Final

Joint Region Marianas
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Guam • Tinian • Farallon de Medinilla

September 2012

FINAL

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

JOINT REGION MARIANAS

GUAM, TINIAN, AND FARALLON DE MEDINILLA

Prepared for

JOINT REGIONS MARIANAS

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SEPTEMBER 2012

ANNUAL REVIEW AND COORDINATION PAGE

This page is used to certify the annual review and coordination of the Integrated Natural Resources Management Plan (INRMP) for Joint Region Marianas, which includes Naval Base Guam, Andersen Air Force Base, Tinian, and Farallon de Medinilla.

By their signatures below, the certifying official acknowledges that the annual review and coordination of the INRMP has occurred for the specified year.

APPROVING OFFICIAL:

2012

NAME Commander Navy Installations Command Joint Region Marianas	**Date**
NAME Commanding Officer Mariana Naval Base Guam	**Date**
NAME Installation Commander Andersen Air Force Base	**Date**

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APPROVING OFFICIAL:

2013

NAME Commander Navy Installations Command Joint Region Marianas	**Date**
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APPROVING OFFICIAL:

2014

NAME Commander Navy Installations Command Joint Region Marianas	**Date**
NAME Commanding Officer Naval Base Guam	**Date**
NAME Installation Commander Andersen Air Force Base	**Date**

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APPROVING OFFICIAL:

2015

NAME Commander Navy Installations Command Joint Region Marianas	**Date**
NAME Commanding Officer Naval Base Guam	**Date**
NAME Installation Commander Andersen Air Force Base	**Date**

ANNUAL REVIEW AND COORDINATION PAGE

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APPROVING OFFICIAL:

2016

NAME Commander Navy Installations Command Joint Region Marianas	**Date**
NAME Commanding Officer Naval Base Guam	**Date**
NAME Installation Commander Andersen Air Force Base	**Date**

JOINT REGION MARIANAS

NAVAL BASE GUAM, ANDERSEN AIR FORCE BASE, TINIAN, AND FARALLON DE MEDINILLA

The Integrated Natural Resources Management Plan (INRMP), dated June 2012, has been prepared in accordance with regulations, standards, and procedures of the Department of Defense (DOD); the U.S. Navy (DoN); and the Sikes Act Improvement Act (SAIA) as amended through 2010 (16 United States Code [U.S.C.] §670a et seq.) in cooperation with the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources (GDAWR), and the Commonwealth of the Northern Marianas Department of Lands and Natural Resources (CNMI DLNR). The management of natural resources in this INRMP reflects the mutual agreement of all parties.

To the extent that availability of agency resources permit, the USFWS (Region 1), GDAWR, CMNI DLNR, and the Joint Region Marianas (JRM), by signature of their agency representative, do hereby agree to enter an agreement program for the conservation, protection, and management of natural resources present on JRM facilities including Navy Base Guam, Andersen Air Force Base, Tinian, and Farallon de Medinilla through implementation of this INRMP. The intention of this agreement is to develop functioning, sustainable ecological communities on JRM that integrate the interests and missions of the agencies charged with conservation, protection, and management of the natural heritage in the public interest with the military mission. The SAIA requires that INRMPs provide for no net loss in the capability of military installation lands to support the military mission of the installation.

The cooperating agencies agree to provide available mutual assistance under the authority of one or more of the following: the Fish and Wildlife Coordination Act (Title 16, U.S.C., Subchapter I, Section 661), the Economy Act (Title 31, U.S.C., Section 1535), and the SAIA. The SAIA requires preparation of INRMPs in cooperation with the USFWS, and the head of the appropriate state, territorial, or commonwealth fish and wildlife agency and, under 16 U.S.C. 670a(d)(2), priority shall be given to the entering into of contracts for the procurement of implementation and enforcement services with Federal, state, territorial, or commonwealth agencies having responsibility for conservation and management of fish or wildlife. The SAIA also states that DOD may enter into cooperative agreements with states (territories or commonwealth), local governments, nongovernmental organizations, and individuals, and into interagency agreements with the heads of other Federal departments and agencies (16 U.S.C. 670c). Further, funds appropriated to the DOD for a fiscal year may be obligated to cover the costs of goods and services provided to a cooperative agreement under the SAIA, or the Economy Act, during any 18-month period beginning in that fiscal year, without respect to whether the agreement crosses fiscal years. Any project funded by JRM in furtherance of the INRMP goals and objectives, shall be accompanied by a separate statement of work and budget mutually agreed to in advance by the participating parties. Section 101(b)(2) of the SAIA states that each INRMP "must be reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years." The INRMP becomes effective upon the date subscribed by the last signatory hereunder. The initial term of the INRMP shall be 5 years, with coordination annually among party agencies. At the 5-year anniversary of the effective date of the INRMP, the party agencies shall perform a coordinated review to determine whether the INRMP requires significant revision, or minor updates. Thereafter, parties to this INRMP will coordinate annually, and, if the INRMP requires only minor updates, the INRMP shall remain in effect unless modified and amended by mutual agreement of the authorized representatives of the signatory agencies, or until terminated by written notice to the other parties, in whole or in part, by any of the parties signing this agreement.

By their signatures, or an enclosed letter of concurrence, all parties grant their concurrence and acceptance of this INRMP.

Approving Officials:

XXXX Commander Navy Installations Command Joint Region Marianas	**Date**
XXXXX Naval Base Guam	**Date**
XXXX Installation Commander Andersen Air Force Base	**Date**

INRMP ACCEPTANCE PAGE

Concurring agency:

U.S. Fish and Wildlife Service

Ms. Robyn Thorson
Regional Director, Region 1
U.S. Fish and Wildlife Service

Date

INRMP ACCEPTANCE PAGE

Concurring agency:

National Oceanic and Atmospheric Administration National Marine Fisheries Service

Michael Tosatto **Date**
Regional Administrator, Pacific Islands Regional Office
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

INRMP ACCEPTANCE PAGE

Concurring agency:

Guam Department of Agriculture
Division of Aquatic and Wildlife Resources

Mrs. Mariquita F. Taitague
Director
Guam Department of Agriculture
Division of Aquatic and Wildlife Resources

Date

INRMP ACCEPTANCE PAGE

Concurring agency:

Commonwealth of the Northern Mariana Islands
Department of Lands and Natural Resources
Division of Fish & Wildlife

Mr. Arnold Palacios
Acting Secretary
Commonwealth of the Northern Mariana Islands
Department of Lands and Natural Resources
Division of Fish & Wildlife

Date

Executive Summary

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to chart a course for natural resources management on Joint Region Marianas (JRM), which includes Navy and Air Force holdings on Guam, and Navy-leased lands on Tinian and Farallon de Medinilla (FDM), which are part of JRM under Commander Navy Installations Command (CNIC). It should be noted that while Air Force holdings are included as part of JRM and natural resources management of Air Force lands are conducted through Naval Facilities Engineering Command Marianas (NAVFACMAR), the U.S. Air Force continues to manage the mission-essential activities conducted on Air Force holdings including managing flights and runways. This INRMP was prepared in accordance with the Sikes Act Improvement Act (SAIA) as amended through 2010, Department of Defense (DOD) Instruction 4715.03 *Natural Resources Conservation Program*, Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1D *Environmental Readiness Program Manual*, and more recent Department of the Navy (DoN), DOD SAIA, and INRMP guidance memoranda. The U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), and the territorial fish and wildlife agencies, which for JRM is the Guam Department of Agricultural, Division of Aquatic and Wildlife Resources (GDAWR) on Guam, and the Commonwealth of the Northern Marianas Department of Lands and Natural Resources (CNMI DLNR) for Tinian, and FDM, have reviewed and signed this INRMP, indicating their mutual agreement with the Commanding Officer regarding natural resources management on the JRM sites.

This INRMP updates and combines the existing INRMPs for Naval Base Guam (NBG), Andersen Air Force Base (AFB), and Tinian and FDM (USAF 2009, U.S. Navy 2009, and U.S. Navy 2010a), includes a discussion of the natural resources on the JRM sites, and reviews natural resources activities undertaken at JRM sites. This INRMP is organized according to the guidelines provided by the Office of the Under Secretary of Defense in August 2006 and NAVFACMAR, and strives to fully integrate and coordinate the natural resources program with other JRM plans and activities. This INRMP provides a description of JRM sites (e.g., location, history, and mission), information about the surrounding physical and biotic environment, and an assessment of the impacts on natural resources as a result of mission activities. Furthermore, the INRMP recommends various management practices, in compliance with Federal, territorial, commonwealth, and local standards, designed to mitigate impacts of the mission on local ecosystems. In addition to terrestrial resources, JRM-managed submerged lands, which extend offshore 3 nautical miles from JRM holdings, are addressed in this INRMP.

It is the intent of this JRM INRMP to preclude designation of critical habitat, when appropriate, by demonstrating special management of listed species. Special management or protection is a term that originates in the definition of occupied critical habitat in Section 3 of the Endangered Species Act (ESA). ESA does not require additional special management/critical habitat designation if adequate management and protection is already in place. Adequate special management or protection is provided by a legally operative INRMP that addresses the maintenance and improvement of the primary constituent elements important to the species and manages the long-term conservation of the species. Three criteria are used to determine if such special management and protection are provided: (1) there is a conservation benefit, (2) there are assurances that the management plans will be implemented, and (3) there are assurances that the conservation efforts will be effective. These three criteria will be met through the strategies presented in this INRMP; therefore, designation of critical habitat is neither necessary nor legally required (U.S. Navy 2006).

This INRMP is a guide for the management and stewardship of all natural resources present on the JRM sites, while ensuring the successful accomplishment of the military mission. A multiple-use approach is

used to allow for the presence of mission-oriented activities while efficiently managing the natural resources to conserve biodiversity and environmental quality. The INRMP presents practicable alternatives and recommendations for the management and stewardship of natural resources and the conservation and enhancement of existing ecosystems on the installation without any net loss in the capability of JRM to support its military mission. Consequently, in some cases, the implementation of certain recommendations might sacrifice the improvement of installation natural resources in deference to the safety and efficiency of the mission.

The intent of this INRMP is to take an ecosystem approach to managing the natural resources present on JRM. The interdisciplinary approach taken by this INRMP follows an ecosystem model, in which all appropriate components are integrated by their function. Ecosystem management is emphasized because it is recognized that the mission of the JRM is inextricably linked to local, regional, and global ecological integrity. Sustaining ecosystem integrity is also the best way to protect biodiversity, ensure sustainable use, and minimize the effort and cost of management. Native and natural communities, and the processes that sustain them, are essential to sustaining system function and resilience over the long-term.

The overriding goal for the JRM INRMP is to provide for the restoration and enhancement of habitats for native species including listed species over the long-term in manner that is consistent with the military mission.

Key components to meeting this goal include the development of long-term ecosystem based management plans for the overlay lands of the Guam National Wildlife Refuge on NBG, Andersen AFB, and in JRM submerged lands in Sumay Cove and Apra Harbor which direct management of these areas over the next 30 to 50 years. These plans will direct management on JRM through the development of studies and projects that are based on, or have as primary components, goals and objectives that are consistent with the overriding goal for the restoration and enhancement of habitats for native species including listed species over the long-term. To ensure that JRM meets the overriding goal, coordination between JRM site land managers and resource agencies should also continue over the long term.

Throughout the development of this INRMP, management concerns were identified in a number of natural resources subject areas. Some of these natural resources concerns could have an adverse impact on the JRM mission or future planning operations. One of the purposes of this INRMP is to identify goals and objectives for the installation and to obtain workable and useful solutions for each concern. Concerns involving natural resources constraints to planning and mission operations are discussed in detail in **Chapter 5** of this INRMP. Concerns are grouped into management sections according to their relevance. **Appendix C** provides a list of projects to be implemented based on the concerns discussed in **Chapter 5**.

This INRMP will serve as a planning tool for CNIC. As opportunities become available to seek funding for environmental projects or as mitigation for future activities, this Plan will serve as a priority list to better enable the Natural Resources department to practice effective ecosystem management. This Plan is not meant as a definitive list of projects that will be automatically funded upon enactment. It provides guidance to the resource managers on strategies to employ for the next 5 years. The Navy will implement recommendations in the INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable Federal law, including the Anti-Deficiency Act, 31 United States Code (U.S.C.) § 341, et seq.

FINAL INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
JOINT REGION MARIANAS
GUAM, TINIAN, AND FARALLON DE MEDINILLA

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1. Overview

An Integrated Natural Resources Management Plan (INRMP) is a long-term planning document designed to guide a Department of Defense (DOD) natural resources manager in the management of natural resources to support an installation's mission while protecting and enhancing installation resources for multiple use, sustainable yield, and biological integrity.

This INRMP complies with the Sikes Act Improvement Act Amendment of 1997 (SAIA), as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which requires the preparation, implementation, update, and review of an INRMP for each military installation in the United States and its territories with significant natural resources. This plan is prepared in cooperation with the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), and the territorial and commonwealth fish and wildlife agencies, which for Guam is the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources (GDAWR), and the Commonwealth of the Northern Marianas Department of Lands and Natural Resources (CNMI DLNR) for Tinian, and FDM.

This INRMP provides for the conservation and rehabilitation of natural resources and the sustainable multipurpose use of resources subject to safety requirements and military security. It provides for no net loss in the capability of installation lands to support the military mission and other activities as considered appropriate to the military. At the same time, this document provides for management of wildlife and land, wildlife enhancement and modification, establishment of natural resources management objectives and time frames, sustained use by the public of natural resources to the extent that such use is not inconsistent with other needs, and public access where appropriate, as well as the enforcement of natural resource laws and regulations.

This INRMP is designed to support the military mission, manage natural resources, and to ensure compliance with related environmental laws and regulations. The plan ensures the maintenance of quality training land, thereby supporting DOD in accomplishing its critical military mission.

For more detail on the purpose of the JRM INRMP, management authorities, and legislative drivers for management, please review the following sections.

All figures in this INRMP were compiled by HDR, except if noted, using data believed to be accurate at the time of publication. However, a degree of error is inherent in all figures. The figures are distributed "AS-IS," without warranties of any kind, expressed, or implied, including, but not limited to, warranties of suitability to a particular purpose or use. No attempt has been made in either the design or production of the figures to define the limits or jurisdiction of any Federal, territorial, commonwealth, or local government. The figures are intended for use only at the published scale. Detailed on-the-ground surveys and historical analyses of sites might differ from the figures.

1.1 Purpose and Scope of Plan

The purpose of this INRMP is to chart a course for natural resources management on Joint Region Marianas (JRM), which includes U.S. Navy and U.S. Air Force holdings on Guam, and Navy-leased lands on Tinian and Farallon de Medinilla (FDM), which are part of JRM under Commander Navy Installations Command (CNIC). It should be noted that while Air Force holdings are included as part of JRM and natural resources management of Air Force lands are conducted through Naval Facilities Engineering Command Marianas (NAVFACMAR), the U.S. Air Force continues to manage the mission essential activities conducted on Air Force holdings including managing flights and runways. This

INRMP is consistent with the SAIA, guidance and regulations provided in DOD Instruction 4715.03 (*Natural Resources Conservation Program*), Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1D (*Navy Environmental and Natural Resources Program Manual*), and more recent Department of the Navy (DoN), DOD SAIA, and INRMP guidance memoranda. These guidance documents collectively require a plan and management approach that integrates mission support, ecosystem- or landscape-level management, and environmental compliance and stewardship.

This INRMP was developed based on a thorough review of the existing INRMPs for Naval Base Guam (NBG), Andersen Air Force Base (AFB), and Tinian and FDM; review of new data pertaining to these sites; and detailed discussions with NAVFACMAR personnel, and various INRMP stakeholders. The plan strives to integrate INRMP activities with other installation plans and activities, and provides explicit goals and objectives to which natural resources strategies and projects will contribute. The projects and strategies contained in this plan include a combination of ongoing natural resources management activities from previous years and new projects and activities identified as priorities during the review process.

This INRMP updates and combines the existing INRMPs for NBG, Andersen AFB, and Tinian and FDM (USAF 2009, U.S. Navy 2009, and U.S. Navy 2010a), includes a discussion of the natural resources on the JRM sites, and reviews natural resources activities undertaken at JRM sites. This INRMP is organized according to the guidelines provided by the Office of the Under Secretary of Defense in August 2006 and NAVFACMAR. The scope of this INRMP includes all lands managed under JRM (see **Table 1-1**).

Table 1-1. Facilities Managed under Joint Region Marianas

Facility Name	Previous Name	Total Acreage	Submerged Lands	Ecological Reserve Area	Refuge Overlay
NBG Main Base[1]	Waterfront Annex	6,205	33,181	163	12,237[4]
Naval Munitions Site	Ordnance Annex	8,800			
NBG TS[2]	Communications Annex Finegayan	3,000	19,550	252	
Communications Site Barrigada	Communications Annex Barrigada	1,800	---		
Andersen AFB[3]		16,021	26,529		10,300
Andersen AFB South	MARBO Annex	1,922	---		
Tinian		15,400			
Farallon de Medinilla		182			
Total Managed Acreage		**53,330**	**79,260**	**415**	**22,537**

Notes:
1. Orote Peninsula Ecological Reserve Area
2. Haputo Ecological Resource Area
3. Guam National Wildlife Refuge
4. Includes the acreage of the Guam National Wildlife Refuge on both NBG Main Base and Naval Munitions Site

This INRMP provides a description of JRM sites (e.g., location, history, and mission), information about the surrounding physical and biotic environment, and an assessment of the impacts on natural resources as a result of mission activities. Furthermore, the INRMP recommends various management practices, in

compliance with Federal, territory, commonwealth, and local standards, designed to mitigate impacts of the mission on local ecosystems. In addition to terrestrial resources, JRM-managed submerged lands, which extend offshore 3 nautical miles from JRM holdings, are addressed in this INRMP.

It is the intent of this JRM INRMP to preclude designation of critical habitat, when appropriate, by demonstrating special management of listed species. Special management or protection is a term that originates in the definition of occupied critical habitat in Section 3 of the Endangered Species Act (ESA). ESA does not require additional special management/critical habitat designation if adequate management and protection is already in place. Adequate special management or protection is provided by a legally operative INRMP that addresses the maintenance and improvement of the primary constituent elements important to the species and manages the long-term conservation of the species. Three criteria are used to determine if such special management and protection are provided: (1) there is a conservation benefit, (2) there are assurances that the management plans will be implemented, and (3) there are assurances that the conservation efforts will be effective. These three criteria will be met through the projects and strategies presented in this INRMP; therefore, designation of critical habitat is neither necessary nor legally required (U.S. Navy 2006).

1.2 Goals and Objectives

According to the SAIA, the vision of an installation INRMP is to ensure the sustainability of all ecosystems within the installation, and to ensure a no-net-loss of the capability of the installations to support the military mission (U.S. Navy 2006). To meet the intent of the SAIA, the DOD adopted ecosystem management as the basis for future management of DOD lands and waters through applying the principles of adaptive management and through collaborating with parties both inside and outside the fence (DOD 2011). In addition, the DoN developed guidance for developing and implementing INRMPs at Navy installations in 1998, and revised the guidance in 2006 (U.S. Navy 2006). This guidance was revised in 2006 based on lessons learned from the first round of INRMPs developed by the Navy, which included the following (U.S. Navy 2006):

1. Increasing the ties between natural resources management and military readiness.
2. Establishing a consistent funding policy and project review process.
3. Improving the efficiency of INRMP review and coordination.
4. Increasing the effective implementation of INRMPs.
5. Expanding opportunities for involvement with all INRMP stakeholders.

The 2006 guidance also stressed the need for clear INRMP goals and objectives to guide natural resources management on an installation while ensuring a no net loss to the mission. The guidance defines goals as "broad guiding principles for the [installation natural resources] program" and objectives as "measurable targets for achieving the goals" (U.S. Navy 2006). In addition, the guidance states that the INRMP will provide parameters to determine "the effectiveness" of the natural resources program outlined in the INRMP through ensuring that the plan includes "quantifiable, scientifically valid parameters that will demonstrate achievement of objectives," or INRMP projects (U.S. Navy 2006).

The overriding goal for the JRM INRMP is to provide for the restoration and enhancement of habitats for native species including listed species over the long-term in manner that is consistent with the military mission.

Key components to meeting this goal include the development of long-term ecosystem based management plans for the overlay units on NBG, Andersen AFB, and in JRM submerged lands in Sumay Cove and Apra Harbor to direct management of these areas over the next 30 to 50 years. These plans will direct management on JRM through the development of studies and projects that are based on, or have as

primary components, goals and objectives that are consistent with the overriding goal for the restoration and enhancement of habitats for native species including listed species over the long-term.

To achieve this goal, resource-specific goals, objectives, and strategies have been developed to guide natural resources management on JRM sites. Each of the management strategies described in this INRMP should be monitored so that changes can be made as environmental conditions change. INRMP goals may be revised over time to reflect changing missions and environmental conditions. Any future changes in mission, training activity, or technology should be analyzed to assess their impacts on natural resources. As new installation plans and DoN guidance and regulations are developed, they will be integrated into this INRMP. The INRMP will be reviewed, assessed, and modified as needed annually, and updated every 5 years.

Throughout the development of this INRMP, management concerns were identified in a number of natural resources subject areas. Some of these natural resources concerns could have an adverse impact on the mission or future planning operations of JRM sites. One of the purposes of this INRMP is to identify goals and objectives for JRM and to obtain workable and useful solutions for each concern. The concerns involving natural resources constraints to planning and mission operations are discussed in detail in **Chapter 5**. Natural resources concerns are grouped into management sections according to their relevance. **Appendix C** provides a list of projects to be implemented based on the concerns and strategies discussed in **Chapter 5**. While projects from the 2010 Update of the Integrated Natural Resources Management Plan for Tinian and FDM for Navy-leased lands at Tinian and FDM are included in both **Chapter 5** and **Appendix C**, the INRMP and included information pertaining to location, mission, operations, and existing conditions for these lands is included as **Appendix D**.

This INRMP will serve as a planning tool for CNIC. As opportunities become available to seek funding for environmental projects or as mitigation for future activities, this Plan will serve as a priority list to better enable the Natural Resources department to practice effective ecosystem management. This Plan is not meant as a definitive list of projects that will be automatically funded upon enactment. It provides guidance to the resource managers on strategies to employ for the next 5 years. The Navy will implement recommendations in the INRMP within the framework of regulatory compliance, national Navy mission obligations, anti-terrorism and force protection limitations, and funding constraints. Any requirement for the obligation of funds for projects in this INRMP shall be subject to the availability of funds appropriated by Congress, and none of the proposed projects shall be interpreted to require obligation or payment of funds in violation of any applicable Federal law, including the Anti-Deficiency Act, 31 U.S.C. § 341, et seq.

1.3 Authority

This INRMP was developed in concert with guidance and regulations provided in the SAIA, DOD Instruction 4715.03 (*Environmental Conservation Program* (2011), OPNAVINST 5090.1C CH-1, *Environmental Readiness Program Manual* (DoN 2011), and associated DoN and DOD SAIA and INRMP guidance memoranda. These guidance documents collectively require a plan and management approach that integrates mission support, multipurpose use, ecosystem- or landscape-level management, and environmental compliance and stewardship. The SAIA is one of the primary drivers behind the JRM natural resources management program and INRMP. According to the SAIA, the purposes of a military conservation program are conservation and rehabilitation of natural resources, sustainable multipurpose use of those resources, and public access to military lands, subject to safety requirements and military security. Moreover, the conservation program must be consistent with the mission-essential use of the JRM and its lands. The SAIA requires the preparation of an INRMP to facilitate the conservation program. The INRMP shall be prepared in cooperation with the USFWS, NMFS, and the territory and commonwealth fish and wildlife agencies, which for Guam is GDAWR, and CNMI DLNR for Tinian and

FDM. The resulting plan reflects the mutual agreement of all four parties concerning conservation, protection, and management of natural resources on the JRM sites.

The SAIA states that "the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the U.S. under the jurisdiction of the Secretary, unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate." DOD Instruction 4715.03 prescribes procedures for integrated management of natural resources, including preparing an INRMP as required by the SAIA. DOD Instruction 4715.03 also states that "INRMPs shall be prepared, maintained, and implemented for all lands and waters under DOD control that have suitable habitat for conserving and managing natural resources." OPNAVINST 5090.1C CH-1 requires the preparation of INRMPs and prescribes Navy policies, procedures, and standards to "restore, improve, conserve, and properly use natural resources on Navy-administered lands."

The Deputy Under Secretary of Defense (Installations and Environment) (DUSD[I&E]) has developed several memos that include outlining *Implementation of the Sikes Act Improvement Act: Updated Guidance* (DUSD (I&E) 2002); memorandum providing policy on scope of INRMP review, public comment on INRMP review, and ESA consultation on INRMPs [DUSD (I&E) 2004]; memorandum providing policy on the applicability of the Sikes Act INRMP requirement for DOD lands leased to a non-DOD party [DUSD (I&E) 2005a]; and *Best Practices for Integrated Natural Resources Management (INRMP) Implementation* [DUSD (I&E) 2005b]. In addition, DOD developed a handbook to assist resource managers with developing and implementing INRMPs (*Conserving Biodiversity on Military Lands: A Guide for Natural Resources Managers*) (Benton et al. 2008). The DoN issued its implementing guidance on SAIA and INRMP requirements in OPNAVINST 5090.1C CH-1. The JRM INRMP is consistent with and was developed according to these guidance memoranda.

It is the policy of the Navy to act responsibly and in the public interest to restore, improve, preserve, and properly use natural resources. The Navy is charged with complying with Federal laws, regulations, and policies; and showing a conscientious and active concern for the inherent value of natural resources in all Navy plans, actions, and programs. The Navy environmental strategy is to protect the environment and conserve natural resources for present and future generations through compliance, conservation, pollution prevention, and stewardship. The Navy must ensure their operations comply with Federal, local, and host nation environmental requirements, which include endangered species and wetlands. Conservation is achieved through protecting and enhancing the life-sustaining quality of the land and waterways under Navy protection. The Navy manages, conserves, and rehabilitates the land and natural resources such as fish, wildlife, forests, and submerged lands. Additionally, the Navy strives to prevent or reduce pollution at its source through increased efficiency in the use of raw materials, energy, water, or other resources.

The Navy's Natural Resources Management Program follows policies established in DOD Instruction 4715.03, *Natural Resources Management Program*; OPNAVINST 5090.1C CH-1, *Environmental Readiness Program Manual*; and the NAVFAC *Real Estate Procedural Manual*, P-73, Volume II.

1.4 Stewardship and Compliance

The DoN has acknowledged and recognizes that simply complying with environmental regulations does not necessarily sustain the mission. The Navy Environmental Strategy, *Sustaining our Environment, Protecting our Freedom*, moves the Navy's environmental program beyond compliance to a long-range vision of sustainability that recognizes that environmental stewardship is part of the mission, not independent of the mission (U.S. Navy 2008). The strategy calls for all Navy personnel to "look ahead, think ahead, and plan ahead when it comes to the environment" (U.S. Navy 2008). JRM integrates

stewardship considerations into planning and analysis through environmental personnel participation, and through the National Environmental Policy Act (NEPA) process.

INRMP implementation involves the anticipated execution of all "must fund" projects and activities (e.g., those projects and activities required to meet recurring natural resources conservation management requirements or current natural resources compliance needs) in accordance with specific timeframes identified in the INRMP (DUSD[I&E] 2002). An installation INRMP is considered to be implemented by DOD if an installation does the following:

1. Actively requests, receives, and uses funds for "must fund" projects and activities.
2. Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
3. Coordinates annually with all internal and external cooperating offices.
4. Documents specific INRMP action accomplishments undertaken each year.

NEPA requires review of federally supported activities or actions to assess their potential impacts on the environment. The NEPA process is designed to identify potential environmental problems early in the planning process so the proponent of the action can resolve problems in the early stages of project development. OPNAVINST 5090.1C CH-1, Chapter 5, *Procedures for Implementing the National Environmental Policy Act*, sets forth policy, responsibilities, and procedures for integrating environmental considerations into Navy planning and decision making.

An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) have been prepared to document implementation of the JRM INRMP (see **Appendix S**).

1.5 INRMP Review and Revision Process

The SAIA requires that INRMPs must be reviewed for operation and effect no less than once every 5 years. The JRM INRMP will be reviewed by the installation, the USFWS, NMFS, and the territory and commonwealth fish and wildlife agencies (in this case, the GDAWR and CNMI DLNR). The DOD and DoN have provided specific guidance on the joint review and coordination process and timeframe (DUSD [I&E] 2002, DoN 2011). As part of the review, JRM should invite annual feedback from the USFWS, NMFS, GDAWR, and CNMI DLNR on the effectiveness of the INRMP and inform the agencies which INRMP projects and activities are required to meet current natural resources compliance needs. This information does not need to be included in the INRMP at the time of review, but may be provided after the installation reviews and validates the estimated costs of the requirements (DoN 2011).

The Chief of Naval Operations (CNO) developed guidance for preparing, implementing, and revising INRMPs in April 2006. The guidance establishes the protocol that installations will use the Navy's Web-based Metrics Builder tool located on the Natural Resources Data Call Station Web site to facilitate annual review of the INRMP by JRM, the USFWS, NMFS, GDAWR, and CNMI DLNR (U.S. Navy 2006). There are seven (7) Focus Areas that comprise the Metrics to be evaluated during the annual review of the Natural Resources Program and associated INRMP that include:

1. Ecosystem Integrity.
2. Listed Species and Critical Habitat.
3. Fish and Wildlife Management for Public Use.
4. Partnership Effectiveness.
5. Team Adequacy.

6. INRMP Project Implementation.
7. INRMP Impact on the Installation Mission.

If the 5-year INRMP review for operation and effect results in major revisions to the plan, JRM must solicit public review and comments (U.S. Navy 2006). The NEPA process may be used to meet public review requirements if the public is provided a meaningful opportunity to comment on the *Draft Revised* INRMP. Absent extraordinary circumstances, the public must be afforded a minimum of 30 days to review and comment on the revisions, either as part of the NEPA process or some other process. After soliciting public comments, JRM must afford the USFWS, NMFS, GDAWR, and CNMI DLNR the opportunity to review all public comments. If an existing INRMP requires only limited revisions that are not expected to result in significant environmental effects other than those anticipated for the existing INRMP, then neither NEPA analysis nor public review are necessary (U.S. Navy 2006).

According to recent CNO guidance, (U.S. Navy 2006), INRMPs must also be reviewed by installations at least once per year to verify the following:

- Current information on INRMP conservation metrics, as described in the Metrics Builder tool located on the Natural Resources Data Call Station Web site
- All "must fund" projects and activities have been budgeted for and implementation is on schedule
- All required trained natural resources positions are filled or are in the process of being filled
- Projects and activities for the upcoming year have been identified and included in the INRMP (an updated project list does not necessitate INRMP revision)
- All required coordination has occurred
- All significant changes to the installation's mission requirements or its natural resources have been identified.

1.6 Responsible Parties for Natural Resources Management on Joint Region Marianas Lands

Successfully implementing an INRMP requires the support of natural resources personnel, other installation staff, command personnel, and installation tenants. The following section discusses the responsibilities for INRMP implementation within JRM.

1.6.1 Joint Region Marianas

As the lead service for natural resources management at JRM, responsibility for natural resources management falls to the Navy and is governed by OPNAVINST 5090.1C CH-1. The following sections describe command authority for natural resources management under OPNAVINST 5090.1C CH-1 (DoN 2011).

Commander, Navy Installations Command (CNIC)

CNIC provides support for Navy-wide shore installation management.

The role of CNIC in natural resources management is as follows (DoN 2011):

- Ensure all lands owned, leased, withdrawn, permitted, or otherwise under the control of Navy are evaluated for significant natural resources

- Ensure installations under their command develop, implement, review, and revise INRMPs as necessary
- Provide overall program management oversight for all natural resources program elements;
- Program and budget resources to fund both routine and recurring costs to operate and maintain natural resources management planning and INRMP implementation
- Work with Naval Facilities Engineering Command field offices to develop and maintain liaisons with appropriate Federal, state, and local agencies and other organizations to facilitate implementation of INRMPs
- Implement Navy policy to ensure stewardship of Navy lands and resources and compliance with natural resources laws and regulations
- Implement policy for managing and conserving soil, water, forest, land, grounds, fish and wildlife, wetlands, floodplains, coral reefs, and natural areas.

Naval Facilities Engineering Command Marianas

NAVFACMAR provides oversight and support for the development, maintenance, and implementation of Navy Region Mariana's installation INRMPs and the natural resources programs.

The role of NAVFACMAR in natural resources management is as follows:

- Serve as the Navy's natural resources technical program manager
- Provide technical and contractual support to installation commanding officers for the preparation, development, and implementation of INRMPs and associated NEPA documents
- Facilitate and coordinate the issuance of INRMP related NEPA documentation
- Evaluate and disseminate information concerning new technology, methods, policies, and procedures for use in the development and implementation of INRMPs
- Provide technical and administrative guidance for the development and execution of contracts and cooperative agreements to develop and implement INRMPs
- When requested by budget submitting offices (BSOs) and subordinate commands, coordinate natural resources management requirements with other Federal, state, territorial or commonwealth agencies, or local professional authorities, including ESA Section 7 consultations
- Facilitate the acquisition of the INRMP "mutual agreement" between the Navy, USFWS, NOAA, and state, territory, or commonwealth fish and wildlife agencies
- Facilitate resolution of conflicts between the Navy, USFWS, NOAA, and state, territory, or commonwealth fish and wildlife agencies and other stakeholders, if necessary
- Provide technical oversight and resources for forest management and agricultural outlease projects
- Provide technical oversight and budget approval of installation fish and wildlife/hunting and fishing fee and permit projects
- Compile, track, and maintain INRMP metrics on the Natural Resources Data Call Station.

1.6.1.1 Naval Base Guam

Commanding Officer

The Commanding Officer (CO) has the ultimate responsibility for ensuring that NBG activities comply with applicable substantive and procedural Federal and local environmental laws and regulations, and is in charge for the overall management of the facilities and for successfully carrying out the mission. The CO's responsibilities include implementing and enforcing this INRMP and managing installation operations, including the facilities and security directorates, and contingency operations. The CO is responsible for ensuring that NBG has the funding, staff, and other resources necessary to manage the installation's natural resources effectively to fulfill the environmental stewardship component of the mission. The responsibilities of the CO regarding natural resources management on NBG are described in OPNAVINST 5090.1C CH-1.

1.6.1.2 Andersen Air Force Base

Installation Commander

The Installation Commander at Andersen AFB has the ultimate responsibility for ensuring that Andersen AFB activities comply with applicable substantive and procedural Federal and local environmental laws and regulations, and is in charge of the overall management of the facilities and for successfully carrying out the mission. Responsibilities include implementing and enforcing this INRMP and managing installation operations, including the facilities and security directorates, and contingency operations. The Installation Commander is also responsible for ensuring that Andersen AFB has the funding, staff, and other resources necessary to manage the installation's natural resources effectively to fulfill the environmental stewardship component of the mission. The responsibilities of the Installation Commander regarding natural resources management on Andersen AFB are described in Air Force Instruction 32-7064.

1.6.2 Signatory Agencies

1.6.2.1 U.S. Fish and Wildlife Service

The USFWS has the responsibility for the welfare and protection of endangered and threatened species, migratory birds, and certain anadromous fishes occurring in the United States. The Division of Ecological Services staff provides technical assistance regarding invasive species threats and biosecurity issues as it relates to threatened, endangered, and species of concern (TES) (Section 7 *consultation, listing, recovery, and habitat conservation planning*); Clean Water Act (CWA) permitting; NEPA analysis; and environmental contaminants. The Division of Law Enforcement enforces Federal and international laws and treaties that protect endangered and threatened species and migratory birds. The Federal Assistance Program and the Division of Fisheries and Habitat Conservation administers and provides Federal funds to state, territorial and commonwealth agencies for the Sport Fish and Wildlife Restoration and Endangered Species Conservation programs. The Division of Fisheries and Federal Aid funds provided to the GDAWR benefit natural resources at JRM. The National Wildlife Refuge System provides for resource management, law enforcement, public use, and research in units of the Guam National Wildlife Refuge (GNWR).

The Navy and Air Force entered into a cooperative agreement with the USFWS in December 1993 to designate portions of NBG Main Base, the Naval Munitions Site (NMS), and Andersen AFB as overlay

refuge units of the GNWR. These lands are managed cooperatively by the USFWS, and JRM natural resources personnel for TES primarily through habitat enhancement and conservation.

1.6.2.2 National Oceanic and Atmospheric Administration

NOAA is dedicated to protecting and preserving the nation's living marine resources through scientific research, fisheries management, enforcement, and habitat conservation (NOAA 2011a). NMFS (also known as the National Marine Fisheries Service), is the lead Federal agency responsible for the stewardship of the nation's offshore living marine resources and their habitat. The mission of NMFS is to ensure healthy fisheries and habitat for the benefit of all Americans by managing, conserving, and protecting fish, whales, dolphins, sea turtles, and other living creatures in the ocean (NOAA 2011b). NMFS works within the Magnuson-Stevens Fishery Conservation and Management Act (MSFMCA), the Marine Mammal Protection Act of 1972 (MMPA), and the ESA to fulfill its mission of promoting healthy ecosystems.

The USFWS and NMFS share jurisdiction over sea turtles that are listed as endangered or threatened under the ESA of 1973, as amended. The USFWS has jurisdiction over sea turtles when they come ashore, while NMFS retains management control while sea turtles are in the ocean. In addition, both agencies enforce Federal laws concerning wildlife trade in endangered species. NMFS coordinates with other agencies and GDAWR in the review of projects that impact marine resources under Section 7 of the ESA. NMFS also maintains law enforcement personnel on Guam to enforce certain provisions of the MMPA, the ESA, and the MSFMCA.

1.6.2.3 Guam Department of Agriculture, Division of Aquatic and Wildlife Resources

GDAWR is the leading Government of Guam (GovGuam) agency responsible for fisheries, wildlife, and other natural resources management on Guam. GDAWR has an active natural resources management program that includes research on the natural history of endangered species; recovery of endangered species; captive breeding and release of the endangered Guam Micronesian kingfisher, Mariana crow, and Guam rail; monitoring of endangered species populations and trends; wetland studies and delineations; research into the control of the brown treesnake; fisheries surveys and management; sea turtle monitoring; environmental education of the public; public hunting and game management; control of invasive species; consultations for the protection of Threatened and Endangered Species and their Habitats under the ESA; and other programs. GovGuam administers several conservation areas including Bolanos, Cotal, and Anao, and has concurrent jurisdiction over submerged lands on Guam in accordance with 48 U.S.C. § 1704. On May 16, 1997, Public Law (P.L.) 24-21 created five marine preserves on Guam and changed fishing regulations in these locations. One such preservation area is the Pati Point Preserve located on the eastern coastal boundary of Andersen AFB. Conservation Officers with GDAWR have jurisdiction on Federal lands for the enforcement of Guam wildlife laws. Guam Conservation Officers have also been deputized by the USFWS and are authorized to enforce Federal fish and wildlife laws. Through signing this INRMP, GDAWR is a party, with the USFWS, for the protection, development, and management of fish and wildlife resources on JRM sites in accordance with the SAIA. Funding for GDAWR is provided by the USFWS through the Fisheries and Federal Aid program, GDAWR has pursued increased local funding for their programs, public education, and brown treesnake research; however, local funding is available for GDAWR law enforcement agents. The Conservation Officer programs are locally funded.

1.6.2.4 Commonwealth of the Northern Mariana Department of Lands and Natural Resources, Division of Fish and Wildlife

The CNMI DLNR, Division of Fish and Wildlife, was created in 1981 by the Fish, Game and Endangered Species Act, P.L. Number 2-51. The Division endeavors to conserve fish, game, and wildlife, and to protect endangered and threatened species. Through research, monitoring, regulation, enforcement, planning and management, the Division seeks to ensure the long-term survival and sustainability of the CNMI's natural resources for present and future generations.

The Division is directed by CNMI DLNR to provide and enforce regulations governing hunting, fishing, harvesting, and taking of species; and human behavior and activities in protected and conservation areas in the CNMI. The Division also reviews all development proposals submitted to the Coastal Resources Management Office (CRMO) and Division of Environmental Quality (DEQ) to ensure that negative impacts on endangered and threatened species are minimized, mitigated, or avoided.

1.7 Integration with Other Joint Region Marianas Site Plans and Programs

JRM could be affected both internally and externally by growth in the JRM region. Internal factors include meeting the needs of existing mission partners, anti-terrorism/force protection (ATFP) standards, and a potential increase in requests from Federal agencies for real property assets in terms of facilities and buildable land at JRM sites.

Outside factors expected to drive growth and development immediately adjacent to JRM include a reduction in available land in the region, a continuing increase in population growth, and development in the coming decades. Consequently, the impacts of planning and future development on Guam and JRM are inextricably linked.

The recognition of internal and external factors demands that natural resources management on JRM be integrated with other disciplines, programs, and planning beyond the scope of traditional fish and wildlife management on JRM sites. On a day-to-day basis, INRMP goals, objectives, strategies, and projects are integrated with other installation plans to sustain mission-oriented activities while managing the natural resources.

The following JRM site plans were reviewed to highlight key interrelationships, and recommendations contained within these plans were used in the development of this INRMP. Note that the INRMP is not intended to compile detailed information on each plan and its contents.

1.7.1 U.S. Navy

1. Record of Decision for the Guam and CNMI Military Relocation including Relocating Marines from Okinawa Transient Nuclear Aircraft Carrier Berth Air and Missile Defense Task Force: September 2010.
2. Orote Peninsula Ecological Reserve Area General Management Plan, Naval Base Guam: August 2010.
3. Interim Final Integrated Natural Resources Management Plan, Plan Years 2009–2014, Navy Base Guam: 2009.
4. Update of Integrated Natural Resources Management Plans for Navy Leased Lands on Tinian and Farallon de Medinilla, Plan Years 2010–2015: May 2010.

5. Guam Submerged Lands Management Plan. U.S. Navy Region Mariana: September 2007.
6. Management Plan for the Haputo Ecological Reserve Area: January 1986.
7. Haputo Ecological Reserve Area General Management Plan: 2010.
8. Biological Opinion for the Joint Guam Program Office Relocation of the U.S. Marine Corps from Okinawa to Guam and Associated Activities on Guam and Tinian: September 2010.
9. Naval Base Guam Ungulate Management Plan: September 2012

1.7.2 U.S. Air Force

1. Final Environmental Impact Statement for Establishment and Operation of an Intelligence, Surveillance, Reconnaissance, and Strike Capability: November 2006.
2. Biological Opinion on the Establishment and Operation of an Intelligence, Surveillance, Reconnaissance, and Strike Capability Project on Andersen AFB, Guam: October 2006.
3. Environmental Assessment Beddown of Training and Support Initiatives at Northwest Field Andersen AFB, Guam: May 2006.
4. Final Integrated Natural Resources Management Plan and Environmental Assessment for Andersen AFB, Guam: July 2009.
5. Final Mariana Fruit Bat Management Plan for Andersen AFB, Guam: August 2008.
6. Green Sea Turtle (*Chelonia mydas*) Management Plan for Andersen AFB, Guam: May 2007.
7. Draft Adaptive Management Plan. Andersen AFB, Guam: February 2011.
8. Andersen AFB Ungulate Management Plan: July 2012.
9. Request for Informal Section 7 Consultation for the Beddown of Training and Support Initiatives at the Northwest Field Project on Andersen Air Force Base, Guam: May 2006.

1.7.3 Guam Comprehensive Wildlife Conservation Strategy

In order to receive Federal funds through a State/Territorial Wildlife Grants Program, Congress charged each state and territory with developing a statewide or territory wide comprehensive wildlife conservation plan by October 1, 2005 through the Consolidated Appropriations Act of 2005 (P.L. 108-447). The State/Territorial Wildlife Grants Program provides Federal money to every state and territory for cost-effective conservation aimed at preventing wildlife from becoming endangered (P.L. 108-447).

Congress also directed that the strategies must identify and be focused on the species of greatest conservation need (SOGCN), yet address the full array of wildlife and wildlife-related issues. The Guam Comprehensive Wildlife Conservation Strategy was completed in 2006 and goals and objectives for managing 65 species were identified within the plan for conservation (GDAWR 2006a). In addition, conservation actions that affect general groups of species were identified in the plan and included strategies such as the development of memoranda of understanding, rehabilitation of habitats, public education, and law enforcement (GDAWR 2006a):

The conservation actions identified by the GDAWR were taken into consideration when preparing this document. The plan identified conservation actions to be undertaken to restore and protect wildlife and their habitats on Guam. The following are actions that can be undertaken by JRM to ensure that conservation goals within the plan are met (GDAWR 2006a):

1. **Legal Protection for Habitats and Wildlife**

   a. Develop cooperative agreements with USFWS, DoN and JRM to include Federal and Guam Conservation Lands as part of the Guam Wildlife Refuge Overlay. Develop cooperative agreements for management, research, and protection of endangered species and species of greatest conservation.

   b. Develop Safe Harbor Agreements with private landowners in other areas adjacent to Conservation Land where wildlife might benefit.

2. **Habitat Assessment and Rehabilitation**

   a. Develop plans to improve habitats in conservation areas, to include reforestation, fire prevention, and control of invasive plants. Assist the Forestry and Soil Resources Division in developing forest recovery plans to include reforestation programs for Guam's Conservation Lands to include the control and removal of invasive, noxious plant species, replanting of native species, and protection of these areas with firebreaks.

   b. Protection of native trees and plants from human destruction.

3. **Control of Limiting Factors**

   a. To control brown treesnake (*Boiga irregularis*) abundance in Conservation Areas and selected sites for release of SOGCN species.

   b. Establish snake control around caves for the reintroduction of vertebrates including Mariana swiftlet (*Aerodramus bartschi*) and Pacific sheath-tailed bat (*Emballonura semicaudata rotensis*).

   c. Develop plans to combat the impacts of invasive species and to prevent the introduction of new invasive species.

4. **Reintroduction and Restoration of SOGCN to Designated Habitats**

   a. Inventory conservation areas for caves and identify other potential cave sites for brown treesnake control and translocation of *A. bartchi* and *E. s.rotensis*.

   b. Inventory fauna within each conservation area including birds, mammals, reptiles, and insects.

5. **Freshwater Species**

   a. Determine the impacts of dams and other man-made structures that could have an impact on freshwater aquatic organisms.

   b. Conduct a biological inventory of freshwater organisms on Guam.

   c. Determine the extent and impact invasive species have on native freshwater species.

6. **Coral Reef Fisheries and Habitats**

   a. Implement local action strategies, to include determining and reducing land-based sources of pollution, implementing coral reef fisheries management actions, fostering education and outreach programs, enhancing recreational use, studying climate change, and researching and reducing the causes of coral bleaching and disease.

   b. Maintain established Marine Preserves.

   c. Implement management actions to protect and improve the status of marine SOGCN within Guam's jurisdiction.

7. **Sea Turtles**

   a. Develop and strengthen cooperative agreements with the USFWS, DoN, and JRM to establish/continue nesting turtle monitoring, protect nesting and foraging habitat, and track migrating turtles.

   b. Track resident sea turtles to understand their movements around the island and life history.

8. **Marine Mammals**

   a. Educate public about marine mammals and steps they can take to help protect these species.

   b. Seek technical assistance from Federal partners to gain information about marine mammals in Guam's waters.

9. **Public Conservation Awareness Program**

   a. Develop outreach campaigns, and educate the public and private industry of the value of preserving Guam's wildlife and habitats.

2. Location, Mission, and Land Use

2.1 Location

Guam, a U.S. Territory, is located in the western Pacific Ocean at 13º 30' north latitude and 145º east longitude and is situated approximately 3,700 miles (5,955 kilometers) west/southwest of Hawai'i and 1,560 miles (2,511 kilometers) southeast of Japan. Guam is the southernmost and largest island of the Mariana Islands archipelago (see **Figure 2-1a**). The island is approximately 30 miles (48 kilometers) long by 4 miles to 8 miles (6 and 13 kilometers) wide and has a total area of approximately 209 square miles (541 square kilometers). JRM sites are located throughout the island, and include both NBG and Andersen AFB sites (see **Figure 2-1b**).

The location of Tinian and FDM are discussed in the 2010 update of the INRMP for U.S. Navy-leased lands in **Appendix D**.

2.2 Abbreviated History of Guam

The Portuguese navigator Ferdinand Magellan reached the Island of Guam in 1521; however, the island was claimed for Spain by General Miguel López de Legazpi in 1565. Spanish colonization commenced in 1668 with the arrival of Padre San Vitores, who established the first Catholic mission. The islands were then governed as part of the Spanish East Indies from the Philippines. Between 1668 and 1815, Guam was an important resting stop on the Spanish trade route between Mexico and the Philippines. Guam, along with the rest of the Mariana and Caroline islands, was treated by Spain as part of their colony in the Philippines. While Guam's Chamorro culture is unique, the cultures of both Guam and the Northern Mariana were heavily influenced by Spanish culture and traditions.

The United States took control of the island in 1898 at the end of the Spanish-American War. Guam came to serve as a station for American ships traveling to and from the Philippines. During World War II, Guam was invaded by Japan on December 8, 1941. Guam's occupation by the Japanese lasted for approximately 31 months, and, during this period, the indigenous people of Guam, the Chamorro, were subjected to forced labor, family separation, incarceration, execution, and concentration camps. Approximately 1,000 people died during the occupation. The United States fought the Battle of Guam on July 21, 1944, to recapture the island from the Japanese. The United States also captured and occupied Saipan and Tinian in the Northern Mariana Islands. After the war, the Guam Organic Act of 1950 established Guam as an unincorporated, organized territory of the United States, which provided for the structure of the island's civilian government, and granted the people U.S. citizenship.

2.3 Regional Land Use

Residents of Guam depend primarily on the U.S. military and tourism from Korea and Japan for their economy. Over the past 20 years, the tourism industry has grown rapidly, creating a construction boom for new hotels, golf courses, and other infrastructure. Nearly 1.2 million tourists visit Guam each year including about 962,000 from Japan and 114,000 from Korea. Most food and industrial goods are imported; however, some crops, primarily fruits and vegetables, are grown on the island. As tourism continues to grow, more and more land will be developed to support the industry. In addition, with the proposed military buildup on Guam, more development of military facilities and island infrastructure will be needed to support military and associated civilian personnel.

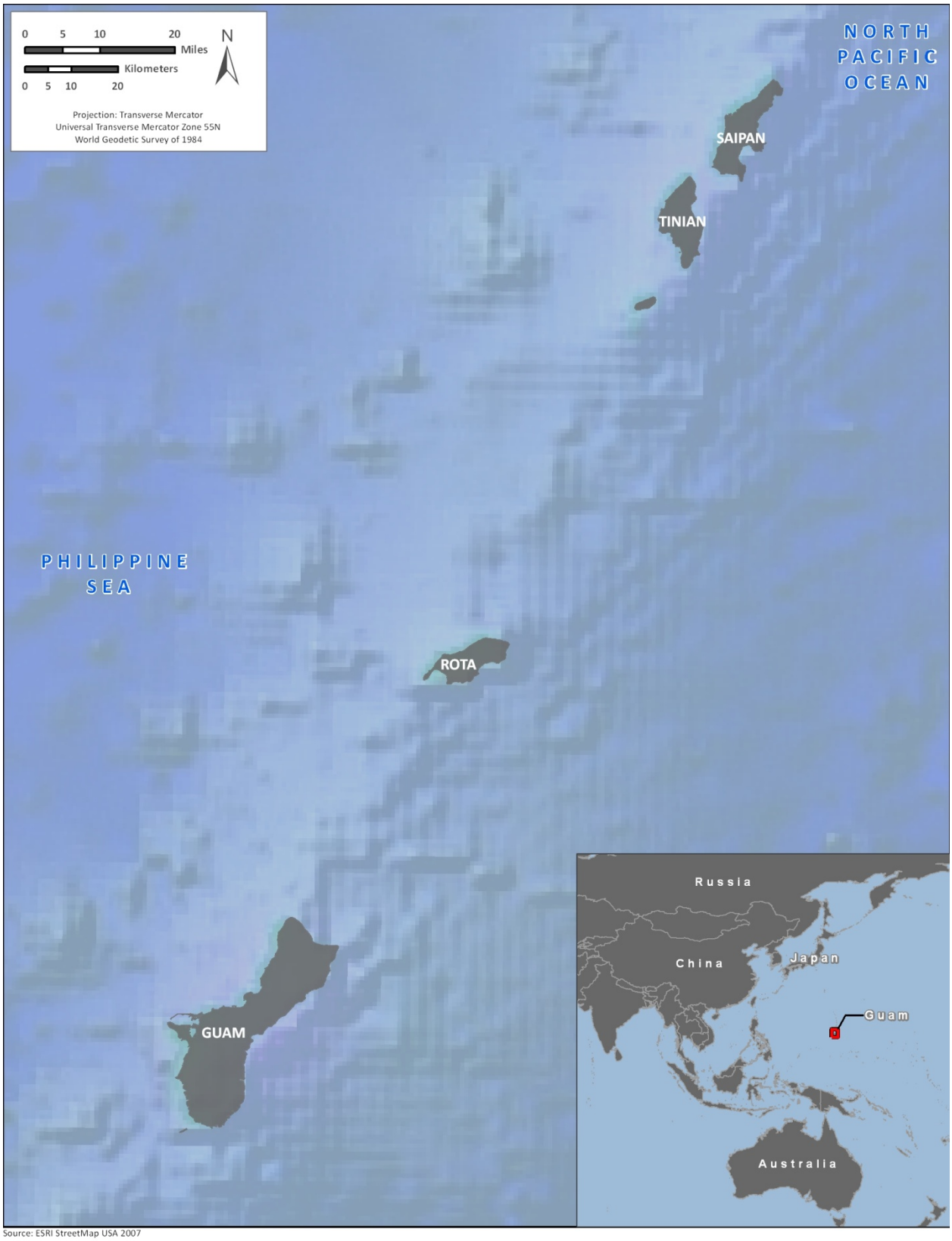


Figure 2-1a. Location of Mariana Islands Archipelago

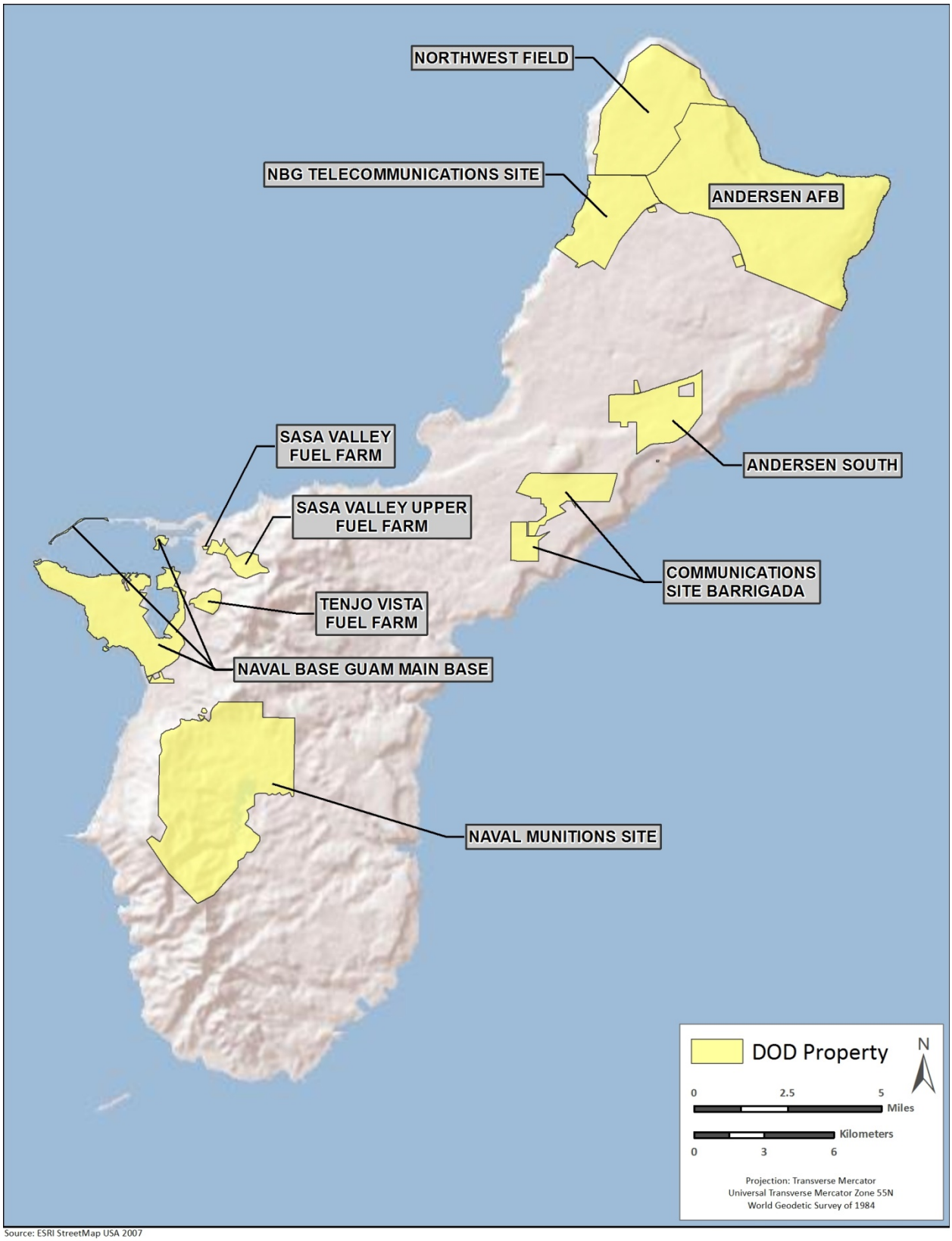


Figure 2-1b. Location of Joint Region Marianas Sites on Guam

2.4 Military Mission

The following sections describe the military missions of the NBG and Andersen AFB components of JRM. A 2006 agreement between the United States and Japan is currently in the process of shifting marines of the U.S. Marine Corps' III Marine Expeditionary Force (III MEF) from installations in Japan to the Island of Guam, which will enhance the military mission of JRM.

2.4.1 Naval Base Guam

The mission of NBG is to support the U.S. Pacific Fleet and other forces operating from, serviced by, or supplied through Guam; to support the fighters based here or attached to tenant commands; and to support the families of sailors stationed in Guam.

2.4.2 Andersen Air Force Base

The mission of the 36th Wing (36 WG) is "to provide a U.S.-based lethal warfighting platform for the employment, deployment, reception, and throughput of air and space forces in the Asia-Pacific region." Guam serves as a stopping point for numerous aircraft enroute to Japan, Korea, and other Asian locations. While Andersen AFB is a Navy installation, mission-support activities conducted at Andersen AFB are an Air Force mission function (e.g., runways), while installation-support activities are a JRM function.

2.5 Operations and Activities and Their Effects on the Natural Environment

JRM, which includes Navy and Air Force holdings on Guam, and U.S. Navy-leased lands on Tinian and FDM, is under CNIC. The following sections describe the operations and general associated environmental effects of NBG and Andersen AFB sites that are now compose JRM. JRM sites on Tinian and FDM are discussed in the 2010 update of the INRMP for U.S. Navy-leased lands on Tinian and FDM in **Appendix D.**

The Navy supports numerous tenant commands and activities on four primary sites: NBG Main Base, NMS, Main Cantonment Area, and Communications Site Barrigada (see **Figure 2-1b**). In total, Navy lands on Guam cover 19,805 acres (8,015 hectares). In addition, the Navy manages all submerged lands adjacent to its holdings from the shoreline out 3 nautical miles. Navy submerged lands total approximately 79,260 acres (32,075 hectares).

The main installation of Andersen AFB is about 8 miles by 4 miles (13 by 6 kilometers) and covers 25 square miles (64 square kilometers), or about 16,021 acres (6,483 hectares), of a relatively flat, uplifted limestone plateau at the northern end of the island (see **Figure 2-1b**).

2.5.1 Naval Base Guam Main Base

2.5.1.1 Operations

NBG Main Base is composed of several noncontiguous areas that were previously separate installations (see **Figure 2-2**). NBG Main Base, approximately 6,205 acres (2,511 hectares), consists of several sites including Main Base (3,114acres [1,260 hectares]), Tenjo and Sasa Fuel farms (651 acres [263 hectares]), Glass Breakwater (41 acres [17 hectares]), Polaris Point (254 acres [103 hectares]), and Drydock Island (48 acres [19 hectares]) to name a few.

Figure 2-2. Location of Naval Base Guam Main Base

JRM operations on NBG Main Base are very diverse and include several critical mission requirements. The primary function of NBG Main Base is to support fleet units and operational forces of the Fifth and Seventh Fleets. NBG Main Base operates three wharfs Kilo, Delta, and Echo on Dry Dock Island that are located in Outer Apra Harbor. Several other wharfs within Inner Apra Harbor are also operated by NBG Main Base, including Alpha and Bravo on Polaris Point; and Lima, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, and X-ray. Berthing of vessels requires adequate water depth (approximately 35 feet [11 meters]), Explosive Safety Quantity Distance (ESQD) arcs, and security around the vessels while in port. See **Figure 2-3** for ESQD arcs for NBG Main Base.

Shore-based support includes warehouses, power, water, sewage treatment, fuel transfer, and other facilities. NBG Main Base also supports military housing areas, recreational facilities, food services, Navy commissary, and Navy exchanges. Camp Covington is also located within NBG Main Base, and supports Naval Mobile Construction Battalions (SeaBees).

Training at NBG Main Base includes beach landing sites (AAV, LCAC, and LCU landing sites), riverine training, small unit maneuvers, rappelling, helicopter insertion and extractions, rapid runway repair, field exercises, small arms range, pistol range, stress course, sniper range, fire and maneuver range, and a skeet range. Training within Apra Harbor includes explosive ordnance disposal (EOD) deepwater mine countermeasures, helicopter paradrops, helicopter cast and recovery, drown-proofing, heliborne firebucket (offload), helicopter search and rescue, and combat swimmer.

2.5.1.2 Environmental Effects

Part of NBG Main Base is included within the GNWR (see **Figure 2-4**). Green and hawksbill sea turtles are known to use the near shore and Apra Harbor waters, and nest on the beaches within NBG Main Base. The Navy monitors for sea turtles on all beaches with known nesting activity and other beaches with suitable nesting habitat throughout the year. Nesting of hawksbill sea turtles was reported in 1995 on a small beach within the Sumay Cove; however, more recent nesting at this site has not been observed. In addition, turtle nests have been confirmed on Spanish Steps. The Mariana common moorhen (*Gallinula chloropus guami*) is known to occasionally occur within wetlands on NBG Main Base. The vegetation along the Orote cliff line retains functional components of native limestone forest, which is suitable habitat for avian species.

Offshore and harbor operations can affect the coral reef communities within the site. Coral reefs within Apra Harbor could be impacted by ship channel maintenance, ship movement, and water contamination or fluid spills. Under Executive Order (EO) 13089, dated June 11, 1998, actions that potentially affect coral reef ecosystems must be mitigated. The marine environment in the Orote Peninsula Ecological Reserve Area (OPERA) is currently on the U.S. Marine Managed Area Inventory and, similar to the Haputo Ecological Reserve Area (HERA) located at the Naval Base Guam Telecommunications Site (NBG TS), may be designated a Marine Protected Area under EO 13158. Marine mammals could also be affected by training exercises offshore, and all species are protected under the MMPA.

As with the HERA, the Navy established the OPERA in 1984 as a mitigation measure for the construction of Kilo Wharf. The OPERA includes submerged lands from the shoreline to a depth of 120 feet (37 meters) offshore. The OPERA extends inland from the mean lower low water line to the upper edge of the cliff along the southwestern edge of Orote Peninsula. The terrestrial unit of this ecological reserve area (ERA) totals about 30 acres (12 hectares), and the submerged lands total about 133 acres (54 hectares). Potential impacts of military training in the OPERA were addressed in the Final Environmental Impact Statement Military Training in the Marianas Islands.

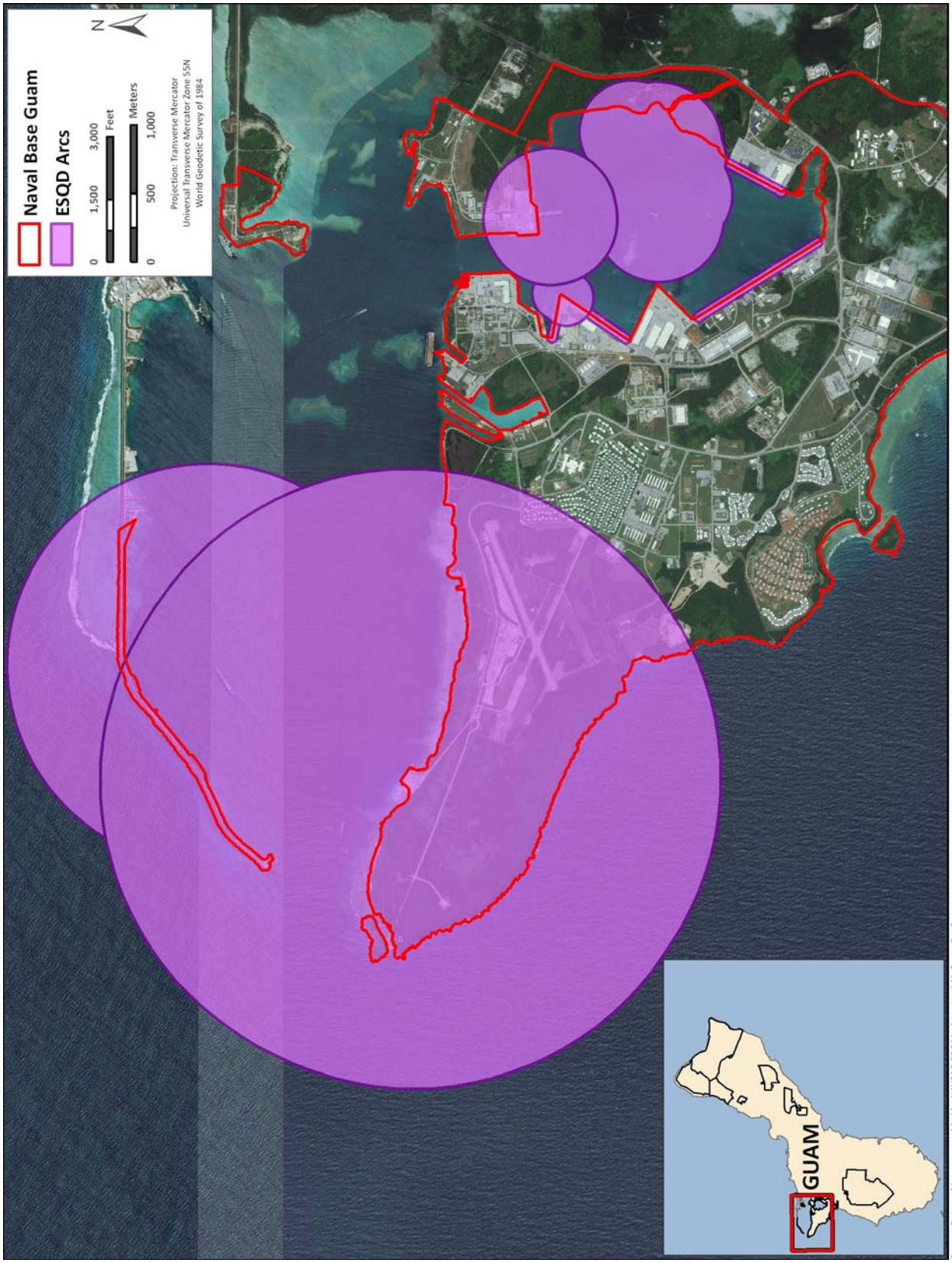


Figure 2-3. Explosive Safety Quantity Distance Arcs for NBG

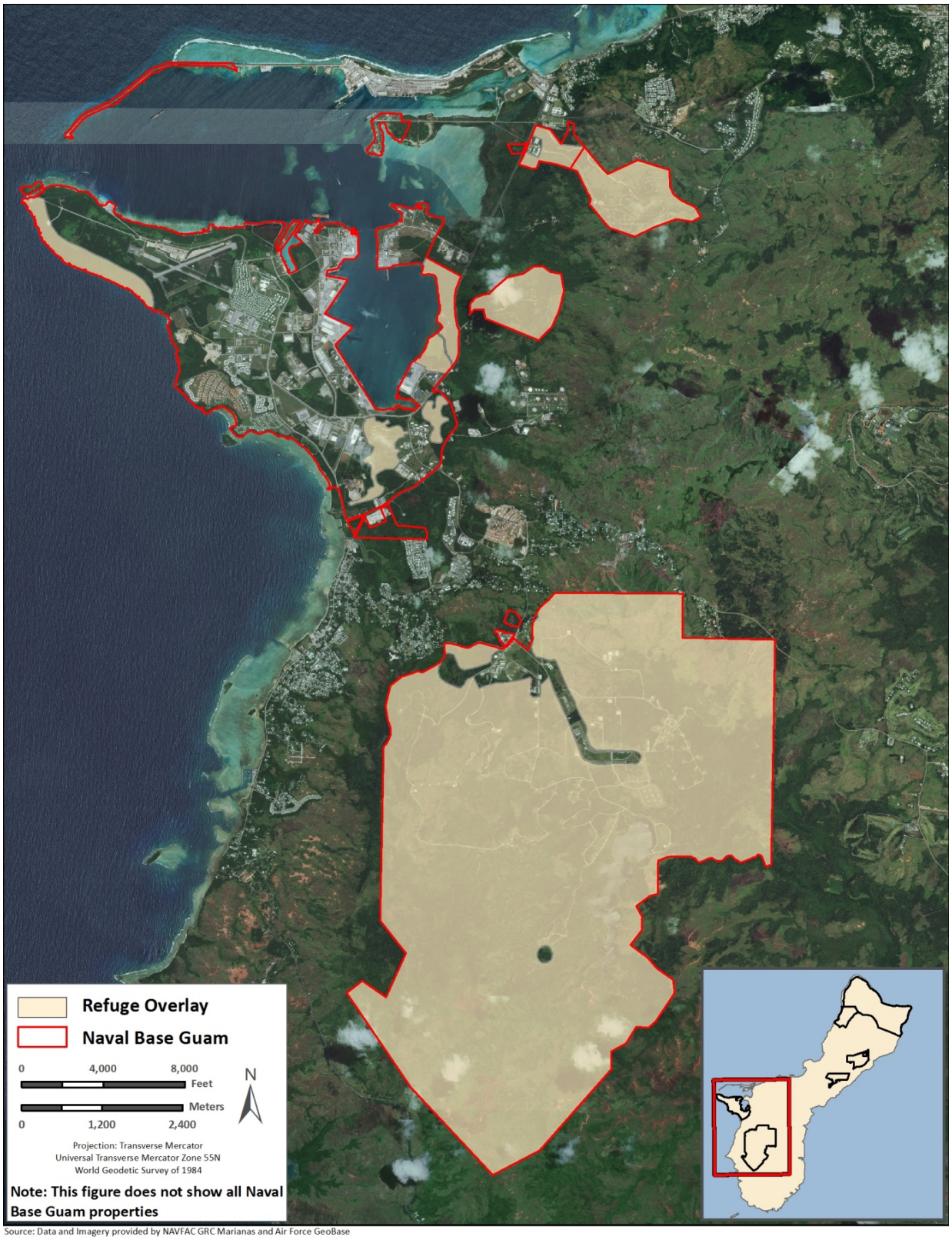


Figure 2-4. Guam National Wildlife Refuge Areas on Naval Base Guam Main Base and Naval Munitions Site

In addition, Guam is within the jurisdiction of the Western Pacific Regional Fishery Management Council (WPRFMC), which has designated the marine waters around Guam, including Navy submerged lands, as Essential fish habitat (EFH), and waters between 130 to 980 feet (40 and 280 meters) as bottom-fish Habitat of Particular Concern (HAPC) (Western Pacific Regional Fishery Management Council, 1998).

The shoreline and cliff lines along NBG Main Base, as well as wetlands, and upland grass fields, support a number of seabird and migratory shorebird species, which are protected under the Migratory Bird Treaty Act (MBTA). Certain activities, such as land clearing, can inadvertently impact these birds. There are several wetlands within NBG Main Base that are regulated by the U.S. Army Corps of Engineers (USACE). Wetlands in Guam are also protected under EO 78-21, EO 90-13, EO 99-09, *The Guam Water Pollution Control Act*, and Guam's *Wetland and Flood Hazard Area Regulations* (Title 13, Subchapter E. Section 12240-12246 and Subchapter D, Section 12230-12236, *Administrative Rules and Regulations*). Wetlands can be affected by operations on NBG Main Base due to construction or other activities that require filling or from activities that cause erosion and sedimentation, which can degrade wetland quality.

Vegetated areas that have been disturbed by clearing, construction, and other activities are dominated by nonnative and invasive plant species, and include a number of invasive weeds.

2.5.2 Naval Munitions Site

2.5.2.1 Operations

The NMS is the largest JRM site on Guam and has the greatest area of terrestrial natural resources. Located on mountainous terrain in south-central Guam, the site consists of approximately 8,800 acres (3,561 hectares) of which half lies within the watershed of Fena Reservoir (see **Figure 2-5**).

The NMS provides support through receiving, renovating, maintaining, storing, and issuing ammunition, explosives, and expendable ordnance materials to units of the Pacific Fleet operating in the Western Pacific. The site has the primary responsibility of providing ordnance support for the Seventh and Fifth Fleets and has been designated as the single transportation service for point-to-point ammunition hauling between military installations on Guam. Magazines at the NMS provide more than 250,000 square feet (76,200 meters) of storage space for ordnance materials.

Because of the ESQDs of the NMS, there has been limited development (see **Figure 2-6**). Approximately 70 percent of the site's land is retained as uninhabited land used as an explosive safety zone. The facilities located within this zone include ordnance storage magazines, ordnance operating and support buildings, the Fena Reservoir Dam, and an extensive network of roads. The remaining land in this area is managed primarily for conservation and watershed.

Fena Dam, built in 1951, contains Fena Reservoir, the largest freshwater body of water on Guam, with a maximum storage capacity of about 7,500 acre-feet (925 hectare-meters). Fena Reservoir provides the majority of Navy's water. Surplus water is sold to GovGuam for distribution to residents in southern Guam. The Fena Water Treatment Plant is operated by NAVFACMAR.

Training within the NMS includes helicopter landings, field exercises, paradrops, small unit bivouac, land navigation, patrols, squad tactics, heliborne firebucket loading, tactical rescue of aircraft and personnel, escape and evasion, sniper range use, and small unit patrolling.

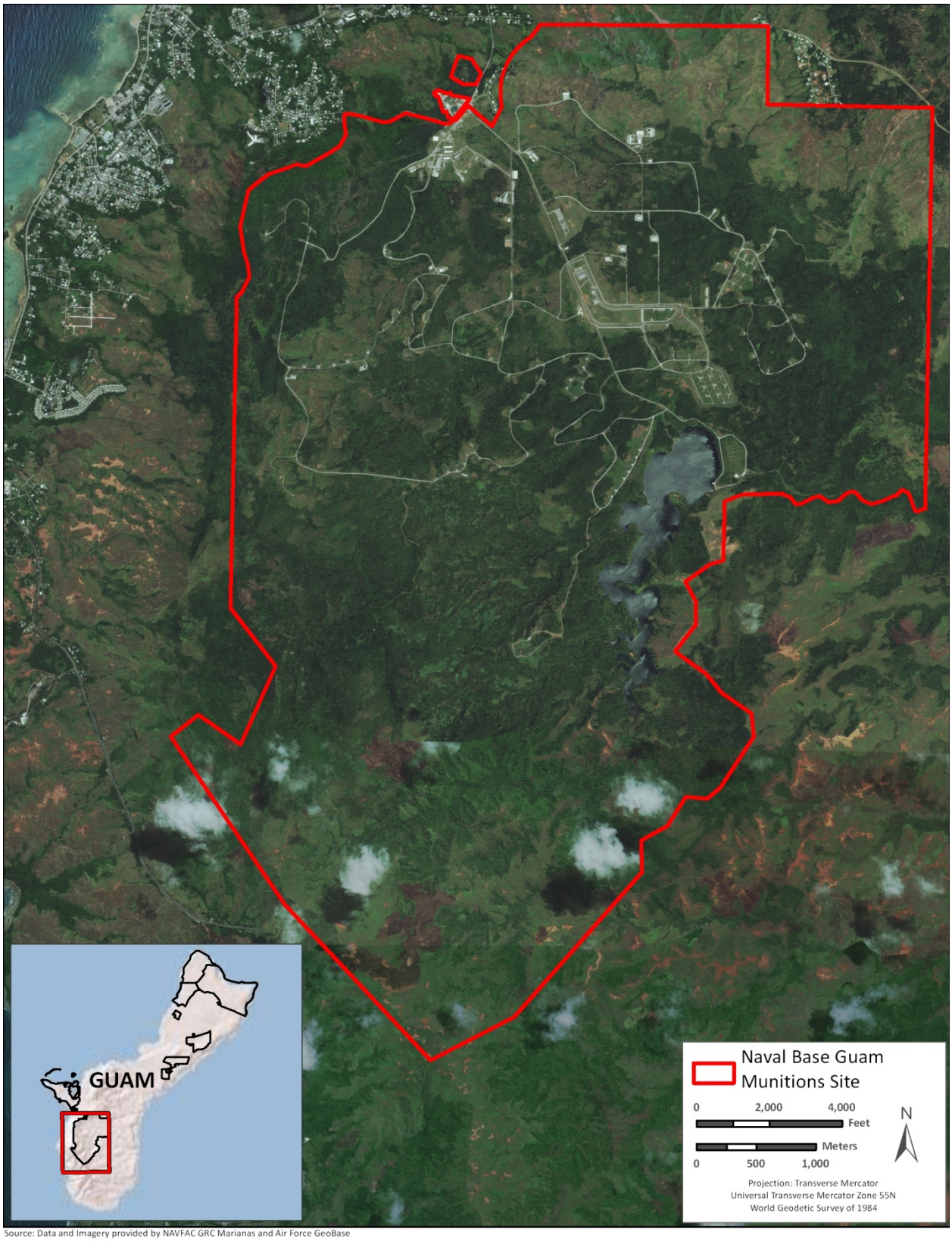


Figure 2-5. Location of the Naval Munitions Site

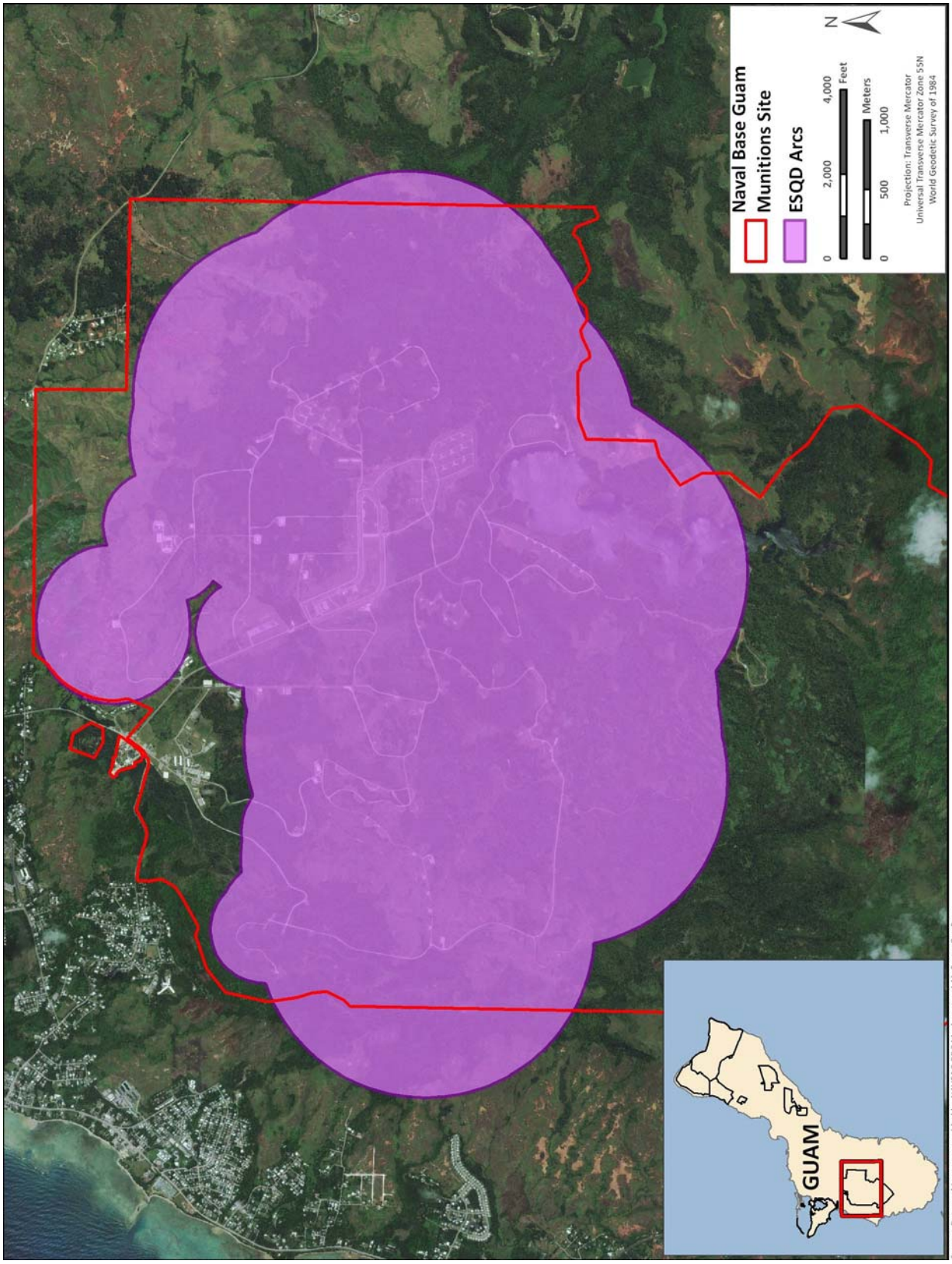


Figure 2-6. Explosive Safety Quantity Distance Arcs for Naval Munitions Site

2.5.2.2 Environmental Effects

The majority of the NMS is included within the GNWR (see **Figure 2-4**). Three caves within the NMS contain the only nesting populations of Mariana swiftlets (*Aerodramus bartschi*) on Guam. The Mariana common moorhen is also known to inhabit the shoreline of Fena Reservoir and many other wetlands on the NMS. Plant communities within the NMS retain functional components of native ravine and limestone forest, which is suitable habitat for the swiftlet and moorhen. The Mariana fruit bat (*Pteropus mariannus mariannus*) has been sighted foraging in the site, and the USFWS recovery plan for the Mariana fruit bat identified the Fena watershed as the largest parcel of suitable habitat for the bat in southern Guam. Training exercises could affect these species if they take place within close proximity to nesting and foraging areas.

Migratory birds, which are protected under the Migratory Bird Treaty Act (MBTA), are frequently observed foraging and roosting on Fena Reservoir and along its shores and upland habitats along the NMS. Operational activities around Fena Reservoir could cause further development and habitat loss which could affect these birds.

As with all other sites, the area has been heavily disturbed and is, therefore, dominated by nonnative, often invasive species. EO 13112 outlines the Federal government's responsibilities to prevent the introduction and provide for the control of invasive species. In addition to invasive vegetation, the NMS has a high population of invasive ungulates that impact vegetation communities, which in turn leads to habitat degradation, increased erosion, and reduced water quality.

2.5.3 Naval Base Guam Telecommunications Site

2.5.3.1 Operations

NBG TS is located on the northwestern side of Guam and totals 3,000 acres (1,214 hectares) (see **Figure 2-7**). NBG TS operates communications systems including radio frequency (RF) systems and terrestrial-based fiber optic cables at this site. This area is designated as, and must be maintained as, an RF quiet zone for a minimum of a 1-mile (1.6 kilometer) radius. The South Finegayan housing area is in a separate parcel south of NBG TS. The Navy mission requirement for the family housing area is to provide a safe, secure environment for the residents of the housing area.

The Navy also owns the submerged lands off of NBG TS at a distance of 12 miles (19 kilometers) from the coast but actively manages up to 3 nautical miles (5.5 kilometers) seaward. These waters off the site are used for military training. Authorized training at NBG TS includes training for Navy Special Warfare Units, Special Forces, and Marine Reconnaissance teams; use of existing trails for inland maneuvers and Military Operations in Urbanized Terrain (MOUT), and the use of small arms at the North Range.

2.5.3.2 Environmental Effects

Land clearing and training exercises can affect endangered species that occur or potentially occur within the site by disturbing or removing habitat or food sources. Two endangered species and four candidate species have been documented within the site: the Mariana fruit bat and green sea turtles (*Chelonia mydas*) are threatened; and the Mariana eight-spot (*Hypolimnas octucual marianensis*), the humped tree snail (*Partula givva*), the Guam tree snail (*Partula radiolata*), and the fragile tree snail (*Samoana fragilis*) are candidate species. Haputo Beach supports nesting sea turtles and nesting activity has been observed.

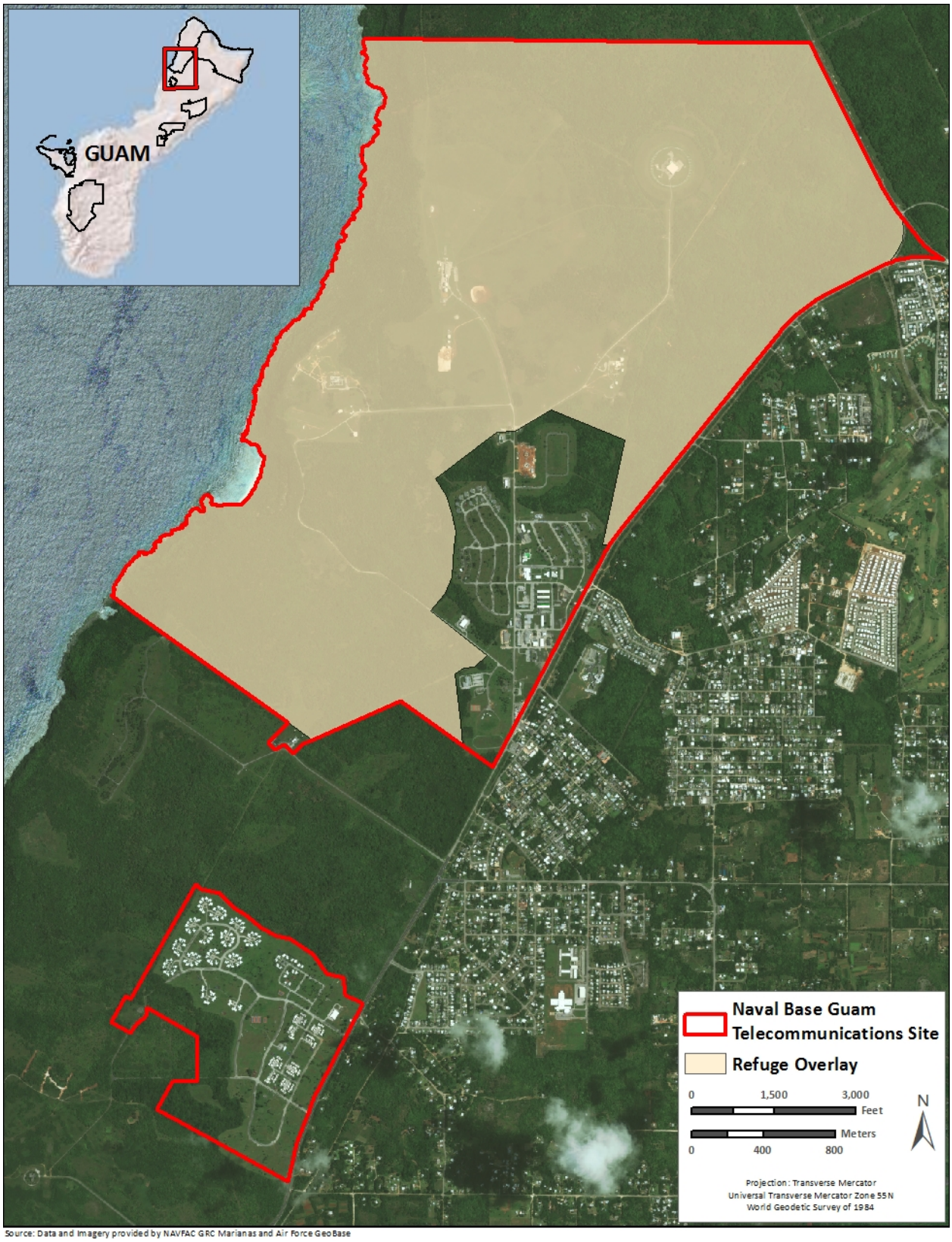


Figure 2-7. Location of Naval Base Guam Telecommunications Site

Coastal training can affect coral reef communities. Under EO 13089, actions that potentially affect coral reef ecosystems must be mitigated. The marine environment in the HERA is currently on the U.S. Marine Managed Area Inventory. Marine mammals can be affected by training exercises offshore. All species are protected under the MMPA.

In 1984, the HERA was established as a mitigation measure for the construction of Kilo Wharf. The HERA includes submerged lands from the shoreline to the outer edge of the reef margin. Inland the HERA extends to the top of the limestone ridge along the full length of the coast. The terrestrial unit of this HERA totals about 180 acres (73 hectares), and the submerged lands total 72 acres (29 hectares). Potential impacts of military training in the HERA were addressed in the Final Environmental Impact Statement Military Training In the Marianas Islands.

The shoreline and cliff line along NBG TS and upland habitats, support a number of shorebird species, which are protected under the MBTA, and training activities in this area can affect these birds. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, outlines Federal agencies' responsibilities to promote the conservation of migratory bird populations, and consultation with the USFWS if any planned action could harm migratory bird species listed in 50 CFR § 10.21.

Receiving antennas and other communications equipment require open areas to prevent interference from surrounding trees or buildings. As a result, much of NBG TS been cleared and is maintained as mowed grasslands. This has allowed for the establishment of nonnative vegetation primarily in the transition areas between the mowed grasslands and the forest areas. These species have also moved into the forest areas, especially along the roadsides where safety areas are maintained. This disturbance and increase in nonnative vegetation has contributed to a highly disturbed habitat and a severe decline in native forest species and suitable habitat for invasive ungulate species.

2.5.4 Communications Site Barrigada

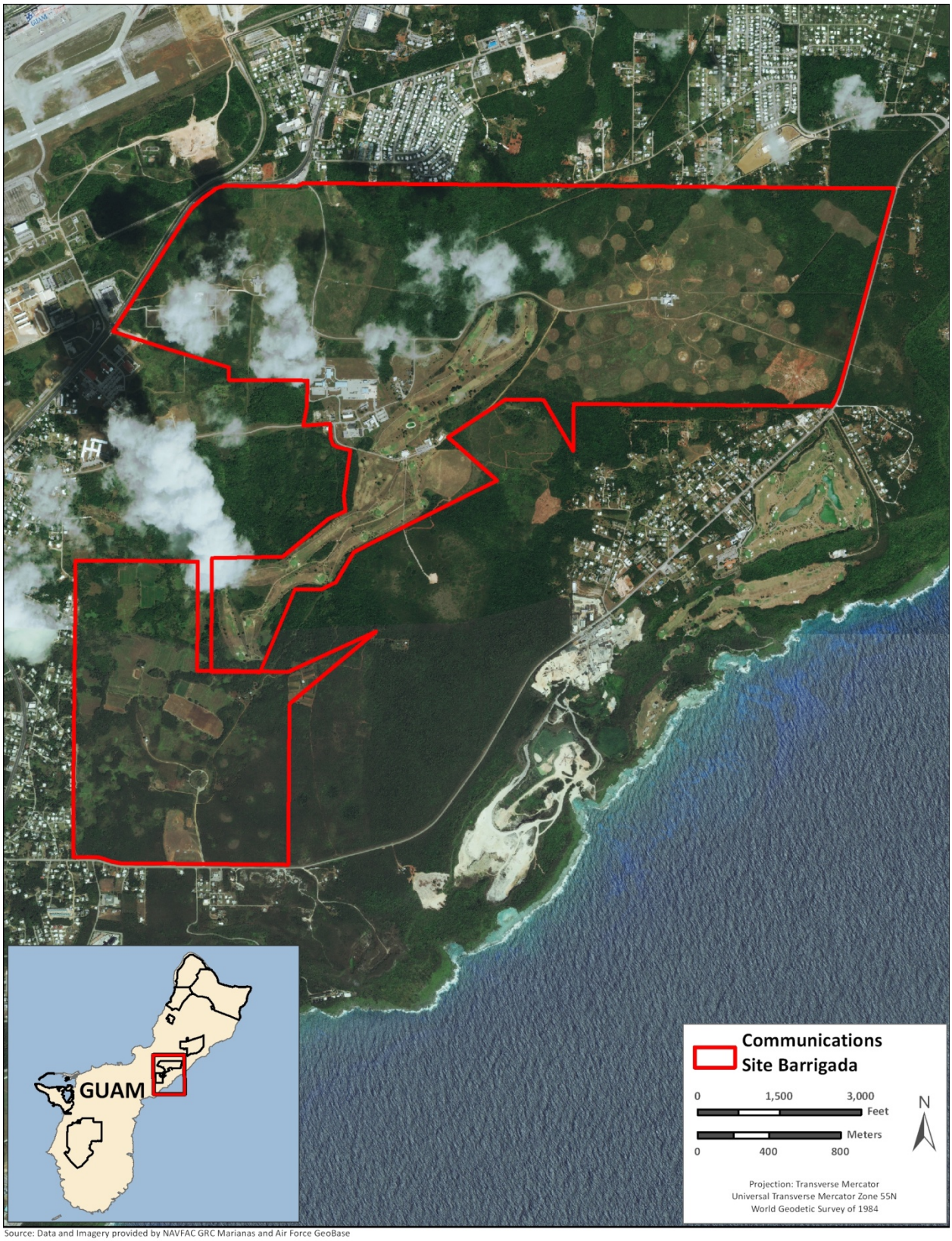
2.5.4.1 Operations

The Communications Site Barrigada is located on the northeastern side of Guam (see **Figure 2-8**). The site is approximately 1,800 acres (728 hectares) and supports a large antenna field developed around an active transmitter facility. The facility serves as the transmitting station for NBG TS. A one-mile (2-kilometer) radius protection zone is designated around transmitting antennas to preclude electromagnetic radiation problems. Fifteen acres (6 hectares) are leased to the Guam Army National Guard for small-unit tactics and land navigation training. The Navy's Admiral Nimitz Golf Course includes several small man-made ponds. The ponds are ephemeral and do not support wetland vegetation.

2.5.4.2 Environmental Effects

The open grasslands and constructed wetlands within Communication Site Barrigada are regularly used as resting and foraging areas for migrating birds, which are protected under the MBTA.

As with the NBG TS, the activities carried out at this site require large amounts of cleared, maintained land for operation. The disturbance of land has led to an increase of nonnative and invasive species. Additionally, there is native understory, and canopy trees within this site for the Mariana fruit bat.



Source: Data and Imagery provided by NAVFAC GRC Marianas and Air Force GeoBase

Figure 2-8. Location of Communications Site Barrigada

2.5.5 Andersen Air Force Base

2.5.5.1 Operations

Andersen AFB covers approximately 16,021 acres (6,483 hectares). The main operations area of Andersen AFB is in the eastern third of the installation at approximately 500 feet (152 meters) above sea level and includes the main active airfield and an array of operations, maintenance, and community support facilities (see **Figures 2-9a** and **2-9b**). The central third of the installation is a Munitions Storage Area. The western third is Northwest Field, a World War II-era airfield used for fixed-wing aircraft and helicopter training and various field exercises and bivouacs.

Andersen AFB is vital to the security of the United States and its mission is expanding to support the new defense strategy specified in the 2001 Quadrennial Defense Review and the 2003 Defense Planning Guidance. This new defense strategy calls for the military to "deter forward" by stationing or deploying forces to five critical regions of the world: Europe, Middle East, Southwest Asia, Northeast Asia, and East Asian Littoral (e.g., region stretching from south of Japan through Australia and into the Bay of Bengal). Under this new defense strategy, Andersen AFB is proposed as a main operating base to conduct and support operations in the East Asian Littoral region due to its long runways, vast ramp space, and large fuel storage capacity. Andersen AFB would be used for potential strikes with bombers or fighters; for Command and Control; for Intelligence, Surveillance, and Reconnaissance; and for air refueling, airlift, and Search and Rescue.

Major units of the 36 WG include the 36th Mission Support Group (36 MSG), the 36th Logistics Group (36 LG), 36th Medical Group (36 MDG), and the 36th Operation Support Squadron (36 OSS). The 36 MSG maintains an infrastructure of communications, engineering, information management, and security; and provides critical personnel support and morale, recreation, and services. The 36 LG provides superior transportation, aircraft maintenance/munitions, supply/fuel, contracting, and logistics planning.

2.5.5.2 Environmental Effects

Training and Support Operations

Northwest Field. Northwest Field is an unimproved expeditionary World-War-II-era airfield that is used for vertical and short field landings. Approximately 280 acres of land are cleared near the eastern end of both runways for parachute drop training. The south runway is used for training of short field and vertical lift aircraft and often supports various types of ground maneuver training. Helicopter units use other paved surfaces for Confined Area Landing, simulated amphibious ship helicopter deck landings, and insertions and extractions of small maneuver teams (U.S. Navy 2010b).

About 3,562 acres (1,442 hectares) in Northwest Field are the primary maneuver training areas available at Andersen AFB for field exercises and bivouacs. Routine training exercises include camp/tent setup, survival skills, land navigation, day/night tactical maneuvers and patrols, blank ammunition and pyrotechnics firing, treatment and evaluation of casualties, fire safety, weapons security training, perimeter defense/security, field equipment training, and chemical attack/response (U.S. Navy 2010b). The 36th Civil Engineering Squadron Environmental Flight (36 CES/CEV) routinely conducts a NEPA review for all training exercises conducted at Northwest Field.

Figure 2-9a. Location of Andersen AFB

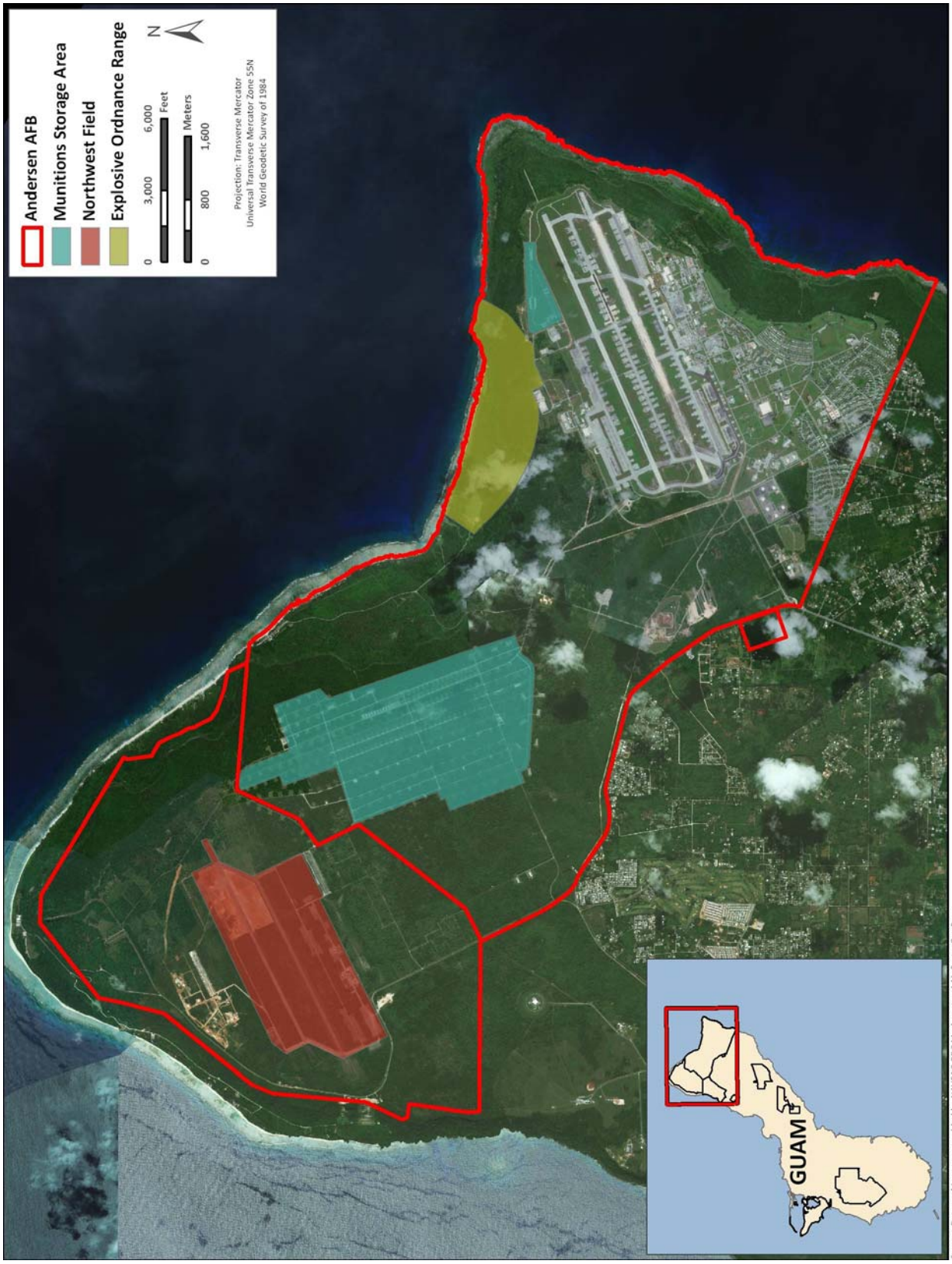


Figure 2-9b. Location of Andersen AFB Operations

Andersen Air Force Base Main Base. Andersen Main Base is dedicated to its primary airfield mission. Administered by 36 WG, the Main Base at Andersen AFB composes about 11,500 acres (4,654 hectares). The installation is used for aviation, small arms, and Air Force EOD training. As a working airfield, the installation has a full array of operations, maintenance, and community support facilities. 36WG supports all U.S. military aircraft and personnel transiting the Mariana Islands Range Complex (MIRC). Facilities are available for cargo staging and inspection (U.S. Navy 2010b).

Tarague Basin Combat Arms and Training Maintenance (CATM) Range and EOD Pit. The CATM range supports training with pistols, rifles, machine guns up to 7.62 millimeters (mm), and inert mortars up to 60 mm. Training is also conducted with the M203 40-mm grenade launcher using inert training projectiles only (U.S. Navy 2010b). Land-based detonations at the Pati Point Explosive Ordnance Disposal Range were the subject of earlier consultations between Andersen AFB and USFWS (U.S. Navy 2009, NMFS 2010a). The Pacific Islands Fish and Wildlife Office concluded that activities at the Pati Point Explosive Ordnance Disposal Range would not adversely affect ESA-listed species.

Explosive Ordnance Disposal Range. The EOD, Small Arms Firing Ranges, and associated Quantity Distance Safety Zones are located in forest and back strand vegetation. The locations of the ESQD arcs on Andersen AFB are shown on **Figure 2-10**. EOD operations have been in existence since 1961 and are conducted in compliance with the U.S. Environmental Protection Agency (USEPA) and Guam Environmental Protection Agency (GEPA) laws. Increased security conditions afford the Mariana fruit bat, Mariana crow, and green sea turtle greater protection when they frequent this area of Tarague Basin. EOD and small arms firing operations impact only the immediate locations of detonation or firing. Explosions at the EOD pit and on the CATM range are on hardtop surfaces or within fire control pits and fires resulting from these explosions are negligible. Potential impacts on sea turtles in terrestrial habitats include noise from explosions; nest disturbance or destruction; beach erosion from the use of landing craft air cushion, landing craft utility, amphibious assault vehicles, combat rubber raiding craft, and rigid-hulled inflatable boats on nesting beaches; and nest disturbance or destruction and beach erosion from over the beach swimmer insertions, combat swimmer special training, diving, and ATFP (U.S. Navy 2010b).

The expansive safety distances (which include jungle/forest habitat and coastline) are off limits. In the event that an accident occurs, emergency response procedures would be enacted. Mariana fruit bats seek these lands as refuge from human disturbance found elsewhere. Over the years, operations have been conducted in accordance with the USFWS and GDAWR. Operations will continue with the concurrence of the USFWS and GDAWR to ensure species protection. In the event that any associated operations or habitat conditions change, potential impacts will be coordinated with the USFWS and GDAWR.

There are approximately 10,300 acres included in the GNWR Overlay Refuge Unit at Andersen AFB (see **Figure 2-11**). The Overlay Refuge Unit provides for close coordination between JRM and the USFWS on Federal actions that might affect threatened and endangered species and their habitats within the Refuge. The Refuge headquarters is located at Ritidian Point.

2.5.6 Andersen South

Andersen AFB South (Andersen South), approximately 1,922 acres (778 hectares), is approximately 4 miles (6.4 kilometers) south of Andersen AFB (NAVFAC Pacific 2010a). The property is located inland of the Pacific Ocean coast (see **Figure 2-12**) and west of Route 15. It is south of Route 1, except for a small parcel (approximately 29 acres [12 hectares]) that is the former site of the Yigo War Dog Cemetery. The dog remains have been relocated, but the area is still referred to as the Yigo War Dog Cemetery parcel. There is a water pump station on the site. Most of the site is vacant (i.e., no modern man-made structures) and naturally vegetated (Bureau of Statistics and Plans 2008).

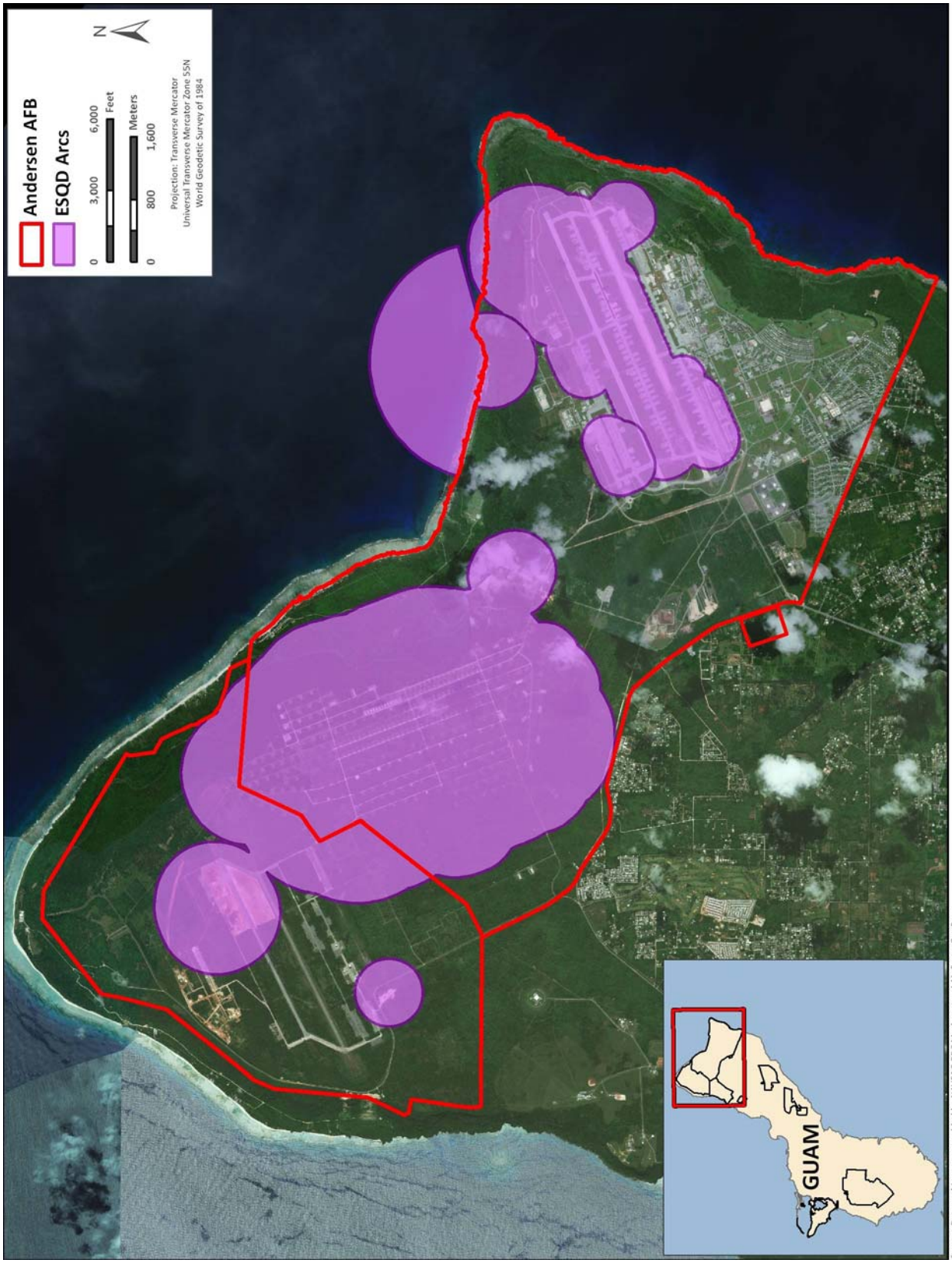


Figure 2-10. ESQD Arcs on Andersen AFB

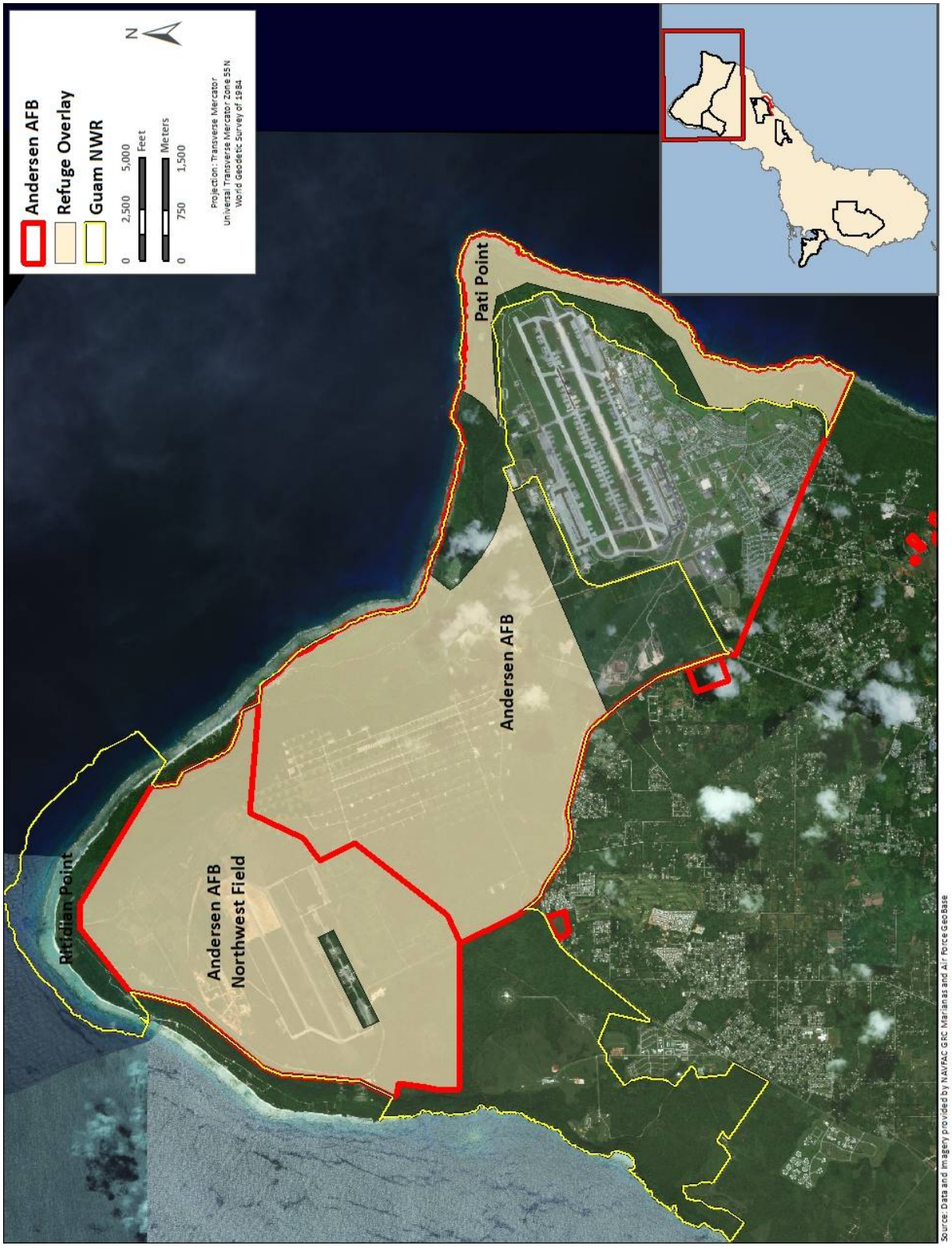
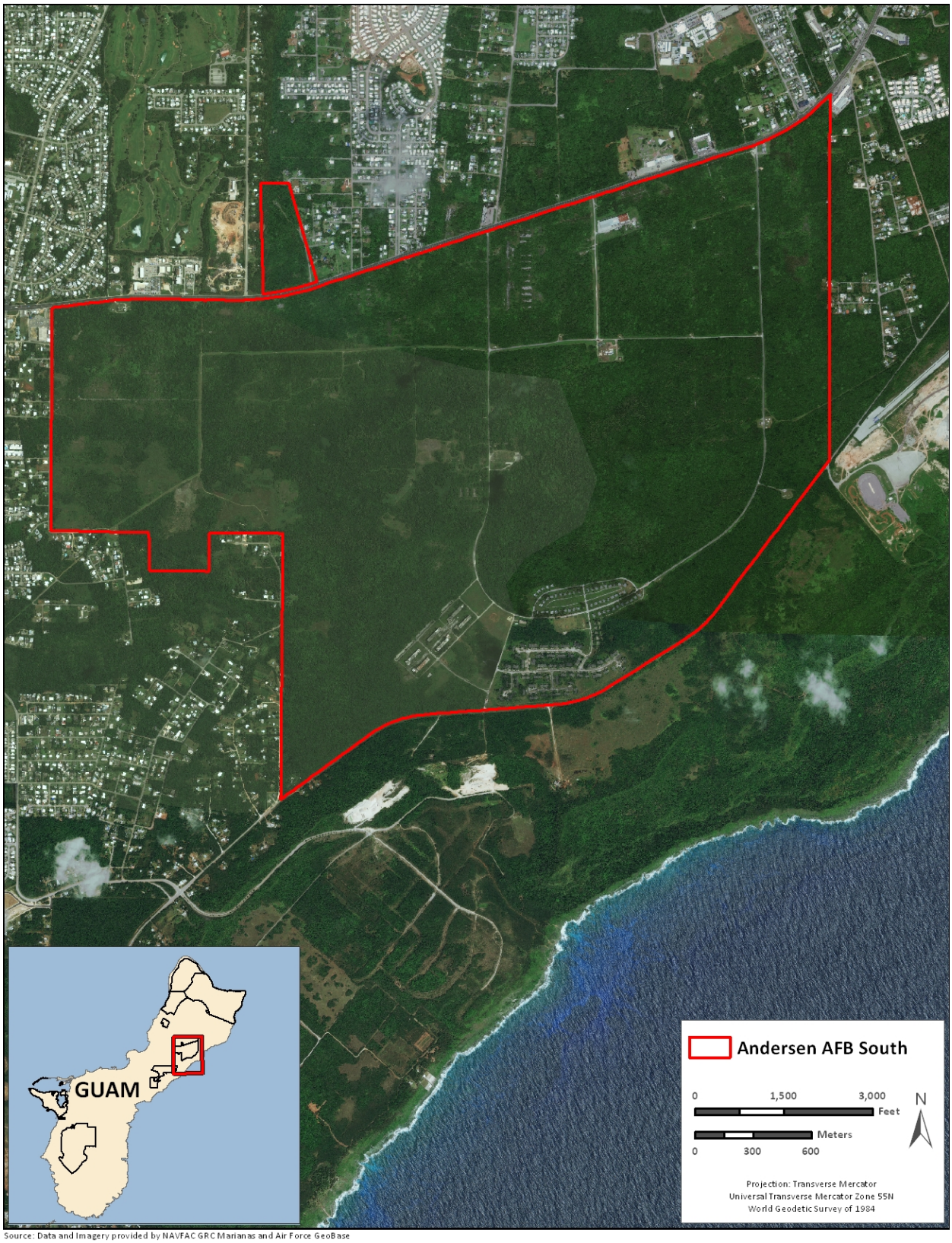


Figure 2-11. Guam National Wildlife Refuge Areas on Andersen Air Force Base



Source: Data and Imagery provided by NAVFAC GRC Marianas and Air Force GeoBase

Figure 2-12. Location of Andersen South

Andersen South is an abandoned U.S. Air Force (USAF) housing area now used as a joint services ground-training site. The abandoned structures, which are situated adjacent to Route 15 along a relatively small portion on the southwest side of the site, are used for urban warfare training (JGPO 2010). The remainder of the Andersen South site is largely composed of an old road network and a few dispersed facilities that are surrounded by moderate-to-dense vegetation. Andersen South and the surrounding community of Yigo are situated on relatively flat topography and thus do not afford much in the way of views from adjacent roadways, which are blocked by the dense vegetation (JGPO 2010).

2.5.6.1 Operations

The Andersen South area consists of open fields, wooded areas, and vacant houses that have been used for humanitarian operations, staging, bivouac, equipment inspection, and small unit tactics. The most intensive use at Andersen South currently occurs during exercises involving up to three Marine Corps companies that use the Andersen South range for up to 3 weeks, which currently occurs twice a year. Blanks used in this training produce an estimated noise level of about 96 A-weighted decibels (dBA) at a distance of 500 feet (152 meters) and about 90 dBA at a distance of 1,000 feet (305 meters), which exceeds compatible noise levels for residential use. There are no residences at Andersen South. The noise levels diminish with distance and the noise levels do not encroach on the surrounding community. MOUT training is conducted in abandoned housing areas. There are installation restoration (clean-up) sites and water production wells with wellhead clearance buffers in the area. Historically, the site was used for family housing and barracks, and includes a wastewater pump station, water booster pump station, water tanks and electrical substation that are not currently being used (NAVFAC Pacific 2010a).

2.5.6.2 Environmental Effects

Based on review of Volume 2, Chapter 8, *Land and Submerged Land Use* of the Final Environmental Impact Statement for the relocation of Marines from Okinawa, proposed uses of the Andersen South would not pose a significant environmental impact because the parcel is not located on the coast and only minor changes in land ownership are anticipated (NAVFAC Pacific 2010a).

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3. Environmental Management Strategy and Mission Sustainability

3.1 Natural Resources Management Strategy

Natural resources management conducted by the JRM sites on Guam strives to integrate biodiversity conservation and an ecosystem-based approach into an adaptive management framework compatible with the military mission. As a result, the natural resources program consists of multiple resource disciplines that are frequently interconnected and share similar objectives. Management projects and plans often consist of multiple program elements with several different resource experts collaborating together. This section describes the various natural resources Program Elements along with their primary goals and objectives.

The Navy is the lead service for natural resources management of DOD lands on Guam. As such, Navy policy on natural resources management, as summarized from OPNAVINST 5090.1C CH-1, is to manage natural resources to support and be consistent with the military mission, while protecting and enhancing those resources for multiple use, sustainable yield, and biological integrity. Land use practices and decisions must be based on scientifically sound conservation procedures and techniques, and use scientific methods and an ecosystem management approach.

Employing ecosystem management helps maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies, human use, and the environment required for realistic military training operations (DOD 2011).

The basic principles and guidelines of ecosystem management are as follows:

- Preserve the function and integrity of natural ecosystems
- Integrate human social and economic interests with environmental considerations
- Involve all interested parties (stakeholders) in identifying management goals
- Adapt to changing conditions and requirements.

Ecosystem function is a result of interactions of its various components: geologic and soil features, climatic elements, plants, animals, humans, and current and past disturbances (including past management practices). The function and integrity of an ecosystem are measured in terms of diversity, nutrient availability (productivity), and structural complexity. Assessing ecosystem health and sustainability requires objectively measuring a set of parameters that can be used to describe conditions. Adaptive management is an iterative cycle of planning, monitoring, evaluation, adjustment, and implementation that is best used to assess ecosystem function and the effectiveness of management practices.

3.2 Cooperative, Adaptive, and Ecosystem Management

The 1994 DOD policy memorandum *Implementation of Ecosystem Management in the DOD* was developed to ensure that resources on DOD installations were managed in a manner to conserve and protect biological diversity through adopting an ecosystem management approach to natural resources management (Benton et al. 2008). The policy states that "military installations will use ecosystem management to: (1) restore and maintain ecological associations that are of local and regional importance and compatible with existing geophysical components (e.g., soil, water); (2) restore and maintain biological diversity; (3) restore and maintain ecological processes, structures, and functions; (4) adapt to changing conditions, including changes resulting from a changing climate; (5) manage for viable populations, and (6) maintain ecologically appropriate perspectives of time and space" (Benton et al. 2008).

The DOD leadership further strengthened the need to manage resources using an ecosystem management approach in DOD Instruction 4715.03 (DOD 2011), that stressed the importance of recognizing the relationship between ecosystem management and biodiversity conservation (Benton et al. 2008). The instruction outlined five goals for installations to preserve and enhance biodiversity: "(1) maintain or restore remaining native ecosystem types across their natural range of variation; (2) maintain or reestablish viable populations of all native species in an installation's areas of natural habitat, when practical; (3) maintain evolutionary and ecological processes, such as disturbance regimes, hydrological processes, and nutrient cycles; (4) manage over sufficiently long time periods for changing system dynamics, including climate change; and (5) accommodate human use in those guidelines" (Benton et al. 2008).

With the passage of the SAIA in 1997, DOD ensured that all INRMPs were developed with an ecosystem management approach to overall natural resources management. One of the primary facets of ecosystem management is to maintain the ecological integrity of the area managed. Ecological integrity is defined as "the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat of the region" (Benton et al. 2008). The INRMP is developed to conserve and protect ecological integrity by promoting a proactive, as opposed to a reactive, strategy for managing resources. The SAIA also requires that INRMPs are reviewed annually and updated every 5 years to ensure that these documents remain as living documents that can be revised based on changes to current conditions (including changes as a result of climate). The goals and objectives developed for this INRMP were developed using an ecosystem management approach that is flexible and takes into account ecosystem changes resulting from various factors including climate change.

The DoN has also developed the *Cooperative Strategy for 21st Century Sea Power* that addresses a need for adaptive management in the face of a changing climate (U.S. Navy, U.S. Marine Corps and U.S. Coast Guard 2007). In addition, the 2008 DoN Environmental Strategy, *Sustaining our Environment, Protecting our Freedom* states the importance of all Naval bases to evaluate activities and ensure that best management practices (BMPs) have been put into place to reduce the overall environmental footprint of the Navy and enhance sustainability (U.S. Navy 2008). Finally, in May 2009, the DoN created a task force to explore and develop policies and strategies that address climate change. The Task Force Climate Change is made up of senior DoN staff and other stakeholders and findings will be based on many factors, including the most current scientific research.

Management Strategy

Communication of Ecosystem Management Philosophy to JRM Personnel

There is an ongoing need for coordination between JRM and other agencies, and between the JRM and interested and affected public entities during plan development and implementation to manage the ecosystem effectively.

Objective: Develop the coordination necessary between JRM, other agencies, and public entities to ensure that an effective and viable ecosystem management approach is developed.

Strategies:

1. Complete this version of the INRMP with concurrence from USFWS, GDAWR, and NMFS, and use it as a beginning point to develop an ecosystem management approach to natural resources management.

2. Develop a process and schedule for coordinating with agencies to allow for agency comment on all natural resources management plans.
3. Coordinate resources management efforts and projects with other agencies including coordinated monitoring programs and data sharing to take an island-wide (or ecosystem) approach toward conservation and resource management.

Ecosystem Management of JRM and Mission Requirements

Conceptually, ecosystem management is an appropriate strategy for managing installation natural resources, and can be used to develop a plan to guide natural resources management.

Objective: Develop an effective natural resources management approach that integrates all ecological components into a comprehensive management program.

Strategies:

1. Foster landscape-scale thinking among JRM staff and provide them with appropriate training if needed.
2. Enhance management through use of a geographic information system (GIS) to store, manage, analyze, interpret, and report data in a scientifically valid, efficient, and cost-effective manner. Develop new and enhance existing databases, and acquire applicable databases from outside sources for application in GIS.

3.3 Climate Change

The updated guidance for Navy INRMPs (OPNAVINST 5090.1C CH-1) added a requirement to address climate change in INRMPs (DoN 2011). It states that natural resources managers may use models to predict climate changes and evaluate needed research, data collection, and potential future management strategies as they make changes in ecosystem structure; however, due to their uncertainty, these models should be used to support and not guide environmental planning and natural resources management decisions.

Per OPNAVINST 5090.1C CH-1, INRMPs should address the following issues:

1. Include a more detailed discussion of the present climate including variability and periodic disturbances and how climate affects management and population dynamics.
2. Identify data and research needs.
3. Identify species and communities resilient/vulnerable to climate change impacts.
4. Ensure species/community conservation reflects climate change risks.
5. Identify restoration projects to provide habitat elements for specific species which might be altered by climate change.
6. Include BMPs related to climate change.
7. Establish need for electronic databases of demographic information from Navy grey literature.
8. Identify existing regional groups (e.g., species recovery teams) to establish partnerships for addressing climate change issues.

9. Identify and implement regional conservation designs that provide stepping stones for species to move (use existing programs such as borderlands and potentially new ones such as mitigation banking) to sites with suitable climates.
10. Provide for the management of TES such that changes in distribution and abundance on Navy installations can be understood in the context of climate change.

Specific Concerns

1. Scientific research indicates that climate change will have long-term, irreversible, adverse consequences on natural resources, including terrestrial and aquatic habitats.
2. Models are the only way to project future changes for JRM and the surrounding region, and to evaluate needed research, data collection, and potential management strategies. A range of scenarios is possible using accepted models, and local data sets need to be developed and integrated through collaboration and consensus.
3. Key questions for NEPA analysis include whether the proposed action is expected to cause climate change effects, whether the proposed action combined with other past, present, and reasonably foreseeable actions would cause such effects, and whether sufficient information is available to describe the nature and extent of the proposed action's effect. Developing mitigation for climate change should be included in NEPA analysis.

Management Strategy

Objective: Adapt and mitigate the adverse impacts of climate change through long-term planning and annual goal setting based on science-based scenarios, targets, collaborative planning, and adaptive management.

Strategies:

1. Identify data and research needs for ensuring an effective response to the impacts of climate change.
    a. Identify species and communities resilient/vulnerable to climate change impacts by conducting climate change vulnerability assessments.
    b. Improve the application of models through data collection and validation (as feasible and needed) and for using such science-based models in environmental and natural resources management planning.
    c. Improve the graphical depiction of the potential impacts of climate change on species ranges and population abundances in climate change vulnerability assessments.
2. Adapt and mitigate the adverse impacts of climate change, including stresses on infrastructure, aquatic vegetation, erosion, and shifts in distributions of terrestrial endemic species ranges and population abundances, and plant communities.
    a. Ensure that species/community conservation priorities and expenditures reflect climate change risks, such as those on the margins of their distribution patterns.
    b. Identify restoration projects to provide habitat elements for specific species, which could be altered by climate change.
    c. Provide for the management of threatened, endangered, and other special status species to avoid or minimize impacts from climate change.

d. Monitor plant community composition and productivity for changes in status, or condition attributed to climate change and implement management strategies to address these concerns.

e. Monitor intertidal and near shore environments for changes in status, or condition attributed to climate change and implement management strategies to address these concerns.

3. Address the impact of human use of resources by emphasizing preventative technologies.

   a. Improve water conservation.

   b. Improve storm water management through use of low impact development (LID) technologies.

   c. Improve coordination between natural resources and development project proponents to ensure more energy-efficient design features.

4. Improve and strengthen coordination among JRM and non-JRM personnel with respect to climate change.

   a. Establish partnerships for collaboratively addressing climate change issues.

   b. Analyze project impacts and cumulative effects through NEPA in a consistent way.

   c. Incorporate climate change in Encroachment Action planning.

   d. Develop science-based agency coordination to protect, maintain, and restore at-risk habitats.

5. Ensure that JRM personnel have access to climate change education and outreach in order to help minimize effects of climate change through modification of individual behavior and lifestyle consumption patterns that contribute to climate change.

3.4 Mission Sustainability

Broadly speaking, sustainability takes a long-term view of natural resources stewardship, mission accomplishment, social responsibility, and economic prosperity into the future. For this INRMP, the topic of sustainability encompasses the following:

- Sustainability of the mission at JRM with respect to how natural resources support this mission
- Resource-specific BMPs, consistent with the installation-specific component plans
- Preparations for climate change and regional growth
- Resource use in the human environment
- Indicators that help monitor progress toward sustainability objectives.

OPNAVINST 5090.1C CH-1 requires installation managers to manage resources to support and be consistent with the military mission, while protecting and enhancing those resources for multiple uses, sustainable yield, and biological integrity (DoN 2011). The instruction further requires each command to establish procedures to keep Navy decision makers informed of the requirements, the current conditions of natural resources, and status of natural resources stewardship objectives contained within this INRMP (DoN 2011).

Specific objectives and strategies were developed to meet the goal of ensuring JRM sites can sustain the mission while protecting natural resources. In addition, a series of strategies for implementation are presented following the objective for each item. A summary of the management strategies and the estimated timeframe for completion is presented in **Appendix C.**

Some of the strategies described in this section will be accomplished through interactive partnerships with other Federal, territory, and local organizations. Natural resources staff at JRM sites will initiate partnerships based on the benefits to the regional ecosystem and the local environment.

3.4.1 Integrating Military Mission and Sustainable Land Use Decisions

The mission of JRM is to provide direct day-to-day operation of installation support functions and to ensure that the installation serves the fleet and tenant commands by providing the highest level of installation operating support and quality of life services for all operating forces and shore activities on JRM.

JRM does anticipate changes in land use and development based on the planned translocation of troops from Japan to Guam; however, JRM is well-positioned to implement and demonstrate environmentally sound land use planning and development through its land planning and NEPA processes, interdepartmental coordination, adherence to DoN guidance and regulations, and timely review and revision of installation site development plans. Development that does occur will be generic and flexible to preserve the natural environment of JRM. In addition, DoN policy requires that all military construction projects meet a silver rating under the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) 2.0 Green Building Rating System (U.S. Navy 2006).

Management Strategy

Objective: Sustain natural resources and the JRM mission by enabling innovation in planning, design, project management, and implementation for development projects affecting the built environment.

Strategies:

1. Ensure JRM leadership has visibility with respect to the total cost of mission sustainment, day-to-day operations, infrastructure and building development, and redevelopment. This should incorporate climate-change scenarios and the projected value of the loss of habitat associated with all actions. Natural resources asset evaluation is needed to implement business decisions that affect resource capability (e.g., value of permitted air emissions, water quality permits, water resources availability). This is completed by identifying those natural resources assets that sustain the mission, and assessing their condition, quality, capacity, and value.
2. Use a NEPA and site-approval process early in the project planning phase that includes water, air quality, engineering, and natural resources professionals.
    a. Improve the integration of JRM site natural resources professionals into sustainability planning through the NEPA and site-approval processes. Facilitate early and advance project review for storm water management, landscaping, shoreline, and in-water structures.
    b. Improve the integration of JRM site natural resources professionals into sustainability planning.
3. Apply sustainability principles to the management of habitats, species, and ecological functions on JRM by identifying resource-specific best practices similar to what has been done for energy and water in the human environment using LEED and LID approaches.
    a. Continue to comply with EO 13123 which tasks Federal agencies with defining principles for implementing sustainable development in construction. Promote sustainable land use through avoiding the use of undeveloped land, open space, water and soil conservation areas, existing natural ecosystems, endangered species habitats, and floodplains (NAVFACINST 11010.45).

b. Implement LID practices for protecting water quality.

c. Minimize effects on habitats, species, and ecological functions in land use planning, and construction projects to the fullest extent possible.

4. Use metrics (indicators) of sustainability that integrate environmental stewardship, mission accomplishment, social responsibility, and economic prosperity.

a. Define and adopt standards, rating systems, and metrics.

b. Collaborate with tenants to develop an integrated, measurable, installation-wide sustainability effort.

c. Incorporate metrics and standards of success meaningful to JRM.

5. Develop sustainability indicators and BMPs, to be incorporated into the JRM planning process. Monitor effectiveness of BMPs and revise as necessary.

6. Conduct training in sustainable design criteria in the Navy for engineers, construction and design specialists, water quality specialists, and biologists. This could be Web-based training.

7. Foster socially and environmentally responsible behavior through communication. Establish and promote submission for existing sustainability leadership awards for excellence in environmental, transportation, and energy management.

3.4.2 Natural Resources Military Mission Constraints

Proper management of natural resources on JRM sites, including maintaining or improving ecological conditions and capability of natural landscapes has numerous effects, including an increased ability to support military training and readiness; an improvement in the quality of life of military personnel and their families; a streamlining of the compliance process and a reduction in conflicts; and a reduction in littering, pollution, and poaching of wildlife and vegetation by limiting access (Keystone Center 1996).

Maintaining compliance with the numerous laws, policies, and regulations that provide protection of environmental elements and guidance for management of natural and cultural resources could affect the military mission. Some of these laws include the ESA, CWA, and the National Historic Preservation Act (NHPA). Effects include limitation of access to, or restriction of, certain activities in some areas. Natural resources management can temporarily preclude use of areas to prevent damage to soils and wildlife during periods required for vegetation recovery or during breeding seasons. Military training and nonmilitary use is prohibited in restricted areas to preclude damage to important cultural and natural resources. Without management of natural resources, military use could degrade the land and decrease the ability of the land to support the training mission of the installation.

Management Strategy

Objective: Achieve no net loss of military value by aligning current and future land and water use (location, extent, timing, and intensity) with environmental value protection into the future, while minimizing the cost of environmental conflict resolution and mitigation.

Strategies:

1. Maintain and enhance existing land uses to support the mission through coordination with all JRM Navy and Air Force stakeholders.

2. Locate new facilities within existing facility footprints or other previously disturbed areas to the extent practicable.

3. Conduct appropriate environmental surveys on any proposed new land use within an undeveloped area to identify sensitive natural and cultural resources, environmental resources, and installation restoration program (IRP) hazardous waste cleanups.
4. Ensure compliance with statutes and regulations to protect sensitive natural and cultural resources, to maintain environmental quality, and to exercise responsible stewardship of public lands.
5. Maintain and enhance coordination and cooperation with neighboring communities, agencies, and organizations to ensure compatibility of natural resources uses with the mission.
6. Provide reasonable accommodation of compatible nonmilitary land use to the extent practicable.
7. Maintain healthy and intact habitats using principles of ecosystem management and sustainability to balance short-term projects with long-term goals.
8. Address long-term threats to the stability of the natural environment including soil erosion, invasive exotic species, climate change, sea level rise, and habitat fragmentation.
9. Continue to use NEPA documentation, including cumulative effects analysis, to guide specific projects and document choices.
10. Ensure the CO and Wing Commander are prepared to answer, as part of the INRMP metrics review, the following questions:
    a. Does the natural resources team consult with facility personnel when making changes to the INRMP in order to keep it current?
    b. To what level do natural resources compliance requirements support the installation's ability to sustain the operational mission?
    c. Has there been a net loss of training lands?

3.5 Natural Resources Consultation Requirements

A number of Federal laws, including the ESA, MBTA, MSFMCA, and CWA, require consultation with a designated Federal regulatory agency such as USFWS, NMFS, or the USACE if a Federal action has the potential to impact a regulated resource adversely.

Endangered Species Act: Federal agencies are required by the ESA to manage federally listed threatened and endangered species and their habitat in a manner that promotes conservation of threatened and endangered species and is consistent with species recovery plans. Section 7 of the ESA requires all Federal agencies to enter into consultation with the USFWS or NMFS whenever proposed actions might affect listed threatened, endangered, and proposed species of plants and animals. At JRM sites, proposed projects, operations, or other actions are scrutinized for potential impacts on threatened and endangered species through a formal review process. Section 7 consultations will be initiated if warranted; otherwise, written documentation that there are no effects on threatened and endangered species will be generated by the natural resources manager and kept with the project files. The natural resources manager will use the installation's INRMP as a tool to identify at an early stage the potential impacts of planned Navy actions on endangered or threatened species and provide a basis for altering the action to prevent or minimize those impacts. Federally listed threatened and endangered species known to occur on Guam are listed in **Appendix E**.

DOD Policy on Endangered Species Act Consultation: INRMPs should incorporate, by reference, the results of an installation's previous species-by-species ESA consultations, including any reasonable and prudent measures that might have been identified in an incidental take statement. Neither a separate

biological assessment nor a separate formal consultation should be necessary concerning most INRMPs or INRMP revisions. Nonetheless, because the INRMP might include management strategies or other actions designed to balance the potentially competing needs of multiple species, listed or not, it might be prudent to engage in informal consultation with USFWS during the INRMP revision process to confirm that these proposed actions will not affect listed species or designated critical habitat. If the INRMP does include management strategies or other actions that could affect listed species or designated critical habitat and these actions have not been the subject of previous consultations, then Section 7 consultation on these actions will be necessary before the actions may be implemented.

USFWS or NMFS (or both) could require changes or minimization measures that could result in delays and additional costs. Because of this, it is imperative that the installation initiate early preconsultation with USFWS and NMFS, and environmental/natural resources review of proposed actions in order to assess risks, develop alternatives, and correctly identify minimization measures both in terms of time and dollars.

Clean Water Act: Under Section 404 of the CWA, discharge of dredge and fill material into waters of the United States, including wetlands, is prohibited unless a permit is issued by the USACE. Military construction (MILCON) and other activities with the potential to disturb wetlands must be reviewed individually with respect to wetland impacts, and Federal permits sought as needed.

Migratory Bird Treaty Act: The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. An exemption to the MBTA that allows incidental take of migratory birds by DOD during military readiness activities was finalized in February 2007 (Federal Register [FR] Vol. 72, No. 39). As directed by Section 315 of the 2003 National Defense Authorization Act, this rule authorizes such take, with limitations, that result from military readiness activities. If DOD determines that a proposed or an ongoing military readiness activity might result in a significant adverse effect on a population of a migratory bird species, they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects.

Magnuson-Stevens Fishery Conservation and Management Act: The MSFCMA sets mandates for NMFS, regional fishery management councils, and Federal action agencies to identify and protect important marine and anadromous fish habitat. The councils, with assistance from NMFS, are required to delineate Essential Fish Habitat (EFH) in fishery management plans or fishery management plan amendments for all managed species. Authority to implement the MSFCMA is given to the Secretary of Commerce through the NMFS. The MSFCMA requires that the EFH be identified and described for each federally managed species,

The MSFCMA requires Federal agencies to consult with NMFS on activities that could adversely affect EFH or when NMFS independently learns of a Federal activity that could adversely affect EFH. The MSFCMA defines an adverse effect as "any impact which reduces quality and/or quantity of EFH [and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810).

3.6 NEPA Compliance

The Council on Environmental Quality (CEQ) defines an INRMP as a major Federal action requiring NEPA analysis. As a result, the Navy Office of General Counsel has determined that SAIA requirements for INRMP implementation necessitate the preparation of NEPA documentation prior to INRMP

approval. It is expected that annual updates and revisions would be covered under the original NEPA documentation unless there has been a major change in installation mission or program scope.

An EA has been developed in association with this INRMP to comply with CEQ and NEPA. The EA evaluated the INRMP to ensure that there will be no negative environmental or social consequences for implementing the plan and its associated management projects. The full EA can be found in **Appendix S**.

3.7 Beneficial Partnerships and Collaborative Resource Planning

Collaborative partnerships are not only important for effective ecosystem-level management, but they also promote the sharing of personnel, data, and other resources among agencies/stakeholders, which can expedite project implementation and progress, and reduce overall costs for JRM.

JRM collaborates with USFWS, NMFS, the U.S. Geological Survey (USGS), U.S. Department of Agriculture (USDA), U.S. Army Corps of Engineers (USACE), GDAWR, GEPA, Guam Department of Parks and Recreation (GDPR), CNMI DLNR, and the University of Guam (UOG) for management, conservation, and preservation of all natural resources on JRM lands. These relationships are critical for achieving the goals set forth in this INRMP, sharing resources and data, and developing ecosystem-level management practices that are not bound by political or property boundaries.

OPNAVINST 5090.1C CH-1 states that "the Sikes Act requires preparation of INRMPs in cooperation with the USFWS and the appropriate State Fish and Wildlife Agency. The SAIA requires that the INRMPs reflect mutual agreement of the parties concerning the conservation, protection, and management of covered fish and wildlife resources. A memorandum of understanding (MOU) between installation, USFWS, and State may serve to address the responsibilities, expectations, and commitments of the various partners." This directive gives JRM the opportunity to use other resources for the development and implementation of the INRMP. An important resource or partner on Guam is GDAWR, which has the staff and expertise to assist JRM with implementing natural resources management projects. Currently, GDAWR only accesses Andersen AFB to assist Conservation Resources staff in collaborative management of the island's natural resources which occur on installation property. A memorandum of agreement (MOA) should be considered between JRM and GDAWR to allow access to JRM lands and expand GDAWR's role in the overall management of resources where compatible and consistent with JRM security and mission requirements.

3.7.1 Other Department of Defense Organizations and Programs

3.7.1.1 Partners in Flight

It is DOD policy to promote and support the Partners in Flight (PIF) initiative that protects and conserves resident and migratory birds and their habitats. The DOD and its components support PIF by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems on their lands, consistent with military missions. PIF includes national working groups to deal with local and regional problems.

3.7.1.2 Department of Defense Legacy Resources Management Program

Congress instituted the DOD Legacy Resources Management Program in 1991 to promote stewardship of natural and cultural resources on DOD lands. The intent of the program is to fund natural and cultural resources management projects that would go unfunded through normal funding procedures. Legacy projects typically

demonstrate innovative techniques for management, conservation, and preservation of natural and cultural resources. Legacy funds may be requested annually in accordance with instructions provided by the DUSD(I&E) and CNO.

3.7.1.3 U.S. Army Corps of Engineers

The USACE provides contract management, construction management, and technical support. DOD has the option to use USACE contracts as vehicles for natural resources management and to access USACE organizations, such as the U.S. Army Engineer Research and Development Center, for technical assistance and support for natural resources projects.

In addition, the USACE has regulatory authority over waters of the United States, which include activities within perennial and intermittent streams and wetlands. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill materials into the waters of the United States, including wetlands. Therefore, even an inadvertent encroachment into wetlands or other waters of the United States resulting in displacement or movement of soil or fill materials has the potential to be viewed as a violation of the CWA if an appropriate permit has not been issued by the USACE.

3.7.1.4 Armed Forces Pest Management Board

The Armed Forces Pest Management Board (AFPMB) recommends policy, provides guidance, and coordinates the exchange of information on all matters related to pest management throughout the DOD. The AFPMB's mission is to ensure that environmentally sound and effective programs are present to prevent pests and disease vectors from adversely affecting DOD operations. The AFPMB Natural Resources Committee provides guidance on integrating pest management and natural resources management programs including the following:

1. Addressing wildlife damage management and pest management requirements in aquatic, riparian, and wetland environments.
2. Identifying conflicts between threatened and endangered species and pest management actions.
3. Integrating pest management considerations with natural resources program responsibilities regarding vegetation management, forest insect and disease damage, and pest damage to ornamentals.
4. Coordinating approval and use of pesticides for vegetation management and other natural resources programs.
5. Initiating or reviewing research regarding natural resources pest management requirements/ considerations.

3.7.1.5 U.S. Coast Guard

The U.S. Coast Guard (USCG) patrols waters off of Guam and enforces Federal maritime laws and fishery laws of Guam.

3.7.2 Other Federal Agencies and Programs

3.7.2.1 U.S. Environmental Protection Agency

The USEPA leads the nation's environmental science, research, education, and assessment efforts. Its activities include developing and enforcing environmental regulations; providing financial assistance to state and territory environmental programs, non-profits, and educational institutions; performing environmental research at laboratories nationwide; sponsoring voluntary partnerships and programs; and providing environmental education (USEPA 2011). The USEPA also provides guidance for managing wetlands and IRP sites.

3.7.2.2 Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) has several natural resources conservation programs that could assist JRM in managing resources including conserving soils, improving water quality, increasing wildlife habitat, and reducing damage resulting from floods or other natural disasters (NRCS 2011).

3.7.2.3 U.S. Department of Agriculture – Wildlife Services

The mission of USDA-Wildlife Services (WS) is "to provide Federal leadership in managing problems caused by wildlife... [by] helping to solve problems that occur when human activity and wildlife are in conflict with one another" (USDA-WS 2011). The USDA-WS can be contracted by JRM to monitor nuisance wildlife, and provide nuisance and nonnative fauna control. USDA-WS is currently funded by JRM to conduct brown treesnake control and interdiction work on Andersen AFB and NBG.

3.7.2.4 U.S. Geological Survey

The USGS is a multi-disciplinary organization that provides scientific information on biology, geography, geology, geospatial information, and water, to minimize damage from natural disasters; and manage the nation's water, biological, energy, and mineral resources. The USGS could assist JRM by helping design biological, water quality, and hydrologic surveys, and facilitating the integration of JRM data into national or regional databases. The USGS Brown Treesnake Project has been conducting research pertaining to treesnake population dynamics and life history on Andersen AFB for more than 10 years. In addition, the USGS has also researched and developed brown treesnake barrier technology that has been used on Andersen AFB.

3.7.2.5 U.S. Department of Agriculture Animal and Plant Health Inspection Service

The mission of the USDA Animal and Plant Health Inspection Service (APHIS) is to protect the health and value of agriculture and natural resources (APHIS 2011). APHIS is "a multi-faceted Agency with a broad mission area that includes protecting and promoting U.S. agricultural health, regulating genetically engineered organisms, administering the Animal Welfare Act and carrying out wildlife damage management activities. These efforts support the overall mission of USDA, which is to protect and promote food, agriculture, natural resources and related issues" (APHIS 2011).

3.7.3 Territory Agencies

3.7.3.1 Guam Bureau of Statistics and Plans

The Guam Bureau of Statistics and Plans serves as the territorial clearinghouse and is the lead agency for the Coastal Zone Management Program. The Bureau has a component of terrestrial lands (uplands) within its program to promote a watershed approach to maintaining healthy submerged lands.

3.7.3.2 Guam Environmental Protection Agency

The GEPA is an agency of the GovGuam established to protect human health and the environment by regulating industries and public utilities and enforcing the environmental laws of the territory. GEPA ensures that territorial environmental standards are met for IRP projects on JRM sites.

3.7.3.3 Guam Department of Parks and Recreation

The GDPR provides technical guidance on outdoor recreation programs at Andersen AFB under provisions of a Cooperative Agreement executed with the USAF. The State Historic Preservation Officer within the GDPR reviews all Federal actions that might affect listed or potential historic or archaeological sites for compliance with the NHPA on JRM sites.

3.7.3.4 Guam Department of Agriculture Division of Forestry and Soil Resources

The Guam Department of Agriculture Division of Forestry and Soil Resources mission is to conserve, protect, and enhance Guam's vegetative environment and sustain the natural resources which are dependent on healthy forests. The department is responsible for protecting and restoring forest ecosystems on Guam.

3.7.3.5 Guam Department of Agriculture Division of Aquatic and Wildlife Resources

The Guam Department of Agriculture Division of Aquatic and Wildlife Resources is the equivalent of a State Fish and Game Agency. The mission of the Fisheries Section of the Division of Aquatic & Wildlife Resources is to restore, conserve, manage, and enhance the aquatic resources in and about Guam and to provide for the public use of and benefits from these resources. The mission of the Wildlife section is to manage Guam's wildlife resources for the benefit of present and future generations with the vision to recover endangered animal and plant species, manage sustainable populations of games species, and promote public awareness of natural resources.

3.7.4 University of Guam

The staff, faculty, and students of the UOG conduct research at JRM sites and are available for consultation on natural resources concerns including conducting wildlife and botanical studies and developing species monitoring plans. Some of the projects that UOG has conducted in conjunction with JRM staff include baseline surveys of the nearshore marine environment at the Andersen AFB Marine Resources Preserve, the *Serianthes nelsonii* Tree Recovery Project, field and nursery studies relating to native plant ecology and propagation, monitoring hydrology and soil erosion on NBG, marine monitoring at OPERA and HERA, surveys of endangered tree snails on JRM lands, and monitoring of the HERA.

3.7.5 Contractors

Contractors may be hired to perform specialized management projects or provide technical knowledge about natural resources management. Contractors must adhere to the requirements and management strategies detailed in the INRMP. Examples of contractor support for implementation of natural resources management goals include:

- Endangered species surveys
- Invasive species surveys
- Soil surveys
- Wetland delineations.

3.7.6 Volunteers

OPNAVINST 5090.1C CH-1 states that commands shall interact with the surrounding community to develop positive and productive community involvement, participation, and educational opportunities; and use volunteers under the supervision of professionally training natural resources personnel, when feasible. Through support from volunteers, JRM is able to educate the public on the natural resources programs conducted at JRM sites, demonstrate environmental stewardship of natural resources, and develop and maintain partnerships with the local community.

An example of volunteer work that supports JRM natural resources management includes activities conducted by Haggan Watch, which is an organization that collects data on Guam's sea turtles. Members of the organization walk along the coasts of Guam to record data on endangered and threatened species of sea turtles.

3.7.7 The Nature Conservancy

The Nature Conservancy (TNC) and DOD signed a cooperative agreement in 1988. This agreement allows installation commanders to obtain technical assistance from TNC and to participate in programs and projects of mutual interest. It also permits TNC to study significant ecosystems under DOD's control. Natural resources staff at JRM sites can benefit from this agreement through use of TNC resources and staff to manage natural resources on the installation.

3.8 Public Access

Although provision of public access is addressed in the SAIA, security concerns in the aftermath of September 11, 2001, have greatly restricted public access on DOD facilities. However, the submerged lands near NBG Main Base (with minor exceptions in Apra Harbor) are accessible to the public.

3.9 Encroachment Partnering

Encroachment is defined in the OPNAVINST 11010.40 as "Any non-Navy or Navy action planned or executed in the vicinity of a naval activity or operational area which inhibits, curtails, or possesses the potential to impede the performance of the mission of the naval activity." OPNAVINST 11010.40 provides details for development of Encroachment Action Plans, which identify, quantify, and provide mitigation strategies for the potential encroachment threats to an installation. These plans delineate short-, mid-, and long-term strategies to address encroachment threats at an installation. Encroachment partnering with allowable entities will help accomplish DOD's goal of preservation and sustainment of conditions that are compatible with the mission and that achieve operational assurance.