be less. For example, Phase II includes reuse of the airport in Zone 1 and encompasses the land up to the existing airfield fence line. Shrub and grassland communities within the airfield fence-line are not likely to be impacted by reuse of the airport. In other areas, site development plans would likely be prepared that maximize the use of existing cleared area and minimize encroachment into vegetated areas.

Maximum potential impacts on vegetative communities based on complete ground disturbance have been assessed by zone through geographic information system (GIS) analysis and are presented in Table 4-2. Areas of new development within each zone are shown on Figure 4-4.

In Zone 1, planned industrial development would affect approximately 75 acres of terrestrial vegetation that is primarily grassland. In Zone 2, planned development would affect terrestrial communities immediately adjacent to freshwater wetland areas along the west boundary of Zone 2 that are associated with the Quabrada Palma drainage system. In Zone 4, planned development would affect terrestrial vegetation immediately adjacent to mangrove communities in the Daguao forest and mangrove communities associated with Enseñada Honda. In Zone 5, planned development would affect terrestrial communities immediately adjacent to mangrove communities in the Daguao forest and immediately adjacent to mangrove communities associated with Enseñada Honda.

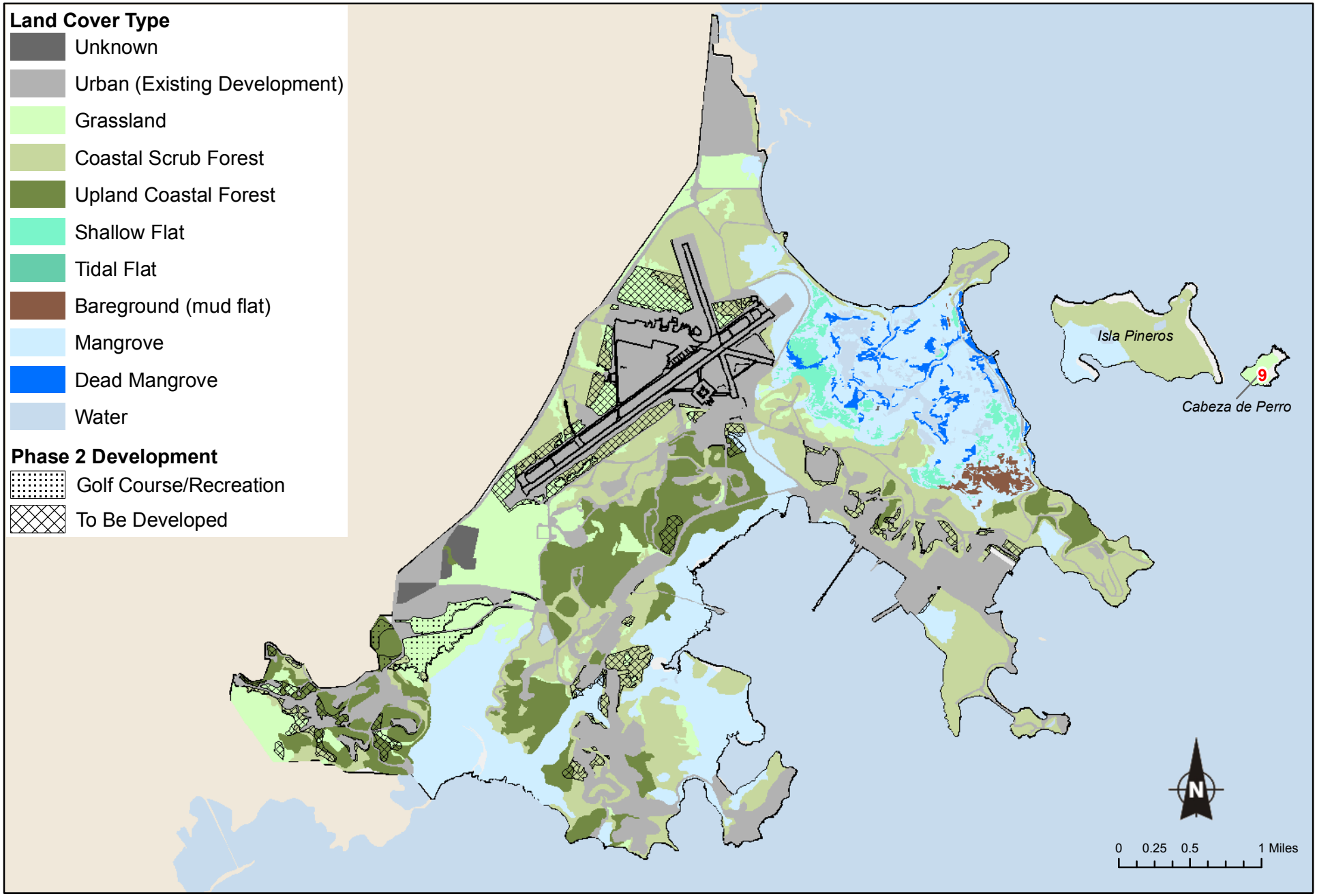
Table 4-2 Maximum Potential Impacts to Vegetative Communities Associated with Build-out Through Phase II of the Reuse Plan

Zone	Vegetative Cover Type						Total (% of Previously Undeveloped Land in Zone Impacted)
	Grassland (acres)	Coastal Scrub Forest (acres)	Upland Coastal Forest (acres)	Wet Meadow (acres)	Wet Coastal Scrub Forest (acres)	Mangrove/ Tidal Wetlands (acres)	
Zone 1	127	106	0	2	1	0	236 (27%)
Zone 2	22	19	41	<1	0	0	82 (32%)
Zone 3	0	0	0	0	0	0	0 acres (0%)
Zone 4	2	13	21	0	<1	3	39 (5%)
Zone 5	5	48	3	0	<1	3	59 (21%)
Zone 6	0	36	2	0	0	1	39 (38%)
Zone 7	0	11	0	0	0	0	11 (2%)
Zone 8	0	0	0	0	0	0	0
Zone 9	0	0	0	0	0	0	0
Total	**156**	**233**	**67**	**2**	**1**	**7**	**466 (8%)**

Upland areas adjacent to wetland communities offer greater habitat value due to their proximity to wetlands. In addition, removing upland coastal scrub forests, scrub forests, and grasslands, which slow flood waters and protect against erosion, or adding impervious surfaces, have the potential to affect water quality, resulting in impacts on the freshwater wetlands, streams, and downstream tidal and marine communities. (Water quality impacts are discussed in detail in Section 4.5 above.)

Zone 9 comprises approximately 3,500 acres, the majority of which are sensitive freshwater wetland and tidal wetland communities. The Reuse Plan designates these areas as conservation areas. The Navy proposes to transfer these areas to the Commonwealth of Puerto Rico. These vegetated areas currently serve to slow surface water flow, allow recharge of groundwater and, in some areas, buffer the impact of torrential rains and flash flooding that result from the steep slopes and type of land use outside NAPR. They also function as filters to trap chemicals and sediments that could otherwise harm freshwater wetlands, coral reefs, and sea grass beds.

Any proposed development would be reviewed by the DNER for compliance with Puerto Rico Law No. 241, which regulates impacts on flora and fauna. Compliance with



Source: Geo-Marine, 2005; ESRI, 2004

Figure 4-4
Phase II Development
Naval Activity Puerto Rico

this law would minimize impacts on vegetative communities on the NAPR property. Therefore, no significant adverse impacts on vegetative communities are expected.

4.8.2 Wildlife

Terrestrial wildlife species are closely associated with vegetative communities. For this reason, the loss of vegetation and modifications to land use, as discussed above, would also affect the wildlife communities at NAPR. Potential impacts on terrestrial wildlife would be primarily from destruction of habitat due to clearing and grading during construction and maintenance of future development projects. Potential impacts would range from minor temporary impacts associated with displacement to long-term impacts associated with loss or alteration of habitat.

Wildlife species may be temporarily displaced in peripheral areas during construction, when noise and human activity levels increase. However, once construction has been completed, the distribution of wildlife in these peripheral areas should be similar to distributions associated with pre-construction conditions. Consequently, such impacts would not be significant. Due to the large amount of mangrove habitat and open water to the east of the airfield, the Puerto Rico Ports Authority (PRPA) and DNER may consider a collaborative effort to prepare a wildlife management plan to ensure airport operations are not adversely impacted.

As noted above, a maximum of approximately 466 acres of vegetation could be removed by implementing the Reuse Plan through Phase II. Considering that the amount of vegetation that would be permanently removed comprises less than 8% of the total vegetation on the property, no long-term adverse impacts on wildlife associated with loss of habitat are expected.

4.9 Marine Environment

4.9.1 Essential Fish Habitat

An EFH assessment, including field surveys, characterization of the sites, effects of the proposed action, and recommended mitigation as a follow-on action by future land owners and Commonwealth agencies, was conducted for the NAPR property by GeoMarine, Inc. (May 2005). (For more details see the EFH Assessment report [Appendix B].)

Implementation of the proposed action, the disposal of NAPR property to non-federal property owners, would not in and of itself adversely affect EFH. However, after completion of the proposed action, future land-use changes could affect listed species. Because of the speculative nature of the Reuse Plan, the potential for an effect on EFH, if any, cannot be addressed. Under existing laws and regulations, future landowners/developers would be responsible for establishing zoning and applying for building permits and other approvals to implement their respective development projects. A USACE permit would be required for projects located in the water or in wetlands. The USACE has previously issued construction and use permits for the existing facilities along the waterfront at NAPR. Therefore, changes to uses that include intensity and operations would require users to obtain a new permit from USACE. The engineering, design, and studies needed to obtain the various approvals from the respective regulatory agencies have not been accomplished. Therefore, discussions of potential effects on EFH are not quantifiable. However, development and reuse of the port facility could impact the marine environment by various routes, including increases in vessel traffic in coastal areas previously restricted to public use. Implementing the Reuse Plan may result in an increase in recreational boating and introduction of ferry services in the waters around NAPR. Increased vessel traffic could also increase the potential for vessel-related groundings on coral reefs and for marine mammal collisions, as well as potentially increase wave action, sediment suspension, and water quality degradation from vessel motors. The EFH Assessment (see Appendix B) lists mitigation measures that could be implemented by future property owners or Commonwealth agencies to minimize any potential impacts on coral reefs as a result of future development. These mitigation measures are also summarized in Section 4.9.2.

This EA, while addressing the disposal action, does not preclude the potential need for future review of specific components of the Reuse Plan pursuant to federal and Commonwealth laws. All Puerto Rican entities must comply with relevant federal laws (e.g., the Clean Water Act and Clean Air Act) and Commonwealth planning, zoning, and environmental laws. While the future potential impacts on EFH are not quantifiable, the Navy has determined that existing federal laws and Commonwealth rules, regulations, and laws, as well as the Special Zoning which would be established by the PRPB, would

provide adequate protection such that the disposal of NAPR to the Commonwealth and other non-federal entities would not result in an adverse direct or indirect effect on EFH.

- **Coral Reefs**
  Implementation of the proposed action alternative would not directly impact coral reefs. However, as discussed below, coral reefs could be indirectly affected by removing public use restrictions in the waters around NAPR and by the planned developments within NAPR.

  - **Zone 1**
    Because the airfield is located away from the immediate coastline and within multiple watersheds, it is not known where runoff from reuse and development of the airfield would be directed nor the localized bodies of water that would experience the greatest effects. However, since water quality degradation can migrate, all coral reefs within surrounding waters could potentially be indirectly affected. Current storm water regulatory requirements for construction sites are designed to minimize these impacts.

    Runoff may impact coral reefs by many routes, the most harmful being increased turbidity and decreased oxygen. The magnitude, extent, duration, and reversibility of impacts depend upon runoff intensity. Obviously, the impact is made more severe by increasing the volume of the contributing constituent reaching open water. At this point in the planning process, predicting runoff rates by volume would be impractical.

  - **Zone 2**
    Few mapped coral reef areas lie in the waters surrounding the Degauo mangrove forest, which is adjacent to Zone 2. The closest coral reef is approximately one mile southwest of shore. Outer reef areas do not necessarily experience elevated loads of land-derived nutrients via surface water flow but do experience moderately elevated nutrient levels in nearshore waters. Given the distance from shore, these coral reefs are not likely to experience increased nutrient loads.

  - **Zone 3**
    The construction phase during expansion of the golf course could be a contributor to runoff, resulting in decreased water quality. This impact would be temporary, lasting only for the duration of construction. Operation of the expanded golf course would not contribute as much runoff as an impervious development encompassing the same acreage because storm water is allowed to infiltrate into the soil, decreasing runoff.

    The coral reefs nearest to the golf course expansion are those referred to in the Zone 2 discussion. Because of the distance from shore, potential impacts on coral reefs due to Zone 3 expansion and reuse are considered negligible.

- **Zone 4**
  Due to the presence of significant buffers, i.e., mangroves between Zone 4 and the coastline, potential impacts on coral reefs from reuse within this zone are considered minimal.

- **Zone 5**
  Zone 5 could be developed in an area that lies adjacent to habitats of colonized bedrock and aggregated and individual patch reef. There is no mangrove buffer between proposed developments and the adjacent waters containing the coral reefs. These areas would also become more accessible to humans, who can potentially cause severe damage to coral reefs by touching, trampling, and collecting.

- **Zone 6**
  Development and reuse of the port facility could impact coral reefs by various routes, including increases in vessel traffic and accidental fuel or oil spills. Implementing the Reuse Plan may result in an increase in recreational boating and introduction of ferry services in the waters around NAPR. Commerce from these activities could include fishing and diving charters running out of the harbor area, both of which could increase human activities directly around coral reefs. This could cause stress on nearby reefs, which are currently buffered by a restricted-waters zone. Increased vessel traffic would also increase the potential of vessel-related groundings on coral reefs, increased wave action, increased sediment suspension, and water quality degradation from vessel motors. The EFH Assessment (see Appendix B) lists mitigation measures that could be implemented by future property owners or Commonwealth agencies to minimize any potential impacts on coral reefs as a result of future development. With implementation of these mitigation measures no significant adverse impacts on coral reefs near Zone 6 from the proposed action are anticipated.

- **Zone 7**
  The only component of Zone 7 development and reuse that lies adjacent to coral reef habitat is a science and research park development. The goal of the science and research park is to educate while conserving and protecting by all realistic means possible. Therefore, construction and operation of this facility suggests that all practices necessary to protect adjacent coral reefs would be implemented, resulting in minor impacts.

- **Zone 8**
  The open recreation areas proposed for the north entrance area would impact the linear coral reefs located approximately 0.5 mile east of the coast. Allowing increased access to this area would attract more vessels that could potentially run aground on the nearby reef, along with the other vessel-related factors described in Zone 6. In addition, increased access would also impact the nearby linear coral reef.

- **Zone 9**
  Some facilities may be built within conservation areas to improve public access. Such facilities would be required to undergo the USACE permit process prior to construction. Similar impacts could result from water quality degradation and human contact as addressed in the zones noted above, although on a much smaller scale. Impacts are expected to be minor.

Potential impacts on coral reefs associated with water quality degradation as discussed above are expected to be a temporary and minor, given that the greatest runoff potential occurs if sediments are exposed. Reuse and operation of existing and new facilities would also increase runoff potential; however, CES permits would be required from the EQB for activities disturbing areas of 9,688 square feet (900 square meters), and NPDES permits would be required from the EPA for construction projects affecting one or more acres of land. Compliance with these laws during development and reuse of properties would avoid or minimize potential impacts from sediments and contaminant-laden runoff.

Coral reefs are also protected locally by Puerto Rico Law No. 147 (July 15, 1999), the Law for the Protection, Conservation, and Management of Puerto Rico Coral Reefs. This law requires government agencies of Puerto Rico to consult with the DNER regarding proposed development or construction that might impact coral reefs and related ecosystems.

Potential adverse impacts on coral reefs resulting from increased human activities in marine areas around NAPR could be avoided by mitigation measures that could be implemented by future property owners or Commonwealth agencies to minimize any potential impacts on coral reefs as a result of future development. Such possible mitigation measures are listed below (see Section 4.9.2 and the EFH Assessment in Appendix B). With implementation of these mitigation measures, no significant adverse impacts on coral reefs from the proposed action alternative are anticipated.

■ **Sea Grass Beds**
Implementation of the proposed action alternative would not directly impact sea grass beds. However, as discussed below, sea grass beds could be affected by removing public-use restrictions in the waters around NAPR and by the planned developments within NAPR.

Decreased water quality could result from additional runoff and discharge from redeveloped areas during construction and operation. Runoff may impact sea grass beds via many routes, the most harmful being increased turbidity, sedimentation, and nutrient runoff. Increased turbidity reduces light penetration, resulting in lower productivity and/or impaired viability of sea grass beds. Sedimentation resulting from increased runoff could smother sea grass

beds. Nutrient-rich runoff could affect sea grasses by increasing the potential for algae blooms, increasing oxygen demand and suffocating sea grasses.

CES permits would be required for activities disturbing areas of 9,688 square feet (900 square meters) under Puerto Rico Environmental Laws (formerly Law No. 9). Compliance with this and other Commonwealth and federal laws during development and reuse of properties would avoid or minimize potential impacts from sediments and contaminant-laden runoff. The law requires government agencies of Puerto Rico to consult with the DNER regarding proposed development or construction that might impact sea grass beds and related ecosystems.

Adverse impacts on sea grass beds from increased runoff would also be minimized by the filtering capacity of the extensive mangrove systems at NAPR: the Deguao mangrove forest would act as a buffer for the expansive sea grass beds located in the waters near the Bundy development and would filter the nutrient-rich runoff from the golf course expansion; the Enseñada Honda mangrove would filter runoff from planned residential development in Zone 5 before the runoff reaches Enseñada Honda and other open waters supporting sea grass beds.

Increased vessel traffic in the waters surrounding NAPR could increase the potential for vessel-related groundings or scarring in sea grass beds, sediment suspension, and human contact and could potentially cause water quality degradation from vessel motors. A fuel or oil spill would impact sea grasses by degrading the water quality or by the fuel or oil coming in direct contact with sea grasses. However, since fuel will float on water, only those sea grasses within the tidal zone would have the potential to come in direct contact with spilled fuel.

The open recreation areas proposed for the north entrance area could impact the adjacent sea grasses. Allowing increased access to the area would attract more vessels, increasing the potential of prop-scarring within the sea grasses, along with the other vessel-related factors described above. Increased human activity could also result in increases in discarded solid waste such as bags and bottles. This solid waste could enter the water and smother sea grasses. People could walk on sea grass beds, causing physical disturbance and compacting sediments, leading to sea grass bed regression. These impacts would mainly be limited to the surf zone and shallow waters where most beach activity would take place, which would account for only a small percentage of sea grasses within the area. Potentially adverse impacts on sea grass beds resulting from increased human activities in marine areas around NAPR could be avoided by implementing the mitigation measures listed in the EFH Assessment (Appendix B). Therefore, impacts on sea grass beds from non-vessel related activities within Zone 8 are expected to be minor.

- **Mangroves**
  Implementation of the proposed action alternative would not directly impact mangroves. However, as discussed below, mangroves could be affected by removing public-use restrictions in the waters around NAPR and by the planned developments within NAPR.

  - **Zone 1**
    Impacts on mangroves resulting from reuse and development of the airfield could occur because of additional runoff and discharge from redeveloped areas during construction and operation. It is not known where runoff from reuse and development would be directed or which localized bodies of water would feel the greatest effects. However, since water quality degradation is a migratory impact, all mangroves within surrounding waters would be affected, although at varying scales of magnitude. The Los Machos mangrove forest would be the area most susceptible to impacts to the airfield and known refueling sectors.

    Accidental discharges or spills of fuel would significantly impact mangroves. Runoff and fuel spills could affect mangroves by many routes, the most harmful being excess high sediment loads and direct contact with hydrocarbons. The lenticels in the mangrove roots (lenticels allow mangroves to breathe) are susceptible to clogging by hydrocarbons and similar pollutants. Sewage, toxic materials, pesticides, herbicides, and suspended or floating substances can suffocate, reduce light, and reduce species diversity in the mangroves. Although mangroves help filter run-off from adjacent lands, excesses of contaminants, especially hydrocarbons, can damage mangroves by fouling lenticels (Proffitt et al. 1999). All mangrove impacts occurring from Zone 1 reuse and development are expected to be minor. No mangrove areas would be filled for development, and proper measures would be taken to reduce and minimize runoff.

  - **Zone 2**
    Expanding currently developed areas in Zone 2 into current undeveloped tracts would reduce the upland buffer associated with the Deguao mangrove forest. This could potentially stress the mangrove forest by causing increased runoff from paved areas. In addition, paved areas contribute to oils and other pollutants that can clog mangrove lenticels. However, all mangrove impacts occurring from Zone 2 reuse and development are expected to be minor, given the relatively small area to be developed. In addition, no mangrove areas would be filled for development.

  - **Zone 3**
    Expanding the golf course in Zone 3 would have impacts on mangroves similar to those identified for Zone 2. Although no mangrove acreage would be developed, the existing golf course is adjacent to the Deguao mangrove forest. The construction phase of expansion could be a contributor to runoff. During construction, a greater potential exists for runoff to carry increased sediments and/or contaminants, resulting in de-

creased water quality and increased sedimentation. The construction phase would be temporary and, subsequently, the key phase of run-off contribution. However, pesticides and fertilizers are also known to foul mangrove lenticels (Proffitt et al. 1999). Increases of these contaminants could mostly affect the Deguao mangrove forest, as could the Bundy development. However, impacts are expected to be minor.

- **Zone 4**
  Construction and operation of facilities in the downtown area would increase runoff and sedimentation via the same routes described in Zones 1 and 2. However, impacts on mangroves are expected to be minor, given the relatively small area affected. In addition, no mangrove areas would be filled for development.

- **Zone 5**
  Zone 5 would be developed in an area that lies adjacent to two mangrove forests, Enseñada Honda forest and Deguao forest. The impacts on these two mangrove tracts would be similar to the impacts in Zones 1, 2, and 4.

- **Zone 6**
  Development and reuse of the port facility could potentially impact mangroves as a result of an increase in vessel traffic and accidental fuel or oil spills. Increased vessel traffic would increase the potential of vessel-related impacts, e.g., increased wave action, increased sediment suspension, increased human contact, and water quality degradation from vessel motors. A fuel or oil spill would impact mangroves by degrading water quality and, potentially, by fuel or oil coming in direct contact with mangroves.

- **Zone 7**
  Developing new facilities and reusing existing facilities could impact mangroves in a manner similar to that described for Zones 1, 2, 4, and 5. The Los Machos mangroves have the greatest potential of being affected by development and reuse within Zone 7, a science and research park development. The goal of developing a science and research park is to educate while conserving and protecting by all realistic means possible. Therefore, the construction and operation of this facility would suggest that all practices necessary to protect adjacent mangroves would be implemented, resulting in minor impacts.

- **Zone 8**
  The open recreation areas proposed for the north entrance area could potentially impact the adjacent mangroves. Allowing increased access to this area could attract more vessels and human activity. Human accessibility could increase compaction of soils, which can lead to mangrove regression. However, this area is currently accessible by the public and all impacting factors are in place, although at a relatively smaller scale. Further impacts are expected to be minor due to the type of impact and prox-

imity of the mangrove to the center of the proposed recreation area. In addition, no mangrove areas would be filled for development.

- **Zone 9**
  Some facilities could be built within conservation areas to improve public access. Impacts from increases in human activity would be similar to those discussed under Zones 1, 2, 4, 5, and 8, although on a smaller scale.

Compliance with Commonwealth and federal environmental laws (which include Puerto Rico Law No. 147, the Marine Mammal Protection Act, and the Magnuson-Stevens Fishery Conservation and Management Act) during development and operation of the planned facilities would lessen or prevent any potential adverse impacts on mangroves. As required by these laws, applicable best management practices would be implemented during construction phases to control runoff and lessen the potential for hydrocarbons to enter mangroves. In addition, post-construction runoff would be minimized by properly designed storm water systems. Pre-existing and new developments would be designed to direct runoff into detention areas, where runoff would be allowed to infiltrate into the soil instead of running over land and into the marine environment.

With implementation of the above best management practices and storm water treatment measures, construction and operation of the facilities proposed through Phase II of the Reuse Plan are not expected to result in significant adverse effects on mangroves. More significantly, the Reuse Plan designates all of the approximately 2,100 acres of mangroves at NAPR as conservation areas. Under the Reuse Plan, conservation areas would be excluded from future development activities. Permanent preservation of the extensive mangrove system at NAPR is considered a positive reuse.

■ **Fish and Shellfish**
Potential impacts on fish and shellfish would primarily be associated with impacts on various marine habitats, including coral reefs, sea grass beds, and mangroves. As noted previously, impacts on these resources are generally expected to be short-term and minor. Consequently, no significant adverse impacts on fish and shellfish as a result of habitat alterations would occur from implementing the proposed action alternative.

Impacts on fish and shellfish could also potentially occur due to increased boat usage in the waters adjacent to NAPR. This increase in boat usage could potentially lead to an increase in fishing, which in turn would increase the recreational or commercial harvest of these resources. However, fishing in the coastal waters of Puerto Rico is managed by the DNER under Commonwealth Law No. 278 (November 29, 1998) and its associated fisheries regulations and Administrative Orders. Under the management of the DNER, the increase in fishing that would potentially occur under disposal and subsequent reuse scenarios would not be expected to adversely affect fish and shellfish resources.

4.9.2 Suggested Conservation Guidelines for Future Property Owners

The transfer of NAPR property to federal agencies and disposal to other future property owners would not in and of itself result in impacts on EFH. Therefore, no Navy-instituted mitigation measures are proposed.

There are a number of mitigation measures that Commonwealth and/or federal resource agencies could/may impose on properties being transferred out of federal ownership to non-federal owners/developers before development-specific approvals or permits are issued to these non-federal owners/developers. Implementation of these mitigation requirements would be the responsibility of the new owner/developer, and the respective issuing agency would be responsible for ensuring that mitigation measures are instituted. The Navy would no longer retain any ownership or control of these properties.

Following is a list of conservation guidelines that could be implemented by future property owners or Commonwealth agencies to minimize any potential impacts on EFH as a result of future development:

- Prevent nutrient loading of Pelican Cove, Enseñada Honda, and Bahia Puerca;
- Contain (prevent the dispersion of) loose sediments generated during construction;
- Develop a sea grass/mangrove/manatee/sea turtle education program (certification) for construction contractors, ferry vessel operators, and property managers;
- Monitor environmental impacts on EFH during and after the construction phase of projects;
- Develop a long-term sea grass-monitoring program for Pelican Cove, Enseñada Honda, and Bahia Puerca (the condition of sea grasses will be indicative of local water quality);
- Create a clearly marked and buoyed (mandatory channel) for the approach to the ferry terminal(s) and other marine activities;
- Create specific locations where boats may/may not be anchored;
- Establish maintenance and usage restrictions for mooring areas;
- Enforce vessel speed limits through established no-wake zones and other such restrictions;

- Post lookouts on ferries to prevent mechanical impacts on sea grass beds and collisions with manatees and sea turtles;

- Prevent the improper disposal of trash during the construction and use of the docking facilities, paying particular attention to materials made of plastic and Styrofoam, buckets, tools, liquid materials (e.g., paints, solvents, and fuels), excess construction materials, hardware, and cigarette butts;

- Provide containers for proper garbage disposal and enforce the proper disposal of garbage;

- Ensure periodic disposal of trash by garbage disposal contractors; and

- Assist future property owners in establishing conservation easements to facilitate their receiving tax deductions and/or property tax exemptions.

4.10 Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) of 1973 requires that the responsible federal agency proposing to undertake an action that has the potential to impact threatened and endangered species or their habitat to consult with the USFWS concerning the respective species or habitat. In accordance with the ESA (50 CFR 402.12), the Navy has developed a Biological Assessment (BA) to assess the potential impacts of the proposed action on listed species or their habitat. A meeting was held on October 31, 2005, to discuss the draft BA, which the Navy provided to the USFWS during the first part of October 2005. Through this process, the Navy incorporated the comments from the USFWS and issued a final BA in January of 2006. In a letter dated April 7, 2006, based on the establishment of 18 conservation parcels, the development of Special Zoning Plan, and the implementation of conservation measures, the USFWS concurs with the Navy's determination that the proposed action is not likely to adversely affect federally-listed species and would not result in adverse modification of designated critical habitat within the project area.

Implementation of the proposed action, the disposal of NAPR property to other federal agencies, Commonwealth, and civilian owners, would not in and of itself adversely affect any listed species. However, following completion of the proposed action, future land-use changes may affect listed species and designated critical habitat. To minimize possible effects related to future activities, conservation measures for each of the species have been developed. By means of the special zoning plan, these measures

would be provided to future landowners for their implementation. As part of the disposal process, special zoning (as discussed in Section 4.1) is been proposed to further minimize possible future effects. Future Commonwealth or private landowners/developers would be responsible for complying with the established special zoning. Private landowners/developers would be required to develop site and design plans for review, obtain construction permits, and apply to other regulatory processes to implement their respective development proposals. These permit processes would be subject to the specific requirements of the Special Zoning Plan, among other local and Federal environmental requirements. In addition, any changes in authorized uses for USACE-permitted facilities (e.g., marina, boat ramps, and cargo pier) would require a new permit from the USACE. Any Federal permit or activity that would result in possible adverse effects to threatened and endangered species will require a section 7 consultation between the Federal agency and the USFWS.

As mentioned in Section 4.1 and shown on Figure 4-1, the Navy has divided NAPR into 68 distinct parcels and the PRPB has been requested by the LRA to establish a Special Zoning Plan for NAPR property. From the 68 parcels, 18 parcels have been designated for conservation. These conservation areas support suitable habitat for threatened and endangered species. No future commercial or residential development projects would be allowed in conservation zones. Additionally, six parcels will be maintained in Federal ownership. These agencies are required to consult with the USFWS for activities that may affect species and their habitats. The remaining parcels have been identified for re-use or for sale. It is anticipated the PRPB will adopt the Special Zoning Plan to guide and control future development for the portion of NAPR that would not remain in Federal ownership. For each of the 68 distinct parcels, the Navy has developed, as necessary, conservation measures that future landowners should undertake for protection of threatened and endangered species or their habitat. A matrix indicating which parcels contain which listed species or habitat is provided in Table 4-3.

Table 4- 3. Presence or Absence of Suitable Habitat for Federally Listed Species by Parcel Number

Parcel Number	Listed Group or Species					Parcel Number	Listed Group or Species				
	BOA	ST	YSBB	M	P		BOA	ST	YSBB	M	P
1	✓		✓			35		✓	✓	✓	✓
2	✓		✓			36			✓		✓
3	✓		✓			37			✓		
4	✓		✓			38	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	39	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	40	✓		✓		
7	✓	✓	✓	✓	✓	41			✓		
8	✓	✓	✓			42		✓	✓	✓	✓
9	✓	✓	✓		✓	43	✓		✓		
10	✓	✓	✓			44	✓	✓	✓		✓
11	✓	✓	✓	✓	✓	45		✓	✓	✓	✓
12	✓	✓	✓			46		✓	✓	✓	✓
13	✓	✓	✓	✓	✓	47		✓	✓	✓	✓
14	✓		✓			48	✓		✓		
15			✓			49		✓	✓	✓	✓
16			✓			50			✓		
17			✓			51			✓		
18	✓		✓			52			✓	✓	✓
19	✓		✓			53			✓		
20	✓		✓			54			✓		
21			✓			55			✓		
22	✓		✓			56	✓	✓	✓	✓	✓
23			✓			57			✓	✓	✓
24			✓			58	✓	✓	✓	✓	✓
25		✓	✓	✓	✓	59	✓	✓	✓	✓	✓
26		✓	✓	✓	✓	60		✓	✓	✓	✓
27	✓		✓			61	✓	✓	✓	✓	✓
28	✓	✓			✓	62	✓	✓	✓	✓	
29	✓		✓			63	✓	✓	✓	✓	✓
30	✓		✓			64	✓	✓	✓	✓	✓
31	✓		✓			65	✓	✓	✓	✓	✓
32			✓			66	✓	✓	✓	✓	✓
33			✓			67	✓	✓	✓	✓	✓
34			✓			68	✓	✓	✓	✓	✓

Key:
✓ = Habitat present.
BOA = Puerto Rican boa and/or Virgin Islands tree boa (coastal habitats).
M = Manatee.
P = Pelican.
ST = Sea turtles (green, hawksbill, leatherback, and loggerhead).
YSBB = Yellow-shouldered blackbird.

The Navy has developed conservation measures that future property owners should implement. The Navy recommends full implementation of these measures to minimize possible adverse effects to threatened and endangered species and designated critical habitat. The Navy will notify the following future property owners, to include:

- Federal agencies. Conservation measures will be provided at or prior to the transfer of ownership responsibility;
- The Commonwealth of Puerto Rico. Conservation measures have been already provided to the Local Reuse Authority;
- Public sale. Conservation measures will be provided to each prospective bidder to be set out in the bid package for the respective parcel;
- Successful bidder. Transfer documents will make it clear that the grantee has the responsibility to implement conservation recommendations to meet ESA requirements;

The USFWS would be notified as to the successful bidder and provided a copy of the recommended conservation measures they were provided with the transfer documents. Furthermore, the LRA has requested that PRPB include the specific conservation measures as indicated in Tables 4-4, 4-5, 4-6, and 4-7 as part of the Special Zoning Plan.

The conservation of threatened and endangered species is required by Federal agencies under the ESA. Additionally the Commonwealth of Puerto Rico has a number of rules and regulations that private citizens, Federal and Commonwealth agencies have to adhere to prior to development. The implementation of the conservation measures is needed to minimize possible adverse effects to the species and designated critical habitat. During Section 7 consultation pursuant to the ESA, the USFWS based their determination for "not likely to adversely affect" on future landowners/developers implementing conservation measures included in the special zoning plan. To avoid violation of Section 9 of the ESA, private property owners who are unable to adhere to the conservation measures would be obligated to consult with the USFWS to seek an Incidental Take Permit under Section 10(a)(1)(B) of the ESA. To apply for this permit, the applicant is required to develop a Habitat Conservation Plan in coordination with the Caribbean Field Office. Failure to comply with the identified conservation measures may result in violation of Section 9 of the ESA. The USFWS has the authority to prosecute violations under the ESA.

In addition, Federal and Commonwealth agencies and private property owners would need to comply with the required reviews and/or permitting as necessary under other Federal and Commonwealth laws. All Puerto Rican entities must comply with relevant Federal laws (e.g., the Clean Water Act, the Clean Air Act and, to a lesser degree, the ESA) and the Commonwealth's planning, zoning, and environmental laws. Although all future potential impacts on species can not be fully anticipated and quantified, the Navy has determined that the establishment of 18 parcels for conservation, the establishment of the proposed Special Zoning Plan, the implementation of the proposed conservation measures, and the requirement of a Section 10(a)(1)(B) permit for applicants that cannot adhere to proposed conservation measures are effective measures to minimize possible adverse impacts to the species. The Navy has determined that the proposed action is not likely to adversely affect threatened and endangered species. The Navy has also determined that the proposed action will not adversely modify designated critical habitat for the yellow-shouldered blackbird.

4.10.1 Commonwealth-Listed Species

As discussed in Section 3.10, Commonwealth-listed species at NAPR include peregrine falcon (*Falco peregrinus*), least tern (*Sterna antillarum*), least grebe (*Tachybaptus dominicus*), West Indian whistling duck (*Dendrocygna arborea*), Caribbean coot (*Fulica caribea*), and snowy plover (*Charadrius alexandrinus*).

Peregrine falcon occurrence at NAPR is expected to be limited to transient individuals; therefore, redevelopment is not expected to result in impacts on this species. Freshwater and tidal wetland habitat for West Indian whistling duck, least grebe, Caribbean coot, snowy plover, and least tern is included in the proposed conservation area. No impacts on this habitat or on the use of the habitat by these species are expected as a result of the disposal/transfer of property at NAPR. However, redevelopment has the potential to result in increased human activity on the beaches at NAPR, which may result in impacts on nesting and feeding habitat for the snowy plover and least tern. Any proposed development at NAPR would require consultation with the DNER under Puerto Rico Law No. 241.

4.10.2 Federally Listed Species

Federally listed species at NAPR include yellow-shouldered blackbird (*Agelaius xanthomus*), brown pelican (*Pelecanus occidentalis occidentalis*), roseate tern (*Sterna dougalii dougalii*), piping plover (*Charadrius melodus*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), green sea turtle (*Chelonia mydas*), Antillean manatee (*Trichechus manatus manatus*), Puerto Rican boa (*Epicrates inornatus*), Virgin Islands tree boa (*Epicrates monensis granti*) and cobana negra (*Stahlia monosperma*).

- **Yellow-Shouldered Blackbird**
  NAPR supports a very small (less than 20 individuals) population of the endangered yellow-shouldered blackbird (YSBB). All of the land area at NAPR is designated as critical habitat for the species. However, all of the land does not provide suitable habitat for the species, as some areas of NAPR have been developed. In 1980, the USFWS and the Navy establish an agreement for Section 7 consultations. In that occasion, a habitat map was developed based on the biological information available at that time for the species. During late 1990s, the Navy developed other maps, including feeding, roosting, and breeding habitats for the species. Based on that information, redevelopment based on the proposed Reuse Plan, may affect approximately 1811 acres of critical habitat at NAPR (Geo-Marine, Inc. September 2005). Approximately 6114 acres of habitat will be protected by the designation of conservation parcels and Special Zoning Plan.

  Redevelopment of these areas may result in loss or alteration of designated critical habitat for the YSBB. Individuals of this species could also be impacted by increased predation by introduced animals: increases in residential use have a potential to result in increased pet and feral animal populations that could prey on the yellow-shouldered blackbird. Additional impacts on eggs and nestlings could occur during construction and demolition activities. As discussed above, it is anticipated that the proposed conservation measures for protection of the YSBB as noted in Table 4-4 will become part of the Special Zoning Plan. Potential landowners or bidders will be informed of the presence of suitable habitat in each of the parcels and of the need to implement proposed conservation measures. Additionally, when developers apply for their respective permits they would become aware of the requirements for protection of the YSBB and their obligation for compliance with the ESA. Accordingly, implementing the proposed disposal action for NAPR and potential subsequent redevelopment of NAPR would not be likely to adversely affect the YSBB and its critical habitat.

Table 4-4. Conservation Measures for the Yellow-shouldered Blackbird

During planning and development phases; vegetation removal, land clearing activities, new construction; demolition or remodeling of existing structures; grounds maintenance; building maintenance; and general operations the following conservation measures should be implemented to minimize possible effects to yellow-shouldered blackbirds or their habitat:
▪ Protect as many existing on site palms and trees as possible in new development plans.
▪ If forested habitat is proposed for clearing or alteration, consultation with the USFWS should be initiated. *Note*: A minimum of one year maybe required to complete consultation.
▪ Schedule activity from September 1 through March 14 or conduct outdoor survey of building(s) (ledges, etc.) and nearby trees (within 50 meters of the building) for yellow-shouldered blackbird nests prior to start date if the development activity is scheduled to occur between March 15 and August 30. Surveys should be conducted by qualified and experienced personnel. Consult with the USFWS if a yellow-shouldered blackbird nest is found.
▪ Consult with the Puerto Rico DNER to identify the need for an endangered species permit to conduct such surveys.
▪ No trimming or cutting of palms and trees between March 15 and August 30 except in an emergency (i.e., downed trees and palms from storms).
▪ Survey for yellow-shouldered blackbird nests prior to any outdoor building maintenance activities between March 15 and August 30. Determine identity of any bird nest found. If a yellow-shouldered blackbird nest is found do not disturb, notify and consult with USFWS.
▪ Before moving parked outdoor equipment (e.g., carts, vehicles) check for yellow-shouldered blackbird nests (March 15 to August 30). If a yellow-shouldered blackbird nest is located do not disturb, notify USFWS.

Note: The above noted conservation measures are applicable to all the parcels as noted on Figure 4-1 except parcel 28. For those parcels that have been identified for conservation no commercial or residential development should take place; however, habitat management activities should be closely coordinated with USFWS.

Notice: If you are willing to comply with the general requirements and conservation measures listed above during the development and subsequent use of this parcel, you may proceed with the project. If you have any questions on the conservation measures, please consult with USFWS, Caribbean Field Office in Boquerón, Puerto Rico. Property owners that cannot adhere to the conservation measures should consult with USFWS to seek an Incidental Take Permit (ITP) under Section 10(a)(1)(B). Be aware that the preparation of a Habitat Conservation Plan is required to apply for an ITP. Failure to comply with the identified general requirements and conservation measures may result in the violation of Section 9 of the ESA. The USFWS has the authority to prosecute violations under ESA.

■ **Puerto Rican Boa**

The Puerto Rican boa occurs in low densities at NAPR (Tolson 2004). Suitable habitat for the species has been identified at Punta Cascajo and in the hills near South Delicias, but adequate habitat exists in other forested areas throughout the base (Tolson 2004). Parcels identified for conservation may support habitat for the species. Impacts on forest areas through Phase II of the Reuse Plan would be minimized by focusing redevelopment in areas that were previously developed and in areas that are immediately adjacent to existing development. Of the approximately 900 acres of upland coastal forest at

NAPR, development through Phase II could impact up to 67 acres, or 7% of the upland coastal forest. No development is proposed for Punta Cascajo or the hills near South Delicias through Phase II, and minimal development is proposed in forested areas. Individual boas could be affected by demolition and construction activities. However, reported occurrences of this species at NAPR have been minimal. As discussed above, it is anticipated that the proposed conservation measures for protection of the Puerto Rican boa as noted in Table 4-5 would become part of the Special Zoning Plan. Potential landowners or bidders will be informed of the presence of suitable habitat in each of the parcels, and the need to implement proposed conservation measures. Additionally, when developers apply for their respective permits they would become aware of the requirements for protection of the Puerto Rican boa and their obligation for compliance with ESA.

Due to the low numbers of Puerto Rican boa reported in the area, the conservation of 18 parcels, the implementation of Special Zoning Plan, the limited amount of forested habitat to be affected by the proposed disposal action for NAPR and the potential subsequent redevelopment of NAPR through Phase II of the Reuse Plan, the Navy does not anticipate adversely effects to the Puerto Rican boa at NAPR.

Table 4-5. Conservation Measures for the Puerto Rican Boa

During planning and development phases ; vegetation removal, land clearing activities, new construction; demolition or remodeling of existing structures; grounds maintenance; building maintenance; and general operations the following conservation measures should be implemented to minimize possible effects to the Puerto Rican boa or its habitat:
▪ When planning new developments in areas that contain Puerto Rican boa habitat (see Table 4-3) strive to save as many existing trees as possible.
▪ If Puerto Rican boa habitat is present and proposed for clearing, consult with the USFWS. *Note:* A minimum of one year maybe required to complete consultation. As part of the consultation process, USFWS may require a survey just prior to clearing to determine the presence/absence of Puerto Rican boas. If Puerto Rican boas are presence contact the USFWS.
▪ Notify the USFWS if a Puerto Rican boa is found during maintenance activities, inside a building/structure or on the grounds.

Note: The above-noted conservation measures are applicable to parcels as noted on Figure 4-1, specifically parcels: 1, 2, 3, 4, 5, 6, 8,9,10,11,12,13,14 18, 19, 20, 22, 25, 27, 28, 29, 30, 31, 38, 39, 40, 43, 44, 48, 56,58, 59,60, 61,62,63,64,65,66,67, and 64.

Notice: If you are willing to comply with the general requirements and conservation measures listed above during the development and subsequent use of this parcel, you may proceed with the project. If you have any questions on the conservation measures, please consult with USFWS, Caribbean Field Office in Boquerón, Puerto Rico. Property owners that cannot adhere to the conservation measures should consult with USFWS to seek an Incidental Take Permit (ITP) under Section 10(a)(1)(B). Be aware that the preparation of a Habitat Conservation Plan is required to apply for an ITP. Failure to comply with the identified general requirements and conservation measures may result in the violation of Section 9 of the ESA. The USFWS has the authority to prosecute violations under ESA.

- **Virgin Islands Tree Boa**

  The existence of the Virgin Islands tree boa at NAPR has not been confirmed. The Virgin Islands tree boa was not found during recent surveys and no occurrence of this species has been reported at NAPR. However suitable habitat for the species has been identified at the Punta Puerca and Puerto Medio Mundo coastlines. As discussed above, it is anticipated that the recommended conservation measures for protection of the Virgin Island tree boa as noted in Table 4-6 will become part of the Special Zoning Plan. No development through Phase II for these areas is proposed by the Reuse Plan. Potential landowners or bidders will be informed of the presence of suitable habitat in each of the parcels, and the need to implement proposed conservation measures. Additionally, when developers apply for their respective permits they would become aware of the requirements for protection of the Virgin Islands tree boa and their obligation for compliance with ESA. Therefore, implementing the proposed disposal action for NAPR and potential subsequent redevelopment of NAPR through Phase II of the Reuse Plan would not adversely affect the Virgin Islands tree boa.

Table 4-6. Conservation Measures for the Virgin Islands Tree Boa

During planning and development phases; vegetation removal, land clearing activities, new construction; demolition or remodeling of existing structures; grounds maintenance; building maintenance; and general operations the following conservation measures should be implemented to minimize possible effects to the Virgin Islands tree boa or its habitat:
▪ When planning new developments in areas that contain Virgin Islands tree boa habitat (see Table 4-3) strive to save as many existing trees as possible.
▪ If Virgin Islands tree boa habitat is present and proposed for clearing, consult with USFWS. Note: A minimum of one year maybe required to complete consultation. As part of the consultation process, USFWS may require a survey just prior to clearing to determine the presence/absence of Virgin Islands tree boas. If Virgin Islands tree boas are presence contact USFWS.
▪ Notify the USFWS if a Virgin Islands tree boa is found during maintenance activities, inside a building/structure or on the grounds.

Note: The above-noted conservation measures are applicable to parcels as noted on Figure 4-1, specifically parcels: 1, 2, 3, 4, 5, 6, 8,9,10,11,12,13,14 18, 19, 20, 22, 25, 27, 28, 29, 30, 31, 38, 39, 40, 43, 44, 48, 56,58, 59,60, 61,62,63,64,65,66,67, and 64.

Notice: If you are willing to comply with the general requirements and conservation measures listed above during the development and subsequent use of this parcel, you may proceed with the project. If you have any questions on the conservation measures, please consult with the USFWS, Caribbean Field Office in Boquerón, Puerto Rico. Property owners that cannot adhere to the conservation measures must consult with USFWS to seek an Incidental Take Permit (ITP) under Section 10(a)(1)(B). Be aware that the preparation of a Habitat Conservation Plan is required to apply for an ITP. Failure to comply with the identified general requirements and conservation measures may result in the violation of Section 9 of the ESA. The USFWS has the authority to prosecute violations under the ESA.

- **Brown Pelican**

  The transfer of NAPR lands to civilian ownership may result in increased public access to brown pelican near-shore and on-shore roosting areas. Potential impacts on brown pelicans may include increased harassment, injury, and mortality, as well as the loss of near-shore and on-shore roosting habitats due

to increases in recreational activities (e.g., swimming, fishing, boating) and vehicular traffic on or near beach areas (e.g., four wheelers, dirt bikes, trucks). Additional impacts on the species may involve ingestion of plastics or other waste items that are produced as a result of redevelopment initiatives (Geo-Marine, Inc. September 2005). Construction of marine facilities will require a permit from USACE. This federal permit process would require a Section 7 consultation between the USACE and the USFWS. During Section 7 consultation, possible adverse effects would be identified and minimized by site-specific conservation measures. However, the Navy believes that the establishment and management of 13 coastal conservation parcels may reduce possible effects to brown pelicans. Additionally brown pelicans occur in low numbers at NAPR and do not use the property for nesting. The Navy has determined that redevelopment is not likely to adversely affect this species.

- **Piping Plover**
  The occurrence of piping plover at NAPR is expected to be limited to vagrants; a vagrant species occurs less than once every 10 years (Geo-Marine, Inc. September 2005). Therefore, redevelopment at NAPR is not likely to adversely affect the piping plover.

- **Roseate Tern**
  The occurrence of roseate tern at NAPR is expected to be limited to accidental because the species could be pushed into nearby coastal waters or inshore during intense storms, but is otherwise not expected to be present at NAPR (Geo-Marine, Inc. September 2005). Therefore, redevelopment at NAPR is not likely to adversely affect the roseate tern.

- **Cobana Negra**
  Coastal development and loss of wetland habitat have been identified as the biggest threats to cobana negra populations in Puerto Rico (Geo-Marine, Inc. September 2005). A single individual of this species was found in a coastal scrub forest area west of American Circle, in an area classified as undevelopable due to slopes in excess of 15%. This is an area identified as a conservation parcel. Cobana negra is most likely to be found in salt flats and mangrove edges in brackish, seasonally flooded wetlands. These areas are included in the conservation area in Zone 9. No development in the vicinity of the identified cobana negra individual or in appropriate habitat for cobana negra is proposed through Phase II. The cobana negra is extremely rare in the proposed action area. The only known individual is located in an area that will be conserved, and additional suitable habitat for this species is within the proposed conservation zone. Accordingly, implementing the proposed disposal action for NAPR and potential subsequent redevelopment of NAPR is not likely to adversely affect cobana negra.

- **Sea Turtles**
  Disposal and reuse of NAPR under the proposed action alternative would not directly affect sea turtles. However, indirect impacts on sea turtles could result from increases in boat traffic (and hence sea turtle/boat collisions); in-

creases in entanglement in discarded fishing gear or ingestion of harmful refuse, or interference of these materials with successful nesting; an increase in nest predation (or disturbance) due to potential increases in nest predators (or human disturbance); an increase in illegal hunting; degradation of habitat from water quality degradation or physical damage from boats; and lighting that distracts nesting or hatchling sea turtles. Each of these potential impacts is discussed below.

- **Sea Turtle/Boat Collisions**
  A direct consequence of property disposal would be the increase in private and commercial vessel traffic. Since most of the waters surrounding NAPR support habitats that are used by sea turtles for feeding and resting, e.g., sea grass beds and coral reefs (see Figure 3-9), the potential for sea turtle/boat collisions would be greater than that which currently exists.

  As discussed in Section 3.10, about one-quarter of the sea turtles recorded in NSRR waters by Rathbun *et al.* (1985) were in Enseñada Honda, particularly the eastern half. While the marina would remain the same size under the proposed reuse, the actual use of the marina and ferry may increase due to the transitioning of the property from military to public use. However, the current permits for the marine facilities are construction/use permits. Therefore, any changes in operational tempo for USACE-permitted facilities (e.g., marina, boat ramps, and cargo pier) would require a new permit from the USACE. Any increase in vessel traffic in Enseñada Honda which could result in a corresponding increase in the potential for sea turtle/boat collisions in this area would be regulated through the USACE permitting process. It is anticipated that prior to issuing a new permit, the USACE would consult with NOAA Fisheries to evaluate possible effects of the proposed actions and to implement conservation measures to minimize possible adverse effects pursuant to Section 7 of the ESA. For this reason, although possible adverse effects are anticipated future section 7 consultation between the USACE and NOAA Fisheries will address these possible effects. The Navy will not be included in the future development of NAPR consultation for any activity with future federal nexus.

- **Entanglement in and Ingestion of Fishing Gear and Other Debris**
  As an additional consequence of the property disposal, sea turtles would potentially be at increased risk of entanglement in or ingestion of abandoned fishing gear (such as abandoned monofilament fishing line) or other refuse (National Research Council 1990). Diaz (2000) noted that during operation of NSRR a seasonal accumulation of trash occurred at beach #1 (along the northeast coast of NAPR), and Geo-Marine, Inc. (September 2005) noted that piles of discarded fishing gear were found along some NAPR shorelines. In Puerto Rico, beaches are managed by the DNER. This agency regulates both, the protection of sea turtles and fishing activities. The Navy anticipates that the DNER will effectively manage both activities, avoiding possible effects on sea turtles.

- **Nest Predation and Hunting**
  During nest monitoring at NSRR/NAPR in 2002 and 2004, Geo-Marine, Inc. (September 2005) recorded a substantial number of nests that had been uncovered and preyed upon. In 2002, 35 of the 73 nests were depredated. In 2004, fewer surveys were conducted; in this year, four of 16 nests experienced depredation. Potential sea turtle nest predators include mongoose, feral cats and dogs, rats, and iguanas (Geo-Marine, Inc. January 2005; Belardo *et al.* 1997). Reuse of the property may lead to an increase in the number of these potential predators (e.g., dogs and cats), or an increase in their occurrence in the less developed or undeveloped areas (where sea turtle nesting potentially occurs). Such a potential increase in predators, and hence predation of sea turtle nests, could adversely affect successful sea turtle nesting on the property if it occurred year after year. However, the beaches will be managed by the DNER, and the Navy anticipates the DNER will effectively managed these issues.

  As mentioned in Section 3.10, in addition to the potential animal predators mentioned above, humans have been noted to illegally hunt sea turtles and eggs (Belardo *et al.* 1997; National Marine Fisheries Service and U.S. Fish and Wildlife Service 1993). Poaching of eggs and hunting of sea turtle are regulated by federal and local agencies. The Navy anticipates the appropriate agencies will effectively manage these issues.

- **Degradation of Habitat**
  Impacts on sensitive habitats supporting sea turtles (i.e., sea grass beds and coral reefs) could occur from boats anchoring or grounding or from propeller scouring and from degradation of water quality from runoff and fuel spills. Adverse impacts associated with water quality degradation would be avoided by compliance with applicable Commonwealth and federal laws, which mandate the use of standard measures (e.g., silt fencing, hay bales, earth swales to channel runoff) during construction and operation to control upland erosion and/or storm water runoff from the development sites into adjacent waters. Based on the implementation of the comprehensive sea turtle conservation measures listed in Table 4-7, implementing the disposal action is not likely to adversely affect sea turtles and their habitat.

- **Lighting Impacts**
  Light pollution on nesting beaches can adversely affect sea turtles because it can alter sea turtle behavior at night (Witherington and Martin 1996). Artificial light sources can deter nesting sea turtles from emerging onto a beach, thereby forcing the turtle to select a less suitable nesting site, and can disorient sea turtles returning to the ocean. Hatchlings emerge from the nest at sundown and use the diminishing light on the horizon as a cue for the direction of the ocean. Artificial lights can misorient (i.e., cause to move in the wrong direction) and disorient hatchlings, thereby increasing the time it takes them to reach the water (Witherington and Martin 1996).

Sea turtles' ability to survive without water is limited, so prolonged exposure increases the chance of mortality from dehydration, predators, and fatigue, especially for hatchlings. The proposed conservation measures for protection of the sea turtles included in Table 4-7 include the development of a comprehensive conservation plan to address possible adverse effects of lighting on sea turtles. This measure will become part of the Special Zoning Plan. Therefore, when developers apply for their respective permits they would become aware of the requirements for protection of the sea turtles and their obligation for compliance with ESA. Implementing the disposal action would not directly result in any impacts to sea turtles due to lighting. With developers following existing Commonwealth laws and regulation and following the lighting requirements which will be part of the Special Zoning Plan, subsequent redevelopment is not likely to adversely affect sea turtles.

Table 4-7. Conservation Recommendations for Sea Turtles

During planning and development phases ; vegetation removal, land clearing activities, new construction; demolition or remodeling of existing structures; grounds maintenance; building maintenance; and general operations the following conservation measures should be implemented to minimize possible effects to the sea turtle species and their habitat:
▪ Avoid the removal of vegetation, fence installation, construction activities, and light installation within 50 meters from the high tide.
▪ Designate a buffer zone of additional 20 meters to minimize indirect impacts from the project and plant sea grapes and native trees within the zone.
▪ Prepare and implement a comprehensive lighting plan to avoid detrimental impacts of artificial lighting on sea turtles. The goal of the plan should be that lights not be seen directly, indirectly or cumulatively from the beach. Light management strategies such as shielding, lowering of the lights, locating the lights away from sight view of the beach, using an alternate light source such as Low Pressure Sodium Vapor, and planting of vegetation barriers are some of the available alternatives to reach the plan goal. In already constructed projects, all lights visible from the beach should be eliminated or relocated so as not to be visible. Those remaining lights shall be modified in order to avoid or minimize the possibility of disorientation. The plan goal and the light management strategies should be specified, described and located in the lighting plan. The plan should be submitted to the DNER and the USFWS for review and approval.
▪ Once the plan is fully implemented, a lighting inspection should be conducted to identify and correct any remaining problematic lights.
▪ Enhance coastal vegetation with planting of native species (e.g., sea grapes) within the maritime zone. Protect coastal vegetation and nesting habitat from vehicular traffic in the area.
▪ Consult with the USFWS and Puerto Rico DNER on all beach use plans and permit requirements
▪ Notify the DNER if you observe an injured or dead turtle anywhere on the property.
▪ Pesticide and herbicide applications must follow Commonwealth of Puerto Rico regulations.

Table 4-7. Conservation Recommendations for Sea Turtles

Note: The above conservation measures are applicable to the parcels as noted in Table 4-3; specifically these are parcels: 5, 6, 7, 8, 9, 10, 11, 12, 13, 25, 26, 28, 35, 38, 39, 42, 44, 45, 46, 47, 49, 56, 58, 59, 60, 61,62,63, 64, 65, 66, 67, and 68.

Notice: If you are willing to comply with the general requirements and conservation measures listed above during the development and subsequent use of this parcel, you may proceed with the project. If you have any questions on the conservation measures, please consult with the USFWS, Caribbean Field Office in Boquerón, Puerto Rico. Property owners that cannot adhere to the conservation measures must consult with the USFWS to seek an Incidental Take Permit (ITP) under Section 10(a)(1)(B). Be aware that the preparation of a Habitat Conservation Plan is required to apply for an ITP. Failure to comply with the identified general requirements and conservation measures may result in the violation of Section 9 of the ESA. The USFWS has the authority to prosecute violations under ESA.

Sea turtles would not be directly impacted by the disposal of NAPR. Subsequent redevelopment could adversely impact sea turtles from follow-on actions both on land and in the waters surrounding NAPR. The transfer of beachfront property at NAPR from federal to civilian ownership could lead to disruption of normal nesting and hatchling emergence behaviors, degradation and/or loss of sea turtle nesting and foraging habitat, increased susceptibility to human and animal predation and increased interaction with fishing gear and watercraft. However, as noted above, the implementation of sea turtle conservation measures as provided in the Special Zoning Plan will minimize possible adverse effects to the species. Additionally, marine facilities with the potential to increase effects related to vessel traffic would require a USACE permit and a Section 7 consultation with the USFWS. Therefore, the Navy has determined that implementing the proposed action is not likely to adversely affect sea turtles at NAPR.

- **West Indian Manatee**

  Disposal and reuse of NAPR under the proposed action alternative would not directly affect manatees. However, indirect impacts on manatees could result from increases in boat traffic (and hence manatee/boat collisions); degradation of habitat; and entanglement in abandoned or active fishing gear. Each of these potential impacts is discussed below.

  - **Manatee/boat collisions**

    As discussed in Section 3.10, collisions with watercraft are one of the greatest sources of manatee deaths in Florida, while gill nets represent the greatest threat in Puerto Rico. An indirect consequence of property disposal would be the potential for increase in private and commercial vessel traffic. Most of the waters surrounding NAPR support habitat that is used by manatees for feeding and resting. Instituting boating restriction such as speeds and anchoring locations as may be required as part of new Federal permits would reduce the potential for manatee/boat collisions.

    As discussed in Section 3.10, manatees use Enseñada Honda for feeding, traveling, and socializing. USFWS data have recorded manatees as feeding in areas on the southeastern end of Enseñada Honda, the southwestern

end, and the middle-western area. Any increase in vessel traffic in Enseñada Honda could result in a corresponding increase in the potential for manatee/boat collisions in this area. While the marina would remain the same size under the proposed reuse, the actual use of the marina and ferry may increase when the property transitions from military to public use and when the restricted waters designation around NAPR is lifted. In the event any changes in authorized uses for USACE permitted facilities (e.g., marina, boat ramps, and cargo pier) took place, it would require a new permit from the USACE and a section 7 consultation with the USFWS.

Another indirect consequence of the property transfer would be loss of protection of certain waters around NAPR. Manatees heavily use pelican Cove, in the Capehart area. Under the Navy's use of the property, no boats (other than harbor police boats) were allowed in Pelican Cove unless coordinated with and approved by the Public Works Department, (Martinez 2004). Removal of this protection would increase the risk of disturbance or harm to manatees from boat collisions in this area.

- **Degradation of habitat**
  As shown on Figure 3-9, sea grass beds occur in most areas adjacent to NAPR. Sea grass beds are extensively used by manatees as feeding and resting areas. Potential impacts on sea grass could result from anchoring, boat groundings, or propeller scouring associated with increased boating activity in the waters surrounding NAPR. In the event any changes in authorized uses for USACE permitted facilities (e.g., marina, boat ramps, and cargo pier) took place, it would require a new permit from the USACE and a section 7 consultation with the USFWS. Instituting boating restriction such as speeds and anchoring locations as maybe required as part of new permit requirements could lessen this potential for habitat degradation.

- **Entanglement in abandoned or active fishing gear**
  Rathbun and Possardt (1986) reported that entanglement in gill nets is a potential source of manatee deaths in Puerto Rico. An indirect impact of the disposal of NAPR could be increased fishing around NAPR. This could increase the likelihood of broken/abandoned gill nets. As stated previously, manatees travel all the waters in the southeastern area of Puerto Rico. While the waters around NAPR have been restricted to boats, fishing just out side the restricted areas did take place. Thus, the potential for broken/abandoned gill nets from fishermen impacting manatees has always existed adjacent to NAPR. The exception would be Enseñada Honda. However, pleasure boats and commercial vessels most likely would use Enseñada Honda. This could potentially limit the usage of gill nets and thus limit the likelihood for impacts to manatees.

In summary, threatened and endangered species and habitat could potentially be indirectly affected by the reuse of NAPR. As required by Section 7 of ESA, the Navy

has concluded consultation with the USFWS regarding the significance of any potential impacts to protected species as a result of disposal and reuse of NAPR. Because of the speculative nature of the Reuse Plan, its full effects on listed species cannot be addressed. However, with the establishment of 18 parcels for conservation and the adoption of a Special Zoning Plan for NAPR that incorporates the implementation of proposed conservation measures into the site/development review process, as previously described and the requirement to obtain new permits from the USACE for any changes in authorized use for permitted facilities, the Navy has determined that the implementation of the Reuse Plan at NAPR is not likely to adversely affect threatened and endangered species or designated critical habitat at NAPR. In a letter dated April 7, 2006, the USFWS concurs with the Navy's determination that the proposed action is not likely to adversely affect federally-listed species and would not result in adverse modification of designated critical habitat within the project area.

4.11 Socioeconomics

4.11.1 Population and Housing

Population

The redevelopment of NAPR is expected to stimulate the local economy and provide growth for the region. People will move to the area and, because of the new construction of 800 dwelling units and potential use of 150 recently built apartments between the Bundy, Capehart, and downtown areas, the infrastructure would be in place to accommodate this population increase. Under the assumption that three individuals reside in each dwelling unit, the permanent residential population of the local area could increase by 2,850 people during Phase I and II (a one- to ten-year time frame). This estimate would not include temporary employees or patrons staying in local temporary or vacation units (i.e., 400 guest rooms proposed in the Bundy area). The increase of 2,850 individuals over the course of ten years would represent an increase of approximately 7% over the 2000 U.S. Census population of Naguabo and Ceiba. However, this number is slightly deceiving because the 2000 population includes a fully occupied base of approximately 7,300 in 2001 (U.S. Army Corps of Engineers 1998).

There is also the potential for an influx of people to the Fajardo/Ceiba Region because of proposed job creation. The actual number of jobs that will be filled locally compared with people from outside the area who would move closer if hired is speculative and cannot be quantified with reasonable certainty.

Housing

The proposed construction of 800 dwelling units and use of 150 apartments, in addition to 400 guest rooms, will allow a gradual increase in the population over the course of 10 years as construction is completed. In addition, it is anticipated that the vacancy rate in the region (16%) will improve slightly due to the jobs created by the development of NAPR and people moving into the region. A portion of these individuals would live in the newly constructed developments and others would live in the existing community. It has been reported that several new residential developments in the region have experienced high levels of absorption recently, and it is believed that similar results will be noticed with residential development at NAPR.

4.11.2 Economy, Employment, and Income

Economy

Much of the development proposed in the Reuse Plan is meant to stimulate the economy of the Commonwealth and local municipalities with opportunities to bring businesses to the area from outside Puerto Rico or the immediate Fajardo/Ceiba Region. Some development scenarios meant to accomplish this are the reuse of the airport and the addition of a government/training center, a golf course, a university campus, marina, ferry terminal, beaches/open space, science park, and conservation areas. These features would draw individuals and businesses from more distant locations to eastern Puerto Rico.

A major benefit of any type of development that takes place at NAPR would be the construction spending that would take place through redevelopment. Although this would be a short-term beneficial impact, it has the potential to be significant if local labor and materials are used to the extent practicable.

The money spent during both construction phases and operational phases would have an initial direct economic impact on the community. This money would be cycled through the local economy through subsequent business spending and wages earned locally, creating further indirect and induced economic benefits — the multiplier effect. This would continue until "leakages" (i.e., money going to businesses or wages earned by employees who are from outside the local community) slowly reduce the amount of the initial expenditure.

The economic sectors that would experience the greatest effect as a result of the disposal and redevelopment of NAPR would include the tourism, marina/port, industrial, and retail sectors. The main economic impacts expected for each of these sectors are discussed below.

- **Tourism**
  As discussed in Section 3.11, tourism is an important sector of the eastern Puerto Rican economy and, as such, much of the development will be tourism-related. The reuse of the airport will serve to enhance the tourism sector locally. The airport will offer commercial passenger flights, general aviation, and cargo transport. The passenger transport capabilities will reduce the time and increase the ease with which tourists can reach destinations in eastern Puerto Rico. Other amenities proposed are the expansion of the current golf course to 18 holes, reuse of the marina boat slips, reuse of the ferry terminal, and preserving open space, beach, and conservation areas.

  Given a setting in eastern Puerto Rico that is already rich with tourism and attractions such as El Yunque, it is expected that there will be sufficient traffic and patrons from outside the immediate area to use these new developments. There will be a net positive economic impact with respect to tourism, although quantifying the actual impact or number of visitors would be too speculative based on available data.

- **Marina/Port**
  The marina/port area of NAPR would continue to be used for similar activities. The 72 existing wet slips (Section 3.11.2) would be reused to attract private and commercial boats. A ferry terminal would be established and, operated by the Port Authority, would be used for both passenger and light cargo transport. Attracting patrons to the property and offering multiple modes of transportation to reach their destination is important for the property's development. The new facilities in the marina/port area would have a positive economic impact through fees charged for boat slips, ferry transport, and light cargo rates, and by allowing access to the region, where money would be spent on other amenities.

- **Industrial**

A variety of industrial development is proposed, including cargo shipping at the airport and port, a government/training center, a university campus, the fuel tank farm, and a science park. A significant amount of money would be spent in the short-term to erect these facilities, which would then stimulate growth, employment, and spending in the local economy and result in an overall positive economic impact on the local economy. The current inventory of industrial space in the Ceiba/Naguabo Region is approximately 450,000 square feet of PRIDCO industrial buildings, with an 18% vacancy rate. The success of the proposed industrial space would be in attracting new business associated with shipping/receiving at the airport and attracting tenants of older PRIDCO facilities to newly constructed industrial buildings that better suit the tenant's business needs. If this is done successfully, it will create a positive economic benefit for the local community.

- **Retail**
  There will be limited direct impacts related to increased retail establishments and corresponding sales associated with the development of NAPR. However, the local municipalities and adjacent shopping areas may experience an increase in spending due to an expected increase in tourist traffic and, potentially, in local residents living in homes developed on the site.

Employment

The development of NAPR offers a variety of employment opportunities and will serve to stimulate the local economy by supplying construction spending and employment in short-term and full-time jobs in a variety of sectors once the airport, shipping/receiving, and other facilities are operational. As discussed in Section 3.11.2, local municipalities are moderately depressed (unemployment rates between 7% and 10%), and new industry and job opportunities will enhance the employment market, both in the short- and long-term. Based upon assumptions made and employment-to-square footage calculations from the Reuse Plan, it is estimated that approximately 5,000 jobs, including jobs in the community service and tourism sectors, will be created in Phase I and II of the development process.

Based upon the population projections (increase of 2,850) under Phase I and II of the Reuse Plan, it is anticipated that an additional 12 police officers (4.1/1,000 residents x 2,850 new residents) in the local community would be needed to maintain a similar proportion of residents to public safety officers before and after the proposed action.

Based upon the population projections (increase of 2,850) and the additional structures proposed at NAPR under Phase I and II of the Reuse Plan, it is anticipated that additional fire-fighting resources would be required. In order to maintain the existing

proportion of firefighters to residents an additional one or two firefighters would be necessary.

The Reuse Plan proposes that the hospital be reused as part of the development of NAPR. The specific capabilities and services to be offered are yet to be determined. However, it is expected that they would be sufficient to address immediate, emergency situations occurring locally. There may be an increased need for family practice physicians to accommodate potential population increases, but at the rate at which residential homes will be built, there should be adequate time for the needed medical resources to move into the area if the current inventory is insufficient.

It is proposed that the former elementary school in the downtown area be reused as a middle/high school and that the former middle/high school in the Capehart area be reused as a private bi-lingual school as part of the development of NAPR. Additionally, a university campus has been proposed for the downtown area that will accommodate people seeking advanced education and research experience. These facilities would serve to enhance the level of education available in the region.

This property was one of the largest contiguous parcels of land left in Puerto Rico. The U.S. Navy's development of the parcel has been kept in check and many areas can be considered pristine. To take advantage of this, the reuse of NAPR seeks to maintain many areas of the property for open space, conservation, and recreational and beach activities, which would attract tourists in the area to the property to enjoy the natural setting.

In addition, the Reuse Plan proposes the upgrade of the current 9-hole golf course to an 18-hole course with improved drainage. This would increase the influx of tourists and money to the local economy and is viewed as a positive economic benefit.

Income

The transfer of NAPR would have a positive impact on taxes and revenues generated on the island. The result of the transfer would be the removal of approximately 8,442 acres of land from tax-exempt status to taxable status. In addition, the municipality of Ceiba has instituted a construction tax on future development on NAPR, which will generate even more income. Furthermore, the increased tourism and business activity

associated with economic-related development also would have a positive impact on the tax base by increasing the value and amount of improved property in the municipalities.

4.12 Cultural Resources

In accordance with Section 106 of the National Historic Preservation Act (NHPA), the Navy entered into consultation with the Puerto Rico SHPO (see May 10, 2005 letter in Appendix A). The protection of historic and archaeological resources at NAPR will be finalized through the Section 106 process.

The majority of the eligible archaeological sites fall within areas designated for conservation. The conservation areas generally include coastal mangroves, wetlands, and an associated buffer zone consisting of upland forest areas. The Navy proposed to transfer lands containing all but four of the archaeological sites to the Commonwealth of Puerto Rico. Most of the area containing archaeological sites would be designated as conservation. However, any site not in a conservation zone would also be afforded protection as it would be on Commonwealth property and prior to any development Commonwealth laws regarding the protection of archaeological resources would be followed. For those four sites not being transferred to the Commonwealth of Puerto Rico, the Navy proposes to undertake data recovery. Data recovery would be undertaken in coordination with the Puerto Rico SHPO and in accordance with the Secretary of Interior's standards for data recovery.

For those structures located on NAPR that are deemed eligible for listing on the NRHP, the Navy will undertake recordation to mitigate the potential for adverse effect in the event any structures are demolished or modified subsequent to Navy ownership. Recordation would be undertaken in accordance with applicable National Parks Service standards and as agreed to between the Navy and the Puerto Rico SHPO.

As part of implementing the Proposed Action, a Memorandum of Agreement (MOA) between the Navy and the Puerto Rico SHPO has been executed (see Appendix D for a copy of the executed MOA). The MOA details which archaeological sites would undergo data recover and to what level. In addition, it specifies the level of documentation needed for respective historic structures or the consultation process needed to establish the level of recordation. Through the execution of the MOA, and by implementing

the stipulations of the MOA, the Navy meets their requirements under Section 106 of the NHPA.

4.13 Coastal Zone Management

The Navy has determined that the proposed action of disposal of NAPR to non-federal entities as described in Section 1.5 would not constitute an effect on coastal uses and resources, as defined by enforceable policies of the Puerto Rico CZMP. Accordingly, the Navy has provided the PRPB with a copy of the negative determination. In a letter dated March 21, 2006, the PRPB determined that the Proposed Action does not require a Federal Coastal Consistency Determination with the Puerto Rico CZMP. The future reuse of the disposed NAPR property would be under the purview of the PRPB, which would be responsible for ensuring that development projects and activities do not adversely affect the existing sensitive ecosystems within the coastal zone.

Once the areas of NAPR are transferred from federal ownership, however, these 8,435 acres of land would no longer be excluded from the coastal zone, and proposed actions within this area with the potential to impact the coastal zone would be subject to CZMP-consistency reviews.

4.14 Environmental Justice / Protection of Children from Environmental Health Risks

In accordance with Executive Order 12898, dated February 11, 1994, and Secretary of the Navy Notice 5090, dated May 27, 1994, the Navy is required to identify and address, as appropriate, the potential for disproportionately high and adverse human health or environmental effects of its actions on minority or low-income populations.

The Navy has not directly or indirectly used criteria, methods, or practices that discriminate on the basis of race, color, or national origin. In addition, the Navy has analyzed the economic and social impacts of the proposed action (i.e., disposal of NAPR) and subsequent reuse and determined that no economic or social impacts on minority or low-income communities are anticipated. Because of the nature of disposal and reuse, and the oversight of the planning process by the LRA, most impacts would be expected to be positive for the local communities. According to the Reuse Plan, guiding principles of the Commonwealth during planning for reuse aimed to benefit the citizens, including

the residents of Ceiba, Naguabo, and surrounding areas. These guiding principles were to encourage community participation, promote activities to create jobs, and to protect natural resources. According to the Reuse Plan, at full build-out the total number of jobs created would be an estimated 18,200 to 19,700. Some portion of the jobs created would likely go to residents in the nearby communities. There would also likely be some positive economic benefits for the business sector in these communities from the additional spending by tourists and visitors and new residents and employees, in addition to the construction dollars that would be introduced to the economy. Additionally, no human health impacts are anticipated. No mitigation measures are necessary to address significant adverse environmental impacts on minority and low-income communities. Therefore, the proposed action does not result in disproportionately high and adverse human or environmental effects on minorities or low-income populations.

Executive Order No. 13045, "Protection of Children from Environmental Health Risks," mandates federal agencies to identify and assess environmental health and safety risks that may affect children disproportionately as a result of the implementation of federal policies, programs, activities, and standards (63 Federal Register 19883 to 19888). The proposed action alternative would not negatively impact schools, housing areas, or gathering places of children. Therefore, there would be no short- or long-term environmental health or safety risks to children posed by the implementation of the proposed action alternative.

4.15 Irreversible and Irretrievable Commitment of Resources

The proposed action is the disposal of NAPR. Implementation of the proposed action would not result in the irreversible or irretrievable loss of any resources discussed in this EA. The proposed action does not irreversibly or irretrievably curtail the reasonable range of potential uses of the environment. However, because of the speculative nature of the Reuse Plan, its full effects on all resources cannot be addressed. Under existing laws and regulations, future landowners/developers would be responsible for establishing zoning and applying for building permits and other approvals to implement their respective development projects. The engineering and design studies needed to obtain the various approvals from the respective regulatory agencies have not been accomplished.

5 Cumulative Impacts

Cumulative impacts are the sum of all impacts from implementation of the proposed action—disposal of NAPR—and from other past or reasonably foreseeable future projects in the area. Potentially significant effects can result from the additive or synergistic effects of individually minor actions that affect the same resources over the duration of the proposed action and within the same geographic area. For the purpose of this assessment, the area considered for cumulative impacts is the northeast region of Puerto Rico near NAPR, including the communities of Luquillo, Fajardo, Ceiba, and Naguabo.

As discussed in Section 1.6 of this EA, the impacts associated with reuse of the property through 2013 (i.e., Phases I and II) under the Reuse Plan are considered indirect impacts of the proposed action. These impacts are described in Section 4 at a general level of detail, consistent with the level of detail found in the Reuse Plan. However, the magnitude of redevelopment beyond Phase II (i.e., Phases III and IV build-out to 2038) would be a function of economic factors and other factors that, with the exception of certain Navy-imposed restrictions, would be beyond the control of the Navy. As such, the ultimate redevelopment of the property through Phase IV of the Reuse Plan is considered to be speculative at present; therefore, the proposed reuses defined in Phases III and IV of the Reuse Plan have been evaluated as unforeseeable, cumulative implications of the proposed action.

5.1 Land Use and Transportation

Implementation of Phases III and IV of the Reuse Plan would result in additional land use impacts as areas are developed more intensively. Significant internal or external land use inconsistencies are not anticipated because most of the additional development would comprise expansions or continuation of developments initiated during Phase II of the plan. Furthermore, the PRPB and other Commonwealth and federal agencies would continue to be responsible for reviewing individual development projects to ensure that such projects are consistent with the applicable zoning regulations, thereby minimizing the potential for unforeseeable future land use inconsistencies.

Additional upgrades to the transportation system would be necessary as Phases III and IV of the Reuse Plan are implemented and areas are developed more intensively. Accordingly, the plan proposes the expansion and improvement of 13 roadways on the property during Phases III and IV. However, given that Phases III and IV would be implemented over a 10- to 20-year period and would not be initiated until at least 10 years after transfer of the property, further review and evaluation of the adequacy of the transportation system would be needed as the development plan progresses.

The proposed action of disposal of NAPR to non-federal entities would exclude approximately 230 acres that would be transferred by the Navy to other federal entities (see Section 1.5.2 and Figure 1-3 for details).

Land Transfers to the Department of the Army

The U.S. Army would use 125 acres in the Bundy area for training and administrative support facilities and five acres along the waterfront area. These activities are generally consistent with the former use of these areas by the Navy as well as with the conservation and residential land uses proposed for this zone by the Reuse Plan. Therefore, no significant cumulative impacts associated with this land transfer are anticipated.

Land Transfers to the Department of Homeland Security

The DHS would take ownership of three separate parcels of Navy-owned land at NAPR. The DHS would use one acre adjacent to the fuel pier on the waterfront for a boat storage and operations area and 10 acres, including Hangar 200 and the aircraft parking apron at the airfield. The U.S. Customs Service would use the facilities for air

operations and administrative facilities. PRPA would be responsible for managing civilian air operations and the civilian airfield facilities after transfer of NAPR. PRPA is planning to develop an airfield master plan for future civilian/commercial air operations. It is assumed that the uses proposed by the DHS for the three parcels would be consistent with waterfront uses and the PRPA's airfield master plan. Therefore, no significant cumulative impacts on the surrounding areas would be expected.

The DHS would use 30 acres constituting the former AFWTF Headquarters at South Delicias for administration and communications facilities. These activities are consistent with the undeveloped nature of the surrounding lands. This area is proposed to remain undeveloped through Phase II of the Reuse Plan. Therefore, no significant cumulative impacts on the surrounding areas would be expected.

The 60-acre parcel at Punta Medio Mundo containing the small-arms range, as well as the existing access roads to the site, would be transferred to the DHS for use as a small-arms training facility. This area is surrounded by lands proposed to be part of the conservation areas, which contain large tracts of mangroves and wetlands natural areas, and its ongoing use as a small-arms range is not entirely consistent with the proposed surrounding land use. During the Navy's use of the small-arms range, access to the surrounding areas was restricted and enforced by the Navy. With reuse, the areas surrounding the small-arms range are proposed to be transferred to a Commonwealth conservation entity. Because of the increased potential for members of the public to be within the conservation zone, use of the small-arms range by the DHS has potential safety implications. The DHS would be required to maintain the established Surface Danger Zone for the range. Furthermore, to minimize these safety issues, it is assumed that the DHS would enter into a Memorandum of Agreement with the Commonwealth conservation entity to effectively limit public access to these areas during operations at the small-arms range. Therefore, no significant cumulative impacts on the surrounding areas would be expected.

Land Transfer to the Puerto Rico Port Authority (Airport)

Construction impacts are commonly short-term and temporary in nature. Typical impacts resulting from an airport construction project include air, water, and noise pollution, as well as potential impacts resulting from increased hazardous waste and solid waste. Im-

pacts resulting from the construction of the reuse plan and its alternatives are not anticipated to be permanent and would occur primarily during the construction period.

FAA Order 5050.4B requires that proposed airport construction be compliant with FAA Advisory Circular 150/5370-10A Standards for Specifying Construction of Airports, Temporary Air and Water Pollution, Soil Erosion, and Siltation Control. These Federally designed control measures would be incorporated into all temporary erosion and sedimentation controls, as well as air and water pollution control measures for all construction projects at the airport site. Additionally, any permits and plans that pertain to construction projects and the potential impacts to water quality, hazardous waste, and solid waste would need to be obtained prior to construction.

5.2 Vegetation

Implementation of the proposed action, disposal of NAPR, combined with past, present, and future actions, could have the potential for an adverse cumulative impact on vegetative communities at NAPR. Redevelopment through Phase IV of the Reuse Plan would result in additional loss or alteration of vegetation in terrestrial communities throughout the property. While a significant portion of land in areas with wetlands and steep slopes would be avoided, the full build-out of the Reuse Plan would result in additional expansion of the development footprint into previously undeveloped upland areas at NAPR. Furthermore, full build-out would result in additional development up to the boundaries of sensitive freshwater wetland, surface water, tidal wetland, and marine ecosystems. The resulting loss of vegetation could remove protective buffers that are important to the health of these sensitive resources.

However, implementing best management practices during construction and complying with all Puerto Rico Commonwealth permitting regulations could minimize any impacts. Therefore, the resultant loss in vegetation would in and of itself not be expected to have a significant adverse impact on natural resources. It should also be noted that the Reuse Plan would result in the permanent protection of more than 3,000 acres of vegetative communities, including more than 2,100 acres of mangroves, through establishment of conservation areas. Protection of such an extensive area of natural vegetation in perpetuity would be a beneficial impact of the proposed action.

5.3 Air and Noise

Cumulative air quality impacts from the proposed action and other existing and reasonably foreseeable actions are not expected to be significant. The reuse of NAPR through Phase IV, as proposed in the Reuse Plan, would entail a more intensive use of commercial and light industrial facilities than the current land uses and infrastructure at NAPR support. The specific level of air emissions associated with the proposed reuses through Phase IV are speculative and not quantifiable at this time. Each proposed development would be required to adhere to the Commonwealth's permit and development review process.

Other existing air pollutant sources include emissions from ferry operations between Vieques and Fajardo, engine emissions from aircraft using the NAPR, Fajardo, and Vieques airports, and from private watercraft operating near the shore. Emissions and air quality impacts from stationary sources on NAPR that remain in federal ownership would be governed by air quality permits issued to each respective agency by the Puerto Rico EQB.

Proposed construction projects at NAPR, as part of the reuse activities, are not expected to generate air pollutant emissions at levels that would impact the air quality within the disposed land areas. Projects such as these would address any potential significant air quality impacts caused by the project in environmental documentation prepared for each project. The cumulative effect of these actions is not expected to adversely affect the region's designation as an attainment area.

The proposed action would not directly or indirectly generate sufficient noise to have a cumulative effect on the overall noise environment of the NAPR property or nearby areas. Historical noise sources located at NAPR (discussed in Section 3.7) include aircraft operations, watercraft operating near the shore, and past military activities. Because of the geographic expanse (8,442 acres) and varying topography of NAPR, the proposed reuse projects at NAPR are not expected to generate sufficient noise to be noticeable outside the disposed land areas.

5.4 Terrestrial and Marine Environments and Threatened and Endangered Species

Implementation of the proposed action, when combined with past, present, and future actions, would not have a significant impact on the terrestrial environment and on those threatened and endangered species that occur at NAPR. As discussed in Section 1.6, the potential impacts associated with development through Phase II of the Reuse Plan are considered as indirect impacts of the proposed disposal action. Potential impacts from development through Phase IV of the Reuse Plan are discussed below.

It is anticipated the PRPB will adopt a Special Zoning Plan based on the proposed Reuse Plan for the development of NAPR. Included in the zoning plan will be specific conservation measures, presented in Tables 4-4 through 4-7, to be undertaken by future landowners/developers to assure protection of threatened and endangered species and their habitat. A statement, which directs property owners/developers to consult with USFWS if they have questions on, or cannot comply with the conservation measures will be part of the zoning conditions. It will further state that failure to comply could violate Section 9.0 of the ESA and that the USFWS has the authority to prosecute violations under the ESA. As these conservation recommendations will become part of the Special Zoning Plan for the development of NAPR, they will constitute conditions that all future landowners/developers will be advised of when undergoing the site/development review process required to obtain a building permit. In addition, any changes in operational tempo for USACE-permitted facilities (e.g., marina, boat ramps, and cargo pier) would require a new permit from the USACE no matter where in the phase development these changes occur.

During implementation of Phase I of the Reuse Plan, which is the disposal action, the Navy would include notification of the recommended conservation measures in all bid packages as it relates to the respective parcel. The successful bidder's transfer documents would also include a copy of the applicable recommended conservation measures, as well as notification to the USFWS as to who the successful bidder is. During the subsequent Phases III and IV, developers will become aware of the conservation measures as part of the zoning/building permit process. Implementation of the proposed action could have the potential for an adverse cumulative impact on the marine environment, sea grasses, sea turtles, and the West Indian manatee if proper conservation measures are not

undertaken. It is likely that restrictions on use of near-shore waters by private vessels and protective restrictions in the Enseñada Honda marina area have contributed to the conservation of these resources. In addition, use of the waters adjacent to NAPR by the Navy decreased dramatically and ultimately ceased with the closure of training facilities and operations at Vieques and NSRR. However, over time, a greater use of the waters for civilian purposes (e.g., recreation, fishing, education, and research) would occur. At present any analysis of the impacts of potential increase in vessel traffic in coastal waters around NAPR as a result of the proposed action is purely speculative. Adherence to the mitigation measures listed below, as well as review and issuance of new permits for any USACE-permitted facilities should the operational tempo of those facilities change, is vital to minimize future impacts to these resources.

In addition to the conservation measures specific to zoning, there are a number of mitigation measures that Commonwealth and/or Federal resource agencies could/may impose on these non-federal owners/developers prior to them being issued development-specific approvals or permits. Implementation of these mitigation requirements would be the responsibility of the new owner/developer and the respective issuing agency would be responsible for assuring mitigation measures are instituted.

Following is a list of potential mitigation measures that could be implemented to minimize any potential impacts to threatened and endangered species or their habitat as a result of future development:

- Prevent nutrient run-off through the use of sedimentation barriers during ground clearing and other construction activities;
- Create a clearly marked and buoyed (mandatory) channel for the approach to the ferry terminal(s) and other marine activities;
- Create specific locations where boats may/may not be anchored;
- Establish maintenance and usage restrictions for mooring areas;
- Enforce vessel speed limits through established ‘make no wake’ zones and other such restrictions;
- For construction activities within the coastal zone, establish appropriate set backs and enforce lighting restrictions as they relate to sea turtles and nesting beaches;

- Assist future property owners in pursuing establishing conservation easement to facilitate their receiving tax deductions and/or property tax exemptions; and

- Local municipalities or Commonwealth agencies establish animal pest management programs to help manage feral cats and dogs, as well as the introduced mongoose.

Provided that future owners/developers develop and follow mitigation measures for reuse activities that have the potential for adverse impacts on marine resources, sea grasses, sea turtles, the proposed reuse through Phase IV (if it occurs as proposed) would not be expected to result in significant adverse cumulative impacts.

5.5 Socioeconomics

This EA provides an assessment of the potential positive and negative socioeconomic effects on the environment and population around the NAPR property. Because of the nature of the project and the disposal of land to civilian ownership, most long-term impacts are expected to be positive for the local population. There would be positive economic benefits for the business and private sector of the surrounding communities because of the expansion of services and the construction dollars and growth that would be introduced to the economy. One aspect will be the addition of housing units on NAPR that would be available for private residences. Although the current residential market in the Fajardo/Ceiba Region is depressed, it is anticipated that, based upon historical absorption rates in the area and the future population growth, the additional residential housing will be a positive benefit for the community. In addition, tourism, especially the expansion of ecotourism, would be expected with the proposed expansion of conservation areas. The negative aspects of this land transfer would be limited to minor increases in population, development, and traffic.

5.6 Environmental Contamination

The proposed action would have a beneficial effect on environmental contamination through the cleanup of existing contamination. The cleanup of environmental contamination would have indirect, short-term, land use impacts (see Section 4.2). The duration and extent of the remedial process at each site is dependent on the outcome of the current ECP (U.S. Navy July 15, 2005) investigations and future work (remedial investi-

gations/feasibility studies, remedial designs, and remedial actions). Site-access controls (e.g., fencing) would be evaluated early in this process. Some contaminated parcels will require mechanized land clearing, excavations, backfilling, and re-grading to complete investigations and cleanups, resulting in indirect, short-term impacts. These impacts can be minimized through the use of best management practices to control erosion, sedimentation, and noise related to cleanup and by appropriate restoration upon completion of cleanups.

5.7 Cultural Resources

Potential adverse cumulative impacts on cultural and historic resources are not expected to be significant. Potentially eligible sites that remain outside of the proposed conservation zones would be exposed to the threat of natural or manmade disturbances (including looting) that would adversely affect the integrity or research potential of the sites. Without monitoring and possible intervention or mitigation, erosion or neglect could affect the integrity of the features or deposits. Over time and in the absence of federal oversight, sites also could continue to be destroyed through development, landscape modification, looting, or uncontrolled excavation. However, inclusion of these sites in the expanded conservation zones would minimize or mitigate these potential impacts such that the cumulative effect would not be significant.

5.8 Energy Supply and Natural Resources

Projects that are federally funded or approved consume, produce or conserve measurable amounts of energy and natural resources in one form or another. The impact to the supply of those resources, due to a proposed Federal project, is determined by the amounts and types of resources consumed, produced, or conserved by the project with respect to supply and demand. Therefore, an energy and natural resources impact assessment is appropriate for most Federal projects.

This section presents the assessment of the consumption of energy and natural resources for the airport projects proposed. The assessment was conducted to determine whether there would be any major changes in the demand for energy or natural resources that would have a significant measurable effect on local supplies due to the proposed airport projects.

There are two major types of energy consumers at an airport – stationary facilities and aircraft operations. Stationary facilities typically use electricity and natural gas to cool, light, and heat buildings and structures such as terminal buildings, passenger concourses, administrative offices, parking lots, and the airfield. Aircraft operations consume a combination of aircraft fuel, gasoline, and diesel fuel to operate aircraft and ground support equipment (GSE).

Generally, airport projects do not increase the consumption of energy or natural resources to the point that significant impacts would occur unless it is found that implementation of a proposed project would cause demand to exceed supply. Examples of actions that could cause such increases in demand include changes in aircraft or GSE usage that would greatly increase fuel consumption or the substantial use of natural resources that are in short supply, which would usually be during construction.

6 List of Preparers

This EA was prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic, Norfolk, Virginia, by Ecology and Environment, Inc. A list of the principal participants in the preparation of the EA is presented below.

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