

Guam Submerged Lands Management Plan

U.S. Navy Region Marianas

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ACRONYMS AND ABBREVIATIONS

AAFB	Andersen Air Force Base
AAV	Assault Amphibian Vehicle
amsl	Above Mean Sea Level
AOR	Area of Responsibility
CCP	Comprehensive Conservation Plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLZ	Craft Landing Zone
COMNAVMARIANAS	Commander, US Naval Forces, Marianas
COMNAVREG MARIANAS	Commander, Navy Region Marianas
COPC	Chemicals of Potential Concern
CRRC	Combat Rubber Raiding Craft
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DOD	Department of Defense
DON	Department of the Navy
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMAP	Environmental Monitoring and Assessment Program
EO	Executive Order
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERAs	Ecological Reserve Areas
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
FCMA	Fishery Conservation and Management Act
FISC	Fleet Industrial Supply Center
FMCs	Federal Maritime Commission
FMP	Fishery Management Plan
ft	feet
FWPCA	Federal Water Pollution Control Act
GCA	Guam Code Annotated
GCMP	Guam Coastal Management Plan
GDAWR	Guam Division of Aquatic and Wildlife Resources
GNWR	Guam National Wildlife Refuge
GUARNG	Guam Army National Guard
GWA	Guam Waterworks Authority
HAPC	Habitat Areas of Particular Concern
HERA	Haputo Ecological Reserve Area
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
KD	known distance
LCACs	Landing Craft, Air Cushion

LCUs	Landing Craft, Utility
m	meters
MCM	mine countermeasures
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MPAs	Marine Protected Areas
MPPRCA	Marine Plastic Pollution Research and Control Act
MPRSA	Marine Protection, Research, and Sanctuaries Act
MRP	Marine Resources Preserve
MSA	Magnuson-Stevens Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MWR	Morale Welfare and Recreation
NAVFAC PAC	Naval Facilities Engineering Command, Pacific
NCCOS	National Centers for Coastal Ocean Science
NCTS	Naval Computer and Telecommunications Station
NEPA	National Environmental Policies Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRFCC	National Recreational Fisheries Coordination Council
NSWU	Naval Special Warfare Unit
NT	No Training
NWD	No Wildlife Disturbance
OERA	Orote Ecological Reserve Area
OPA	Oil Pollution Act
PACDIV	Pacific Division
PACOM	U.S. Pacific Command
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PIFSC	Pacific Islands Fishery Science Center
RFRCP	Recreational Fishery Resources Conservation Plan
RHIB	Rigid Hull, Inflatable Boat
SCUBA	Self Contained Underwater Breathing Apparatus
SDZ	Surface Danger Zone
SFA	Sustainable Fisheries Act
SLMP	Submerged Lands Management Plan
SOI	Secretary of the Interior
SSGN	Guided Missile Submarine
U.S.	United States of America
U.S.C.	United States Code
UOGML	University of Guam Marine Laboratory
US EPA	United States Environmental Protection Agency
USACOE	United States Army Corps of Engineers
USAF	United States Air Force
USDA	United States Department of Agriculture

USFWS	United States Fish and Wildlife Service
USN	United States Navy
UXO	Unexploded Ordnance
WPRFMC	Western Pacific Regional Fishery Management Council
WWTP	Wastewater Treatment Plant
TRUE	Training in an Urban Environment

1 INTRODUCTION

1.1 PURPOSE OF THE SLMP

The Department of the Navy is committed to demonstrating environmental stewardship while executing its national defense mission. More specifically, the Navy's mission includes pollution prevention, environmental protection, and protection of natural, historic and cultural resources.

The purpose of this Submerged Lands Management Plan (SLMP) is to assist Navy Region Marianas in the evaluation of future actions by identifying where adjustments to training exercises, operations or construction should be considered to mitigate potential impacts to natural and cultural resources within submerged lands under the Navy's jurisdiction.

1.2 SLMP PREPARATION METHODOLOGY

Preparation methodology involved 1) summarizing relevant literature about Navy submerged lands around Guam that was recently collected for a NAVFAC Pacific literature review of natural resources of Guam and certain Northern Mariana islands (NAVFAC Pacific 2006), 2) distributing a questionnaire to all major stakeholders about their current and planned management regulations, plans and programs, 3) following up the questionnaire with personal interviews, and 4) circulating the draft document for review and comment.

1.3 RELATIONSHIP TO THE COMNAVMARIANAS INRMP

The SLMP complements and extends the Navy's integrated natural resources management plan (INRMP) to include the Navy's submerged lands around Guam. It is intended that the SLMP be an appendix to the INRMP, a revision of which will begin in 2007.

1.4 NAVY REGION MARIANAS MISSION AND RESPONSIBILITIES

The primary mission of the U.S. Navy is to protect the United States by the effective prosecution of war at sea; to support, as required, the forces of military departments of the U.S.; and to maintain freedom of the seas. The U.S. military presence in Guam reinforces the strategic importance of highly developed military facilities for forward defense and power projection in the Western Pacific/Indian Ocean area (PACDIV 1995).

Although the primary mission of the U.S. Navy remains static, the organization of the various U.S. Navy commands is dynamic allowing for changing operations requirements. The U.S. Pacific Command is responsible for approximately 105 million square miles, and extends from California to Diego Garcia in the Indian Ocean. In support of the overall U.S. Navy mission, Navy Region Marianas' mission is:

To provide executive oversight of waterfront operations, ordnance and other logistic support to fleet units and operational forces of the FIFTH and SEVENTH Fleets; to provide policy support and services to shore activities and personnel of

other naval facilities and their tenant commands in Guam; to act as the interface between the Navy and civilian community, and to perform such other functions and tasks as be assigned by higher authority.

Navy Region Marianas' mission is primarily accomplished by (1) storage and delivery of fuel for U.S. Navy ships, which are either based or transit through Guam; (2) storage and delivery of U.S. military ordnance; (3) transmitting and receiving Department of Defense communications, and (4) providing a realistic environmental setting to conduct U.S. military near-shore and land-based training.

The U.S. Navy owns approximately 18,000 acres of federal property on Guam and significant acreage of submerged lands. As the primary U.S. Navy property owner, Navy Region Marianas is the trustee for a diverse range of natural resources, which include Federally-listed threatened and endangered species, high quality water resources, migratory bird habitat, and productive coral reefs and estuarine habitats.

During the accomplishment of Navy Region Marianas' mission, the U.S. Navy is responsible for protecting and, where feasible, improving the natural ecosystem's structure and function to meet the requirements of federal laws and regulations.

2 NAVY SUBMERGED LANDS AROUND GUAM

2.1 JURISDICTION

In 2005, NAVFAC Pacific completed a literature review of Navy submerged lands on Guam (NAVFAC Pacific 2005a). That report summarized the legal basis for and geographical extent of Navy submerged lands around Guam. The description in this section is taken from that report. Figure 2-1 shows Navy submerged lands around Guam.

Public Law 93-435(b)(ii), effective 5 October 1974, authorizes the Navy to retain title to submerged lands adjacent to property owned by the United States above the line of mean high tide.

Presidential Proclamation 4347, effective 1 February 1975, authorizes the Navy to retain title to submerged lands within inner and outer Apra Harbor and submerged lands adjacent to several other uplands areas as follows:

“unsurveyed land, Municipality of Machanao, Guam, as delineated on Commander Naval Forces, Marianas Y & D Drawing Numbered 597–464, lying between the seaward boundaries of Lots Numbered 9992 through 9997 and the mean high tide, containing an undetermined area of land, (b) unsurveyed land, Municipality of Machanao, Guam, as delineated on Commander Naval Forces, Marianas Y & D Drawing Numbered 597–464, lying between the seaward boundary of Lot Numbered 10080 and the line of mean high tide, containing an undetermined amount of land, and (c) Lot Numbered PO 4.1 in the Municipality of Machanao, Guam, as delineated on Y & D Drawing Numbered 597–464, more particularly described as surveyed land bordered on the north by Lot Numbered 10080, Machanao, east by Northwest Air Force Base, south by U. S. Naval Communication Station (Finegayan) and west by the sea containing a computed area of 125.50 acres, more or less. All of the above lands within the territory of Guam shall be under the administrative jurisdiction of the Department of the Navy.”

The Navy’s submerged lands encompass approximately 67,500 acres (27,320 hectares) and are located adjacent to two general areas of Guam: near Ritidian Point (34,110 acres (13,800 hectares)) and near Apra Harbor (33,320 acres (13,490 hectares)). The Navy’s submerged lands comprise approximately 30 percent of the total submerged lands surrounding Guam, and account for approximately 32 percent of Guam’s coastline (46.1 miles (120 km)). The geographic extent encompasses submerged lands from the mean high tide line out to the three geographical mile limit, including estuary, near-shore and deepwater environments (>5,400 feet (1,650 meters) depths).

2.2 USES OF NAVY SUBMERGED LANDS

The primary uses of Navy submerged lands around Guam are vessel berthing and associated functions in Apra Harbor, military training, designated ecological reserve areas (ERAs), and recreation by both military and civilian personnel. More detail on Apra Harbor facilities and training uses of the various sections of Navy lands are given in Section 3.

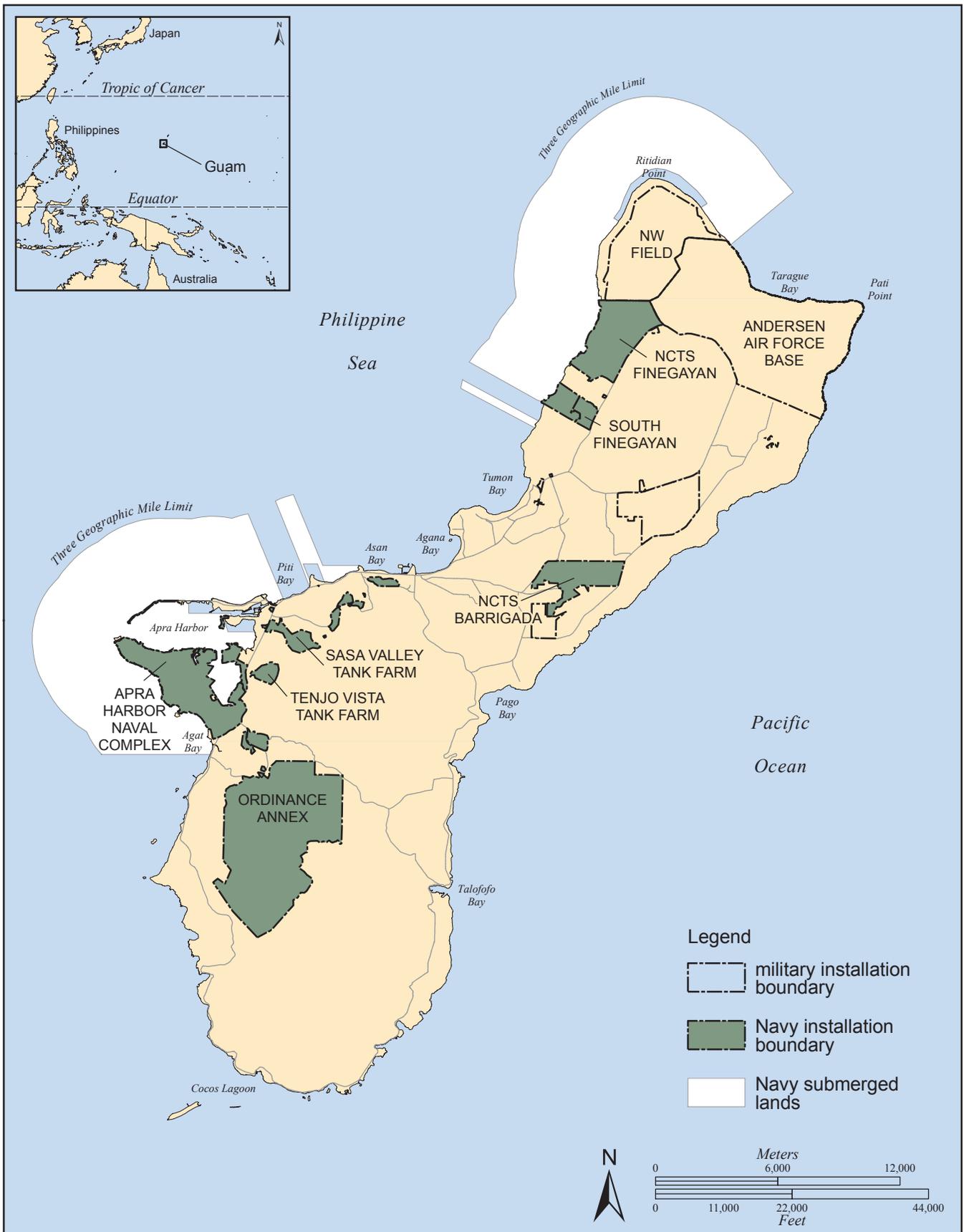


Figure 2-1
NAVY SUBMERGED LANDS ON GUAM

2.3 RELEVANT AUTHORITIES

2.3.1 Laws and Executive Orders

The primary laws and Executive Orders (EO) relevant to the management of natural and cultural resources on Navy submerged lands are described below. A more comprehensive list is included in Appendix A.

The primary environmental laws that govern Navy activities in the marine environment include the National Environmental Policy Act (NEPA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). In addition to these acts, there are several EOs that deal with resource conservation and management in ocean waters under U.S. jurisdiction. The following paragraphs describe these laws and EOs. The descriptions below are based on those provided in NAVFAC (2005).

Federal Resource Laws

- The **Sikes Act** of 1960 (16 U.S. Code [U.S.C.] §§ 670a et seq.) provides for cooperation by the Departments of the Interior and Defense with State agencies in planning, development, and maintenance of fish and wildlife resources on military reservations throughout the U.S. This is accomplished through the creation of integrated natural resources management plans (INRMP), which are long-term planning documents that provide recommendations on managing natural resources. As required by the **Sikes Act Improvement Act** of 1997, the INRMP must, to the extent appropriate and applicable, provide for: 1) fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation; 2) fish and wildlife habitat enhancement or modification; 3) wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants; 4) integration of, and consistency among, the various activities conducted under the plan; 5) establishment of specific natural resources management goals and objectives and time frames for proposed actions; 6) sustainable use by the public of natural resources to the extent that the use is not inconsistent with the needs of fish and wildlife resources; 7) public access to the military installation that is necessary or appropriate for the sustainable use of natural resources, subject to requirements necessary to ensure safety and military security; 8) enforcement of applicable natural resource laws (including regulations); 9) no net loss in the capability of the installation's lands to support the military mission of the installation; and 10) such other activities as the military has determined appropriate.
- The **National Environmental Policy Act (NEPA)** of 1969 (42 U.S.C. §§ 4321 et seq.) established national policies and goals for the protection of the environment. The NEPA aims to encourage harmony between people and the environment, to promote efforts to prevent or eliminate damage to the environment and the biosphere, and to enrich the understanding of ecological systems and natural resources important to the country. Thus, environmental factors must be given appropriate consideration in all decisions made by federal agencies. The NEPA is divided into two sections: Title I outlines a basic national charter for protection of the environment, while Title II establishes the Council on Environmental Quality (CEQ), which monitors the progress made towards achieving

the goals set forth in Section 101 of the NEPA. Other duties of the CEQ include advising the President on environmental issues and providing guidance to other federal agencies on compliance with the NEPA. Section 102(2) of the NEPA contains "action-forcing" provisions that ensure that federal agencies act according to the letter and the spirit of the law. These procedural requirements direct all federal agencies to give appropriate consideration to the environmental effects and cumulative impacts of their decision-making and to prepare detailed environmental statements on recommendations or reports on proposals for legislation and other major federal actions significantly affecting the quality of the environment. Proposed actions requiring federal compliance should be prepared in accordance with Section 102(2)(c) of the NEPA, the CEQ regulations on implementing NEPA procedures (40 Code of Federal Regulations [CFR] 1500-1508), and the Department of the Navy (DoN) regulations on implementing NEPA procedures (32 CFR 775).

- The **Marine Mammal Protection Act** (MMPA) of 1972 (16 U.S.C. §§ 1361 et seq.) established a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction. The MMPA defines taking as "harassing, hunting, capturing, killing, or attempting to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. 1312[13]). It also prohibits the importation into the U.S. of any marine mammal or parts or products thereof, unless it is for the purpose of scientific research or public display, as permitted by the Secretary of the Interior or the Secretary of Commerce. In the 1994 amendments to the MMPA, two levels of "harassment" were defined. Harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A), or any act that has the potential to disturb a marine mammal or marine mammal stock in the wild by disrupting behavioral patterns, including, but not limited to migration, breathing, nursing, breeding, feeding, or sheltering (Level B).

In 2003, the National Defense Authorization Act for fiscal year 2004 altered the MMPA's definition of Level A and B harassment in regards to military readiness and scientific research activities conducted by or on behalf of the Federal Government. Under these changes, Level A harassment was redefined as any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment was redefined as any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered. Section 101(a)(5)(A) of the MMPA directs the Secretary of Commerce, upon request, to authorize the unintentional taking of small numbers of marine mammals incidental to activities (other than commercial fishing) when, after notice and opportunity for public comment, the Secretary: (1) determines that total takes during a five-year (or less) period have a negligible impact on the affected species or stock, and (2) prescribes necessary regulations that detail methods of taking and monitoring and requirements for reporting. The MMPA provides that the moratorium on takes may be waived when the affected species or population stock is at its optimum sustainable population and will not be disadvantaged by the authorized takes (i.e., be reduced below its maximum net productivity level). Section 101(a)(5)(A) also specifies that the Secretary has the right to deny permission to take marine mammals if, after notice and opportunity for public comment, the Secretary finds: (1) that applicable regulations regarding taking,

monitoring, and reporting are not being followed, or (2) that takes are, or may be, having more than a negligible impact on the affected species or stock.

- The **Marine Protection, Research, and Sanctuaries Act** (MPRSA) (33 U.S.C. §§ 1401 et seq.), often referred to as the “Ocean Dumping Act,” was also enacted in 1972, two days after passage of the MMPA. The MPRSA regulates the dumping of toxic materials beyond U.S. territorial waters and provides guidelines for the designation and regulation of marine sanctuaries. MPRSA Titles I and II prohibit persons or vessels subject to U.S. jurisdiction from transporting any material out of the U.S. for the purpose of dumping it into ocean waters without a permit. The term “dumping,” however, does not include the intentional placement of devices in ocean waters or on the sea bottom when the placement occurs pursuant to an authorized federal or state program.
- The **Coastal Zone Management Act** (CZMA) of 1972 (16 U.S.C. §§ 1451 et seq.) established a voluntary national program through which U.S. states and territories can develop and implement coastal zone management plans (USFWS 2003a). The National Oceanic and Atmospheric Administration (NOAA), under the Secretary of Commerce, administers this act. States and territories use coastal zone management plans “to manage and balance competing uses of and impacts to any coastal use or resource” (NOAA 2000). Currently, there are 34 U.S. states and territories with federally approved coastal zone management plans. Guam also has a federally approved coastal zone management plan. The CZMA also instituted a Federal Consistency requirement, which provides Federal agencies with restrictions concerning their behavior in relation to state and territory managed coastal zones. Federal agency actions that affect any land or water use or natural resource of the coastal zone (e.g., military operations, outer continental shelf lease sales, dredging projects) must be “consistent to the maximum extent practicable” with the enforceable policies of a state or territory’s coastal management program (Coastal Zone Act Reauthorization Amendments of 1990). The Federal Consistency requirement was enacted as a mechanism to address coastal effects, to ensure adequate Federal consideration of state and territory coastal management programs, and to avoid conflicts between states/territories and Federal agencies by fostering early consultation and coordination (NOAA 2000). Within each state or territory coastal zone management plan is a list of the Federal agency activities for which Consistency Determinations must be prepared. Under certain circumstances, the President is authorized to exempt specific activities from the Federal Consistency requirement if they determine that the activities are in the paramount interest of the U.S.
- The **Endangered Species Act** (ESA) of 1973 (16 U.S.C. §§ 1531 et seq.) established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. An “endangered” species is a species that is in danger of extinction throughout all or a significant portion of its range, while a “threatened” species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. All federal agencies are required to implement protection programs for threatened and endangered species and to use their authority to further the purposes of the ESA. The NOAA Fisheries (National Marine Fisheries Service [NMFS]) and U.S. Fish and Wildlife Service (USFWS) jointly administer the ESA and are also responsible for the listing (i.e., the labeling of a species as either threatened or endangered) of all “candidate” species. A “candidate” species is one that is the subject of either a petition to list or status review, and for which the NMFS or USFWS has determined that listing may be or is warranted (NMFS 2004). The NMFS

is further charged with the listing of all "species of concern" that fall under its jurisdiction. A "species of concern" is one about which the NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA (NMFS 2004). A species may be a candidate for listing as a threatened or endangered species due to any of the following five factors: (1) current/imminent destruction, modification, or curtailment of its habitat or range; (2) overuse of the species for commercial, recreational, scientific, or educational purposes; (3) high levels of disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-induced factors affecting its continued existence. The major responsibilities of the USFWS and NMFS under the ESA include: (1) the identification of threatened and endangered species; (2) the identification of critical habitats for these species; (3) the implementation of research programs and recovery plans for these species; and (4) the consultation with other federal agencies concerning measures to avoid, minimize, or mitigate the impacts of their activities on these species (Section 7 of the ESA). Further duties of the USFWS and NMFS include regulating "takes" of listed species on public or private land and granting incidental take permits to agencies that may unintentionally "take" listed species during their activities. The ESA allows the designation of geographic areas as critical habitat for threatened or endangered species. The physical and biological features essential to the conservation of a threatened or endangered species are included in the habitat designation. Designation of critical habitat affects only federal agency actions and federally funded or permitted activities.

- The **Fishery Conservation and Management Act (FCMA)** (also called the Magnuson Act) of 1976 (16 U.S.C. §§ 1801 et seq.), later renamed the **Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)** or simply the **Magnuson-Stevens Act (MSA)**, is the principal law governing marine fisheries in the United States. It was originally adopted to extend control of U.S. waters to 200 nautical miles in the ocean; to phase out foreign fishing activities within this zone; to prevent overfishing, especially by foreign fleets; to allow overfished stocks to recover; and to conserve and manage fishery resources. It has since been amended several times, most recently in 2006. Among other things, the Act establishes and defines the role and operating procedures of regional fishery management councils. The Act includes national standards for fishery management and outlines the contents of fishery management plans. In addition, it gives the Secretary of Commerce power to review, approve, and implement fishery management plans and other recommendations developed by the councils. The National Marine Fisheries Service (under the Department of Commerce) is charged with stewardship of the nation's living marine resources. With input from the regional fishery councils and stakeholder groups, NMFS provides guidance for applying the National Standards of the Act.

In 1996, Congress passed the **Sustainable Fisheries Act (SFA)**, which revised the Magnuson Act and reauthorized it through 1999. This revision brought new requirements to prevent overfishing and rebuild overfished fisheries. The law now required that each fishery management plan (FMP) specify objective and measurable criteria for determining when a stock is overfished or when overfishing is occurring, and to establish measures for rebuilding the stock. The SFA also added several new definitions, including definitions for "overfishing" and "overfished," and for fishing communities. The SFA also added three new National Standards to address fishing vessel safety, fishing communities, and bycatch. Several existing standards were revised. The SFA provides a

new habitat conservation tool in the form of the Essential Fish Habitat (EFH) mandate. The EFH mandate requires that the regional FMCs, through federal Fishery Management Plans (FMPs), describe and identify EFH for each federally managed species, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitats. Congress defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802[10]). The term “fish” is defined in the SFA as “finfish, mollusks, crustaceans, and all other forms of marine animals and plant life other than marine mammals and birds.” The regulations for implementing EFH clarify that “waters” include all aquatic areas and their biological, chemical, and physical properties, while “substrate” includes the associated biological communities that make these areas suitable fish habitats (50 CFR 600.10). Habitats used at any time during a species’ life cycle (i.e., during at least one of its life stages) must be accounted for when describing and identifying EFH (NMFS 2002).

Authority to implement the SFA is given to the Secretary of Commerce through the NMFS. The SFA requires that the EFH be identified and described for each federally managed species. The identification must include descriptive information on the geographic range of the EFH for all life stages, along with maps of the EFH for life stages over appropriate time and space scales. Habitat requirements must also be identified, described, and mapped for all life stages of each species. The NMFS and regional FMCs determine the species distributions by life stage and characterize associated habitats, including HAPC.

The SFA requires federal agencies to consult with the NMFS on activities that may adversely affect EFH. For actions that affect a threatened or endangered species, its critical habitat, and its EFH, federal agencies must initiate both ESA and EFH consultations. In 2002, the EFH Final Rule was authorized, which simplified EFH regulations (NMFS 2002). Significant changes delineated in the EFH Final Rule are: (1) clearer standards for identifying and describing EFH, including the inclusion of the geographic boundaries and a map of the EFH, as well as guidance for the FMCs to distinguish EFH from other habitats; (2) more guidance for the FMCs on evaluating the impact of fishing activities on EFH and clearer standards for deciding when FMCs should act to minimize the adverse impacts; and (3) clarification and reinforcement of the EFH consultation procedures (NMFS 2002). The process by which federal agencies can integrate MSFCMA EFH consultations with ESA Section 7 consultations is described in NMFS (2002).

In late 2006, Congress revised and reauthorized the Act again. This revision (called the **Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006**) did not add any National Standards, but made a number of changes related to establishment of annual catch limits, function of the Scientific and Statistical Committee of each council, integration of the environmental review process done for fishery management plans and amendments with that of NEPA, stock rebuilding provisions, limited access privilege programs, and other areas. The Act established a requirement for recreational fishing registration for individuals fishing in the EEZ, except where a state’s recreational fishing license or permit system is deemed adequate for the statistical or scientific purposes of the Act. The Act is now reauthorized through 2010.

- In 1977, Congress addressed the heightened concern over water pollution by amending the **Federal Water Pollution Control Act** (FWPCA) of 1948 (33 U.S.C. §§ 1251 et seq.). The 1977 amendments, known as the **Clean Water Act** (CWA), extensively amended the FWPCA. The CWA took the first step towards establishing a comprehensive solution to the country's serious water pollution problems (EPA 2003). Through standards, technical tools, and financial assistance, the CWA works towards the accomplishment of two goals: (1) to make U.S. waters fishable and swimmable and (2) to eliminate contaminant discharge into such waters. Under the authority of the Environmental Protection Agency (EPA), the act sets water quality standards for all pollutants, requires a permit for the discharge of pollutants from a point source, and funds sewage treatment plant construction (EPA 2003). Section 403 of the CWA sets out permit guidelines specific to the discharge of contaminants into the territorial sea, the contiguous zone, and waters further offshore (USFWS 2003b). The Chief of Engineers and the Secretary of the Army must approve discharges of dredged or fill material into all waters of the U.S., including wetlands. In addition to regulating pollution in offshore waters, the CWA, under the amendment known as the Water Quality Act of 1987, also requires state and federal agencies to devise programs and management plans that aim to maintain the biological and chemical integrity of estuarine waters. In estuaries of national significance, NOAA is permitted to conduct water quality research in order to evaluate state and federal management efforts. Sensitive estuarine habitats, such as seagrass beds and wetlands, are protected from pollution under this act.
- Like the CWA, the **Marine Plastic Pollution Research and Control Act** (MPPRCA) of 1987 (33 U.S.C. §§ 1901 et seq.) also regulates the discharge of contaminants into the ocean. Under this federal statute, the discharge of any plastic materials (including synthetic ropes, fishing nets, plastic bags, and biodegradable plastics) into the ocean is prohibited. The discharge of other materials, such as floating dunnage, food waste, paper, rags, glass, metal, and crockery, is also regulated by this act. Ships are permitted to discharge these types of refuse into the water, but they may only do so when beyond a set distance from shore, as prescribed by the MPPRCA. An additional component of this act requires that all ocean-going, U.S. flag vessels greater than 12.2 m in length, as well as all manned, fixed, or floating platforms subject to U.S. jurisdiction, keep records of garbage discharges and disposals (NOAA 2004).
- Passage of the **Oil Pollution Act** (OPA) of 1990 (33 U.S.C. §§ 2701 et seq.) further increased the protection of our nation's oceans. In addition to amending the CWA, this act details new policies relating to oil spill prevention and cleanup methods. Any party that is responsible for a vessel, offshore facility, or deepwater port that could potentially cause an oil spill must maintain proof of financial responsibility for potential damage and removal costs. The act details which parties are liable in a variety of oil spill circumstances and what damage and removal costs must be paid. The President has the authority to use the Oil Spill Liability Trust Fund to cover these costs when necessary. Any cost for which the fund is used must be in accordance with the National Contingency Plan, which is an oil and hazardous substance pollution prevention plan established by the CWA (USFWS 2003b). Federal, state, Indian tribe, and foreign trustees must assess the natural resource damages that occur from oil spills in their trusteeships and develop plans to restore the damaged natural resources. The act also establishes the Interagency Coordinating Committee on Oil Pollution Research, whose purpose is to research and develop plans for natural resource restoration and oil spill prevention.

- During the reauthorization of the MPRSA in 1992, Title III of the MPRSA was designated the **National Marine Sanctuaries Act** (16 U.S.C. §§ 1431 et. seq.). Title III authorizes the Secretary of Commerce to designate and manage areas of the marine environment with nationally significant aesthetic, ecological, historical, or recreational value as national marine sanctuaries. The primary objective of this law is to protect marine resources, such as coral reefs, sunken historical vessels, or unique habitats while facilitating all compatible public and private uses of these resources. National marine sanctuaries, similar to underwater parks, are managed according to management plans, prepared by the NOAA on a site-by-site basis. The NOAA is the agency responsible for administering the National Marine Sanctuary Program.

Executive Orders

- **EO 12962 on Recreational Fisheries** (60 Federal Register [FR] 30769) was enacted in 1995 to ensure that federal agencies strive to improve the “quantity, function, sustainable productivity, and distribution of U.S. aquatic resources” so that recreational fishing opportunities nationwide can increase. The overarching goal of this order is to promote the conservation, restoration, and enhancement of aquatic systems and fish populations by increasing fishing access, education and outreach, and multi-agency partnerships. The National Recreational Fisheries Coordination Council (NRFCC), co-chaired by the Secretaries of the Interior and Commerce, is charged with overseeing federal actions and programs that are mandated by this order. The specific duties of the NRFCC include: (1) ensuring that the social and economic values of healthy aquatic systems, which support recreational fisheries, are fully considered by federal agencies; (2) reducing duplicative and cost inefficient efforts among federal agencies; and (3) disseminating the latest information and technologies to assist in the conservation and management of recreational fisheries. In June 1996, the NRFCC developed a comprehensive Recreational Fishery Resources Conservation Plan (RFRCP) specifying what member agencies would do to achieve the order’s goals (NMFS 1999). In addition to defining federal agency actions, the plan also ensures agency accountability and provides a comprehensive mechanism to evaluate achievements. A major outcome of the RFRCP has been the increased utilization of artificial reefs to better manage recreational fishing stocks in U.S. waters (USFWS 2003c).
- **EO 13089 on Coral Reef Protection** (60 FR 30769) was issued in 1998 “to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment.” The EO directs all federal agencies to protect coral reef ecosystems to the extent feasible and instructs particular agencies to develop coordinated science-based plans to restore damaged reefs as well as mitigate current and future impacts on reefs, both in the U.S. and around the globe (Agardy 2000). This order also establishes the interagency U.S. Coral Reef Task Force, co-chaired by the Secretary of the Interior and the Secretary of Commerce through the Administrator of the NOAA.
- **EO 13158, Marine Protected Areas** (65 FR 34909) of 2000 is a furtherance of EO 13089. It created the framework for a national system of marine protected areas (MPAs). MPAs are defined in EO 13158 as “any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.” This EO

strengthened governmental interagency cooperation in protecting the marine environment. It also calls for strengthening management of these existing areas, creating new ones, and preventing harm to marine ecosystems by federally approved, conducted, or funded activities (Agardy 2000). Currently, the NOAA is redefining the criteria used to designate MPAs and has recently reclassified all existing MPAs as “marine managed areas.”

2.3.2 Regulations and Permits

2.3.2.1 COMNAVMARIANAS Instructions

Navy Region Marianas maintains several instructions for Navy operational diving, water safety, marine fishing, and for the maintenance and operation of the Sumay Cove Marina. These are described in this section.

- **COMNAVMARIANAS INSTRUCTION 1700.14B – Saltwater Fishing** sets policy for fishing in Navy-controlled waters around Guam. Fishing will not violate Federal or Guam territorial laws including fishing licenses. Commercial fishing is not permitted. Net fishing is restricted to traditional (i.e., subsistence) methods (e.g., cast net, drag net or seine, surround net) for taking of seasonal juveniles such as rabbitfish (mañahak), skipjack (i'e'), goatfish (ti'ao), herring (menis and mullet (aguas)). Only military personnel (active duty and retired), their family members, sponsored guests, and actively employed DOD civilian employees are allowed to fish from the bands of COMNAVMARIANAS shorelines and nearshore waters. This may be modified by Force Protection Conditions impacting base or selected area access. Areas closed to fishing include protected swimming area of San Luis Beach, the float buoyed boundary area of Polaris Point Beach, 400 yards offshore of Gab Gab Beach/Finger Reefs, and from the boat ramp northward to the end of the mooring area of Sumay Cove marina and all operational wharves. Recreational or subsistence fishing by pole, hand line or spear, either from the shore or boat, is permitted within the Orote and Haputo ERAs. Prohibited fishing techniques include: spearing between sunrise and sunset, or within 100 yards of any Government of Guam recreational “dive buoy,” explosives, poisons, intoxicating substances, electrical devices, snagging by any method, and weirs (traps) unless permitted by the Guam Department of Agriculture. Nets with a stretched mesh of less than one and one half inch opening are prohibited, except for small hand nets for collection of aquarium fish. Gill nets are prohibited.
- **COMNAVMARIANAS INSTRUCTION 1710.1B – Regulations Governing the Operation of Swimming Pool and Beach Areas** establishes that personnel must be familiar with INSTRUCTION 5100.1A and provides rules of conduct for a safe and enjoyable experience for all users of the facility. The responsibilities of Lifeguards and the Aquatics Supervisor are described.
- **COMNAVMARIANAS INSTRUCTION 1710.5B – Maintenance and Operation of Sumay Cove Marina** describes the services, facilities, required procedures and access priorities for the marina. Boats, moorings, slips, storage and work pads are available for rent. Regulations for their use are provided. Specific regulations are provided for the

storage, maintenance and disposal of hazardous materials and wastes. Sailing classes and competitions are offered through the marina.

- **COMNAVMARIANAS INSTRUCTION 3150.1A – Diving Operation Procedures** defines the roles of the Diving Officer and the Diving Supervisor, provides safety checklists, specifies regulations and safety precautions for divers and diving operations.
- **COMNAVMARIANAS INSTRUCTION 5100.1A – Water Safety Program** provides a water safety program and establishes regulations and requirements for recreational skin diving, scuba diving, water skiing and boating in Navy waters by military members and DOD personnel. It also applies to all personnel using MWR facilities or recreating on property under the jurisdiction of the Commander, U.S. Naval Forces Marianas. This includes all persons diving on the shipwrecks in outer Apra Harbor that are on U.S. Navy submerged lands. Personnel must view a Water Safety Video prior to recreating at any location other than where and when a lifeguard is on duty. Commanding Officers are required to declare waterfront areas on their installations open or closed on a day-to-day basis. Any activity or area may be declared off limits. The Instruction provides guidelines for recreational scuba diving, including required equipment and training.

2.3.2.2 Essential Fish Habitat and Habitat Areas of Particular Concern

Guam is within the jurisdiction of the Western Pacific Regional Fishery Management Council (WPRFMC). The WPRFMC currently manages fisheries in the Western Pacific under five Fishery Management Plans (FMP): (1) pelagics, (2) bottomfish and seamount groundfish, (3) crustaceans, (4) precious corals, and (5) coral reef ecosystems. Each of these FMPs identifies areas of Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) for different life stages of species managed under the respective plan. All Navy submerged lands fall within the EFH and HAPC designations for Guam. Table 2-1 summarizes these designations.

Table 2-1 EFH and HAPC in Navy Submerged Lands

FMP	EFH (Juveniles and Adults)	EFH (Eggs and Larvae)	HAPC
Pelagics	Water column down to 1,000m	Water column down to 200m	Water column above seamounts and banks down to 1,000m
Bottomfish and Seamount Groundfish	Bottomfish: Water column and bottom habitat down to 400m Seamount Groundfish: None	Bottomfish: Water column down to 400m Seamount Groundfish: None	Bottomfish: All escarpments and slopes between 40-280m Seamount Groundfish: None
Crustaceans	Bottom habitat from shoreline to a depth of 100m	Water column down to 150m	None

FMP	EFH (Juveniles and Adults)	EFH (Eggs and Larvae)	HAPC
Coral Reef Ecosystems	Water column and benthic substrate to a depth of 100m	Water column and benthic substrate to a depth of 100m	All MPAs identified in an FMP, all PRIAs, many specific areas of coral reef habitat (see FMP)

Source: WPRFMC 2004. All areas are bounded by the shoreline and the outer boundary of the EEZ, unless otherwise indicated.

There is no designated EFH or HAPC for precious corals or seamount groundfish around Guam, but other designations do apply. EFH for at least one life stage of a managed species group extends from the shoreline to the outer extent of the EEZ from the surface to a water depth of 1,000m and includes bottom habitat to a depth of 400m (Figure 2-2 through Figure 2-4).

HAPC within Navy submerged lands around Guam includes seamounts and banks to depths of 1,000m, escarpments and slopes between 40 and 280 m, bottom habitat down to depths of 100m and specific areas around Ritidian Point, Haputo ERA, Jade Shoals in Apra Harbor and Orote ERA.

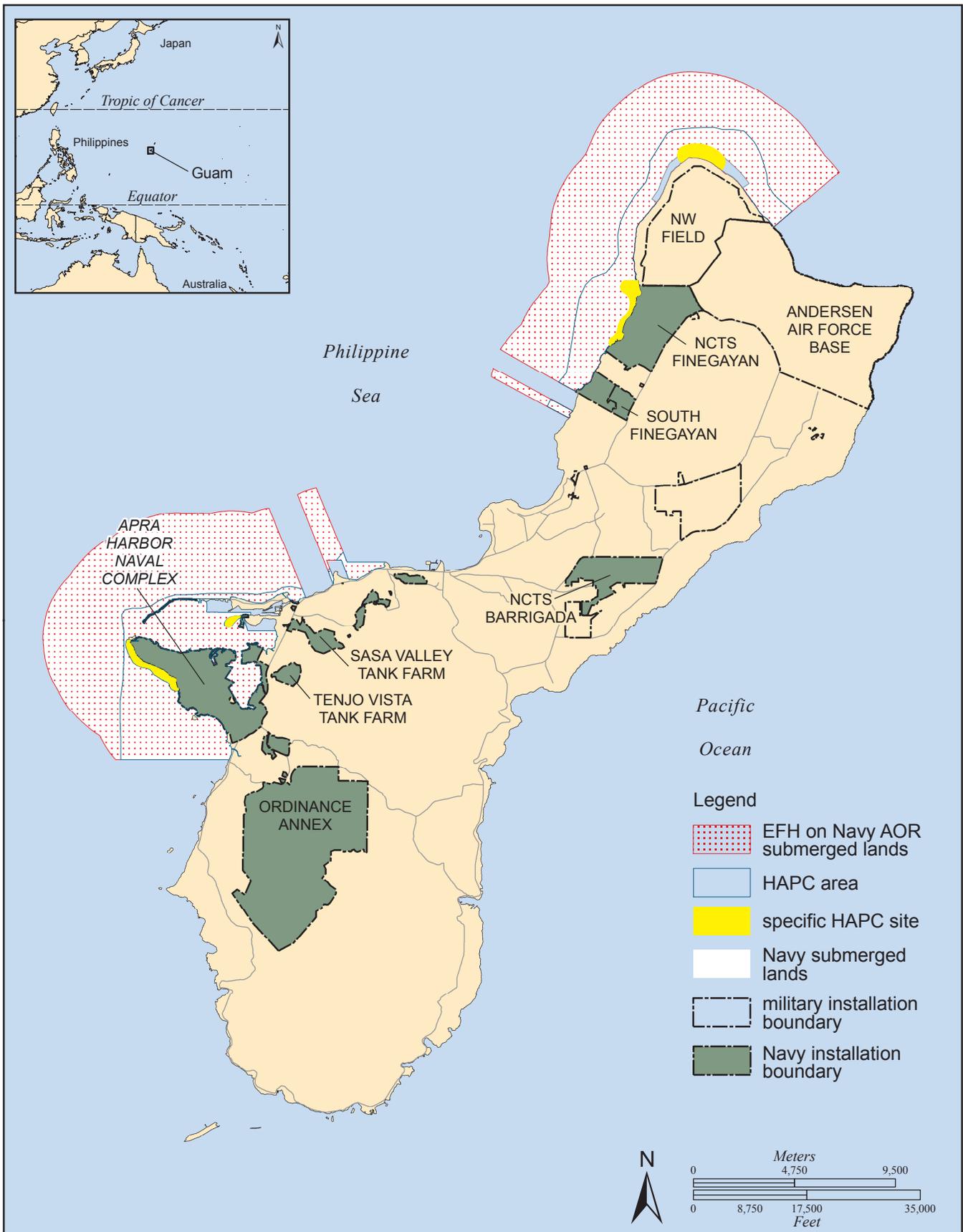


Figure 2-2
Essential Fish Habitat (EFH) and
Habitat Areas of Particular Concern (HAPC) in Navy Submerged Lands, Guam

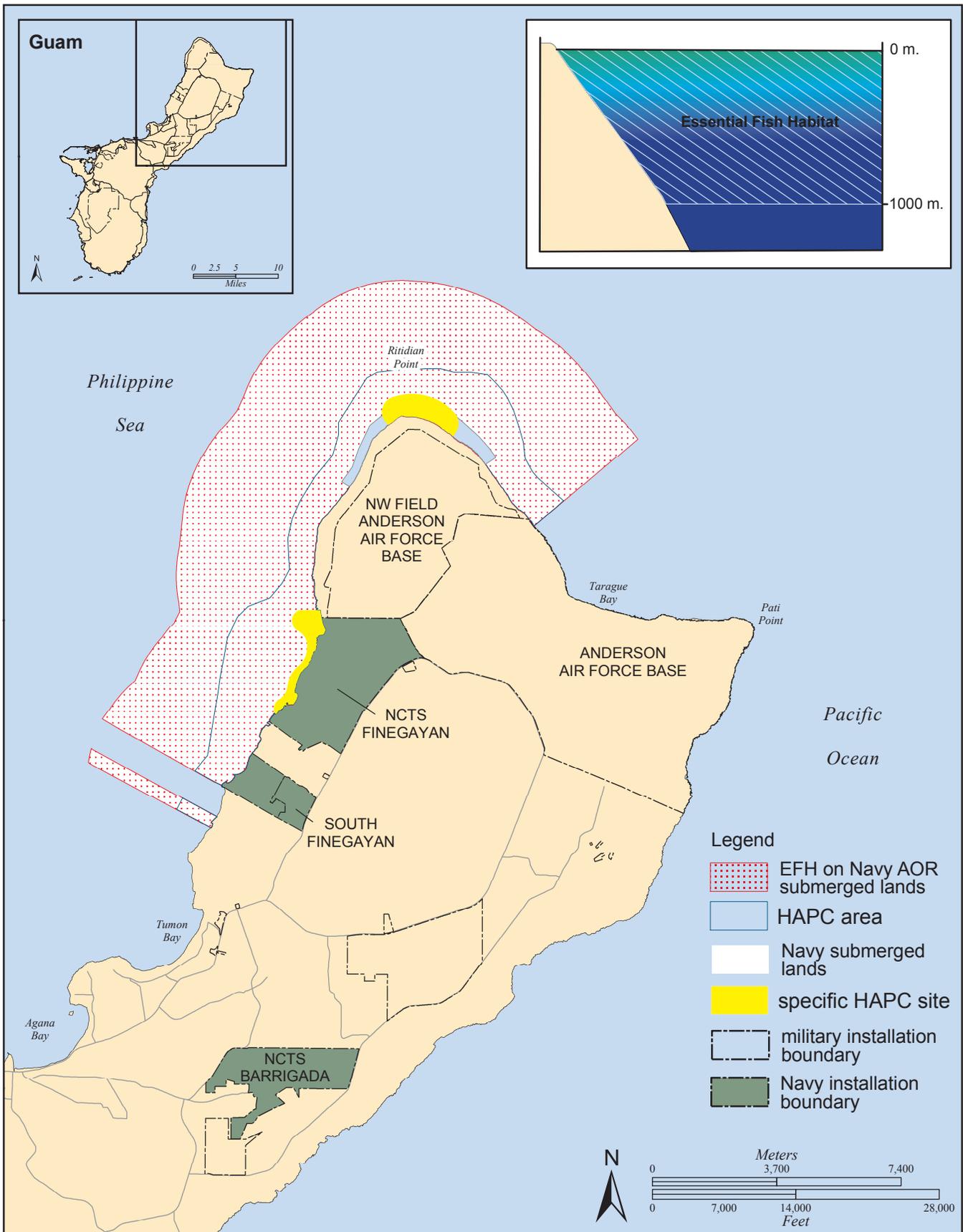


Figure 2-3
Essential Fish Habitat (EFH) and
Habitat Areas of Particular Concern (HAPC) in Navy Submerged Lands,
Northern Guam

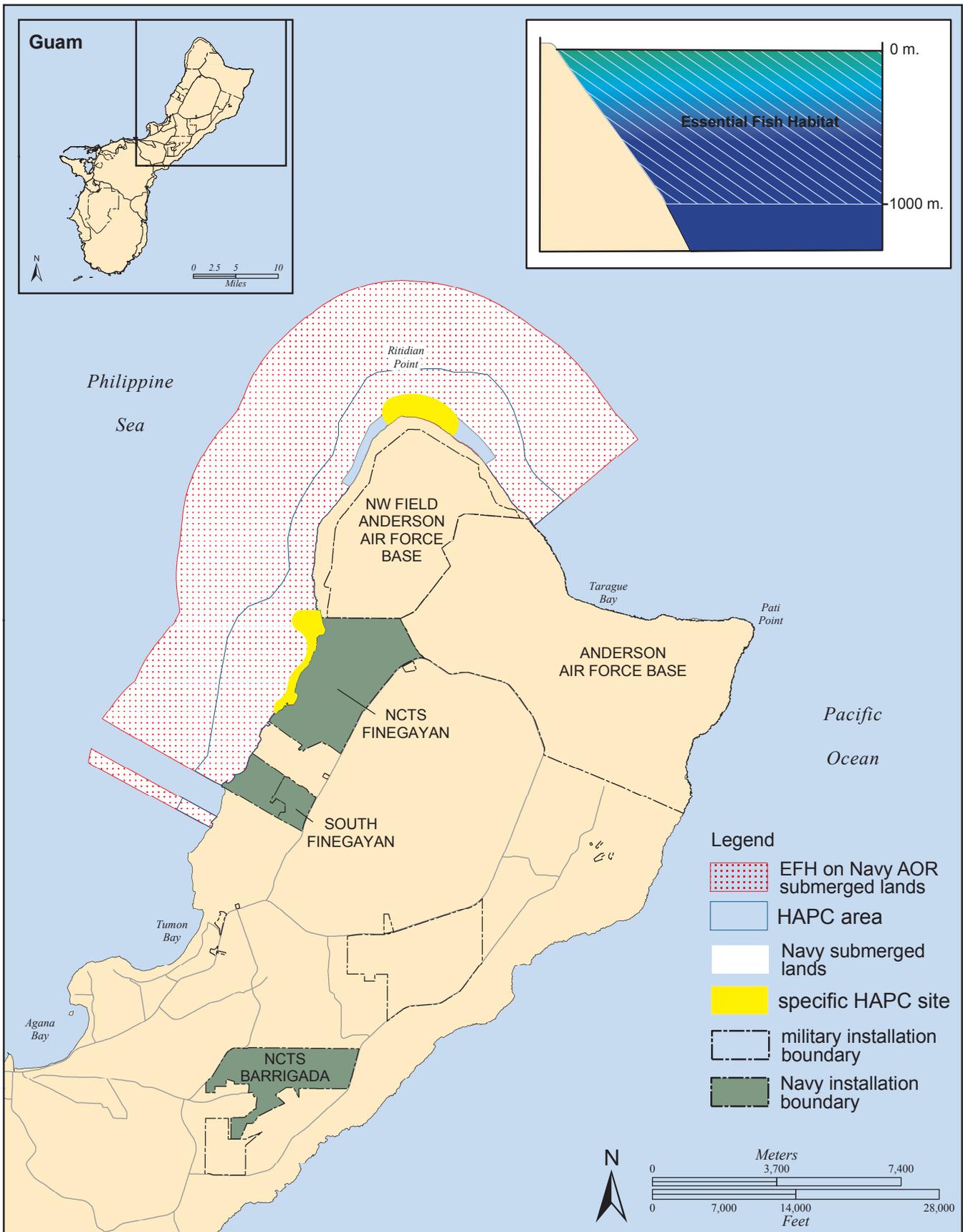


Figure 2-3
Essential Fish Habitat (EFH) and
Habitat Areas of Particular Concern (HAPC) in Navy Submerged Lands,
Northern Guam

2.3.2.3 Government of Guam Regulations

Guam's legislature has delegated the authority and responsibility of management and oversight for all aquatic and wildlife resources to the Guam Department of Agriculture Division of Aquatics and Wildlife Resources (GDAWR). In May 1997, the Government of Guam created five (5) marine preserves under Public Law 24-21. These five marine preserves are Tumon Bay, Piti Bomb Holes, Sasa Bay, Achang Reef Flat, and Pati Point, totaling over 10% of Guam's coastline. The size of the preserves varies, but all preserves extend from 10 m above the mean high tide mark to the 600 ft (183 m) depth contour.

Although Navy submerged lands in Sasa Bay and between Orote Point and Asan overlap with the Sasa Bay and Piti Bomb Holes marine preserves respectively, they are not part of the marine preserves. The Navy does not recognize these submerged lands as part of a designated marine preserve.

DAWR regulations prohibit the following activities in all five marine preserves: dip netting, gill netting, drag netting, surround netting, spear fishing, the use of gaffs, shell collecting, gleaning, and removal of sand or rocks. Trolling may be conducted from the reef margin seaward, but only for pelagic fish. Specific fishing prohibitions in the preserves are as follows:

Sasa Bay and Piti Bomb Holes

- No fishing is allowed.

Tumon Bay

- Bottomfishing may be conducted seaward of the 100 ft (30 m) contour;
- Hook-and-line fishing from shore and cast net (talaya) fishing from shore and along the reef margin are permitted for certain species. All other fishing methods are prohibited; and
- From shore, catch is limited to rabbitfish (sesyon, mañahak), juvenile goatfish (ti'ao), juvenile jacks (i'e'), and convict tangs (kichu). All other fish must be released immediately. Cast net fishing along the reef margin is allowed for rabbitfish and convict tangs only.

Pati Point

- No species restrictions for fishing, although fishing methods are limited to hook-and-line from shore.

Achang Reef Flat Marine Preserves

- Limited cultural takes are permitted for seasonal runs of juvenile rabbitfish (mañahak) and scads (atulai) (NOAA 2005).

In 1997, GDAWR used its regulatory authority to amend and expand the existing fishing regulations through Title 16 of the Guam Administrative Rules and Regulations (GARR). Title 16 includes size and gear restrictions for aquatic fauna. Title 16 also restricts the taking of giant clams to individuals larger than 7 inches across; no more than three may be taken per day for food or shell collecting and none may be taken for commercial purposes.

Guam law (5 GCA, Chapter 63) regulates the taking of coral and identifies penalties for damages inflicted on corals during fishing activities. Coral can only be taken with a permit issued by the Guam Department of Agriculture. The law has provisions for permits for both personal and commercial take, but limits such permits to five days and requires that specific collecting locations be identified. However, no personal or commercial permits have been issued since 1982. The UOGML has been issued a collection permit for scientific research. This law also regulates fishing net mesh sizes used in coastal waters and prohibits the use of illegal chemicals and explosives for fishing.

2.4 MONITORING PROGRAMS AND SURVEYS

2.4.1 Navy Monitoring

The Navy has three current monitoring programs aimed at surveying natural resources in submerged lands. They are:

- Marine Biodiversity Resource Survey and Baseline Reef Monitoring Survey of the Orote Peninsula, Agat Bay and the Haputo Ecological Reserve Area. The marine resources of Navy submerged lands from Agat Bay to Orote Point and within the Haputo Ecological Reserve Area were inventoried in 2001. These surveys are scheduled to be repeated in 2007.
- Watershed Resource Assessment of Inner Apra Harbor and Sasa Bay – The Navy has funded the USDA Natural Resources Conservation Service to complete a watershed resource assessment of the watershed above Inner Apra Harbor and Sasa Bay. The purpose of this study is to identify sources of accelerated soil erosion, sediment pathways into Inner Apra Harbor and Sasa Bay, and make conservation recommendations to reduce sedimentation of these areas. (COMNAVMAR 2006)
- Turtle Tagging Study – Navy Region Marianas has monitored the movement of green and hawksbill sea turtles in cooperation with Guam Division of Aquatic and Wildlife Resources.

2.4.2 Government of Guam Monitoring

The Government of Guam has two current monitoring programs that assess coastal natural resources.

- The Guam Environmental Protection Agency (GEPA) in coordination with GDAWR, biennially monitors coastal waters under the Guam Environmental Monitoring and Assessment Program (EMAP). Parameters include water column characteristics, sediment and tissue chemistry, benthic and fish community composition and abundance, and benthic habitat descriptions. Approximately 55 stations are monitored throughout the island. Several of these are on Navy submerged lands, including 15 in Apra Harbor, four in Agat waters, one at Ritidian Point and one off Tanguisson Point. The next monitoring event is scheduled for 2008 (GEPA 2007).

- The DAWR monitors sea turtles throughout the island through a voluntary program called “Haggan Watch.” Two species of sea turtles, the threatened green sea turtle (*Chelonia mydas*) and the endangered hawksbill sea turtle (*Eretmochelys imbricata*), are known to frequent Guam’s waters and nest on its beaches. This program enlists the volunteer help of island residents to gather data on turtle sightings and nesting activity throughout Guam’s coastline.

2.5 ENFORCEMENT ON NAVY SUBMERGED LANDS

Enforcement within Navy submerged lands is done by the Shore Patrol or by Government of Guam Department of Aquatic and Wildlife Resources (GDAWR) personnel operating under a Memorandum of Agreement for Cooperative Law Enforcement with the U.S. Fish and Wildlife Service. The GDAWR has prepared a draft updated Cooperative Agreement for Law Enforcement, which is under review.

3 RESOURCES AND MANAGEMENT BY AREA

For the purposes of this document, Guam submerged lands under Navy jurisdiction are divided into five regions: 1) Apra Harbor, 2) Orote Point to Agat, 3) Orote Point to Asan, 4) Tanguisson and Finegayan, and 5) Ritidian Point. Figure 3-1 shows these areas and the descriptions follow.

3.1 APRA HARBOR

3.1.1 Overview

Apra Harbor is the largest U.S. deepwater port in the Western Pacific and the busiest port in Micronesia. The harbor is the only deep lagoon on Guam and is enclosed on its north and northwest sides by the Glass Breakwater and on its southwest by Orote Peninsula. The Glass Breakwater is a seawall that was constructed in 1944 by the 76th Naval Construction Battalion (SEABEES) and is made of 1.5 million m³ of soil and coral that were extracted from adjacent Cabras Island (Thompson 2005). With an average height of approximately 15 ft above mean sea level (amsl), it is the largest artificial substrate in the Marianas.

Apra Harbor consists of three parts: the outer harbor, the inner harbor and Sasa Bay. Orote Peninsula borders most of the southern boundary of the outer harbor while the Glass Breakwater and Cabras Island form the northern borders. The inner harbor has Polaris Point on its northeast end and is otherwise surrounded entirely by wharves Lima through X-Ray. Sasa Bay is located at the eastern end of the harbor between Polaris Point and Dry Dock Island (Figure 3-2). Most of the submerged lands in Apra Harbor are Navy-owned. Only a relatively small portion, in the northeastern corner along Cabras Island and the northern portion of Sasa Bay, is owned by the Government of Guam.

Outer Apra Harbor is a deep (>100ft) lagoon that contains the port operations for both the Navy and civilian, commercial port, which is currently operated by the Government of Guam. The outer harbor contains fringing and patch reefs with some of the highest coral cover on the island and these reefs are important recreational sites for residents and tourists alike. The Port Authority of Guam maintains the Commercial Port of Guam facilities on Cabras Island. Much of the remainder of the outer harbor contains both port and recreational facilities owned by the Navy.

Navy facilities in Outer Apra Harbor include Kilo Wharf, and Gab Gab and San Luis beaches on the northern side of Orote Peninsula, and Delta and Echo wharves on Dry Dock Island. The Fleet Industrial Supply Center (FISC) occupies Delta, Echo and Kilo wharves. Kilo wharf is a 400-foot long ammunition pier approximately 1,097 m east of the entrance to the harbor. Dredging has brought the depths next to the wharf to 13-15 m and the wharf is slated for further expansion in 2008.

The former Naval Ship Repair Facility (SRF) is located on Orote Peninsula east of San Luis Point and across the entrance to the Inner Apra Harbor from Polaris Point. The facility is currently functioning as a privatized ship repair facility, operated by the Guam Shipyard.

In addition, the outer harbor contains numerous mooring buoys, anchorages, and piers used by commercial and private boats.

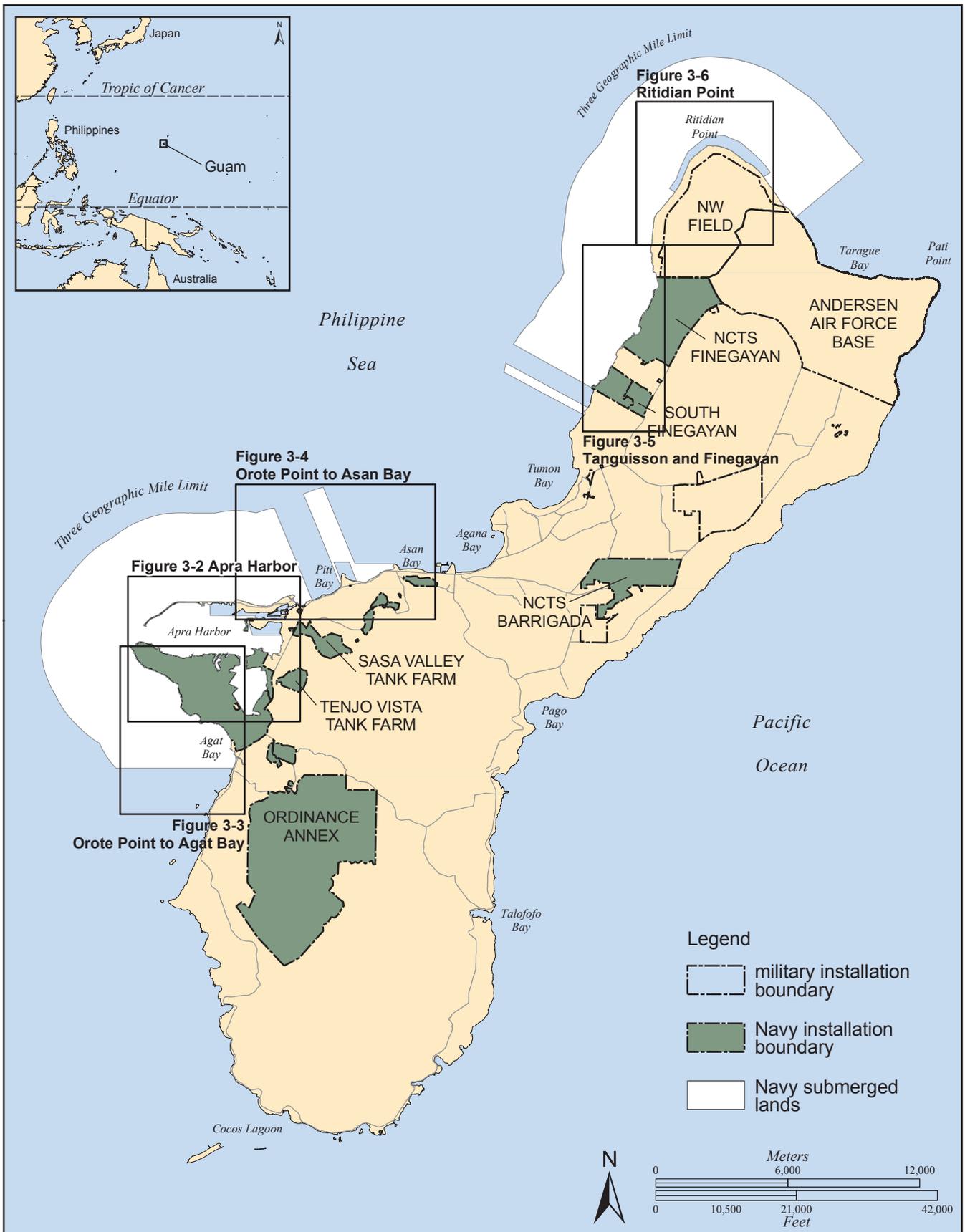


Figure 3-1
SLMP Descriptive Areas Index

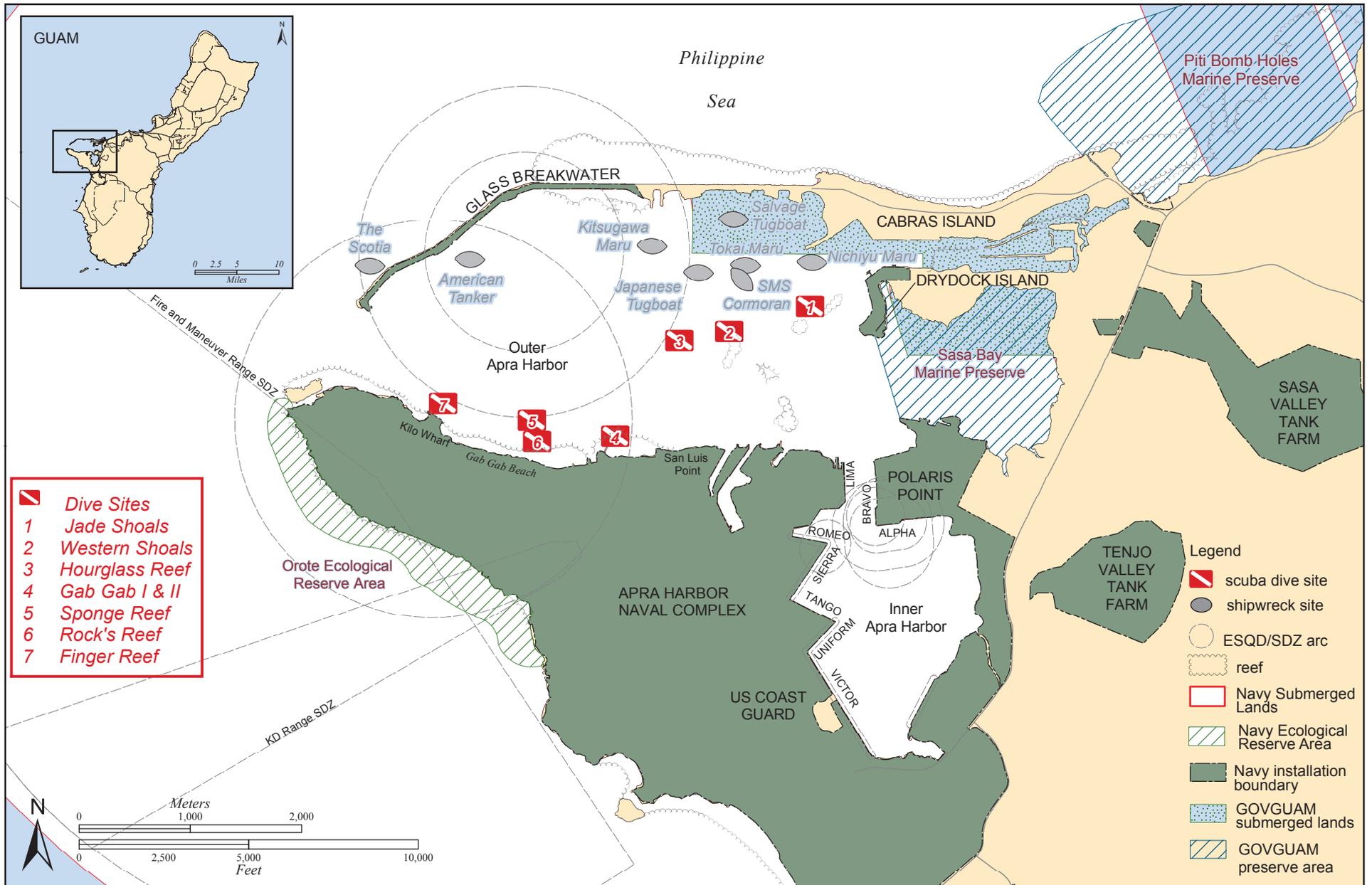


Figure 3-2
Apra Harbor

Inner Apra Harbor is reached through a passageway between Polaris Point and the Guam Shipyard and allows entrance by vessels with a maximum draft of 9.7 m. Inner Apra Harbor is a man-made lagoon dredged in the 1940s and is used exclusively by the Navy. The Navy port facilities located in the inner harbor includes the following: Alpha and Bravo wharves on Polaris Point, and Lima, Romeo, Sierra, Tango, Uniform and Victor wharves on the west side. X-ray wharf is located on the southeast side of the inner harbor and is occupied by FISC.

Sasa Bay is a shallow estuarine lagoon containing patchy corals (Scott 1993) and an extensive mangrove habitat. Its waters are generally extremely turbid because of rivers emptying fine sediments into the bay. The bottom substrate is mostly fine muds to rocky and sandy habitat.

3.1.2 Natural Resources

3.1.2.1 Habitats and Biota

Descriptions of the habitats and biota found in Navy submerged lands in Apra Harbor are organized below into four distinct areas: 1) Outer Apra Harbor, 2) Inner Apra Harbor, 3) Sasa Bay, and 4) Wetlands.

Outer Apra Harbor

Apra Harbor is the only deepwater lagoon in the Marianas Archipelago. Prior to 1944, Apra Harbor lagoon was bordered on the north by Cabras Island, Luminao Reef, and Calalan Bank; on the east by the Piti area; and on the south by the Orote Peninsula (Paulay et al. 1997). In 1944, the Glass Breakwater was built of limestone boulders on Calalan Bank totally altering the barrier reef system by restricting the exchange of water between Apra Harbor and the open ocean. In addition, fill operations that developed Dry Dock Island, Polaris Point and artificial shorelines of the northeastern and southeastern boundaries also altered the lagoon (Paulay et al. 1997).

In spite of these alterations to the harbor since the liberation of Guam during WWII, the outer harbor "...holds a vibrant and thriving marine community, including well-developed reefs with some of the highest coral cover on Guam, and a diverse biota of algae, invertebrates and fish. In this regard the harbor is unlike most other major ports, which tend to become greatly degraded for marine life (Paulay et al. 1997)." In addition, the outer harbor supports diverse populations of macro-invertebrates, finfish and moderate numbers of the threatened green sea turtle (COMNAVMAR 2006).

Following is a descriptive tour of Outer Apra Harbor habitats beginning at the Glass Breakwater on the north, continuing to the south in the area from Orote Point to the Entrance Channel of Inner Apra Harbor, and finally the mounds and shoals located throughout the lagoon.

Glass Breakwater – The reefs on the northwestern tip of the Glass Breakwater as well as the tip of Orote Peninsula and the northwestern sides of Orote Island are greatly influenced by the open ocean. Many species such as the sponge *Xestospongia exigua* were found only in this part of Apra Harbor yet are common outside the harbor (Pauley et al. 1997). The Glass Breakwater is a steep man-made shore composed of limestone boulders down to a depth of 5-7m. These boulders generally sit on solid reef pavement and extend outwards forming a shelf for approximately 100-200m. Once this shelf reaches a depth of around 10-15m, it slopes

downwards to below 30m. Although the shelf and slope areas contain a diverse coral community typical of Outer Apra Harbor, the limestone boulders, which comprise the breakwater contain few corals with only *Porites rus* being common (Pauley et al. 1997).

Orote Point to the Entrance of Inner Apra Harbor – Paulay et al. (1997) surveyed biodiversity in the harbor and divided the southern portion of Apra Harbor into two zones: (1) Orote Point to San Luis Point and (2) San Luis Point to the entrance of Inner Apra Harbor.

Paulay characterized the area between Orote Point and San Luis Point as containing a diverse assemblage of corals, sponges, soft corals and others invertebrates. The area contains mostly fringing reefs and fringing reef slopes, which become more oceanic in character moving westward from San Luis Point towards Orote Point. *Porites rus* is the dominant hard coral on the slopes of the fringing reef. Although diverse, all species encountered by Pauley are found on other reefs of Guam.

Other studies have also shown coral cover is high in this area. Several studies looked at the area between Orote Point and Gab Gab Beach including east and west of Kilo Wharf (DOD 1999; Smith 2004; NCCOS/NOAA 2005). The areas surrounding Kilo Wharf contain nearly 100% coral cover consisting mainly of *P. rus* (>90% of the cover) with other hard corals including *P. lichen*, *P. lobata*, *Platygyra pini*, *Leptoseris* spp., *Lobophyllia corymbosa*, and *Acanthastrea echinata* (Smith 2004).

The area between San Luis Point and Inner Apra Harbor is quite different, according to Pauley's survey. Much of this area has been altered or created by landfill during original construction of the inner harbor. The shallow areas contain a narrow shelf down to approximately 2-3 m in depth followed by a steeper slope composed primarily of *Halimeda* sand. Some coral patches appear below 10 or 20 m, again dominated by *Porites rus*, a coral common throughout the harbor.

Several recent Navy marine surveys identify and delineate marine resources and conditions in and adjacent to Kilo Wharf. These include the following:

- *Ecological Assessment of the Marine Community in the Vicinity of Kilo Wharf, Apra Harbor, Guam* by Stephen H. Smith June 2004a (Nomenclature Revised September 2005);
- *Field Report of Supplemental Reconnaissance Level Observations in the Vicinity of Kilo Wharf, Apra Harbor, Guam November 3rd and 4th, 2004* by Stephen H. Smith November 30, 2004b;
- *Reconnaissance Survey of the Marine Environment Outer Apra Harbor, Guam Characterization of Benthic Habitat* by Marine Research Consultants, September, 2005a;
- *Reconnaissance Surveys of the Marine Environment Outer Apra Harbor, Guam Baseline Assessment of Water Chemistry* by Marine Research Consultants, September 2005b;
- *Assessment of Stony Corals Between Orote Point and Sumay Cove, Apra Harbor, Guam* by Stephen H. Smith and Donald E. Marx, Jr. April 2006.

The conclusions of these surveys parallel the earlier findings:

- The reef in the 1-31 m depth range, between Orote Point and Sumay Cove entrance channel shows a high degree of uniformity with hard corals as the dominant benthic

organisms. This area is biologically significant based on six global standards: 1) the percentage of the sea floor covered by live coral, 2 - 4) the size frequency distribution, growth forms and apparent health of the corals, 5 - 6) the physical complexity and rugosity of the reef.

- The dominant coral species in this area is *Porites rus*. It becomes less dominant below 22 m and at the eastern and western portions of this area.

Shoals and Mounds – West of Sasa Bay in the center of the Outer Harbor lie Western Shoals, Jade Shoals and Middle Shoals. These shoals are patch reefs that rise from the harbor floor to approximately 10 m from the water surface. Each is dominated by the coral species *Porites rus* and contain several other coral species including *P. lobata*, *P. annae*, *P. cylindrica*, *Millepora dichotoma*, *Acropora formosa*, and *Pocillopora damicornis* (Paulay et al. 1997). Coral cover on the shoals range from 50 to 90% (Paulay 2003, NCCOS/NOAA 2005). There are also several mounds located in deeper parts of the lagoon, including Sponge Mound, which comes to within 20 m of the surface. Paulay et al. (1997) surveyed Sponge Mound (located west-southwest of Western Shoals) and found that the top of the mound supported the highest diversity of sponges in all of Guam with several sponge species known only from this site.

Inner Apra Harbor

Inner Apra Harbor is approached through the Inner Apra Harbor Entrance Channel between Polaris Point and the former SRF. The eastern side of the Entrance Channel extends for approximately 550 m while the western side extends approximately 400 m. The width of the entrance channel is 300 m. The inner or southern portion of the Entrance Channel is comparable to the floor of the inner harbor and is composed of fine calcareous sand. Moving seaward in a northerly direction the channel sediments become increasingly coarse; rock outcrops appear and hard corals become more common (COMNAVMAR 2006).

Inner Apra Harbor is man-made and was dredged to a maximum depth of approximately 11 m in the 1940s. More recent maintenance dredging in 1978 and 2004 has maintained the original dredged depths that allow for safe navigation by seagoing vessels (COMNAVMAR 2006). Primarily because of the original and continued dredging, Inner Apra Harbor is dramatically different than Outer Apra Harbor. While Outer Apra Harbor supports a diverse community of corals, algae, fish and others, Inner Apra Harbor is relatively devoid of life.

The floor of Inner Apra Harbor is composed primarily of very fine calcareous sands. Although not common, most life is composed of burrowing benthic invertebrates, which are visible only by the mounds they build. No algae, sponges, soft corals, hard corals or gorgonian corals have been observed on the floor of the inner harbor (COMNAVMAR 2006). Corals, both soft and hard, algae and most other sessile organisms require hard substrates on which to attach. The lack of hard substrate on the floor of the inner harbor may explain the lack of these groups.

Although the sandy bottom of the inner harbor contains little life other than burrowing organisms, corals and other sessile fouling organisms are found growing on the upper half of vertical hard surfaces such as metallic sheet piles and concrete walls. Three species of hard corals are dominant on these vertical surfaces; *Porites rus*, *P. lutea* and *Pocillopora damicornis*, all of which are common on Guam's reefs (DON 2003b). These vertical surfaces act like artificial reefs and provide the hard substrate needed for attachment.

Finfishes, although present, are not abundant and are represented by only three families: (1) Pomacentridae/damselfishes, (2) Chaetodontidae/butterflyfishes, and (3) Carangidae/jacks (COMNAVMAR 2006).

The waters of the inner harbor are highly turbid with some areas having a visibility of less than a few feet. High turbidity in the inner harbor makes surveying fish difficult, and also decreases the amount of sunlight available to algae and corals.

The coral community in the Entrance Channel to the inner harbor, although present, is much less diverse, less complex, supports smaller individual coral colonies and has a much lower rugosity factor than coral communities in Outer Apra Harbor (COMNAVMAR 2006). *Porites rus* and *P. cylindrica* are the most common and abundant corals in both the inner and outer harbor, however at least 10 additional coral families are present in the outer harbor (COMNAVMAR 2006).

Sasa Bay

The Government of Guam has set aside over 10% of Guam's coastline in five marine preserves, one of which is Sasa Bay. The Sasa Bay Marine Preserve (3.1 sq km) extends from Dry Dock Island to Polaris Point and ends at the public right of way bordering Marine Corps Drive (Route 1). Route 18 runs along its northern end while the road to Polaris Point borders its southern end. Although the southern portion of Sasa Bay is within the Navy submerged lands, its preserve status is not recognized by the Navy.

Sasa Bay contains a large mangrove habitat, one of few such habitats on Guam. Mangroves are typically found in estuaries or shores protected from the open ocean (Scott 1993). They are composed of salt-tolerant woody trees and shrubs and other plant species and provide critical habitat for both marine and terrestrial life. Species diversity tends to be high in functioning mangroves, which are found throughout the tropical and subtropical regions of the world. Mangrove habitats can also act as water filters by removing sediments and nutrients from waters that flow through them. When mangroves are not functioning properly, sediments and nutrients flow into and can damage fragile coral reef ecosystems (Scott 1993, Nybakken 1997, Thurman 1997). This may account for the limited coral habitat (0.02 sq km) in Sasa Bay; two rivers, the Sasa and Aguada Rivers, dump large quantities of sediments into the bay, which lowers visibility and overwhelms most corals (GDAWR 2005).

The Sasa Bay mangroves serve as nursery grounds for jacks (*Carangidae*), barracudas (*Sphyraenidae*), snappers (*Lutjanidae*), and groupers (*Serranidae*) and is home to numerous burrowing invertebrates including bivalves, small crabs and worms (Wiles and Ritter 1993). Sasa Bay is also visited by foraging green sea turtles and hawksbill sea turtles, both of which are protected species.

Wetlands

Wetlands within Apra Harbor area were delineated and mapped in 1998; more than 138.9 ha in 48 separate wetlands were found to occur within the Navy's boundaries. These wetlands range in size from 0.01 to 35.9 ha and include shallow freshwater and brackish water habitat. The wetlands that serve as habitat and foraging area for the federally listed Mariana Common moorhen (*Gallinula chloropus*) are located along the east side of Apra Harbor. These delineated wetlands are jurisdictional wetlands and are regulated by the U.S. Army Corps of Engineers

(USACOE). Wetlands in Guam are also protected under 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). These wetlands are not used by vessels for navigation as they are too shallow and most are located either inland or along some of the coastal areas in inlets.

3.1.2.2 Protected Species

Throughout this document protected species include those species listed as endangered or threatened under the Endangered Species Act (ESA), all marine mammals, listed or not, as they are protected under the MMPA, and all seabirds, listed or not, as they are protected under the MBTA. Each of these laws is described in Section 2.3 and Appendix A.

The threatened green sea turtle (*Chelonia mydas*) and the endangered hawksbill sea turtle (*Eretmochelys imbricata*) are known to occur in the waters of Apra Harbor and may nest on the beaches within the harbor. The Navy, in cooperation with the USFWS and DAWR, monitors for sea turtle nesting on Navy land throughout the sea turtle nesting season. Nesting of hawksbill sea turtles has been documented on a small beach within the Sumay inlet; however nesting has not been confirmed since 1995. During dives in the vicinity of Kilo wharf in November 2003, threatened green sea turtles were often sighted. In addition, two sightings of the endangered hawksbill sea turtle were made (NAVFAC 2004a). Sea turtles are also often seen by divers at Gab Gab 1 and especially Gab Gab 2, as well as in waters near the Yacht Club (personal communication, R. Brown, September 2007). The green sea turtle is also known to visit the waters near Spanish Steps and Sasa Bay (NOAA 2005).

In dives in 2006, one listed marine fish Species of Concern, the Napoleon (Humphead) wrasse (*Cheilinus undulatus*) was observed (NAVFAC Pacific 2006b).

Several bird species frequent Apra Harbor including the Brown Noddy (*Anous stolidus*) and the White Tern (*Gygis alba*), both of which are common along the shores between Orote Point and Gab Gab Beach and on buoys and anchorages near the mouth of the harbor.

According to Roy Brown (personal communication, September 2007), spinner dolphins are noted on a rare but somewhat regular basis within Apra Harbor. Brown runs dolphin tours throughout Guam's waters and estimates that dolphins are seen up to four times a year within the outer harbor, as they enter the harbor in a small group for a few hours and then exit. The most recent sighting was on September 10, 2007.

3.1.3 Cultural Resources

Cultural resources on submerged Navy lands around Guam primarily consist of shipwrecks. There are more than 60 documented shipwrecks in Guam waters that span a period of more than four centuries. The first documented wreck in the Apra Harbor area is the Manila Galleon *San Pablo*, which sunk at anchor during a typhoon in 1568. Shipwrecks are present from every period in Guam's history including the Spanish colonial period, the whaling years, American colonialism, the period from World War I to World War II, and up to the modern era (Carrel 1991).

A total of five ships from the twentieth century have been the focus of underwater archeological investigations, four of which are in Navy waters. They include the *SMS Cormoran* from World War I and *Kitsugawa Maru*, *Tokai Maru* and *Nichiyu Maru*, from World War II. These shipwrecks are included as cultural resources; however, they are also important recreational resources that are popular with snorkelers and SCUBA diving residents and visitors.

In addition to these well-documented shipwrecks, Apra Harbor has numerous other sunken artifacts including shipwrecks, sunken airplanes and war debris such as Dry Dock Reef Vessel, the Scotia, the Bulldozer and Mystery Vessel, Seabee Junkyard, American Tanker, the Val (Val Bomber), Salvage Tug and Barge Reef.

3.1.4 Uses

3.1.4.1 Past and Current Uses

Military Uses

Apra Harbor is home to a number of naval vessels including submarines, a submarine tender ship, and two U.S. Coast Guard cutters, and is visited by numerous other vessels including aircraft carriers. Maintenance dredging maintains adequate water depth (approximately 35 ft) needed by the movement of vessels throughout the harbor, and especially in Inner Apra Harbor. Regulations also maintain Explosive Safety Quantity Distance (ESQD) arcs and security around vessels while berthed within Inner Apra Harbor as well as around Kilo Wharf in Outer Apra Harbor.

Apra Harbor is currently used for all types of training activities with the exception of naval gunfire and aerial bombardment. It is an approved training site for numerous requirements including deepwater mine countermeasures (MCM), helicopter paradrops, helicopter cast and recovery, drown-proofing, heliborne firebucket (offload), helicopter search and rescue, and combat swimmer. In addition, training for landing by amphibious craft may occur at Dry Dock Island and Polaris Point (DON 1999).

Approved training in Apra Harbor, as detailed in the COMNAVMAR Marianas Training Handbook (2000), is described in the paragraphs below. A summary of potential impacts of this training on the environmental resources of Apra Harbor is described by DON (1999) and these impacts are discussed in more detail in Section 3.1.6 of this document.

- Deepwater demolition training is approved near the Glass Breakwater in Outer Apra Harbor. The site is about 2,000 ft (600 m) from the nearest known submerged historic ship, is a safe distance from commercial and Navy shipping operations, has a sandy bottom, and a water depth of about 125 ft (38 m). Safety protocols limit the size of the charge to 10 pounds (4.5 kilograms). Prior to detonations, surface waters within about 1,000 ft (300 m) of the site are surveyed for marine animal and/or civilian presence. During an exercise a radius of approximately 0.6-mile (1,000 m) surrounding the site is closed to civilian use.
- Shallow-water demolition is approved near the tip of the Glass Breakwater. This site can be easily monitored to ensure public safety and used without conflicting with other activities or substantially damaging coral or reef fish. Shallow water demolition training generally uses from 1 to 20 pound charges designed to "clear beach obstacles."

- Inert mine dismantling training requires that inert mines be brought to the surface and taken ashore. Dry Dock Island and Polaris Point have been approved as sites to be used for this activity, since this training would not interfere with other functions conducted at these sites.
- Floating mine neutralization training is approved in the open ocean north of the entrance to Apra Harbor. A charge of 10 pounds or less is detonated near the surface to “neutralize” the floating mine or to cut its mooring cable. Protocols are in place to assure no civilian activity is in the area prior to detonation.
- Amphibious landing sites have been approved in several areas of Inner and Outer Apra Harbor, including Dry Dock Island, Polaris Point, Toyland Beach and Sumay Cove Marina. However, many of these sites will require site preparation, modification, maintenance, and funding prior to use.
- Riverine training may be conducted at the Atantano River, which is located northeast of “X-ray” Wharf in Inner Apra Harbor.

Recreational Uses

Marine recreational activities within Apra Harbor include water skiing, swimming, snorkeling, scuba diving, wildlife viewing, crabbing, fishing, parasailing, surfing, windsurfing, jet skiing, charter boat fishing, dinner cruises, and beachcombing. A commercial submarine tours the outer harbor. The Sumay Cove Marina rents powerboats and a civilian marina located on Cabras Island also rents sailboats and offers sailing lessons.

On Orote Peninsula, the Spanish Steps area is a swimming and snorkeling site. The Navy Morale, Welfare and Recreation Department (MWR) organizes outdoor recreational activities and manages developed beach areas, including Gab Gab, and San Luis beaches. Other reefs and beaches located in the outer harbor include Jade Shoals, Western Shoals, Hourglass Reef, Sponge Reef, Fingers Reef, and Rock’s Reef. Many of these reefs are popular SCUBA diving and snorkeling sites.

3.1.4.2 Proposed Uses

Military forces in Guam are expected to grow substantially in the coming years. An increase in these forces will require new construction and the expansion of many of the facilities on military lands, several of which will impact Navy submerged lands. Most planned changes will be to expand existing wharves, to improve pier and waterfront infrastructure, and to dredge to meet increased draft needs of incoming vessels.

On March 7, 2007, the Department of the Navy announced its intent to prepare an Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) to evaluate the potential environmental effects associated with (1) the relocation of Marine Corps Command, Air, Ground, and Logistics units (which includes approximately 8,000 service members and 9,000 family members) from Okinawa, Japan to Guam, (2) the enhancement of infrastructure, logistic capabilities, and improvement of pier/waterfront facilities to support transient CVN berthing at Naval Base Guam, and (3) the placement of an Army Ballistic Missile

Defense (BMD) task force (approximately 630 service members and 950 family members) in Guam.

This proposed action will require new or upgraded facilities and there may be potential impacts from activities associated with operations, training and infrastructure changes, some of which will be in Navy waters. The Guam Integrated Military Development Plan (GIMDP) discusses basing opportunities in Apra Harbor and recommends the expansion of Navy waterfront capabilities and shore side facilities to accommodate forward-deployed ships, new support ship platforms, transient CVN, and the construction of facilities required for Marine Corps embarkation operations. Approximately 6 ha (15 ac) will be required by embarkation to sea for loading ships, 2 ha (5 ac) for an AAV landing ramp and laydown area, and 214 m of berthing length. Other proposed Marine Corps uses of the harbor include use as a potential site for amphibious assault training and underwater demolition training (PACOM 2006).

Several projects within Apra Harbor are currently in progress to meet other U.S. Navy near-term initiatives. Kilo Wharf in Outer Apra Harbor is scheduled to be doubled in size in order to accommodate the new class of T-AKE ships, with completion set for 2008 or 2009. Some dredging will be required for this expansion to 800 linear feet. Alpha and Bravo Wharves on Polaris Point are currently being enhanced to support changing submarine mission requirements. In late 2007, a larger class of submarine (SSGN – guided missile submarine) will transit through Guam, which will function as the forward location close to the theater of operations for crew exchanges, voyage repairs and other operational needs. The SSGN is longer and has a deeper draft than submarines currently berthed at Polaris Point. To accommodate these requirements, Bravo wharf is being extended and structural and utility upgrades are underway at both wharves. Inner Apra Harbor will also be dredged to meet the new submarine depth requirement of -40 ft (-12.2 m) mean lower low water (mllw) or approximately 5 ft deeper than the existing depth of -35 ft (-10.7 m) mllw (COMNAVMAR 2006). The areas to be dredged encompass approximately 103 ac (42 ha) of submerged land; they include areas fronting Alpha and Bravo Wharves, a 600 ft (183 m) wide ship lane through the channel, and a turning basin in Inner Apra Harbor (COMNAVMAR 2006).

3.1.5 Current Management

The management of natural resources on Navy submerged lands within Apra Harbor is guided by overall Navy program requirements, guidelines, and standards for complying with resource protection laws, and conserving and managing natural resources on Navy administered lands (OPNAVINST 5090.1B CH-4). Relevant federal resource laws and executive orders for natural resource management on Navy submerged lands are listed in Section 2.3 and detailed in Appendix A. COMNAVMAR regulations concerning recreational uses of coastal resources within Apra Harbor are described in Section 2.3.2.1.

3.1.6 Management Issues and Use Conflicts

The marine environmental management issues in Apra Harbor that could affect the installation mission include:

- Water quality maintenance;
- Presence of threatened and endangered species and habitat;

- Presence of EFH habitat;
- Presence of specific HAPC sites;
- Presence of coral reefs;
- Presence of wetlands and mangroves;
- Concern over introductions of invasive species;
- Presence of migratory birds; and
- The need for public access to recreation opportunities in the outer harbor.

Public access to the recreational sites in Apra Harbor will continue to be an issue, especially as ESQD arcs expand with the enlargement of Kilo Wharf. Increased ship traffic in general may also be an issue with the public who use the submerged lands for recreational purposes. Limited public access to recreational sites within Navy submerged lands may require further consideration to the potential negative impacts to fragile submerged habitats in most frequented areas.

Based upon reports from the Western Pacific Regional Fishery Management Council, fish stocks throughout Guam, and within Apra Harbor in particular, are considered to be depressed (NAVFAC 2004a). Spear fishing while SCUBA diving is a concern in Apra Harbor and throughout the island's waters, particularly at night. Diurnal fish can be caught in such numbers that fish abundance can be severely impacted.

Surveys performed by the Navy in the vicinity of Kilo Wharf concluded that the size frequency distribution of the fishes sighted, along with the absence of top-level predators are indicative of severe overfishing. There is some concern that by extending Kilo Wharf the larger ships that will be able to access this wharf will increase wave-caused erosion of the Spanish Steps area, an area known to be visited by the green sea turtle (personal communication, Shawn Wusstig, DAWR, September 2007).

The Inner Apra Harbor area has fewer management conflicts because it is not open to the public and is therefore not used for recreational purposes. Impacts are therefore caused solely by the use of the area by the Navy. The coral community in the inner harbor Entrance Channel is routinely subjected to stresses common to harbor entrances: abrasion from ships' hulls, breakage from towing cables touching the sea floor, severe propeller wash from tug boats and large vessels (COMNAVMAR 2006). The corals in this area can be damaged by ship traffic, as well as by anchors, groundings, and illegal vessel discharges.

Military training impacts on biological and cultural resources within Apra Harbor as a whole have been addressed in the *Final Environmental Impact Statement Military Training in the Marianas* (DON 1999). However, current proposed plans for Marine embarkation, associated training activities, and transient CVN berthing in Apra Harbor could have the following impacts on marine resources and their uses:

- Land clearing for embarkation could impact native vegetation, including the estuarine habitats such as mangroves and marsh grass habitats;
- Habitat disruption and modification could cause impacts to threatened and endangered species;
- Underwater demolitions create damage through direct explosive effect, which has the potential to harm sea turtles, marine mammals, fish or coral reefs;
- Direct ship strikes on reefs could damage fragile reefs;

- Dredging could also impact coral reefs, either directly in dredged areas or indirectly from increases in turbidity and sedimentation;
- Amphibious assault training using AAVs could impact coral reefs, harm nesting turtles or compact sand over turtle nests, change the beach profile, and increase run-off, the latter resulting in sedimentation damage to underwater habitats; and
- Bilge water discharges and incidental spills could degrade water quality.

3.1.7 Recommended Management Measures

Mitigation measures for military training impacts are detailed in the COMNAVMAR INSTRUCTION 3500.4, Marianas Training Handbook. These measures address potential impacts within Apra Harbor caused by field maneuvers and logistics support, amphibious landings, live-fire range training, and underwater demolitions.

Several recommendations were made in the Literature Review of Navy Submerged Lands on Guam (NAVFAC Pacific 2005a). Among them are the following:

- The coral reef ecosystems in the harbor should be monitored using long term transects.
- A geo-referenced map of near-shore coral reef ecosystems should be created and should include seagrass habitats.
- The geo-referenced map should also include areas that do not currently support coral reef ecosystems, yet have suitable environmental conditions for other marine life.
- Analysis of the feasibility of using artificial substrate to encourage coral reef establishment.
- The identification and evaluation of the impact of sediment sources affecting Inner Apra Harbor.

3.2 OROTE POINT TO AGAT BAY

3.2.1 Overview

The reefs from Orote Point south to Agat include numerous microhabitats and macrohabitats supporting a diverse assemblage of coral reef organisms. Turf algae and macroalgae cover the shelf between Orote Point and Apuntua Point to the south (NCCOS/NOAA 2005). Much of the reef in this area is included in the Orote Ecological Reserve Area (OERA). Fringing reefs are present only fronting Tipalao and Agat Bay. Tipalao and Dadi Beaches are Navy Beaches while further south along Agat Bay are several public beaches including Rizal Beach, Agat Beach, Togcha Beach, and Salinas Beach. Further south is the Agat-Santa Rita Wastewater Treatment Plant (WWTP).

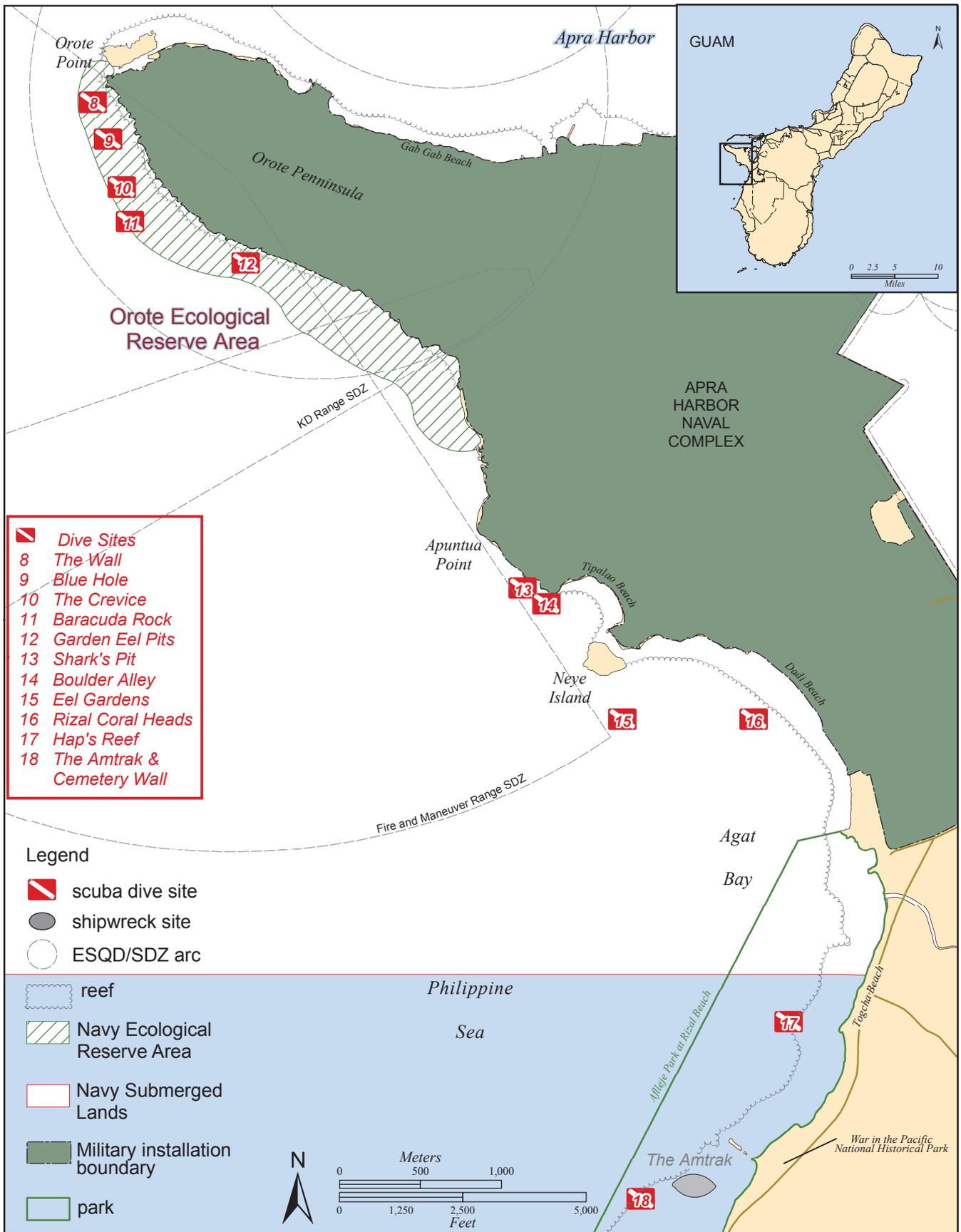


Figure 3-3
Orote Point to Agat Bay

Diversity and species composition of the reefs on the southwestern side of Orote Peninsula to the northern end of Agat Bay are strongly influenced by wave assault, currents, and bottom topography. In general, diversity declines moving southeast of Orote Point, but then increases again in Agat reefs (Paulay et al. 2001). For example, reefs along Orote Peninsula to Tantapalo Point are less diverse than southeast of this area due to wave exposure. Diversity is also high in microhabitats such as the reef flat between Neye Island and the coast, and the patch reefs in North Agat Bay.

Installation Restoration Program - Orote Landfill

The Former Orote Landfill is located along the southwest side of Orote Peninsula and is administered by the Navy. The landfill encompasses approximately 9.4 acres of land and extends from shallow marine areas to approximately 800 ft from the shoreline (NAVFAC Pacific 2007a). The landfill was used from approximately 1944 to 1969 to dispose of residential, industrial, and construction wastes.

A series of environmental investigations, beginning in 1990, have been conducted to characterize the nature and extent of contamination at the landfill and the near-shore marine environment. The chemicals of potential concern (COPCs) identified at the site in soil and groundwater include polychlorinated biphenyls (PCBs), chlorinated pesticides, dioxin/furans, and metals. Due to increased erosion of the cliff face of the landfill, the Navy decided to consolidate and stabilize the landfill with a seawall and cap in 1999. This work was completed in 2001.

Since the completion of the seawall and cap, risk assessments have focused on groundwater entering the marine environment. The results of recent studies completed in 2006 indicate that the landfill cap and seawall are functioning properly and that the landfill does not appear to be a significant source of chemicals to groundwater or the marine environment (NAVFAC Pacific 2007a).

In 2001, the Guam Department of Public Health, in consultation with the Navy, GEPA, EPA Region 9, and DAWR, issued a seafood consumption advisory extending from the landfill to Nimitz Beach in the south and Orote Point in the north. The advisory warned fisherman and residents of the potential health risks associated with consumption of seafood from the advisory area. Based on the results of sampling of near-shore territorial fish and a seafood consumption survey, the seafood advisory was modified to include the area from Orote Point to the southern portion of Rizal Beach (NAVFAC Pacific 2007a). The 2001 consumption advisory has resulted in a de facto fishing preserve, allowing some stocks to rebound from fishing pressure (Paulay et al., 2001).

3.2.2 Natural Resources

3.2.2.1 Habitats and Biota

The following section describes the natural resources moving from Orote Point at the northwest towards the southeast and Agat Bay.

West Side of Orote Peninsula

The west side of Orote Peninsula is washed by strong currents and heavy wave action. Four macrohabitats were identified by Paulay et al. in 2001: the fringing reef off Orote Point, the Orote cliff reef, the Orote reef slope, and the Orote dropoff. Within this area of the Navy's submerged lands lies the Orote Ecological Reserve Area. It is located along the west side of Orote Peninsula nearly down to Apuntua Point.

Orote Point fringing reef – This reef is located between the tip of Orote peninsula and Orote Island. This habitat contains two contiguous fringing reefs: one part of the reef faces Apra Harbor (east of Orote Island) and the other lies between Orote island and Orote Peninsula. Corals that populate the Orote Point fringing reef are similar to Apra Harbor reefs to the north end of the reef and change to become more similar to Orote reefs toward the southwestern end. The northern and middle parts of the reef support high coral cover composed mainly of *P. rus* and *P. cylindrical* while the corals on the southwestern end consist primarily of *Acropora valida*, *A. digitifera*, and *Galaxea fascicularis* (Pauley et al. 2001).

Orote cliff reef – The Orote cliff reef continues from above the waterline down to the fore reef slope. Visible at sea level are numerous notches and caverns that have been cut by wave action into the cliff. At the base of this area are accumulations of large boulders originating from the cliff face. The cliff surfaces below the waterline have been highly bioeroded by boring sea urchins (*Echinometra*) and that, along with wave erosion, have resulted in a pitted and scarred cliff face. This macrohabitat has a low diversity of corals comprised primarily of *Montipora*, *Pocillopora*, and *Millepora platyphylla*. Sponges make up the majority of sessile benthos and, the abundance of sponges in this area is substantially higher than many other reefs outside the harbor on Guam (Paulay personal communication in NAVFAC 2005).

Orote Point reef slope – This macrohabitat extends from Spanish Steps on Orote Point to the western tip of Orote Island and continues south to the southern end of the peninsula. Paulay et al. (2001) defined the Orote reef slope as a depth zone between the Orote cliff reef and the Orote drop-off. The western tip of Orote Island down to the southern end of this zone is considered a high-energy environment and is the largest macrohabitat on this side of the Orote peninsula.

The northern portion (between Spanish Steps and the western tip of Orote Island) is quite different in character compared to the southern portion that runs along the west face of Orote Peninsula. The northern portion has higher coral and fish diversity as well as higher fish biomass than most locations on Guam. A small area on the eastern end of the Orote Point reef slope, which abuts the Apra Harbor southern reef slope, is not a high energy environment. Moving west of the *P. rus* dominated Apra Harbor, the reefs become more diverse and include 19 species of corals (Pauley et al. 2001). The reef slope is also heavily bioeroded and supports a diverse cryptofauna that includes shrimp, lobster, and crab and abundant crinoids.

The southern portion of the slope along the western side of the peninsula is mostly barren pavement with a gentle slope; it has low diversity with only clumped macroalgae, some corals (*Montipora foveolata*, *Leptastrea*, *Astreopora*, *Pocillopora*), and the large boring sponge *Spirastrella vagabunda*. However, within this southern slope zone there are three microhabitats that support unusual biota: the boulder fields, the rubble fields, and the Blue Hole.

Boulder fields are found off Neye Island, Apuntua Point, and Barracuda Rock. These fields are formed when boulders detach from and accumulate below the cliffs, with individual boulders up to 15 m in diameter. These boulder fields provide habitat for highly diverse reef communities and support higher coral diversity and higher fish diversity and biomass compared to most locations on Guam. Several species of soft corals that are rarely observed elsewhere are found in this area. In addition, Paulay et al. (2001) found the largest population of *Plerogyra sinuosa* (bubble coral) and the only sighting of *Madracis kirbyi* known on Guam.

Rubble fields are also found in numerous areas with aggregations of rubble fragments from 10 to 100 cm in size. The rubble fields contain diverse cryptofauna including a new species of lobster (*Paraxiopsis* sp.), a species of a swimming crab (*Carupa* sp.), a rare crab (*Aethra edentata*), the only observation of a spider crab on the island (*Acheus lacertosus*), and many species of pagurid hermit crabs. (NAVFAC Pacific 2005b).

The other unique microhabitat on the reef slope is the Blue Hole, the most popular dive spot on the island (Hanauer 2001). This cave was formed during past low sea levels with a depth of 91m, a collapsed roof at 18m and a “window” at 37m. Biota in the cave consists of many sessile species and fishes known only to this location on Guam. In the 1970s, the Blue Hole contained many more gorgonians and much more macrofauna than it does today, however, recreational divers have taken many of the gorgonians as souvenirs (Birkeland 1997). Gorgonians still found in the cave include *Viminella* sp., *Keroides* sp., *Heliania spiniescens*, and *Briareum excavatum*, which have only been observed around the lip of the cave and on the Orote Drop Off (Paulay et al. 2001). Also of biological interest are the undescribed minute false oyster (*Dimyella* sp.) and an undescribed hard coral (*Leptoseris* sp.) (NAVFAC Pacific 2005b).

A total of 53 species of fishes including sharks, tuna, groupers, snappers, parrotfish, and emperors are abundant around the Orote Point reef slope (NAVFAC 2005). In addition this general area once supported a large aggregation of Bumphead parrotfish (*Bulbometopon muricatum*) (Davis personal communication in NAVFAC Pacific 2005b).

Orote dropoff – This area is on the southwestern margin of the Orote peninsula and starts at the deep end of the Orote Point Reef Slope. The dropoff is a steep vertical face that begins around 25 to 35 m and extends down to >100 m. The area is exposed to strong currents but is well below the wave washed areas of the cliff. It contains large gorgonians and black corals such as (*Annella mollis*, *A. reticulata*, *Astrogorgia* sp., *Subergorgia suberosa*, *Antipathes* sp., and *Cirripathes* sp.) as well as a rare encrusting gorgonian *B. excavatum* and the hard coral *Favia rotumana*. Paulay et al. (2001) has also identified an undescribed sponge *Callyspongia* aff. *carens* (NAVFAC Pacific 2005b).

Agat Bay

This region of Navy submerged lands extends from the end of the Orote Peninsula around Tipalao Bay southeast towards Togcha Beach. It contains numerous sandy beaches with small limestone outcrops. The sand in much of the bay consists of dredge spoils from inner Apra Harbor that were deposited following World War II. This explains the presence of abundant shells of *Timoclea* sp., a bivalve specific to Apra Harbor (NAVFAC Pacific 2005b).

Much of the middle of the bay at depths ranging from 5 to 30 m is covered with sand and silt. (Paulay et al 2001, NCCOS/NOAA 2005). Sand channels and harder reef substrate are interspersed with patch reefs and reef substrate that rises more than 2 m above the sand

channels. Sand dominates the deeper parts of this area while patch reefs increase in shallower areas. Epifauna found on these sand substrates show a low diversity (NAVFAC Pacific 2005b).

The reef flat from Tupalao Bay through Dadi Beach is mostly intertidal in nature with large areas of sandy substrate covered with macroalgae and seagrass. The National Ocean Survey benthic mapping project (NCCOS/NOAA 2005) noted that there are extensive seagrass beds in Agat Bay including the Agat Unit of the War in the Pacific National Historical Park (Daniel and Minton 2004 in NAVFAC Pacific 2005b). According to Paulay et al. (2001) silt, macroalgae and seagrass cover decrease with increasing distance from shore. Meanwhile, the diversity of corals, macroinvertebrates, and fish increase further from shore. Corals found along the inner part of the reef flat include *Porites australiensis*, *P. lutea*, and *Leptastrea purpurea*, all common reef flat corals. The corals along the outer reef flat are more diverse and include *Pocillopora damicornis*, *Acropora valida*, *A. abrotanoides*, *Pavona venosa*, and newly recorded on Guam, *P. bipartita*.

The reef flat between Neye Island and the mainland is swept by strong currents and is therefore less subject to siltation. This area contains a high diversity of corals and is dominated by large *Porites* microatolls and eleven *Acropora* species. Macroalgal cover is low while the cover of coralline algae is quite high. In addition, there are 34 species of echinoderms on the reef flats of Neye Island (NAVFAC Pacific 2005b).

Orote Ecological Reserve Area

The Navy established the OERA in 1994 as a mitigation measure for the construction of Kilo Wharf. Most of the reefs along the western side of Orote Peninsula are within the OERA. The OERA includes all submerged lands from the shoreline to a depth of 120 ft including the fringing reef, cliff reef, reef slope down to the dropoff.

Inland from the shore the OERA extends from the mllw line to the upper edge of the cliff. All the habitats within this area are steep cliff with one exception: a small sandy beach near Apuntua Point. This beach merges into limestone pavement that is continuous with the slope. The beach has been used as a dump for concrete and metal debris since the end of WWII, and virtually the entire beach is covered with iron and metal debris that has rusted into a solid mass. Much of this material has washed into the ocean. The terrestrial portion of this ERA totals about 30 acres while the submerged portion totals approximately 133 acres.

The biota and habitats found in the OERA are discussed in more detail in the prior section covering the West Side of Orote Point. Most of the area is exposed to high energy wave assault and currents. In all, there are 1,252 known species of marine animals reported from the area, including 156 species of hard corals. In general, coral cover, abundance, and diversity are low and submerged areas are scoured. Microhabitats including boulder fields, rubble fields and the Blue Hole, display higher diversity than the rest of the reserve.

At a depth of 36 m in the northern section along the dropoff, black "whip coral" (*Antipatharia*) is locally abundant. A few small whip corals have been also found along the vertical submarine slope at the same depth outside the "window" at Blue Hole. Immediately outside the OERA boundary at a depth of 45 m lie a number of sea fans (*Gorgonacea*), which are otherwise believed to be rare within the general area.

3.2.2.2 Protected Species

The green sea turtle and the endangered hawksbill sea turtle are found foraging in many of the offshore waters of Guam. The Navy, in cooperation with the USFWS and DAWR, has monitored for sea turtle nesting on Navy land throughout the sea turtle nesting season. Groups of small green sea turtles are commonly seen by drift divers in the area between Turtle Rock and the Crevice within the OERA. The hawksbill turtle (*Eretmochelys imbricata*) is also seen in this area though very rarely (personal communication, R. Brown, September 2007).

Pods of Spinner dolphins (*Stenella longirostris*), are frequently seen in the waters on the northern end of Agat Bay and several private companies provide daily dolphin tours in this area. The tours extend from the southern end of Agat Bay up through the waters near Neye Island. They are less common south of this area. Spinner dolphins are found in this area by dolphin tours up to 300 days a year (personal communication, R. Brown, September 2007). Bottle nose dolphins (*Tursiops sp.*) are seen more rarely, and further out from shore.

Several other marine mammal species in the order Cetacea, including both Odontocete or Toothed whales, and Mysticete or Baleen whales, have also been seen in the waters surrounding Guam. Some of these whales migrate seasonally, though there are no known migratory routes in Guam waters. Melonhead whales (*Peponocephala electra*) are occasionally seen beyond the 12 m depth offshore, while sperm whales have been seen transiting the area about a mile or two offshore (personal communication, R. Brown, September 2007).

Several shorebirds, terns, pelagic and migratory bird species, including the Black noddy (*Anous minutus*), Brown Noddy (*Anous stolidus*), Pacific Reef Heron (*Egretta sacra*), and the Yellow Bittern (*Ixobrychus sinensis*) are commonly seen on Nye Island and the northern portion of Togcha Beach (NOAA 1994). The Red Footed Booby (*Sula sula*) is also known to visit the OERA (NOAA 1994).

3.2.3 Cultural Resources

The War in the Pacific National Historical Park, managed by the National Park Service, has seven Units, two of which are marine. One of these marine units, the Agat Unit, is located along this region of Navy submerged lands and includes Apaca Point, Ga'an Point, Bangi Point and Bangi Island. The Agat Unit is the site of the southern landing beach where the 1st Provisional Marine Brigade followed by the 305th Regimental Combat Team and the 77th Army Infantry stormed the shores on July 21, 1944. Underwater there are historic war relics surrounded by reefs including:

- Ga'an Point –This area is part of the War in the Pacific National Historical Park complex. It was from two camouflaged bunkers onshore that Japanese soldiers inflicted heavy casualties on American forces during their attempt to reclaim Guam during WWII. In depths from 5-18m are found large coral heads and a variety of sea anemones.
- The Amtrak – Located at around 15m, the Amtrak (amphibious tractor) was part of the US invasion force that stormed the island in 1944. It was one of several amtraks that once rested on the bottom of Agat Bay.

3.2.4 Uses

3.2.4.1 Past and Current Uses

During Spanish colonial times, the reefs of Agat Bay were used as a protected anchorage for sailing ships. During liberation of Guam from Japanese forces in 1944 near the end of World War II, Agat was the southern assault location for US forces.

The Navy submerged lands lie next to the Navy's Waterfront Annex on the north and civilian controlled lands on the south. Ga'an Point, although outside of Navy submerged lands, is the location of the Agat-Santa Rita Wastewater Treatment Plant (WWTP), which is used by the Military as well as by civilians.

Military Uses

As detailed in the Marianas Training Handbook, the western coast of Orote Peninsula is designated and approved for several military training activities. These activities include:

Deepwater demolition training – This activity is conducted at a site approximately 450 m offshore of Dadi Beach in waters 13 to 30 m deep. This site is used because there are no significant submerged historic resources in the area. The nearest recreational dive sites are Haps Reef approximately 2 km away, and Blue Hole approximately 3.5 km away. The area may be visited by sea turtles, dolphins, and rays. If noted, their presence would suspend training until the area is cleared (COMNAVMAR 2000)

Amphibious vehicle landings – Tupalao Beach is approved for landing by LCACs and AAVs following the completion of near shore reef and beach preparation to remove obstacles or debris. CRRCs and RHIBs may also land at points along these shores and combat swimmers may be inserted at locations as needed.

Shallow-water demolition with live charges – In addition to the tip of the Glass Breakwater a second site near Tupalao Beach is approved for shallow-water demolition. This area has been identified to be far enough from recreational sites to allow this training. Shallow water demolition training generally uses from 10 pound to 20 pound charges designed to "clear beach obstacles."

Inert mine dismantling training – Tupalao Beach (along with sites in Apra Harbor) has been approved as a site to be used for this activity because this training would not interfere with other functions in the area.

Floating mine neutralization – In addition to the entrance to Apra Harbor, floating mine neutralization training is conducted in the open ocean at the Agat Drop Zone. A charge of 10 pounds or less is detonated near the surface to "neutralize" the floating mine or to cut its mooring cable. Protocols are in place to assure no civilian activity is in the area prior to detonation.

Live-fire range training – Small arms training occurs within the Waterfront Annex using live ammunitions. A known distance (KD) rifle range (200-, 300- and 500-yard (183-, 274-, and 487-m) firing lines) is available for use by resident and transient active organizations including the

Guam Army National Guard and Reserve units. The surface danger zone (SDZ) extends out over the ocean southwest of Orote Point; however, the backstop keeps the majority of ammunition from entering the ocean. A pistol range is also found behind the rifle range target line; however, it can only be used when the rifle range is not in use. The pistol range uses the same 65 ft (20 m) high backstop. Training with 40 mm rifle grenades and 60 mm mortars may be conducted using inert projectiles at the Orote Peninsula ranges.

Recreational Uses

This region of Navy submerged lands contains some of the most popular dives sites located on the island because of its proximity to the civilian boat harbors in Apra Harbor to the north and the Agat Marina to the south. Moving from north to south these include the Wall, Blue Hole, the Crevice, Baracuda Rock, Garden Eel, Shark's Pit, Boulder Alley, Eel Gardens, Dadi Beach, Afleje Park at Rizal Beach, Rizal Coral Heads, Togcha Beach and Reef, and Hap's Reef also known as Guam's Underwater Zoo.

Besides SCUBA diving this area has numerous other activities including dolphin tours, parasailing, kayaking, charter boat fishing, snorkeling, banana boating, sailing and jet skiing.

Wastewater Treatment Plants

The Agat-Santa Rita WWTP is owned and operated by the Guam Waterworks Authority (GWA) and services approximately 17,000 people in the Agat and Santa Rita areas. Effluent is pumped through the Tupalao Outfall located directly north of Agat Bay. The receiving water for the WWTP is Tupalao Bay. The Tupalao Outfall also services the US Navy's Apra Harbor WWTP.

A National Pollutant Discharge Elimination System (NPDES) Permit was issued to the Agat-Santa Rita WWTP (No. GU0020222) on April 16, 2001 and permit renewal has been granted by the US EPA. The permit regulates ocean disposal for the WWTP protecting the biota in the discharge area.

3.2.4.2 Proposed Uses

A former small arms range located parallel to the rifle range will be developed as a small arms stress course incorporating physical obstacles for the shooters as well as targets for live-fire weapons training. In addition, the Guam Army National Guard (GUARNG) plans to modify an area of individually bermed, firing points and short-range target lines for shotgun familiarization fire and setting rifle battle sights. Naval Special Warfare Unit (NSWU) also plans to modify a former pistol range on Orote Point for use as a fire-and-maneuver range.

3.2.5 Current Management

A Management Plan for the Orote Ecological Reserve Area was prepared by the Navy Pacific Division, Naval Facilities Engineering Command in March of 1986. The Management Plan is outdated and needs revision, but regulations related to permitted and non-permitted activities are reproduced below (NAVFAC 1986b). Access to the OERA is controlled by the Commanding Officer, COMNAVMAR. The management plan mandates no improvements to the OERA.

Recreational Activities Permitted by the Plan

- Recreational or subsistence fishing by pole or hand line from either the shore or boat, as well as spear fishing, is allowed within the OERA subject to existing Federal and Government of Guam laws, and Navy regulations for fishing and harvesting.
- Recreational shell collecting is allowed within the OERA. Only non-destructive collecting methods (picking up by hand and without the use of pry-bars or similar tools) are permitted.
- Snorkeling, diving and other associated non-consumptive recreational activities are permitted within the ERA.

Recreational Activities Prohibited by the Plan

- To remove, injure, trap, kill or possess any form of or parts of any mineral, plant, wildlife or fish except as permitted in the Plan.
- To possess or use any firearm, bow and arrow or any other weapon, trap, snare, poison or any device designed to take, capture, or kill wildlife or to possess or use any explosives, poison or any other chemical to kill or capture fish or other marine life except as permitted in the Plan.
- To introduce any form of non-indigenous plant or animal life into the ERA.
- To damage, destroy or harvest for any purpose any coralline structure or fossil within the ERA except as permitted by the Plan.
- To dump, drain or leave any litter, toxic material or other waste material in the ERA or to otherwise violate any federal or Guam law regarding land, water, or air pollution.
- To remove, alter, deface or otherwise damage historical or cultural sites or artifacts found within the ERA in accordance with the National Historic Preservation Act of 1966, as amended, as well as 32 CFR Part 229 and other historic preservation statutes and regulations.

Monitoring Programs and Surveys

The Navy conducted a Marine Biodiversity Resource Survey of the Orote ERA in 2001. This survey is scheduled to be repeated in 2007.

3.2.6 Management Issues and Use Conflicts

The marine environmental management issues in Apra Harbor that could affect the installation mission include:

- Presence of threatened and endangered species and habitat.
- Presence of EFH habitat.
- Presence of coral reefs.
- Concern over introductions of invasive species.
- Presence of migratory birds.

COMNAVMAR (2000) identified the potential impacts of training activities caused by amphibious landings, live-fire range training, and underwater demolitions within Navy submerged lands between Orote and Agat. Mitigation measures and pre-training protocols are in place to minimize these potential impacts to the natural and cultural resources and recreational uses of this area.

3.2.7 Recommended Management Measures

The Orote ERA Management Plan was prepared by the Navy Pacific Division, Naval Facilities Engineering Command in March 1986. The Management Plan is outdated and should be revised to assure that all parts of the plan are current. Most of this area is in need of long term monitoring using transects and trained biologists. In addition, geo-referenced maps should be created to include near-shore coral reef ecosystems, seagrass beds, as well as areas that do not currently support coral reef ecosystems, yet have suitable environmental conditions for other marine life.

3.3 OROTE POINT TO ASAN

3.3.1 Overview

This area begins at the mouth of Apra Harbor and includes the waters north of the Glass Breakwater and Cabras Island as well as Piti Bay, Tepungan Beach, and from Asan Memorial Beach to Adelup Point (Figure 3-4). During personal communication with Gutierrez in 2007, he noted that Asan Bay is heavily fished, and that fish stocks have decreased in this area since monitoring began in 2001.

On the other hand, the Piti Bomb Holes have been designated as a Government of Guam marine preserve, due to the Bay's wide diversity of habitats and biota. Full implementation of its preserve status began in January 2001, and since then, noticeable increases in herbivorous fish densities have been noted. These fish appear to have better controlled the growth of edible macroalgae, resulting in healthier reefs in Piti Bay. Continued fish and habitat assessment surveys within the marine preserve will provide the information needed to assess the status of the coral reef ecosystem and the success of the marine preserve designation (NOAA 2005).

The Navy does not recognize the preserve status of the portion of the Piti Bomb Holes marine preserve located in Navy submerged lands. Most of the Piti preserve is located outside of Navy submerged lands, and fall primarily within GovGuam submerged lands. Only small sections on the eastern and western borders of the preserve fall within Navy submerged lands.

3.3.2 Natural Resources

3.3.2.1 Habitats and Biota

Seaward of Luminao Reef/Cabras Island

According to NAVFAC Pacific (2005b), the fringing reefs on either side of the Glass Breakwater, Luminao Barrier Reef, the fore reef off Cabras Island, and the fore reef of Piti Reef have between 10 and 50% coral cover. All of these reefs are high-energy environments that face the open ocean.

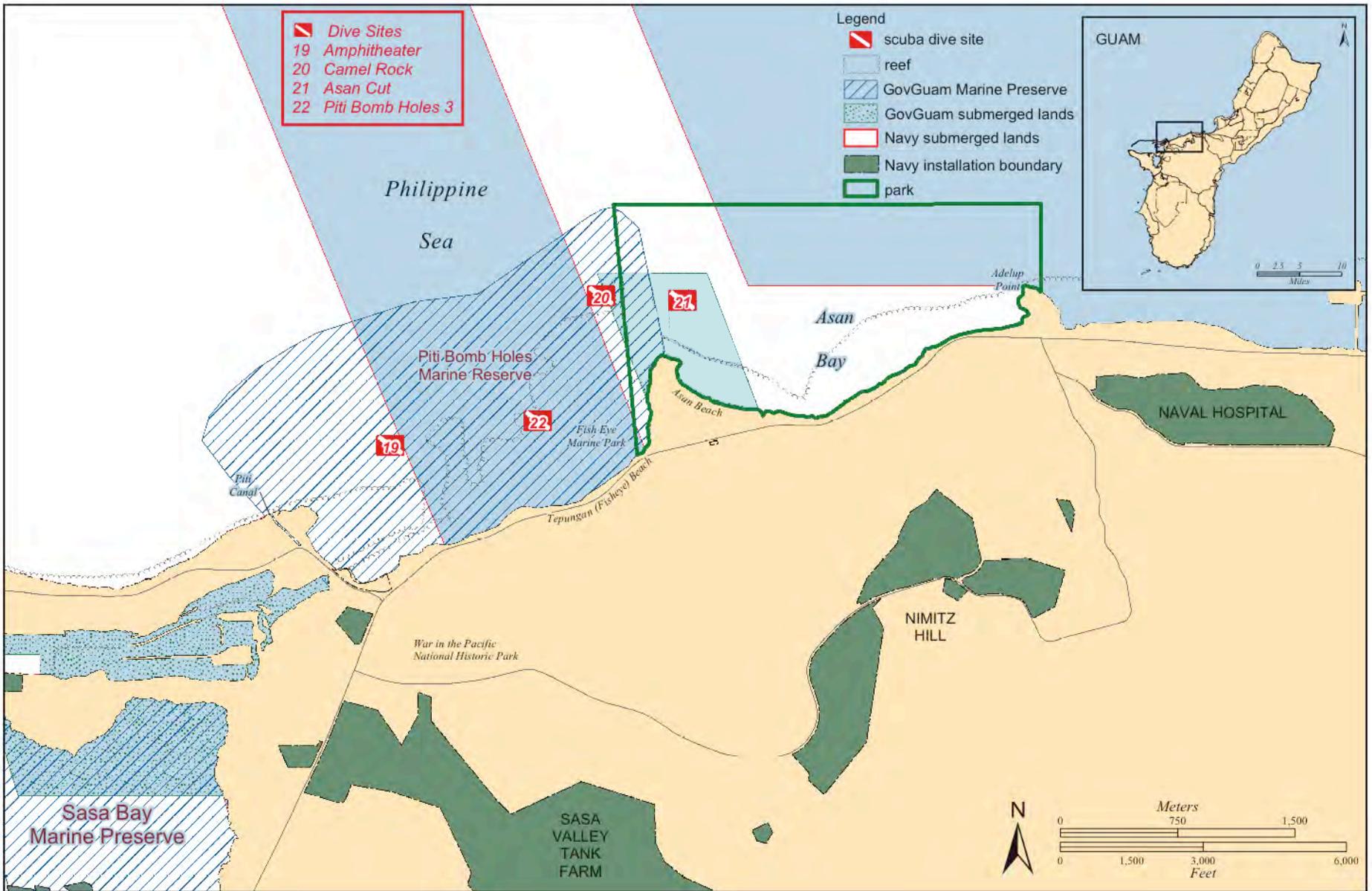


Figure 3-4
Orote Point to Asan Bay

Also, a narrow strip of seagrasses border the entire fore reef from the end of the breakwater to Piti Reef.

In 1982 Randall et al. surveyed three reef areas in this portion of Navy submerged lands: Luminao Barrier Reef on the seaward side of the Glass Breakwater, the fringing reef on the seaward side of Cabras Island, and the Piti Reef (fringing reef east of Cabras Island). However, since the date of that study, numerous impacts of corallivorous predators and storms on the corals of Guam have occurred. Therefore, these surveys may not be representative of current reef conditions (coral diversity and cover) (Birkeland 1997, Abraham et al. 2004). Unfortunately, because there have been no new studies within these areas, the following description comes from Randall et al. (1982).

Luminao Barrier Reef flat varies from 50 to 200 m long and is less than 1 to 2 m deep. Coral cover on the reef flat ranged from 7 to 31% with the majority of corals from the following genera: *Porites*, *Pocillopora*, *Leptastrea*, *Montipora*, *Millepora*, *Acropora*, *Psammocora*, *Leptoria*, and *Goniastrea*. Coral cover on the reef front and slope ranged from 18 to 25% and was composed of *Pocillopora*, *Acropora*, *Goniastrea*, and *Millepora* corals.

The Cabras Island Reef consisted of a narrow reef flat made up of reef pavement approximately 0.6m deep, a reef margin, and a reef slope. Coral cover on the reef pavement and reef margin was minimal ranging from 0 to 1.1% coral cover. Coral genera on the reef pavement included *Porites* and *Pocillopora* while on the reef margin there were a few more coral genera including *Goniastrea*, *Pocillopora*, *Acropora*, *Porites*, and *Favites*. Coral cover on the reef front starting at 5m in depth ranged from 10 to 22% and was mostly composed of *Pocillopora*, *Goniastrea*, *Acropora*, *Millepora*, and *Montipora*.

The Piti Reef is located seaward of the Tepungan Channel seaward of the Piti shoreline. There are five physiographic zones on the Piti Reef: the inner and outer reef moats, the outer reef flat, the reef margin, and the reef front slope. The inner reef moat is roughly 50m wide and 1m deep while the outer reef moat is approximately 150 m wide and 1.3 m deep. The outer reef flat which is approximately 60m wide and less than 1m deep had the highest coral cover in the area, approximately 20%, and the reef margin (approximately 50m wide and exposed at low tide) showed the second highest coral cover of 12%. The reef front slope is the area exposed to waves and is approximately 50m wide and 5m deep. Coral cover throughout the five zones ranged from 0.2 to 20%, with the lowest cover found in the inner and outer reef flats (0.2% and 0.4%, respectively) (NAVFAC Pacific 2005b).

Piti Bomb Holes Marine Preserve

GDAWR has been monitoring the Piti Bomb Holes marine preserve to determine the effectiveness of the preserve system. These studies focus on fish species targeted for consumption as well as indicator species such as butterflyfish (NOAA 2005). The studies compare the preserve site to control sites that are not designated as preserves approximately two years after implementation of the preserve regulations. The data suggest that fish stocks in the preserve areas are starting to recover, which contrasts with some non-preserve areas that are still declining. Data from within the Piti Bomb Holes Marine Preserve indicate there was a significant increase of 113% ($p < 0.001$) in the overall number of fish within the study site after the preserve rules were implemented. At non-preserve control sites, significant to minor decreases were noted (NOAA 2005).

War in the Pacific National Historical Park, Asan Beach Unit

The Asan Beach Unit of the War in the Pacific National Historical Park (NHP) is located within Navy submerged lands in the area between Adelup Point and Asan Point. Included in the park is the shore and reef flat from the seaward end of Adelup Point westward including Asan Bay to the west of Asan Point at the Matgue River, and seaward to Camel Rock (Gapan Islet). The following description of the marine environment in the area is taken from NPS (1983).

Intertidal beaches are composed primarily of bioclastic material with intermixed volcanic detrital debris. The shore from the area of the Asan River to Asan Point is mainly a man-altered, artificial coastline. Camel Rock is composed of raised pinnacled limestone.

The reef flat varies in width from 91 m (at the Asan Bay channel) to 978 m (west of Asan Point) but most of the reef-flat platforms are slightly more than 300 m in width. The complex consists of an intricate combination of intertidal reef and low-tide moats, with much of the outer reef is exposed at low tide.

Seagrass (*Ehhalus acoroides*) is found in widely scattered patches east of Adelup Point. Corals are widely scattered to abundant in the low-tide moat along the inner reef flat. The densest corals are found immediately west of Adelup Point and seaward of the raised coral headland. Abundant areas of soft corals are found west of Asan Point.

3.3.2.2 Protected Species

Large seagrass beds are located between the Piti Bomb Holes and Tepungan Beach (Fisheye Beach). They are found in the shallow intertidal waters near the beach on both sides of the Fish Eye boardwalk. These seagrass beds include all three species that grow on Guam: *Enhalus*, *Halodule* and *Halophila* species. Seagrass beds are not common habitats on Guam's reefs and are protected from degradation by regulatory agencies. Turtles have been known to frequent this area and seagrass beds are known to be feeding sites for the green sea turtle.

Black Noddy, Brown Noddy, Pacific Reef Heron, and the Yellow Bittern visit the area near Asan Point (NOAA 1994).

Several shorebirds, terns, pelagic and migratory bird species, including the Black noddy (*Anous minutus*), Brown Noddy (*Anous stolidus*), Pacific Reef Heron (*Egretta sacra*), and the Yellow Bittern (*Ixobrychus sinensis*) visit the area near Asan Point (NOAA 1994).

3.3.3 Cultural Resources

The Submerged Resources Center of the NPS has documented submerged cultural resources within the Asan Beach Unit of the NHP. The Asan Beach Unit is the site of the northern landing of the U.S. 3rd Marine Division during reinvasion of the island on July 21, 1944. The site still has guns, caves, pillboxes, and 445 acres of reefs and underwater relics. Prior to the famous landing, several battleships, cruisers, and destroyers stood offshore pummeling the landing zones with one of the lengthiest bombardments of World War II in the Pacific. Divers have found spent and live ammunition on the sand bottom and along the reef of Asan Bay.

Located just off the area known as Asan Cut and approximately 200 yards from the NHP visitor center is an amphibious tractor or LVT, located in 35 ft of water. Another site, reported by the Explosive Ordnance Disposal Group One in 1978, contains at least 64 tons of unexploded WWII Japanese and American ordnance. Although in poor condition, the ordnance sizes range from .30-caliber bullets to 500-pound bombs in a depth range of 30 to at least 130 feet (NPS 2003).

3.3.4 Uses

3.3.4.1 Past and Current Uses

The fierce battles of WWII greatly affected the offshore reefs in this region, and debris including unexploded ordnance remains on the bottom. Today this area is among the most popular dive and snorkel sites on the island.

Recreational Uses

North of Orote Point, from west to east, are numerous beaches and dive sites including: Luminao and Cabras seaward reefs, Piti Channel, Piti Bomb Holes Marine Preserve, Fish Eye Marine Park, The Amphitheater, Tepungan (Fisheye) Beach, Camel Rock, Asan Cut and Beach and Magandas Surf spot on Luminao Reef.

The Piti Bomb Holes Marine Preserve is regularly used by commercial dive companies for daily dives and is also the location of the Fish Eye Marine Park, underwater observatory.

Military Uses

At this time this area is not formally designated for military training purposes.

3.3.4.2 Proposed Uses

The Navy has not specifically identified areas within this section of submerged lands for future training purposes; however, as military needs change, some of these areas may be used in the future.

3.3.5 Current Management

No specific Navy regulations or COMNAVMAR instructions apply to this area of Navy submerged lands. However, the management of natural resources on Navy submerged lands within this reach is guided by overall Navy program requirements, guidelines, and standards for complying with resource protection laws, and conserving and managing natural resources on Navy administered lands (OPNAVINST 5090.1B CH-4). Relevant federal resource laws and executive orders for natural resource management on Navy submerged lands are listed in Section 2.3 and detailed in Appendix A.

War in the Pacific NHP

The War in the Pacific NHP was established by Public Law 95-348 in August 1978 and placed under the administrative control of the National Park Service (NPS). The law requires that the NHP be administered in accordance with provisions generally applicable to units of the NPS, more specifically the National Park Act, the National Trust Act, and the Historic Sites Act.

The War in the Pacific NHP is composed of seven separated sites, all located in the west central portion of Guam. The Asan Beach Unit of the NHP lies within Navy submerged lands between Adelup Point and Asan Point, and covers an area of approximately 109 land acres and 445 acres of submerged lands. There are three politically separate submerged areas of the NHP: the area belonging to the Navy (exclusive of the GovGuam Marine Preserve), the area belonging to the Government of Guam, and the area off Asan Beach belonging to the NPS.

The NPS asserts authority to manage the marine resources and all activities within the boundaries of the Asan Beach Unit belonging to the NPS. A NPS Draft Compendium outlines the goals, objectives and strategies for managing the NHP. Draft regulations are applicable to park access, fishing, wildlife protection, and recreational use. Significant management measures include the following:

- All GDAWR fishing regulations apply to waters within the Park;
- The Piti Bomb Holes Marine Preserve status is recognized and fishing is prohibited within NHP boundaries that overlay the preserve;
- Commercial fishing is prohibited within the Park;
- Water skiing is prohibited within the Park;
- Personal watercraft use is prohibited within the Park; and
- Specimen collection is prohibited, without a permit.

3.3.6 Management Issues and Use Conflicts

Management of access to the Glass Breakwater is currently unclear. Although coastal regulations give the public the right to access coastal areas, the presence of the Port Authority of Guam, as well as the ESQD and SDZ arcs and homeland security measures have made access to fishing, surfing and SCUBA locations in the seaward side of the Glass Breakwater problematic.

One of the sites often visited by newly certified divers is the Piti Bomb Holes Marine Preserve. Tsuda and Donaldson (2004) noted that snorkelers and scuba divers have caused considerable disturbances to the seagrass bed and corals at this site. The disturbances to the seagrass beds include physical impacts from walking on the seagrasses, an increase in turbidity, and decreases in fish abundance and diversity. Inexperienced divers are known to lie on and walk on the large coral mounds in and surrounding the bomb holes, causing chronic damage to the delicate coral growing tips.

Unexploded ordnance is found throughout this area especially at dive sites within the War in the Pacific NHP Asan Beach Unit.

The marine environmental management issues in this area that could affect the mission include:

- Water quality maintenance.
- Presence of threatened and endangered species and habitat.
- Presence of coral reefs.
- Concern over introductions of invasive species.
- Need for public access to recreation opportunities.

3.3.7 Recommended Management Measures

A Navy submerged lands literature review conducted in 2005 indicated that virtually no quantitative or detailed surveys have been carried out in this area. Several recommendations made in that document are applicable to this area and among them are the following that pertain to the area seaward of the Glass Breakwater:

- The coral reef ecosystems should be monitored using long-term transects.
- A geo-referenced map of near-shore coral reef ecosystems should be created and should include seagrass habitats.
- The geo-referenced map should also include areas that do not currently support coral reef ecosystems, yet have suitable environmental conditions for other marine life.

3.4 TANGUISSON AND FINEGAYAN INCLUDING THE HAPUTO ECOLOGICAL RESERVE AREA

3.4.1 Overview

This region of Navy submerged lands includes a thin slice of submerged lands off Tanguisson Beach Park and the area from Tanguisson Point to Urunao Point. The Haputo Ecological Reserve Area (HERA) is found in this area. North of this area is the Navy submerged lands off of NCTS, Finegayan (Figure 3-5).

The northwest coast of Guam is steep and composed of karst topography with generally limited marginal reef development. The coast faces west / northwest and is thus sheltered from the largest wave and current impacts. The central section of this coast is largely devoid of reef flats and is bounded mostly by narrow, supratidal benches, or rock faces without reef protection.

The HERA was established by the Chief of Naval Operations on March 15, 1984. This reserve was established as one of several mitigation measures implemented by the Navy to obtain approval from Federal and Government of Guam agencies for the construction of the ammunition wharf (Kilo Wharf) in Apra Harbor. The HERA is located along the NCTS Finegayan coast, extending from just north of Haputo Beach to just north of Double Reef. The area contains narrow, supratidal benches and unprotected rock faces. This ERA was chosen for its diverse assemblage of marine habitats. One of its most striking habitats is Double Reef.

The coastline in this area of Navy submerged lands includes only two small, localized but important reef flats: one off Haputo Beach and the second inshore of Double Reef (aka Pugua Patch Reef). Double Reef is the most striking offshore feature along the entire northwest coast of Guam because it is the beginning of a young barrier reef that breaks the ocean surface (Paulay et al. 2001).

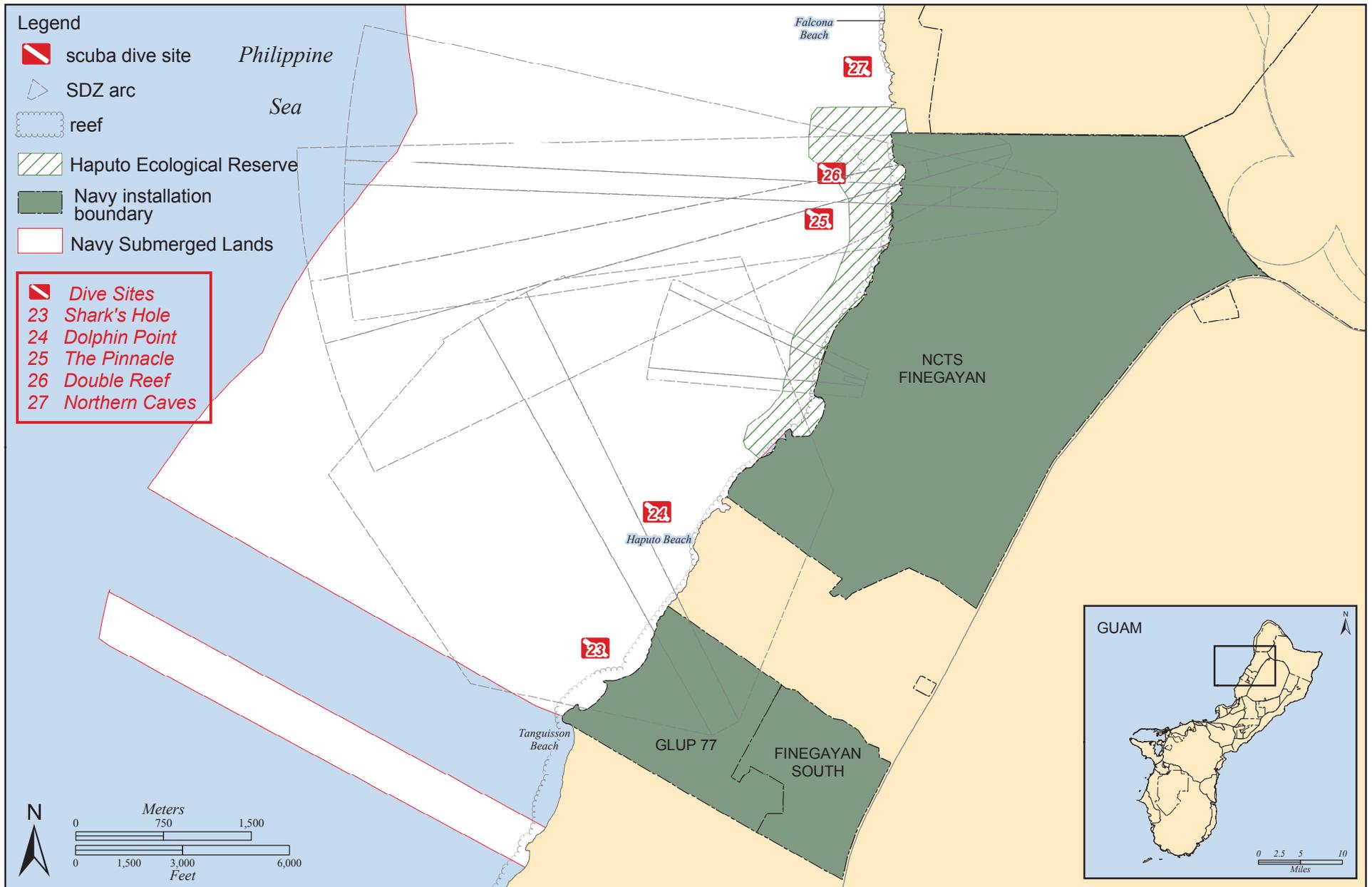


Figure 3-5
Tanguisson to Finegayan

Double Reef lies on a shallow shelf that extends considerably further from the coast than adjacent areas. The area around Double Reef is topographically heterogeneous because of topographic variation created by reef growth and the erosive action of the large quantities of freshwater discharge from the islands freshwater aquifer. Equally important is the heterogeneity of invertebrate biota created by the coral structure of Double Reef, which provides shelter for a large and diverse community. Other than Double Reef, the fore reef areas of the northwest coasts of Guam show relatively little variation in macrohabitat, but do illustrate widespread fine-scale variation in benthic communities (Paulay et al. 2001).

3.4.2 Natural Resources

3.4.2.1 Habitats and Biota

Two areas along this section of coast are discussed in detail below: the submerged portion of the Haputo Ecological Reserve Area, and the area surrounding Double Reef (which is within the HERA).

Haputo Ecological Reserve Area

The Haputo ERA coastline is characterized by exposed and narrow supratidal benches (less than 5m wide, raised approximately 0.5 to 1.5m above sea level) alternating with vertical cliffs. The submerged portion of the HERA is composed of 29 ha (72 acres) and extends offshore to a depth of just under 36m. The terrestrial portion of the HERA extends from the upper cliff line boundary to the mllw line where the marine portion begins. From the mllw line, the marine portion extends down to the edge of the outer reef margin and includes Double Reef (Pugua Patch Reef). The HERA includes a small reef flat and a fringing reef at Haputo and Double Reef beaches, Double Reef located offshore, and a ribbon of sea level benches and submarine terraces extending from one end of the HERA to the other. Coral and fish diversity are high, particularly at Double Reef, the submarine terraces, and the spur and groove zones of the reef margins. The HERA is popular among residents for hiking, wildlife viewing, crabbing, fishing, and beach-combing and seabirds and other migratory birds feed along the shoreline.

The following information on the Haputo ERA marine community is taken from Amesbury et al. (2001).

Amesbury found 21% of the known marine fauna of Guam within the HERA. These organisms consisted of 154 coral species, 583 species of other macroinvertebrates (>1 cm), and 204 fish species. The 154 coral species found in the HERA correspond to approximately 60% of the coral species known on Guam, and the 204 fish species make up 22% of the fish known on Guam. The marine portion of the HERA is therefore an area of relatively high biodiversity, however, overfishing, has greatly reduced the diversity and abundance of fish.

There are six main macrohabitats supporting corals in the Haputo ERA within the 1 to 18m water depth range: exposed benches, protected reef flats, Double Reef Top, the back reef, the shallow fore reef, and the deep fore reef. Macrohabitats on the deep fore reef support more diverse assemblages of corals, macroinvertebrates, and fish than the three shallow macrohabitats. Corals, however, have the greatest diversity in shallow water on Double Reef.

Coral cover ranged from 37 to 64% in the HERA. Coral cover is higher along transects taken at an 8m depth compared to those taken at 15m, and coral genera with the highest coverage in the HERA include *Porites* (deep area), *Montipora* (shallow area), and *Leptastrea*. Following is a short description of the six main macrohabitats in this area:

Exposed benches – Shallow splash pools are found in this area and support low diversities of corals, fishes, and cryptofauna. Shoreward of the benches and at the base of the cliffs are notches eroded by wave action on the rock face where species of limpets, chitons, slugs, and shore crabs can be found. The seaward edge of these benches is a steep subtidal face typically bioeroded by echinoids that supports corals, macroinvertebrates and fishes.

Protected reef flats – Off of Haputo Beach and shoreward of Double Reef are intertidal reef flats supporting a few species of corals (including *Pavona divaricata*), hermit crabs, crabs, sea slugs, and sea cucumbers that can withstand the environmental extremes of an exposed habitat. Corals and fishes are more common and diverse at the seaward margin of these reef flats.

Double Reef Top – This area is a reef front that supports healthy corals with greater than 75% coral cover consisting of *Acropora valida*, *A. digitifera*, and *Pocillopora* species. The exposed reef pavement has been honeycombed by echinoids. Details of this macrohabitat are found in the discussion of Double Reef below.

Back reef – This area to the east and south of Double Reef supports branching, plate, and massive corals including *Acropora palifera*, *A. acuminata*, *Porites rus*, and *Porites* spp. greater than 2m diameter. The soft coral *Asterospicularia randalli* is common and very abundant in this portion of the reef.

Shallow fore reef – This area includes a steep reef front and gently sloping fore reef starting at 4 to 8m in depth. Numerous cuts and channels are common along the shoreline and run through the fore reef creating substantial structural complexity. The highest coral cover, with 54 different species is found between these cuts and channels. Branching corals such as *Acropora* and *Pocillopora* species dominate the areas between 1 and 3m. Coral composition between 4 and 9m varies and includes some areas dominated by encrusting species of *Montipora* while other areas are dominated by massive *Porites* species. In addition, crevices and caverns within the reef front create a favorable habitat for sponges: Amesbury et al. (2001) recorded three new sponge species for Guam in this macrohabitat (*Neofibularia hartmani*, “yellow tough sponge,” and “puff sponge”).

The reef front part of the shallow fore reef contains very large and diverse faviid corals greater than 0.5m in diameter making this area distinctive compared to other locations of Guam. Elsewhere on Guam abundant large massive corals are largely composed of *Porites* species. Over 80% of the substrate in the reef front of this area is covered with corals consisting of faviid, mussid, and poritid species (*Leptoia phrygia*, *Goniastrea* spp., *Platygyra* spp., *Favia stelligera*, *Lobophyllia hemprichii*, and *Porites* spp.). Since these coral species are slow growing, are healthy and large in size, Amesbury et al. (2001) believe that this site has been able to withstand the pressures of *Acanthaster planci* predation as well as physical damage by storms.

Deep fore reef – This area extends from 9 to 18m in depth. Amesbury et al. (2001) found 52 species of corals, a species richness comparable to that found on the shallow fore reef. The coral community on the deep fore reef is healthy and dominated by *Porites* species. Two faviids

rare on Guam, *Favia helianthoides* and *F. maritima*, are common along the deeper parts of this habitat. The soft corals *Sinularia leptoclados*, *S. racemosa*, *Lobophytum batarum*, and *Sarcophyton trocheliophorum* are also common in this area.

Double Reef

Double Reef is one of the macrohabitats in the HERA and is well known for its unusually high coral cover and coral diversity compared to other areas on Guam, especially along the northwest coast of Guam. Coral cover around most of Guam is less than 20%, but in the Double Reef area coral cover averaged 46%. High coral cover on Guam is usually associated on reefs that are dominated by the ubiquitous coral *Porites rus*, including Apra Harbor and a number of other locations around the island. Although *P. rus* does dominate the reef immediately to the south of Double Reef, it is relatively rare elsewhere in the Double Reef area. Interestingly, the high coral cover at Double Reef is not limited to this small section where *P. rus* is dominant, but also other areas of Double Reef where *P. rus* is not dominant. Also important is the reef fronting Haputo Bay where large colonies of faviid and mussid corals dominate very high coral cover. Approximately 60% of the known coral fauna of Guam were encountered during a limited survey on this short reef section (Paulay et al. 2001).

In contrast to the great abundance and diversity of corals, surveys of local fish show low population density and had notably few fishes belonging to species targeted by fishers. The Double Reef area had considerably lower fish diversity and lesser abundance of large fish than the Orote-Agat reefs. Some of the differences between these areas may be the result of very different habitats. For instance, the Orote coast is washed by strong currents that carry large quantities of food for fish: it may also provide greater structural complexity with its dropoffs and giant boulder fields. Even with these caveats the low abundance of large fish in the Haputo ERA is striking according to Paulay et al. (2001). The overall low population density and low numbers of large fish indicates that overfishing is a serious problem in this area.

One other micro habitat noted for its diversity and unusual species of cryptofauna is the back reef portion of Double Reef. In addition, the caverns, fissures and freshwater seeps along the steep portion of the coast from the north end of Haputo to Pugua Point are also noteworthy in that they hold numerous species not previously seen on Guam, some of which may be endemic. According to Paulay et al. (2001) these species include crabs associated with freshwater seeps, sponges associated with the caverns, and probably numerous other species of cryptofauna.

3.4.2.2 Protected Species

The federally listed threatened green sea turtle is known to the area near Double Reef (NOAA 1994).

Spinner dolphins are also seen in the areas surrounding Double Reef. According to Roy Brown (personal communication, September 2007) the numbers are low compared to the Agat area, but there is some indication that when the dolphins are missing from the Agat area, they are found up in the Double Reef area. Environmental Sensitivity Index Maps prepared by NOAA for coastal environments in Guam show that Bottle nose dolphins and Spinner dolphins are common throughout the entire section of the Navy submerged lands from Tanguisson north to Ritidian Point.

3.4.3 Uses

3.4.3.1 Current Uses

Military Uses

The U.S. Navy owns the submerged lands off of NCTS, Finegayan for a distance of three geographical miles seaward and these waters are used often for military training purposes. Authorized training activities include over-the-beach training for Navy Special Warfare Units, Special Forces, and Marine Reconnaissance teams; use of existing trails to scale the cliff and reach Northwest Field for inland maneuvers, Training in an Urban Environment (TRUE), and finally, the use of the Haputo small arms range. Access to the beach from the water is critical for this training.

Periodic weapons re-qualification and base security drills are conducted on land at Finegayan. The small arms range is oriented to fire towards the northwest on the plateau above the cliffs between Haputo and Double Reef Beaches. The range's two-dimensional SDZ extends to the northwest over water, however the range itself is confined on both sides and behind the targets by high dirt berms, which act as bullet barriers. In addition, Naval Special Warfare, Special Operations, and Marine Reconnaissance units use Haputo and Double Reef beaches as entries to Northwest Field for field training (COMNAVMAR 2000).

Recreational Uses

The HERA is popular for hiking, wildlife viewing, fishing, crabbing and beach-combing. Much of it is not open to the general public and is accessible by land only to those with access to NCTS Finegayan. Dive sites are generally accessible by boat to the general public. Popular dive sites and beaches include the following, from south to north: Tanguisson Beach, Sharks' Hole, Dolphin Point, Haputo Beach, The Pinnacle, Double Reef, Northern Caves and Falcona Beach.

3.4.3.2 Proposed Uses

Waters off NCTS Finegayan have been proposed as a potential location for deep-water explosive ordnance disposal (EOD). As part of the relocation of the Marine Corps from Okinawa to Guam, the Marines are proposing NCTS Finegayan as locations for their infrastructural requirements, including buildings, housing, and training facilities. The Marines are also proposing the building of two small arms training facilities comprising 30 firing points and a surface danger zone (SDZ) over water. With the exception of the SDZ extending over the waters off NCTS Finegayan, most of these proposals will not impact Navy submerged lands in this area.

3.4.4 Current Management

The Haputo Ecological Reserve Area Management Plan was prepared by the Navy Pacific Division, Naval Facilities Engineering Command, in January of 1986. The Management Plan is outdated and needs revision, but the existing regulations are reproduced below (NAVFAC 1986a). The purpose of the ERA is to preserve the specified habitat and the focus of the Management Plan is to protect the HERA ecological communities from change.

Prohibited Recreational Activities:

- To remove, injure, trap, kill or possess any form of or parts of any mineral, plant, wildlife or fish except as provided for in the Management Plan;
- To possess or use any firearm, bow and arrow or any other weapon, trap, snare, poison or any device designed to take, capture, or kill wildlife or to possess or use any explosives, poison or any other chemical to kill or capture fish or other marine life except as provided for in the Management Plan;
- To introduce any form of non-indigenous plant or animal life into the ERA;
- To damage, destroy or harvest for any purpose any coralline structure or fossil within the ERA except as provided for in the Management Plan;
- To operate any land or air vehicle within the ERA except as provided for in the Management Plan;
- To remove, alter, deface or otherwise damage historical or cultural sites or artifacts found within the ERA in accordance with the National Historic Preservation Act of 1966, as amended, as well as 32 CFR Part 229 and other historic preservation statutes and regulations.

Permitted Recreational Activities:

- Recreational and subsistence fishing by pole or hand line from either shore or boat, as well as spear fishing, is allowed within the ERA subject to existing Federal or Government of Guam laws, Navy regulations. All Federal and Government of Guam laws, rules and regulations relating to fishing or harvesting of marine life shall be complied with;
- Recreational shell collecting is allowed within the ERA. Only non-destructive collecting methods (picking up by hand from beaches or the shore or without the use of pry-bars or similar tools in the water) are permitted;
- Swimming, picnicking and associated beach activities are permitted on a day-use basis on all ERA beach areas. Overnight camping and associated activities including controlled fires are permitted on a regulated basis in designated areas only. All activities of this nature are to be in accordance with standing NCTS security regulations which require the users of the Haputo Beach Area to register with Station Security prior to each entry;
- Snorkling and other associated non-consumptive recreational activities are permitted within the marine unit of the ERA.

Research and scientific studies involving clear objectives and scopes of study are permitted within the HERA. Approval for the use of HERA for scientific study purposes is required prior to beginning the study. Exempted from the need for approval are the FWS, NMFS and DAWR, when conducting routine, ongoing fish and wildlife or marine surveys. Approval also need not be obtained by these agencies for other routine scientific investigations and emergency actions deemed necessary for the survival of a species or for the preservation of the HERA.

3.4.5 Management Issues and Use Conflicts

The management issues for natural resources in the submerged lands in this area that could affect the Navy's mission include:

- Protection of Haputo Ecological Reserve Area,
- Presence of threatened and endangered species and habitat.
- Presence of coral reefs.
- Concern over introductions of invasive species.
- Need for public access to recreation opportunities.
- Development of housing and required infrastructure and proposed training activities.

Potential impacts from military training in this area creates conflicts with the recreational uses of the area and issues relative to the management of the areas natural and cultural resources. The principal issues for this area are as follows:

Range training – In spite of barriers, a small fraction of the ammunition will miss the backstops and continue out to sea. No significant impacts to marine life are expected from their landing in the ocean. The release of lead or other metals into the ocean is prevented by the accumulated coating of hard water minerals, which prevents exposure (Belt Collins 1999). However, there is a potential for seabirds or larger marine life to ingest the projectiles.

Underwater demolitions – This can create damage through direct explosive effects, which may harm or kill sea turtles, marine mammals, or fish. Potential acoustic impacts are also a concern.

Impact to corals – Sedimentation during land-based construction as well as ordnance training may cause impacts if corals are too close to training locations.

Beach landings – Use of Haputo beach by landing craft, tracked, and/or wheeled vehicles will not be allowed, as it is part of the Haputo ERA. Landings can result in alterations to the beach's topography, which could result in increased erosion, habitat disruption for shorebirds, and possible impacts to sea turtle nesting habitat.

Public use – Public use of the Haputo ERA would be minimally impacted, as access would only be restricted during training exercises.

3.4.6 Recommended Management Measures

The reserve has extraordinary potential for marine education and awareness programs, as well as an ideal site for research. Recreational fishing is common at present and needs to be regulated to assure future fish stocks in the area. The marine portion of the HERA should be protected to the maximum extent possible. Although the management plan prepared in 1986 is outdated and needs revision, many of the recommendations remain valid (USFWS 1986a).

- Surveys of crown-of-thorns starfish populations to 20 m in depth should be conducted annually. The timing of these surveys should be coordinated with appropriate agencies and local scientists.
- Quantitative surveys of coral and fish communities are needed to document changes in population structure and composition and should be conducted periodically. In addition, long-term monitoring of other biological resources is recommended.

- The HERA has been defined as a pristine, rich, and diverse marine community by Stojkovich (1977). As it continues to be a popular diving and fishing site, the following measures should be implemented to limit human impacts to the resources:
 - Removal of live coral and invertebrates by collectors should not be allowed.
 - Anchors and anchor chains are known to dislodge coral colonies and injure reef framework and scar and crush corals, thus increasing infections and possible diseases (Davis 1977). To alleviate this problem, anchoring of small boats should be limited to the sand channels and pockets found in the submarine terrace between the Double Reef and the beach. A better, though costly alternative, is installing permanent anchor buoys in high use areas.
 - Effective measures to control illegal fishing activities should be designed through coordination with DAWR. One suggestion is for military security personnel to include this area for patrol and to scan the submerge portions of the HERA from the cliff line.
- Personnel from military security should be tasked with patrolling the area to assure that fishing and other uses follow regulations.
- The installation of interpretive displays describing the resources and natural history within the HERA would enhance appreciation of the site by Navy personnel and their families. In addition, a brochure describing the resources would be a valuable educational tool. These should be made available to schools and incoming personnel for educational purposes.
- Threatened and endangered species and their habitat should be avoided.
- Sensitive habitat and areas with concentrations of protected species should be designated as No Training (NT) or No Wildlife Disturbance (NWD) areas.
- Noise should be controlled in the NWD areas.
- Underwater demolition should continue to follow existing Navy protocol for the protection of sea turtles and other marine organisms. The presence of protected species should always be determined in pre-demolition training surveys. The size of explosive charges should be limited and post-exercise surveys should be performed to assess impacts.
- Public access for recreational use of natural resources in the HERA should be improved, including access to beaches and coastal areas for swimming, beachcombing, fishing, trapping, boating, bird watching, snorkeling, and SCUBA diving.
- The use of SCUBA while spear fishing should be prohibited, especially at night.
- A geo-referenced map of near-shore coral reef ecosystems should be created and should include seagrass habitats.
- The geo-referenced map should also include areas that do not currently support coral reef ecosystems, yet have suitable environmental conditions for other marine life.

3.5 RITIDIAN POINT

3.5.1 Overview

This region of Navy submerged lands includes the area from north of Falcona Beach on the northwest coast of Guam around Ritidian Point and east to the border of Tarague Beach (Figure 3-6). The USFWS manages 401 acres of submerged lands bordering the Guam National Wildlife Refuge (GNWR) at Ritidian Point from the high tide mark out to the 100 ft bathymetric contour. East of the section of Navy submerged lands begins the submerged lands under the jurisdiction of the USAF.

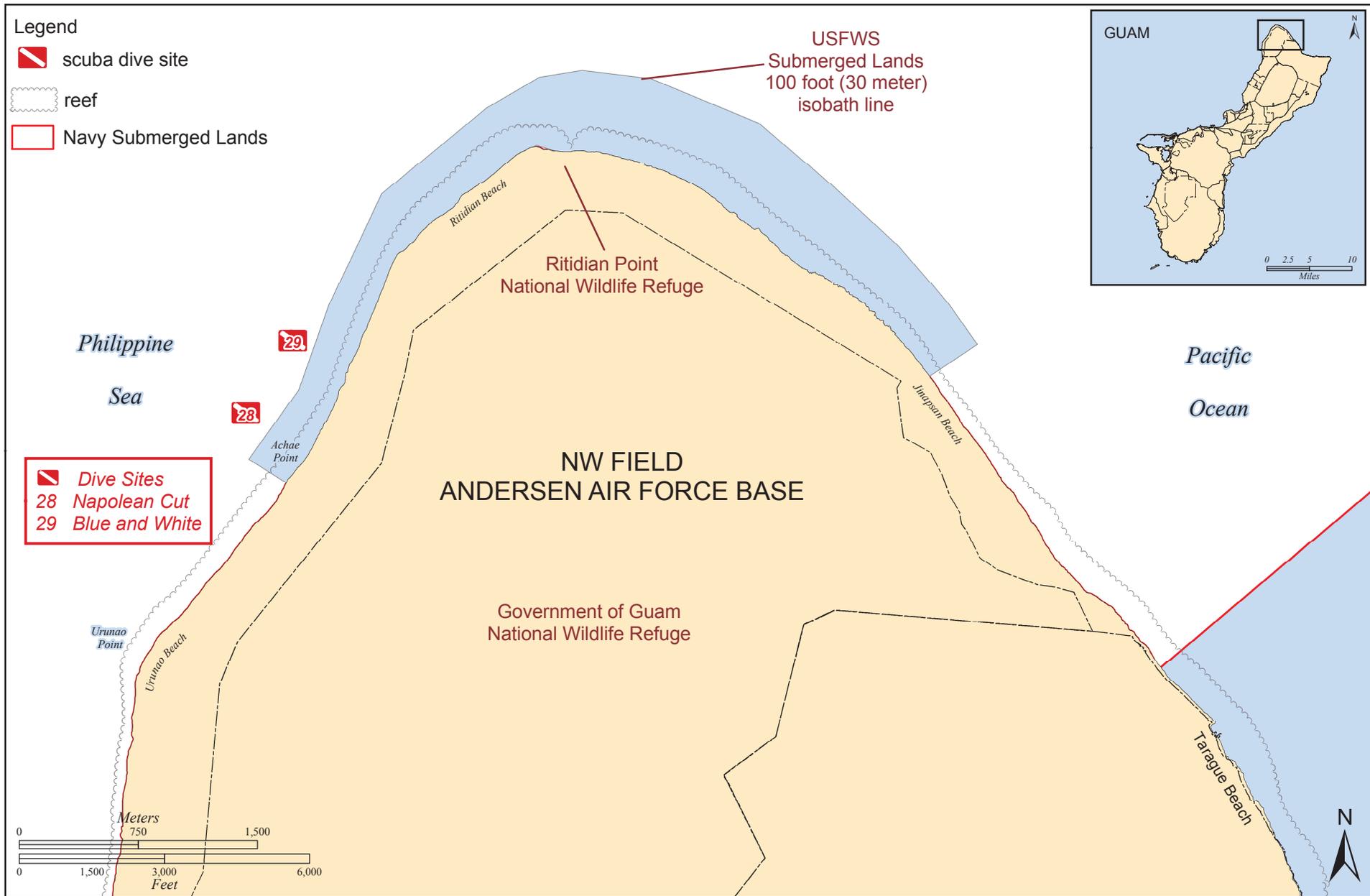


Figure 3-6
Ritidian Point

In general, this area of Guam's coast is a high-energy environment with strong currents inside and outside the reef margin. Looking at Guam as a whole, coral cover and diversity are typically highest in the area beginning roughly at Falcona Beach on the northwest coast, continuing clockwise around the northern coast (and within this part of Navy submerged lands), and extending down to Pagat Point on the eastern side of the island. Although the reefs between Tanguisson Point and Falcona Beach also have high coral cover and diversity, they are heavily fished and have higher recreational use than the reefs to the north (Amesbury et al. 2001, NOAA 2005).

3.5.2 Natural Resources

3.5.2.1 Habitats and Biota

The area as a whole contains a narrow fringing reef, much of which is an algal reef.

Ritidian Point and the Guam National Wildlife Refuge

The northern tip of Guam is bordered by a nearshore narrow fringing reef composed primarily of coralline algae on the eastern end and corals on the western end (NCCOS/NOAA 2005 and Guam Coastal Atlas 2005). The shallow parts of the reef flat are primarily populated by macroalgae with the intertidal area colonized by seagrasses. Corals increase moving towards the reef margin with between 10 and 50% coral cover (NCCOS/NOAA 2005). The fringing reef is bisected in several locations by bays and channels as well as areas of seagrass. Along the coast between Achae Point and Ritidian Channel, the fringing reef and fore reef area transitions from a 250 m wide swath of coral to an area populated by turf algae approximately 200 to 500m wide. Seagrasses are especially abundant in a small bed in the Ritidian area (NAVFAC Pacific 2005b).

3.5.2.2 Protected Species

The green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), are Federally protected species that nest on beaches throughout this area or forage in waters offshore (NOAA 1994). Green sea turtles are known to forage in offshore waters and nest on beaches in the Tarague Beach area (Davis 1991). Although more recent data on turtle nesting is not available, in 2000, Andersen AFB observed one active green sea turtle nest with 16 crawls. However, no active nests were found in 2001.

Spinner (*Stenella longirostris*) and Bottlenosed (*Tursiops gillii*) dolphins are also common in the offshore waters throughout this entire area from Falcona Beach to Tarague Beach (NOAA 1994).

Terns and pelagic birds, including the Brown noddy (*Anous solidus*), Red-footed booby (*Sula sula*) and the Brown booby (*Sula leucogaster*) are known to frequent the eastern portion of Navy submerged lands in this area from Ritidian Point to Jinapsan Beach.

3.5.3 Uses

3.5.3.1 Past and Current Uses

Approximately 600 years prior to the Spanish colonization of Guam, a large Chamorro settlement thrived at Litekjan (Ritidian). The village of Ritidian was abandoned in the 1680s.

Prior to 1944 the waters surrounding Andersen Air Force Base (AAFB) were unspoiled by anthropogenic causes. It was during World War II that AAFB, then named North Field, was first opened for use as a staging area for B-29 Superfortress bombers. It was the influx of military personnel and families as well as construction workers into the base area and increased use of the beaches that began impacts to the submerged lands.

Military Uses

At this time, this area of submerged lands is not identified for specific training purposes.

Recreational Uses

Several beaches and dive sites are located in this area moving clockwise from the south: Urunao Beach, Napoleon Cut, Blue and White, Ritidian Beach, Jinapsan Beach, Tarague Beach and the AAFB Marine Resources Preserve.

The Guam National Wildlife Refuge is located at Ritidian Point. The GNWR provides educational services to the public, and is visited by over 75,000 residents and tourists a year.

3.5.3.2 Proposed Uses

Recent USAF proposals include the development of ISR/Strike capability at AAFB to include permanently assigned Global Hawk UAV aircraft, permanently assigned tankers, and facilities and support infrastructure for rotational fighters and bombers. Proposed development to accommodate Navy and USMC initiatives include the ACE bed-down at AAFB, which includes construction of additional hangars, helicopter ramp space, construction of a new Crash Fire Rescue facility and development of up to 70 acres to accommodate facility requirements. Plans for Andersen Northwest Field (NWF) include a variety of support initiatives for training programs of the RED HORSE squadron, the Silver Flag training unit, the Commando Warrior program, and the Combat Communication squadron.

Although none of these proposals identify Navy submerged lands to be used for training or facility requirements, the increase in development on the base has the potential to increase impacts to the submerged lands. Additionally, as military needs change, these lands may be identified for use in the future.

3.5.4 Current Management

The Guam National Wildlife Refuge (GNWR) was established in December 1993 and covers an area of approximately 97.1-sq-km around Ritidian Point. The memorandum of understanding (MOU) between the USFWS, the Navy, and the USAF established the goals and regulations of

the GNWR. The purpose of this MOU was to develop cooperative agreements for the management of Guam's natural resources on federal and conservation lands (GDAWR 2005). The management of the GNWR consists of eight administrative units, five of which are noncontiguous, or under two different legal authorities. The GNWR is located in seven DoD units on active military bases where the USFWS has consulting rights and management obligations. A second fee title area is wholly owned and managed by the USFWS at Ritidian Point. Of the 771 acres owned and managed by USFWS, 401 acres are submerged lands and 371 acres are terrestrial habitat.

The USFWS asserts authority to manage the marine resources and all activities within the refuge boundaries of the Ritidian Unit pursuant to the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997. Therefore, the waters fronting the GNWR, Ritidian Unit are managed by the USFWS. USFWS regulations governing uses within the GNWR can be found in 50 CFR Part 32 (WPRFMC 2005).

The GNWR is currently preparing a Comprehensive Conservation Plan (CCP) for the refuge lands, both terrestrial and submerged. This CCP will outline the goals, objectives and strategies for managing the refuge and will be updated every 15 years. The plan will assure that the purposes of the refuge; the long-term conservation of fish, wildlife, plants and their habitats; and the public uses of the refuge, including wildlife observation and photography, hunting, fishing, interpretation, and environmental education, are compatible with the goals of conservation. The final CCP is targeted for completion in late 2008.

The AAFB Integrated Natural Resources Management Plan (INRMP) contains certain management measures that may be applicable to adjoining submerged Navy lands. These include:

- The collection of marine organisms, dead or alive, is prohibited with the exception of hook and line fishing from shore in designated areas. Spearfishing and the use of fishing nets are prohibited.
- Current management programs include law enforcement, marine population surveys, and tagging and nesting studies performed by AAFB and GDAWR. Funding has been provided by AAFB to GDAWR to track turtle activity. Activities that may impact sea turtle nests, alter the natural topography (such as tire ruts on the beach) are prohibited.
- The use of vehicles on the beach is prohibited because of potential impact to turtle nests and beach topography.

AAFB Regulations and procedures related to fishing activities include the following:

- The entire AAFB coastline is a designated Marine Resources Preserve.
- Spearfishing is prohibited in waters that are under the control of AAFB.
- All net fishing is prohibited in waters that are under the control of AAFB.
- The possession of spears, spear guns, or nets, in the water or within 20 meters inland of the mean high tide mark signifies the intent to fish illegally and violators will be prosecuted.
- "Chumming" is prohibited in waters that are under the control of AAFB.
- Trolling from a boat may be conducted from the reef margin seaward for pelagic fish only. Persons catching non-pelagic fish shall release them immediately upon capture. Where the reef margin is not well defined because of gaps or undulations in the reef, the margin shall be defined by drawing a point between the two marine markers.

3.5.5 Management Issues and Use Conflicts

Constraints relative to the marine environment in this area that could affect the mission include:

- Presence of threatened and endangered species and habitat.
- Presence of refuge areas.
- Presence of protected migratory birds.
- Need for public access to outdoor recreation opportunities.
- Presence of coral reefs.
- Need for public access to recreation opportunities.
- Concern over introductions of invasive species.

3.5.6 Recommended Management Measures

Several recommendations were made in the Literature Review of Navy Submerged Lands on Guam (NAVFAC Pacific 2006a). Those that pertain to this area of submerged lands include:

- The coral reef ecosystems should be monitored using long term transects.
- A geo-referenced map of near-shore coral reef ecosystems should be created and should include seagrass habitats.
- The geo-referenced map should also include areas that do not currently support coral reef ecosystems, yet have suitable environmental conditions for other marine life.

4 SUMMARY OF RECOMMENDED MANAGEMENT ACTIONS

The goals for management of the Navy's submerged lands around Guam are as follows:

1. Maintenance of the military mission capability,
2. Compliance with all applicable laws, regulations, executive orders and instructions,
3. Protection of natural and cultural resources, and
4. Enhancement of opportunities for public recreational use.

To some extent the objectives and implementation strategies of Goal 1 overlap with those of Goals 2 and 3 because violations of legal guidelines, which also require protection of natural and cultural resources, will result in disruptions to mission-related activities, whether they be facilities related or operations related.

Goals 3 and 4 are shared with other agencies with jurisdiction over submerged lands around Guam. Included in the implementation strategies below are various projects that have been suggested by GDAWR, NOAA, and the USFWS for marine resources. These are identified with the suggesting agency in parentheses.

4.1 GOAL 1 – MAINTENANCE OF THE MILITARY MISSION CAPABILITY

Goal 1 Objectives and Implementation Strategies

- A. Maintain and enhance as appropriate the capabilities of Apra Harbor to support all necessary military operations.

Implementation Strategies for Goal 1, Objective A:

- Construct, operate and maintain adequate marine facilities to support mission requirements.
- Coordinate with the Port Authority of Guam to minimize operational conflicts in the harbor and make efficient use of available facilities.
- Continue to maintain ESQD restrictions.
- Maintain control over recreational uses in the harbor including restricting uses or areas of use when necessary (e.g. EOD training exercises).

- B. Maintain and enhance as appropriate the capabilities of Navy submerged lands to support necessary military training functions.

Implementation Strategies for Goal 1, Objective B:

- Update, modify as appropriate and continue to implement the guidance provided in the COMNAVMARIANAS Training Manual, which specifies measures to be taken to avoid or minimize training-related impacts to natural and cultural resources.
- Continue to evaluate the opportunities and constraints to uses of various submerged lands given the increased training needs on Guam.

- C. Continue to avoid impacts to the marine environment and users in offshore SDZs.

Implementation Strategies for Goal 1, Objective C:

- Continue to enforce range use protocols and maintain physical barriers for errant projectiles.

4.2 GOAL 2 – COMPLIANCE WITH LAWS, REGULATIONS, EOS, AND INSTRUCTIONS

Goal 2 Objectives and Implementation Strategies

- A. Avoid any violation, breach, oversight or conflict situation with legal mandates.

Implementation Strategies for Goal 2, Objective A:

- Ensure that appropriate guidance and training concerning environmental protection is provided to appropriate personnel.
- Ensure that all required plans, reports, and forms are completed and maintained in a timely manner.
- Ensure that all necessary documentation is prepared and approved prior to initiating any action with potential effects on the marine environment.
- Update Cooperative Agreements for Law Enforcement with appropriate Government of Guam and Federal resource agencies.

4.3 GOAL 3 – PROTECTION OF NATURAL AND CULTURAL RESOURCES

Goal 3 Objectives and Implementation Strategies

- A. Minimize or eliminate impacts to natural resources from facilities construction, renovation, or operation.

Implementation Strategies for Goal 3, Objective A:

- Assess potential impacts from facilities construction or renovation and devise appropriate mitigation measures. Comply with measures specified in any necessary permits.
- Ensure proper erosion controls are in place when site work is required.
- Ensure proper turbidity controls are in place during dredging operations.
- Ensure that wastewater has adequate treatment prior to ocean discharge and that the discharge has minimal negative impact on important habitats.
- Provide settling basins to minimize particulate matter in stormwater runoff.
- Ensure that leachate from landfills does not contaminate ocean waters.

- B. Protect listed species and species of concern.

Implementation Strategies for Goal 3, Objective B:

- Prohibit take of listed species and species of concern.
- Prohibit take of live mollusks and aquarium fish.
- Prohibit commercial take of marine resources.
- Minimize lighting on nesting beaches.

- Stop direct and indirect harvest of sea turtles and eggs through education and law enforcement actions.
- Determine population size and status of sea turtles through regular nesting beach and in-water censuses.
- Provide DAWR with 2-4 satellite tags for sea turtles (DAWR).
- Identify and protect primary nesting and foraging areas for the species.
- Eliminate adverse effects of development on sea turtle nesting and foraging habitat.
- Control nonnative predators of turtle eggs and hatchlings (e.g., feral cats and monitor lizards).
- Support research into ecological requirements of native species.
- Determine occurrence, relative abundance and distribution of marine species.
- Identify, characterize and map spawning areas of resident fishes (DAWR).

C. Protect important habitats including coral reefs, seagrass beds, mangrove forests, wetlands, ERAs, EFH and HAPC.

Implementation Strategies for Goal 3, Objective C:

- Minimize damage from natural events through adherence to regulations for erosion control, debris removal, fuel storage, hazardous materials/waste handling and storage.
- Prohibit destructive fishing methods.
- Conduct creel surveys of fishing on base (DAWR).
- Develop a management plan for Sasa Bay (DAWR).
- Update management plans for Orote and Haputo ERAs (NOAA).
- In coordination with resource agencies, conduct a better assessment of resources in Apra Harbor including identification of sensitive areas (NOAA).
- Establish permanent monitoring sites in the ERAs (NOAA).
- Cooperate with other federal and Guam agencies to monitor the condition of important habitats.
- Coordinate actions and programs and share data with the Guam Coral Reef Initiative Coordinating Committee (GCRICC).
- Install permanent multiple mooring buoy anchors to allow rotating of buoys where frequent anchoring can damage important habitat.
- Acquire and train adequate staff to implement and oversee environmental and cultural resources mandates.
- Implement a volunteer conservation program (DAWR).
- Initiate reforestation programs in suitable upland areas.

D. Minimize habitat damage from recreational uses.

Implementation Strategies for Goal 3, Objective D:

- Limit types and or amount of use where necessary. Identify areas where potentially destructive uses (i.e., jet skis) will be permitted.
- Study the impacts of recreation on submerged lands (DAWR).
- Install permanent multiple mooring buoy anchors to allow rotating of buoys where frequent anchoring can damage important habitat.
- Spearfishing with SCUBA should be prohibited.

E. Develop a greater understanding of human impacts to reef ecosystems.

Implementation Strategies for Goal 3, Objective E:

- Cooperate with other agencies and organizations to fund, facilitate and conduct appropriate research
- Develop and strengthen cooperative agreements with the USFWS, NMFS, AAFB and GDAWR to establish/continue nesting turtle monitoring, protection of nesting and foraging habitat and tracking migrating turtles.

F. Minimize risk of introduction and establishment of aquatic invasive species.

Implementation Strategies for Goal 3, Objective F:

- Establish protocols for hull inspection and cleaning.

G. Increase public awareness

Implementation Strategies for Goal 3, Objective G:

- Participate in joint development of outreach campaigns to educate the public of the value of preserving Guam's marine environment and the laws that protect it. This should include awareness of the different behaviors and activities that have little impact as well as high impact on the marine environment.
- Implement a program to inform residents and contractors about environmental programs and requirements.
- Provide better educational information to dive companies, including MWR (NOAA).
- Assist in educating the public about the serious environmental consequences of wildland arson.

H. Enforcement

Implementation Strategies for Goal 3, Objective H:

- Provide proper education on environmental laws and other requirements for enforcement and increase enforcement staff to levels capable of enforcing regulations.

4.4 GOAL 4 – ENHANCEMENT OF OPPORTUNITIES FOR PUBLIC RECREATION

Goal 4 Objectives and Implementation Strategies

A. Maximize public access to Navy submerged lands for recreational purposes.

Implementation Strategies for Goal 4, Objective A:

- Assess security risks and institute appropriate policies and procedures to enhance public access to Navy submerged lands consistent with security requirements.
- Increase fishing access (NOAA)
- Spearfishing with SCUBA should be prohibited.

B. Minimize UXO risk to recreational users of Navy submerged lands.

Implementation Strategies for Goal 4, Objective B:

- Survey public use areas for the presence of UXO and assess the risk to recreational users. Take action as appropriate based on risk assessment.

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Appendix A

Laws, Regulations, Military Directives, Memorandums of Agreement, and Cooperative Agreements

Appendix A

Laws, Regulations, Military Directives, Memorandums of Agreement and Cooperative Agreements

Federal Laws and Executive Orders	
Authority	Narrative Summary
Abandoned Shipwreck Act of 1987	This act, PL 100-298, defines and clarifies access and ownership rights and directs the Director of the National Park Service to prepare guidelines, in consultation with appropriate public and private section interests, to administer and manage underwater resources.
Antiquities Act of 1906 (PL 59-209, 16 USC 431-433)	Within this act, the President of the United States is authorized to declare historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest, that are situated upon the lands owned or controlled by the Federal Government, to be national monuments (16 USC 431). Permits for the examination of ruins, the excavation of archaeological sites, and the gathering of objects of antiquity upon the lands under their respective jurisdictions, may be granted by the Secretaries of the Interior (SOI), Agriculture, and Army to institutions they may deem properly qualified to conduct such examination, excavation, or gathering, subject to such rules and regulations as they may prescribe.
Archaeological and Historic Preservation Act of 1974 (Moss-Bennet Act) (16 USC 469-469c)	This act, PL 93-291 (amends PL 86-523), directs Federal agencies to notify the Secretary of the Interior (SOI) when they find that any Federal construction project or Federally-licensed activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data. It also provides criteria for funding historical and archaeological protection for such resources.
Archaeological Resources Protection Act of 1979 (PL 96-95, 16 USC 470aa-470ll)	This act was last amended in October 1988. The purpose of this act is to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data which were obtained before 1 October 1979 (16 USC 470aa(b)).
Clean Water Act, § 404; (33 USC 1311)	Section 404 of this act (33 USC 1344) requires that all discharges of dredged and fill material in the waters of the United States, including wetlands, meet the requirements of USEPA's 404(b)(1) guidelines (40 CFR 230) and obtain water quality certification from the state (33 USC 1341) unless exempted by Congress through implementation of Section 404(r).
Coastal Zone Management Act of 1972 (16 USC 1451, <i>et seq.</i>)	The CZMA provides protection of land/ocean resources in the coastal zone (on Guam non-Federal property) within the Territory including offshore islands, submerged lands and waters to three miles. Impacts of proposed actions on coastal zones must be assessed. The Guam Bureau of Planning is the lead agency for conducting Consistency Reviews.

Federal Laws and Executive Orders	
Authority	Narrative Summary
Comprehensive Environmental Response Compensation and Liability Act (Superfund) of 1980, (26 USC 4611-4682, PL 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish cleanup standards, assign liability, and other efforts to address environmental contaminants. The Installation Restoration Program (IRP) guides cleanup efforts at DoD installations.
Endangered Species Act of 1973 (16 USC 1531-1544, 87 Stat. 884), as amended	The ESA provides Federal protection for species that are considered under threat of extinction throughout all or a portion of their range and their designated critical habitat. Includes provisions for listing, recovery, delisting, consultation, coordination, law enforcement, mitigation and habitat conservation planning.
Executive Order 11514, Protection and Enhancement of Environmental Quality	Installations to initiate measures needed to direct their policies, plans and programs so as to meet national environmental goals.
Executive Order 11593, Protection and Enhancement of the Cultural Environment	The Federal Government shall provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Agencies of the executive branch of the Government (hereinafter referred to as 'Federal agencies') shall (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, (2) initiate measures necessary to direct their policies, plans and programs in such a way that Federally-owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored and maintained for the inspiration and benefit of the people, and (3), in consultation with the Advisory Council on Historic Preservation (16 U.S.C. 470i), institute procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-Federally-owned sites, structures and objects of historical, architectural or archaeological significance.
Executive Order 11987, Exotic Organisms	Executive agencies shall, to the extent permitted by law, restrict the introduction of exotic species into the natural ecosystems on lands and waters which they own, lease, or hold for purposes of administration; and, shall encourage the States, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States.
Executive Order 11990, Protection of Wetlands	Under this EO, dated 24 May 1977 and amended by EO 12608, dated 9 September 1987, each Federal agency must provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Each agency, to the extent permitted by law, must avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds: (1) that there is no practical alternative to such construction, or (2) that the proposed action includes all practical measures to minimize harm to wetlands that may result from such use. In making this finding the head of the agency may take into account economic, environmental and other pertinent factors (Section 2(a)). Each agency must also provide an opportunity for early public review of any plans or proposals for new construction in wetlands (Section 2(b)).

Federal Laws and Executive Orders	
Authority	Narrative Summary
Executive Order 12088, Federal Compliance with Pollution Standards	This EO, dated 13 October 1978, requires Federally-owned and operated facilities to comply with applicable Federal, state, and local pollution control standards. It makes the head of each executive agency responsible for ensuring that the agencies, facilities, programs, and activities the Agency funds meet applicable Federal, state, and local environmental requirements for correcting situations that are not in compliance with such requirements. In addition, the EO requires that each agency ensure that sufficient funds for environmental compliance are included in the agency's budget.
Executive Order 12114, Environmental Effects Abroad of Major Federal Actions (32 CFR 187)	This EO was issued in 1979 to further environmental objectives consistent with U.S. foreign and national security policies by extending the principles of the NEPA to the international stage. Under EO 12114, federal agencies that engage in major actions that significantly affect a non-U.S. environment must prepare an EA of the action's effects on that environment. This is similar to an environmental impact statement (EIS) or EA developed under the NEPA for environments in the U.S. Certain actions, such as intelligence activities, disaster and emergency relief actions, and actions that occur in the course of an armed conflict, are exempt from this order. Such exemptions do not apply to major Federal actions that significantly affect an environment that is not within any nation's jurisdiction, unless permitted by law. The purpose of the order is to force Federal agencies to consider the effects their actions have on international environments.
Executive Order 12962, Recreational Fisheries	This EO, dated 7 June 1995, mandates that Federal agencies, to the extent permitted by law and where practicable, improve the quality, function, and sustainable productivity and distribution of U.S. aquatic resources for increased recreational fishing opportunities. This EO also established the National Recreational Fisheries Coordination Council.
Executive Order 13089, Coral Reef Protection	This 1998 Executive Order directs Federal agencies to study, restore, and conserve U.S. coral reef ecosystems. It established a U.S. Coral Reef Task Force, and the U.S. Department of Defense has submitted a Coral Reef Protection Implementation Plan to this Task Force. It is the policy of the Department of Defense to identify important reef areas held in trust by the U.S. Military, develop management guidelines and policies to enhance protection of coral reef ecosystems, and initiate long-term monitoring efforts to determine the health of these ecosystems over time.
Executive Order 13112, Invasive Organisms	Requires Federal agencies to restrict introduction of invasive species into the natural ecosystems on Federal lands. An "invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.
Executive Order 13158, Marine Protected Areas	This EO, dated 26 May 2000, mandates strengthening the management, protection, and conservation of existing marine protected areas (MPA) and establishment of new or expanded MPAs; the development of a scientifically based, comprehensive national system of MPAs representing diverse U.S. marine ecosystems and the Nation's natural and cultural resources; and avoiding causing harm to MPAs through Federally-conducted, approved, or funded activities [Added July 2000].

Federal Laws and Executive Orders	
Authority	Narrative Summary
Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	This EO, dated 10 January 2001, directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act. The EO requires that each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, within two years, a Memorandum of Understanding (MOU) with the Fish and Wildlife Service (Service) that shall promote the conservation of migratory bird populations. Under this EO, the SOI will establish the interagency Council for the Conservation of Migratory Birds (Council) to oversee the implementation of the EO [Added April 2001].
Executive Order 13287, Preserve America	This EO, dated 3 March 2003, states that it is the policy of the Federal Government to provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of the historic properties owned by the Federal Government, and by promoting intergovernmental cooperation and partnerships for the preservation and use of historic properties. The EO directs Federal agencies to [Added April 2003]: seek partnerships with State and local governments, Indian tribes, and the private sector to promote local economic development and vitality through the use of historic properties in a manner that contributes to the long-term preservation and productive use of those properties. Agencies with real property management responsibilities shall prepare an assessment of the current status of its inventory of historic properties required by section 110(a)(2) of the NHPA (16 U.S.C. 470h-2(a)(2)), the general condition and management needs of such properties, and the steps underway or planned to meet those management needs. Each agency must report on its progress in identifying, protecting, and using historic properties in its ownership and make the report available to the Council and the Secretary.
Federal Consistency with Approved Coastal Management Programs under CZMA (15 CFR 930)	States that all Federal activities will comply with the CZMA to the maximum extent possible through the use of approved management programs.
Federal Environmental Pesticide Control Act of 1972 (PL 7 USC 2809)	Controls the sale, distribution, and application of pesticides through a registration and permitting process.
Federal Water Pollution Control Act of 1977	Provides for maintenance of water quality including permitting, monitoring, and reporting of discharges of pollutants from point sources. A non-point sources program also includes sedimentation, erosion and nutrient control.
Fish and Wildlife Conservation Act (16 USC 2901-2911; 94 Stat. 1322, PL 96-366)	Installations are encouraged to use their authority to conserve and promote conservation of non-game fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 USC 661 <i>et seq.</i>)	Installations are to consult with the USFWS and State agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. The Act includes provisions for mitigation and reporting.

Federal Laws and Executive Orders	
Authority	Narrative Summary
Fish and Wildlife Improvement Act of 1978 (16 USC 7421; 92 Stat.3110)	Authorizes the Secretaries of the Interior and Commerce to establish, and conduct national training programs for State fish and wildlife law enforcement personnel. Provides authorization for cooperative agreements between State and Federal agencies for law enforcement, and other law enforcement measures.
Fishery Conservation and Management Act of 1976 (PL 94-265, 16 USC 1801-1882; 90 Stat. 331), as amended (Magnuson-Stevens Fishery Conservation and Management Act)	Principal law governing marine fisheries in the United States. It was originally adopted to extend control of U.S. waters to 200 nautical miles in the ocean; to phase out foreign fishing activities within this zone; to prevent overfishing, especially by foreign fleets; to allow overfished stocks to recover; and to conserve and manage fishery resources. It has since been amended several times, most recently in 2006. The Act establishes and defines the role and operating procedures of regional fishery management councils (FMCs). The Act includes national standards for fishery management and outlines the contents of fishery management plans. In addition, it gives the Secretary of Commerce power to review, approve, and implement fishery management plans and other recommendations developed by the FMCs. The National Marine Fisheries Service (under the Department of Commerce) is charged with stewardship of the nation's living marine resources. With input from the regional fishery councils and stakeholder groups, NMFS provides guidance for applying the National Standards of the Act.
FY 91 Defense Appropriations Act	This Act established the "Legacy Resource Management Program" for natural and cultural resources. The program's emphasis is on inventory and stewardship responsibilities including restoration of degraded or altered habitats.
Historic Sites Act of 1935 (PL 74-292, 16 USC 461-467)	This act authorizes the designation of national historic sites and landmarks, authorizes interagency efforts to preserve historic resources, and establishes a maximum fine of \$500 for violations of the act.
Hunting, Fishing and Trapping on Military Lands (10 USC 2671, PL86-337)	This law requires that all hunting, fishing, and trapping be in accordance with the fish and game laws of the state in which it is located, and that appropriate state licenses can be obtained for these activities.
Lacey Act of 1900 (50 CFR 10-14)	Authorizes the Secretary of the Interior to adopt measures to restore the populations of game and birds and to regulate the introduction of bird and other animals to new habitats.
Marine Mammal Protection Act of 1972 (16 USC 1361-1407, PL 92-522, 86 Stat. 1027), as amended	Established a Federal responsibility to conserve marine mammals. Installations shall identify all designated species and their habitats that may be affected by a Federal action. If listed species are present, formal consultation must be undertaken with the USFWS or the National Marine Fisheries Service as appropriate. Consultation procedures are in 50 CFR 402.
Marine Protection, and Sanctuaries Act of 1972, as amended (PL 92-532) (16 USC 1401 -1444)	This act declares that the United States will strictly limit all dumping into the ocean of any material which would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities.
Migratory Bird Conservation Act (16 USC 715 parts 25-28)	Established a commission to approve areas of land or water as reservations for migratory birds.

Federal Laws and Executive Orders	
Authority	Narrative Summary
Migratory Bird Treaty Act of 1918 (16 USC 703-711)	This act (last amended in December 1989), is a Federal law that enforces international conventions for the protection of migratory birds and game animals to which the United States is a party. Unless permitted by regulations, it is unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or in part, of any such bird or any part, nest, or egg thereof, included in the terms of the conventions for the protection and conservation of migratory birds and game mammals between the United States and the USSR, the United States and Mexico, and the United States and Japan (16 USC 703). It is also unlawful to ship, transport, or carry, by any means whatever, from one state, territory, or district to or through another state, territory, or district, or to or through a foreign country, any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried at any time contrary to the laws of the state, territory, or district in which it was captured, killed, or taken, or from which it was shipped, transported, or carried (16 USC 705). [NOTE: This law includes essentially all species of birds, not just those typically considered migratory. The only exceptions include Rock Dove (pigeon) and European Starling].
National Environmental Policy Act (NEPA) of 1969, (PL 91-190, 42 USC 4321-4347), as amended	NEPA requires all Federal agencies to prepare detailed environmental impact statements for major Federal actions significantly affecting the quality of the human environment. The statute stipulates factors to be considered, requires an interdisciplinary approach to ensure that unquantified environmental values are given appropriate consideration along with economic and technical considerations.
National Historic Preservation Act of 1966, as amended - 1980 (PL 88-29) (16 USC 470-470w-6)	This act, last amended in August 1992, addresses the issue of preserving our national history. Congress declares that the historical and cultural foundations of the nation should be preserved as a living part of our community life and development; and that the preservation of this irreplaceable heritage is in the public interest so its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans (16 USC 470(b)(2)(4)).
National Wildlife Refuge Act	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements and other means.
National Wildlife Refuge System Administration Act of 1966 (16 USC 668dd-668ee)	This Act provides guidelines and directives for the administration of National Wildlife Refuges and other conservation areas.
Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, (104 Stat. 4761, 16 USC 4701)	PL 101-646 established a broad Federal program to prevent the introduction of and control the spread of introduced aquatic nuisance species and the brown tree snake (<i>Boiga irregularis</i>). The Aquatic Nuisance Species Task Force and the Brown Tree Snake Control Committee, comprised of representatives of the U.S. Departments of Agriculture, Commerce, Defense, and the Interior, the Commonwealth of the Northern Mariana Islands, the Government of Guam, and the State of Hawaii, were directed to undertake a program to control the brown tree snake.

Federal Laws and Executive Orders	
Authority	Narrative Summary
Oil Pollution Act of 1990 (OPA 90)	This Act set up a trust fund financed by a tax on oil that is available to use for cleanup of oil spills should the responsibly party be unable/unwilling to do so. It also regulates the transport and storage of oil.
Rivers and Harbors Act of 1899 (33 USC 401 <i>et seq.</i>)	This Act makes it unlawful to conduct any work or activity in navigable waters of the United States without a Federal Permit. Installations should coordinate with the Corps of engineers to obtain permits for the discharge of refuse affecting navigable waters under NPDES, and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the Corps of Engineers.
Sikes Act (16 USC 670a-670l, 74 Stat. 1052), as amended	This Act provides for cooperation by the Departments of the Interior and Defense with State agencies in planning, development and maintenance of fish and wildlife resources on military reservations. Installations must have a fish and wildlife conservation plan agreed upon by the USFWS and the State agency. Resources shall be managed for sustained multipurpose uses and public access provided as necessary or appropriate for those uses. Other provisions include: services necessary for development, implementation and enforcement of fish and wildlife management shall be provided by trained DoD personnel to the extent feasible; installations shall have an outdoor recreation cooperative plan agreed upon by the Installation, National Park Service and the appropriate State agency; fees may be charged for recreation and hunting and fishing permits; hunting and fishing must be in accordance with fish and game laws in the State; revenues so generated must be used for fish and wildlife conservation; States are entitled to 40 percent of an installation's net annual proceeds from hunting and fishing permits for county roads and schools.
Public Law 90-465 (82 Stat. 661), the Sikes Act Amendment Act (Section 670c)	Authorizes a program for development of outdoor recreation facilities.
Tidelands, submerged lands, or filled lands (48 USC 15 §1705)	Guam. (1) The submerged lands of inner and outer Apra Harbor; and, (2) the submerged lands adjacent to the following uplands: (a) Unsurveyed land, Municipality of Machanao, Guam, as delineated on Commander Naval Forces, Marianas Y & D Drawing Numbered 597-464, lying between the seaward boundaries of Lots Numbered 9992 through 9997 and the mean high tide, containing an undetermined area of land, (b) unsurveyed land, Municipality of Machanao, Guam, as delineated on Commander Naval Forces, Marianas Y & D Drawing Numbered 597-464, lying between the seaward boundary of Lot Numbered 10080 and the line of mean high tide, containing an undetermined amount of land, and (c) Lot Numbered PO 4.1 in the Municipality of Machanao, Guam, as delineated on Y & D Drawing Numbered 597-464, more particularly described as surveyed land bordered on the north by Lot Numbered 10080, Machanao, east by Northwest Air Force Base, south by U. S. Naval Communication Station (Finegayan) and west by the sea containing a computed area of 125.50 acres, more or less. All of the above lands within the territory of Guam shall be under the administrative jurisdiction of the Department of the Navy.

Government of Guam Laws, Regulations, and Memorandums of Agreement	
Authority	Narrative Summary
Endangered Species Act of Guam, 5 GCA 63208, PL 6-85	This is the local analog to the Federal Endangered Species Act. It provides authorization to conserve and manage endangered and threatened species to achieve the purposes of the Federal Endangered Species Act. It provides for the creation of a local endangered species list, and extends local protection to all Federally-listed species. Guam Customs and Quarantine Officers are specifically named as enforcement officers along with GDAWR Conservation Officers and Guam Police Officers.
Game, Forestry and Conservation, 5 GCA, Chapter 63, PL 6-85	Gives the Guam Department of Agriculture the authority to control and regulate fish and game on Guam. The Director (of Agriculture) shall be the Chief Conservation Officer who may appoint suitable employees as Deputy Conservation Officers who shall have the powers of Peace Officers to carry arms and make arrests for violations. Their jurisdiction includes the Territorial waters of Guam and areas controlled by the military. Enforcement of the Live Coral and Fishing Nets article shall be enforced primarily by the Director and Conservation Officers and secondarily by Peace Officers.
Government Code of Guam, 1 GCA 4002(a) as amended by PL 15-114, and PL 20-185	This is the local analog to the Magnuson Stevens Act. It establishes a 200-mile exclusive economic zone for Guam and defines the waters of Guam as extending to the outermost limit of the EEZ. Includes prohibitions on the use, transfer, possession, etc. of gill nets or fish harvested with pelagic drift nets. Any peace officer may enforce this law.
Importation: Harboring, 5 GCA 63124	Prohibits unlicensed importation of game (defined as "all native or introduced species of wild birds or wild animals"); and "fish," defined as "any aquatic animal life..." by 5 GCA 63101.
Organic Act of Guam of 1950, as amended, 64 Stat. 384 (48 USC 1421, <i>et seq.</i>)	Specifies that the Governor shall be responsible for executing the laws of Guam and applicable U.S. laws in Guam. (See amendment of Ford Administration re submerged lands.)
Protection of Wild Animals, 5 GCA 63121	Local analog to the Marine Mammal Protection Act. Protects wild animals including marine mammals "in and about" Guam (includes "waters of Guam" to 200 geographic miles seaward of the mean low water mark). Declares it to be "unlawful for any person to take, buy, sell, transport, or possess any wild animal or part thereof,...except as authorized..."
Protection of Wild Birds, 5 GCA 63120	Local analog to the Migratory Bird Treaty Act. Provides protection for wild birds by prohibitions to "take, buy, sell, transport, or possess any wild bird, or any part thereof, or wild bird eggs... except as authorized..." Includes migratory birds, and endangered and threatened species "in and about Guam" (amended to include "waters of Guam" to 200 geographical miles seaward of the mean low water mark).
Memorandum of Agreement for Cooperative Law Enforcement	Conservation Officers of GDAWR have been deputized by the USFWS to enforce Federal fish and wildlife laws and regulations.

DoD and Navy Base-Level Directives and Regulations	
Authority	Narrative Summary
Archaeological and Historical Resources on Military Lands (DoD Directive 4710.1, Environmental Security)	Provides policy and procedures and assigns responsibility for the management of archeological and historic resources located on lands and waters under DoD control.
COMNAVMARIANAS INSTRUCTION 1700.14B – Saltwater Fishing	Sets policy for fishing in Navy-controlled waters around Guam. Fishing will not violate Federal or Guam territorial laws including fishing licenses. Commercial fishing is not permitted. Net fishing is restricted to traditional (i.e., subsistence) methods (e.g., cast net, drag net or seine, surround net) for taking of seasonal juveniles such as rabbitfish (mañahak), skipjack (i'e'), goatfish (ti'ao), herring (menis and mullet (aguas)). Only military personnel (active duty and retired), their family members, sponsored guests, and actively employed DOD civilian employees are allowed to fish from the bands of COMNAVMARIANAS shorelines and nearshore waters. This may be modified by Force Protection Conditions impacting base or selected area access. Areas closed to fishing include protected swimming area of San Luis Beach, the float buoyed boundary area of Polaris Point Beach, 400 yards offshore of Gab Gab Beach/Finger Reefs, and from the boat ramp northward to the end of the mooring area of Sumay Cove marina and all operational wharves. Recreational or subsistence fishing by pole, hand line or spear, either from the shore or boat, is permitted within the Orote and Haputo ERAs. Prohibited fishing techniques include: spearing between sunrise and sunset, or within 100 yards of any Government of Guam recreational “dive buoy,” explosives, poisons, intoxicating substances, electrical devices, snagging by any method, and weirs (traps) unless permitted by the Guam Department of Agriculture. Nets with a stretched mesh of less than one and one half inch opening are prohibited, except for small hand nets for collection of aquarium fish. Gill nets are prohibited.
COMNAVMARIANAS INSTRUCTION 1710.1B – Regulations Governing the Operation of Swimming Pool and Beach Areas	Establishes that personnel must be familiar with INSTRUCTION 5100.1A and provides rules of conduct for a safe and enjoyable experience for all users of the facility. The responsibilities of Lifeguards and the Aquatics Supervisor are described.
COMNAVMARIANAS INSTRUCTION 1710.5B – Maintenance and Operation of Sumay Cove Marina	Describes the services, facilities, required procedures and access priorities for the marina. Boats, moorings, slips, storage and work pads are available for rent. Regulations for their use are provided. Specific regulations are provided for the storage, maintenance and disposal of hazardous materials and wastes. Sailing classes and competitions are offered through the marina.
COMNAVMARIANAS INSTRUCTION 3150.1A	Diving Operation Procedures defines the roles of the Diving Officer and the Diving Supervisor, provides safety checklists, specifies regulations and safety precautions for divers and diving operations.

DoD and Navy Base-Level Directives and Regulations	
Authority	Narrative Summary
COMNAVMARIANAS INSTRUCTION 5100.1A	Water Safety Program provides a water safety program and establishes regulations and requirements for recreational skin diving, scuba diving, water skiing and boating in Navy waters by military members and DOD personnel. It also applies to all personnel using MWR facilities or recreating on property under the jurisdiction of the Commander, U.S. Naval Forces Marianas. This includes all persons diving on the shipwrecks in outer Apra Harbor that are on U.S. Navy submerged lands. Personnel must view a Water Safety Video prior to recreating at any location other than where and when a lifeguard is on duty. Commanding Officers are required to declare waterfront areas on their installations open or closed on a day-to-day basis. Any activity or area may be declared off limits. The Instruction provides guidelines for recreational scuba diving, including required equipment and training.
Concurrent Jurisdiction Act (48 USC 1704)	The Virgin Islands, American Samoa, and Guam has/have concurrent civil jurisdiction with the US government. Exceptions are made for situations affecting national defense as determined by the Secretary of Defense.
Environmental and Natural Resources Protection Manual (OPNAVINST 5090.1B, Chg 4)	Primary guidance for the management of the environment, natural and cultural resources for all Navy ship and shore activities. It discusses Federal regulations, Department of Defense requirements, Department of the Navy requirements, delineates responsibilities, and issues policy.
Environmental Security - Fish & Wildlife Conservation and Management (DOD Directive 4715.3)	Integrated management of natural and cultural resources on property under DoD control. Implements policy, assigns responsibility, and proscribes procedures that the DoD uses to protect and enhance resources while supporting military readiness.
Integrated Natural Resources Management Plan. AFI 32-7064	Provides specific implementing instructions and guidance on integrated natural resources management programs for endangered and threatened species, other fish and wildlife, water resources, coastal resources, cultural resources, outdoor recreation, forestry, wetlands, grounds, agricultural outleasing and GIS.
Legacy Resources Management Program (Congressional/DOD Appropriations Act, § 8120 of 1991)	Provides funding to the DoD for projects ("Legacy Projects") that preserve natural and cultural heritage while still supporting military readiness.
Management and Recreation of Natural and Cultural Resources on U.S. Naval Activities, Guam (OPNAVINST 5090.6)	Establishes policy and responsibilities of the Navy and Marine Corps for the evaluation of environmental effects of ongoing and future DoN actions. National defense should be carried out in a manner consistent with national environmental policies whenever possible.
Memorandum of Understanding DOD & DOI 1978	Management of fish and wildlife resources on military land will be accomplished through a cooperative effort between the DoD and USFWS. The DoD will institute management practices to protect species and habitat, and carry out federal laws dealing with fish and wildlife with technical support provided by USFWS.
Natural Resources Management Program (DOD Directive 4700.4)	Requires all levels of command to implement and maintain an integrated program of natural resources management. Requires installations to maintain integrated natural resources management plans that meet certain criteria.
Pacific Fleet Environmental Protection Program (CINCPACFLTINST 5090.1B)	Provides a manual of statutory and regulatory requirements and assigns responsibility for management of Navy programs dealing with cleanup of waste disposal sites, compliance, conservation, pollution prevention and technology.

DoD and Navy Base-Level Directives and Regulations	
Authority	Narrative Summary
Policy for Environmental Protection, Natural Resources and Cultural Resources Programs (SECNAVINST 5090.8)	This instruction establishes policy and assigns responsibilities within the Department of Navy concerning environmental protection, natural resources, and cultural resources programs. It establishes DON policy to integrate environmental protection, natural resources, and cultural resources programs considerations into all DON operations and activities; and to fully comply with all applicable Federal, State, and local laws and regulations, Executive Orders, environmental requirements, and international agreements.

Cooperative Agreements	
Cooperative Agreement for the Establishment of the Guam Overlay National Wildlife Refuge Overlay Unit (Dec 10, 1993)	Adds additional acreage to the Guam Wildlife Refuge as habitats for threatened and endangered species. Additional land is under military control.
Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at U.S. Naval Communication Area Master Station, WESTPAC (Mar 14, 1988)	Provides for interagency cooperation for the conservation and development of fish and wildlife resources at U.S. Naval Communication Area Master Station, WESTPAC.
Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at U.S. Naval Magazine, Guam (Mar 7, 1988)	Provides for interagency cooperation for the conservation and development of fish and wildlife resources at U.S. Naval Magazine, Guam.
Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at U.S. Naval Station, Guam (April 12, 1988)	Provides for interagency cooperation for the conservation and development of fish and wildlife resources at U.S. Naval Station, Guam.
Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at U.S. Navy Public Works Center, Guam (April 11, 1988)	Provides for interagency cooperation for the conservation and development of fish and wildlife resources at U.S. Navy Public Works Center, Guam.
Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at U.S. Naval Supply Depot, Guam (Feb 29, 1988)	Provides for interagency cooperation for the conservation and development of fish and wildlife resources at U.S. Naval Supply Depot, Guam.
Memorandum of Agreement for Cooperative Law Enforcement between the U.S Fish and Wildlife Service and Division of Aquatic and Wildlife Resources Department of Agriculture, Territory of Guam (July 9, 1990)	Executed between the USFWS and GDAWR. Recognizes the importance of law enforcement in protection and conservation of wildlife resources, and mutual benefits of sharing law enforcement expertise, training, information, equipment and facilities. Provides delegation of Federal authority to GDAWR Conservation Officers who meet certain criteria. Delineates procedures for investigation of Federal violations. Provides delegation of Guam fish and wildlife law enforcement authority to USFWS Law Enforcement Agents.
Memorandum of Agreement Related to Concurrent Jurisdiction, 1988	Executed among the Government of Guam, the Commander, U.S. Naval Forces Marianas, and the Installation Commander, Andersen AFB, Guam. Coordinates law enforcement activities among the agencies.

Laws, Regulations, Military Directives, Memorandums of Agreement and Cooperative Agreements

Memorandum of Understanding for the Establishment and Management of the Guam National Wildlife Refuge, Guam. December 10, 1993	Executed among the U.S. Air Force, the U.S. Navy, and the USFWS, the MOU recognizes mutual concerns, mandates, and interest in natural resources management on DoD lands on Guam and defines goals of the Refuge. Provides a means by which each agency may participate in the establishment and management of the Refuge.
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