2.0 Introduction

2.1 Purpose and Objectives

The primary purpose of an INRMP is to ensure that natural resources conservation measures and military operations on the installation are integrated and consistent with stewardship and legal requirements. This document is a long term planning document intended to guide the installation commander in the management of natural resources to support the installation's mission, while protecting and enhancing installation resources for multiple use, sustainable yield, and biological integrity. The Diego Garcia Final Governing Standards (FGS) provide specific standards for environmental protection for the Department of Defense (DOD) and organizational components on Diego Garcia. The FGS implements DOD Instruction 4715.5, Overseas Environmental Baseline Guidance Document (OEBDG) and supplements Executive Order 12088 - Federal Compliance With Pollution Control Standards.

The Navy is required to provide plans and programs to ensure proper protection, enhancement, and management of applicable natural resources and any biological species declared protected, threatened or endangered by either the United States (U.S.) or the United Kingdom (U.K.) (see Chapter 13, Natural Resources and Endangered Species, FGS). Additionally, many Navy program requirements for ensuring military readiness and sustainability *while* complying with natural resources protection laws, and conserving and managing natural resources follow OPNAVINST 5090.1B, Environmental and Natural Resources Program Manual Chapter 22.

U.S. federal policies and programs apply only to the extent that the U.K. agrees that they should be applicable and as they conform to British Indian Ocean Territory (BIOT) policies and programs. The full governmental and civilian judicial authority, including that relating to natural resources conservation and environmental protection, rests with the British Representative (BRITREP), a Senior Royal Navy Commander. The U.K., through the BRITREP, generally monitors environmental matters. Larger environmental concerns are referred to the annual U.S.-U.K. Political Military (Pol-Mil) Talks for resolution.

In 1997, the Naval Facilities Engineering Command, Pacific, released the Natural Resources Management Plan (NRMP), U.S. Navy Support Facility, Diego Garcia. That document cataloged significant natural resources on Diego Garcia and listed management options. The purpose of this 2005 Integrated Natural Resources Management Plan (INRMP) is to update and expand the 1997 NRMP in conformance with FGS, and it provides the information and guidance required for the effective management of natural resources on Diego Garcia. The INRMP incorporates the lists and descriptions of significant natural resources; updates maps, tables, and similar figures in the 1997 NRMP; discusses under what legislation and/or policy those resources are to be managed; suggests management options that serve to enhance those resources in accordance with Navy policy; and identifies potential opportunities for outdoor recreation compatible with the military missions of the facilities.

The overall objectives of natural resources management on Diego Garcia are to:

- Protect, conserve and manage watersheds, wetlands, natural landscapes, soils, forests, near shore marine areas, beaches and strands, fish and wildlife, and other natural resources, as vital elements of a natural resources program.

- Manage natural resources to provide outdoor recreation opportunities.

- Use and care for natural resources in the combination best serving present and future needs.

- Provide for the optimum use of land and water areas and access thereto while maintaining ecological integrity.

2.2 Applicative Directives and Organization Structures

Beginning in 1966, formal agreements between the U.K. and the U.S. governments made a portion of the atoll available to the U.S. for the mutual defense interests of both nations. Although provided much latitude, U.S. Navy authorities practice full disclosure of all land use and facility construction matters in advance with U.K. counterparts. The U.S. Navy Support Facility Diego Garcia (NSF Diego Garcia) Commanding Officer is responsible for adherence to all pertinent U.K. directives for operations at Diego Garcia. Appendix A summarizes the primary applicable Navy laws, regulations, and guidance that are relevant to natural resources management on Diego Garcia. See Appendix B for a list of pertinent U.K. directives and guidelines.

The Regional Environmental Program Director (REPD) [Commander, U.S. Naval Forces, Japan (CNFJ)] holds the NSF Diego Garcia Installation Environmental Program Director (IEPD) responsible for managing an effective environmental program in compliance with the FGS and Host Country Regulations. For the preservation of natural resources, the FGS requires NSF Diego Garcia to ensure that personnel performing natural resources functions must have training in natural resources management. The Environmental Office (CodeN5E) is located within the Public Works Department (PWD) at Building 138 (Figs. 2.1 & 2.2).

Figure 2.1 Public Works Department

2.3 Duration and Plan Organization

The plan is designed for implementation over a five-year time frame. The plan is reviewed on an annual basis, with major revisions anticipated during the fifth year review.

2.3.1 Chapter 3. Status and Current Land Management

The current state of human use and management practices, both land management and natural resources management are briefly described in the following section.

2.3.2 Chapter 4. Natural Resources (Plants, Fish & Wildlife)

Describes the current status of natural resources found on and in waters adjacent to Diego Garcia

2.3.3 Chapter 5. Outdoor Recreation

Describes the current outdoor recreation practices on and in waters adjacent to Diego Garcia.

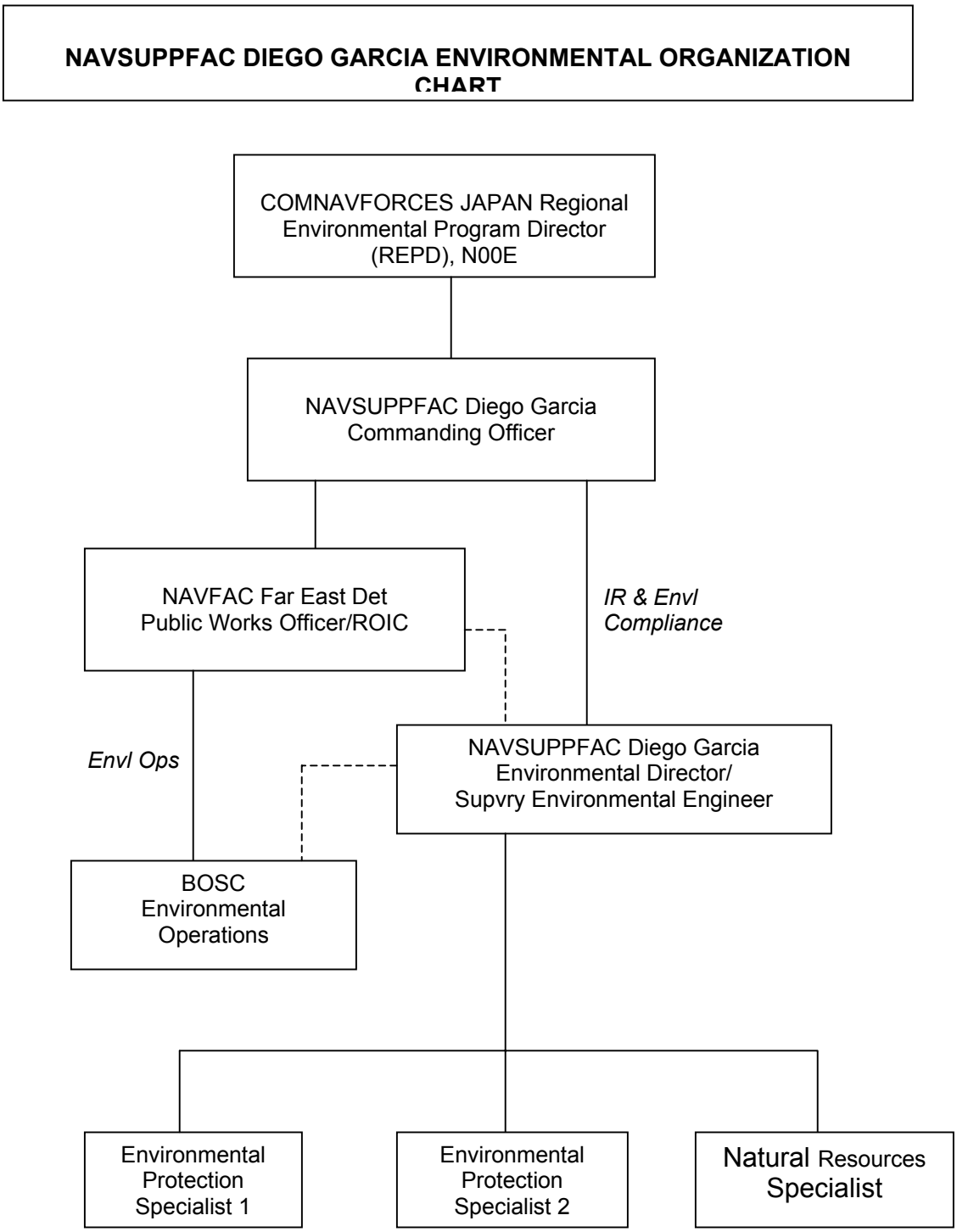

Figure 2.2 NSF Diego Garcia Environmental organizational chart.

2.3.4 Chapter 6. Natural Resources Management and Implementation

Provides management suggestions to implement the INMRP. There are also recommended project activities and estimated budgets for land management, fish and wildlife, and outdoor recreation management.

2.4 General Information

2.4.1 Location

Diego Garcia is a tropical, footprint-shaped coral atoll located south of the equator in the central Indian Ocean. It is part of the Chagos Archipelago and positioned at 7°26' south latitude and 72°23' east longitude. The atoll is approximately 1,800 miles (2,900 kilometers [km]) east of the African coast and 1,200 miles (1,900 km) south of the southern tip of India (Figure 2.3). Diego Garcia lies at the southernmost tip of a long chain of coral reefs, atolls, and islands comprising the Laccadives, Maldives, and the Chagos Archipelago. Within the Chagos Archipelago— which also contains Peros Banhos, the Salomon Islands, the Three Brothers, and the Egmont Islands—Diego Garcia is the largest atoll, occupying approximately 6,270 acres of land and lagoon (10.5 square miles or 2,719 hectares [ha]).

The islands of the Chagos Archipelago are owned and controlled by the U.K. and are part of the BIOT. The on-island BRITREP is a Royal Navy Commander who exercises full governmental and civilian judicial authority on the island, the archipelago, and the Fish Reef Protection Zone within the archipelago.

2.4.2 History

The first recorded Portuguese ships visited the Chagos Archipelago in the first and second decades of the 1500s. Diego Garcia may have been named after a Spanish navigator whom visited the atoll in 1532. For the next 200 years, the Portuguese, English, French, and Dutch ships intermittently used the island. British and French ships landed frequently during the 1700s without attempts to colonize or accurately chart the island. In the latter 1700s, both the British and French conducted surveys and charting expeditions around the atoll.

In 1778, the French governor of Mauritius granted access to Diego Garcia and allowed individuals to collect coconuts and fish. In 1786, the British separately attempted to settle the island. When they arrived, they discovered a crude French settlement established to collect coconuts and fish. The British persuaded the French to depart and stayed for six months until they abandoned Diego Garcia because of various difficulties. The French attempted to settle the area

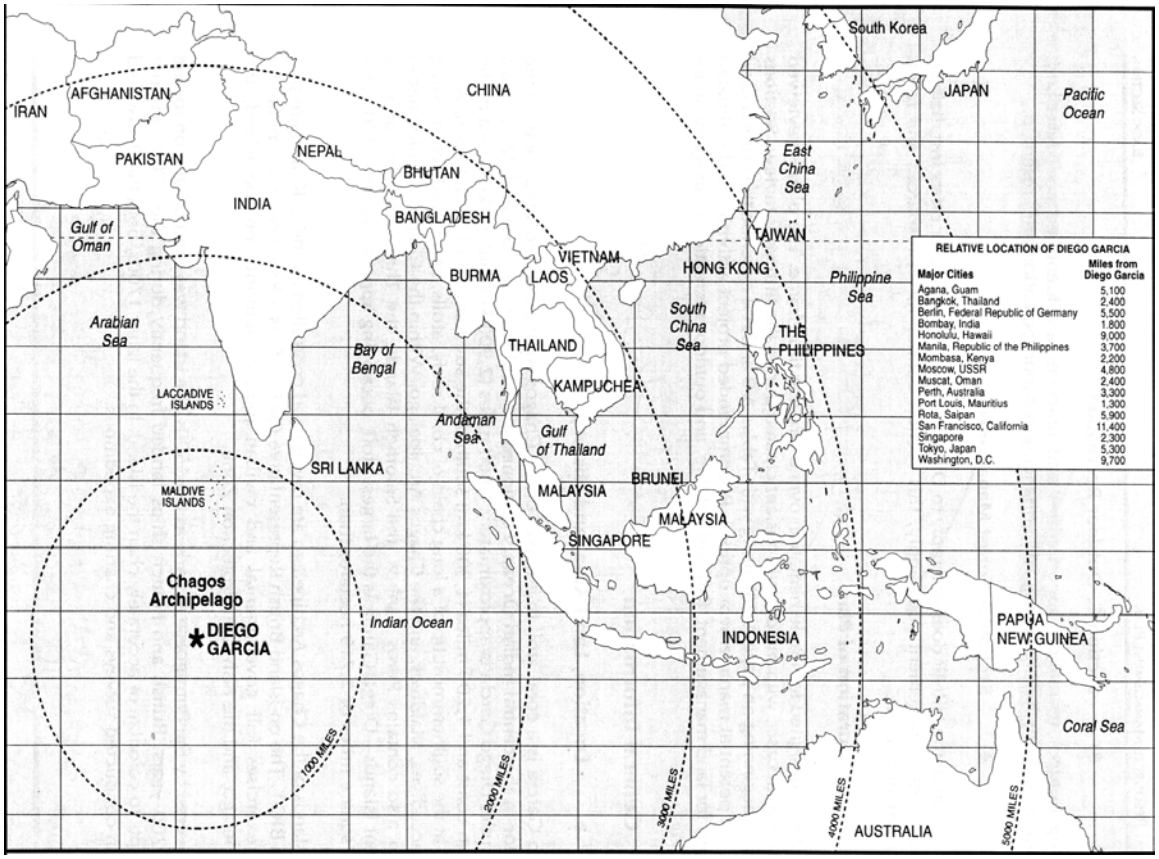

Figure 2.3 Location map of Diego Garcia (reprinted from the 1997 NRMP).

again after the British left and, in 1793, a settlement was established to produce coconut oil, etc. and was populated with freemen, slaves and lepers. Thus began the plantation era of Diego Garcia that lasted until the mid-20th century.

In 1810, at the end of the Napoleonic Wars, the French surrendered Mauritius and the Chagos Archipelago to the British. The British took over and continued the plantations on Diego Garcia. Beginning in 1882 and lasting but a few years, coaling stations were established to service steamships sailing the Suez-Australia sea lane, but production of coconut oil was the staple industry well into the 20th century.

Although World War I had little effect on Diego Garcia, Japanese activities in the Indian Ocean during World War II resulted in the establishment of a British military base to monitor the surrounding area. The island supported a flying boat squadron, some small craft and a detachment of troops from India with artillery weapons (six-inch guns). No hostility befell the island, and by mid-1946, all military personnel were gone.

Talks between the U.K. and U.S. began in 1963 to explore the possibility of using Diego Garcia as a joint base of operations. The impetus was the decline of British authority east of the Suez Canal and the need for communications and security for aircraft and vessels on Africa-Far East routes. A bilateral agreement was signed in 1966, making the islands of BIOT available to both nations for defensive purposes. The copra plantation was bought out and the workers resettled on Mauritius between 1966 and 1971. The first major U.S.-financed project was construction of the naval communications station. NAVCOMMSTA Diego Garcia became operational in March 1973 (NAVCOMMSTA is now designated the U.S. Naval Computer and Telecommunication Area Master Station or NCTAMS PACIFIC DET). Moreover, various facilities were constructed to provide support to the U.S. Fleet.

In October 1977, NSF Diego Garcia, was established as the base command with NAVCOMMSTA as its primary tenant. Major expansion was initiated in 1979 to provide troop billeting, dining, medical support, and other personnel support functions. Planning continued for the development of a fuel and general supply area for the Fleet as it operated in the Indian Ocean. Planning also included the development of a waterfront complex.

In November 1980, Commander Naval Logistics Command, U.S. Pacific Fleet (COMNAVLOGPAC) became responsible for U.S. Navy activities at Diego Garcia. By 1981, the Naval Air Facility (NAF) was operational and the Rapid Deployment Force (RDF) was implemented. Sixteen ships of the Near-Term Prepositioned Force (NTPF) were incorporated into the Afloat Prepositioning Force (APF), and an expanded anchorage and mooring area was developed. COMNAVLOGPAC was disestablished in 1989 and Commander, Naval Aviation Command, U.S. Pacific Fleet (COMNAVAIRPAC) took over responsibility for NSF Diego Garcia. However, in 2000, CNFJ took over as the Navy representative and coordinator for Diego Garcia.

Figure 2.4 Provides an installation map and identification of the area permitted for use by the United States.

2.4.3 Military Missions and Functions Overview

International conflicts, proximity to petroleum sources and vital supply routes, and unrest in Southwest Asia have increased the level of importance of Diego Garcia's supporting role. The main mission of NSF Diego Garcia is to maintain and operate facilities and provide services and materials in support of afloat units, operating forces on forward deployment, and tenant shore activities. More specifically, for the present, the mission of NSF Diego Garcia is "to provide logistic support to operational forces forward deployed to the Indian Ocean and

Persian Gulf Area of Operations (AORs) in support of national policy objectives. NSF Diego Garcia occupies a critical part on the 'tip of the spear' for US military forces by supporting a multitude of unique and challenging mission requirements." Diego Garcia is also the assigned anchorage for several ships of the Afloat Pre-positioning Force (APF), which comprises pre-positioning ships of the Military Sealift Command (MSC).

There are three Navy shore activities on Diego Garcia. The first is NSF Diego Garcia, which functions as a naval station providing personnel berthing and support, security, and air and harbor operations control. NSF Diego Garcia is also responsible for facility support for the island's Royal Navy and Royal Marine personnel. The second activity, the NCTAMS PACIFIC DET, provides primary off-island communications via the Defense Satellite Communications System (DSCS), as well as cryptologic mission support. The third activity, the Naval Security Group Detachment (NSGD), manages, operates and maintains U.S. cryptology facilities and supports the Navy fleet, other U.S. Government agencies and allied forces in the Indian Ocean Theater. These three activities support about 30 separate shore units and the various elements comprising the APF, such as Maritime Prepositioned Ships Squadron Two. Primary Navy aviation tenants include a rotating anti-submarine warfare patrol squadron and a permanently assigned patrol wing support detachment (ASD, AIMD, PATWING and VP Squadron were detached in Jan-Feb 2005).

The U.S. Air Force presence began with the Air Mobility Command (AMC); a passenger and air cargo operation that plays an important role in moving personnel and cargo to and from Diego Garcia. The Strategic Air Command (SAC) tankers first began to use Diego Garcia in the 1980s, however after Operation Desert Storm in the early 1990s, the Air Force has maintained a major contingency base to support both the Pacific Command and Central Command. The use of Diego Garcia to stage Air Force missions in support of Operation Enduring Freedom is a current example of the importance of this function.

USAF responsibility includes operation of satellite detection and tracing facility known as Ground-based Electro-Optical Deep Space Surveillance (GEODSS) System, which is staffed by about 16 contract workers supervised by military personnel and purposely located away from inhabited areas and light-generating sources. The Air Force also operates a Global Positioning System (GPS) ground instrument facility and an Automated Remote Tracking Station (ARTS).

A Base Operating Support Contractor (BOSC) is responsible for housing, food services, transportation, and supplies. The BOSC is also responsible for hazardous waste collection and transfer, custodial services, antenna

maintenance, facilities and grounds maintenance, pest control, utility systems operation and maintenance, and solid waste collection and disposal. The majority of BOSC workers originate in the Philippines, Mauritius, and the U.S.

Up until early 1996, a detachment from a U.S. Naval Mobile Construction Battalion (NMCB), more commonly referred to as Seabees, served a six- to seven-month assignment conducting horizontal (e.g., grading) and vertical (e.g., structures) construction projects. For large programs ($750,000 and up), a Military Construction (MILCON) contractor with a civilian workforce is employed.

An island population estimated to be 3,650 persons, consisting of military and civilian personnel, BOS Contractors and MILCON Contractors that require either partial or full-time support, carries out install installation and tenant units' missions.

2.5 Physical Description

2.5.1 Topography

Diego Garcia forms a dryland rim that stretches 40 miles (64 km) from one end to the other, making it one of the most continuous land rims of any atoll in the world (Figure 2.5). This rim encloses a lagoon 13 miles (21 km) long and up to 7 miles (11 km) wide. Three small islands—named East (18.5 acres [7.49 hectares]), Middle (12.3 acres [4.98 hectares]), and West (4.94 acres [2.0 hectares]) Islands—are located at the lagoon entrance.

Figure 2.5 Diego Garcia

The dryland rim, which is continuous around the lagoon except for a four-mile (6 km) pass at the north end, varies in width from a few hundred yards (few hundred meters) along several segments to about 1-1/2 miles (2.4 km) at the northwest end of the rim. The highest parts of the rim are along the ocean side, where some dunes reach heights of 15 to 30 feet (4.5 to 9 m) above mean low water. Shallow depressions between the ocean and lagoon beach ridges occupy the central parts of the wider segments of the rim. Excavation associated with construction has greatly changed the natural land surface in some areas.

The total area of the atoll is 65.6 square miles (169.6 km²). The lagoon area is 47.9 square miles (124.1 km²) with depths ranging down to 80 feet (25 m). The total land area (excluding peripheral reefs) is 11.6 square miles (30.0 km²) (Stoddart and Taylor, 1971). The coral reef surrounding the seaward side of the atoll is generally broad, flat, and shallow, ranging from two to four feet (0.6–1.2m) below mean sea level in most locations and varying from 300 to 650 feet (91 to 198m) in width. This fringing seaward reef area is approximately 13.61 square miles (35.2 km²). At the outer edge of the reef flat, the bottom slopes very steeply into deep water, at some locations dropping to more than 1,500 feet (457 m) deep within 0.6 miles (0.96 km) from shore.

2.5.2 Climate

Diego Garcia is located 7° south of the equator. It is characterized by plenty of sunshine, warm temperatures, showery precipitation and light breezes. Day to day weather conditions remain fairly constant, but pronounced seasonal changes are observed. The period of June through September has less precipitation and is characterized by moderate southeasterly winds and slightly cooler temperatures. December through February is the rainy season (summer monsoon) and is characterized by light west-northwesterly winds, and warmer temperatures.

2.5.2.1 Precipitation

The average annual rainfall is greater than 102.5 inches (260.4 cm), but periods of drought (defined as any 12-month period with less that 75 inches [191 cm]) occur occasionally (e.g., 65.72-inch (167 cm) rainfall in 1956 and 64.89 inches (165 cm) in 1974). Cumulus clouds are typical, and occasionally build up to produce local rainsqualls. For the most part, visibility is good, and fog is virtually nonexistent.

2.5.2.2 Temperature

The average daily temperature is 81°F (27°C) with temperatures generally ranging between 70°F and 90°F (21.1°C and 32.2°C). Higher temperatures typically occur January through March. Lower average temperatures are associated during the winter months of June through September. The average maximum is 86°F (30°C) and the mean minimum is 77°F (25°C). The listed extreme maximum temperature is 95°F (35°C) and the extreme minimum is 65°F (18°C), however, during January through March of 2005, temperatures have been recorded as high as 104°F (40°C).

2.5.2.3 Wind

The winds vary seasonally. During January through March, westerly or northwesterly winds of 10 to 20 knots (19 to 38 km per hour) predominate. These winds are a part of the Asiatic northwest monsoon system. April and May are transitional months in which winds are more variable during the change from northwesterly to southeasterly trades. During June through September there is a period of consistent southeasterly trade winds of 15 to 24 knots (28 to 44 km per hour), with gusts to 35 knots (65 km per hour) or higher. October to December is another transition period as the wind pattern changes from southeasterly to westerly and northwesterly. Winds exceeding 40 knots (74 km per hour) are unusual on Diego Garcia. Sources of higher-than-normal winds include tropical cyclones and squalls or gales resulting from a freshening of trade or monsoon winds. Close passage of a fully developed cyclone is a rarity at Diego Garcia because many cyclones begin their formation near the island and then move away. Also, low-latitude tropical cyclones are, in general, weaker than higher-latitude tropical cyclones.

2.5.2.4 Limiting Conditions

There are no significant climatic limiting conditions on Diego Garcia. The predicted increase in global sea levels, as a result of climate change, is a concern for all atolls and low lying coral islands and may have negative implications for continued activities on Diego Garcia in the very long term.

2.5.3 Geology and Soils

2.5.3.1 Bedrock Geology

Diego Garcia is a mid-oceanic coral atoll with coralline bedrock composed of calcium carbonate. The coral reef on the outer perimeter of the island is a limestone material formed primarily by calcareous algae that is denser than the corals and sediments of the lagoon.

2.5.3.2 Surface Geology

The surface geology of Diego Garcia is quite uniform, consisting either of bare rock with coral boulders, or calcium carbonate base rock covered with 6 to 8 feet (1.8 to 2.4 m) of calcareous sand.

2.5.3.3 Soils

Several types of soils are found on Diego Garcia. Generally, the soil consists of coral or coral rock, coral sand, and some loam; coral covered with the surface sand loam provides a solid surface. There are, however, isolated areas with a silty cover that have poor structural bearing capacity. On the higher and older portions of the atoll, a dark-brown, peaty loam has formed to a depth of several inches. This soil is composed of decaying organic matter mixed with sand.

2.5.4 Hydrology/ Groundwater Resources

Fresh groundwater in Diego Garcia is contained in the calcareous deposits underlying the dryland rim of the atoll. The freshwater lenses are thick near the middle of the dryland area and thin near the ocean and lagoon shores. These freshwater lenses float on an underlying saltwater base, which occurs below ground level. The freshwater lenses are maintained by local rainfall. It is estimated that a fourth to a third of the rainfall becomes groundwater recharge, amounting to 40,000 to 50,000 gallons per day (151,400 to 189,250 liters) per million square feet (9.3 ha) of land surface.

2.5.5 Seismology

Tsunamis (sea waves of seismic origin) are rare in the Indian Ocean. Seismic activity within a 150 mile (241.4 km) radius recorded since 1965 include approximately 123 tremors with magnitudes ranging from 4 to 7+ on the Richter scale. However, 69 of these tremors were experienced in the last month of 1983, with 34 of these tremors hitting within a 24-hour period (30 November-1 December). The magnitude of the initial tremor of this set had a value of 7.70. An additional 23 tremors were experienced in January of 1984. Since then there have been 21 tremors recorded within a 150 mile (241.4 km) radius between 1986 and September 2004, of magnitudes between 4.0 and 6.0. However, on December 26, 2004, an earthquake registering at least 9.0 on the Richter scale occurred off of the west coast of Northern Sumatra, Indonesia (3.307°N, 95.947°E) (Fig. 2.6). The resulting tsunamis affected not only the Indian Ocean, but also the Pacific Ocean. The tsunamis affected Indonesia, Sri Lanka, India, Thailand, Somalia, Myanmar, Malaysia, Seychelles, Tanzania, Bangladesh, South Africa, Kenya, Yemen, the Maldives and Madagascar with a death toll of over 220,000 people. The tsunami traveled as far as Struisbaai, South Africa 5,300 miles (8,500 km) from the epicenter. Diego Garcia is approximately 2,100 miles (3,380 km) from Sumatra, but favorable ocean topography minimized the tsunami's impact on the atoll. The atoll is situated on the southern-most part of the subsurface Chagos-Laccadive Ridge, and to the east of Diego Garcia lies the Chagos Trench, a 400-mile (643.7 km) long, underwater canyon that ranges in depth from less than

3281 feet (1,000 m) to over 16,404 feet (5,000 m). The depth of the trench and the grade to the shore did not allow the tsunami to build to destructive heights before passing the atoll. Instead, the result was a high tidal surge estimated at six feet (1.8 m).

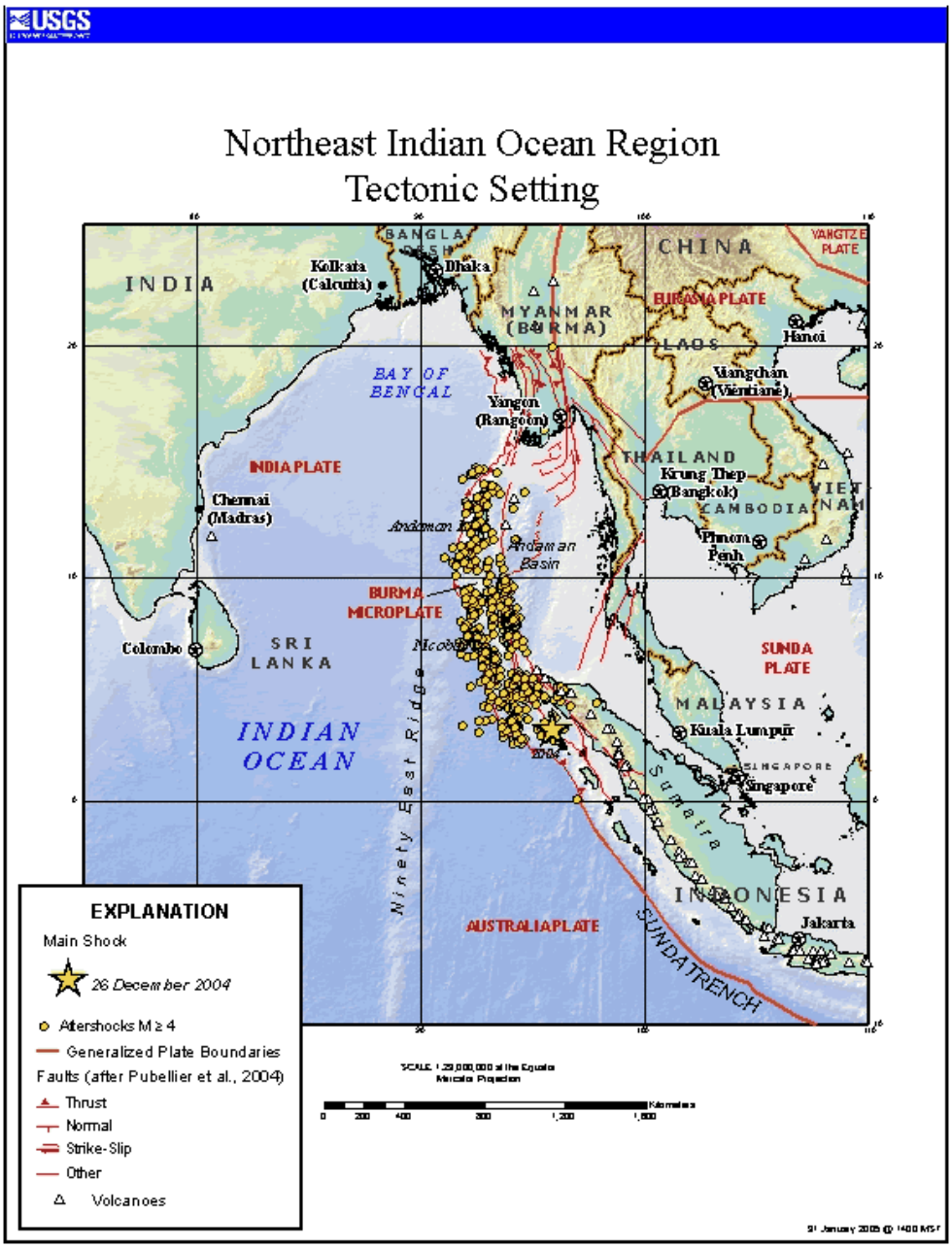

Figure 2.6. Location of the Dec. 26, 2004, earthquake (from www.noaa.gov).

2.5.6 Marsh/Wetland Type Habitats

There are two main marsh/wetland areas of environmental value on the western portion of the island (Figure 2.7). Wetland area "A" is in the cantonment, next to the receiver antenna farm and the "Charlie" area. It is described as a "fern bog, a raft of peat composed of decomposed fern leaves floating on the freshwater lens." The bog covers about 80 acres (32 ha) and is surrounded by a band of coconut trees. The area serves to recharge the freshwater lens in the cantonment area. The tidally influenced Wetland area "B" is south of the airfield operations area, next to the Point Marianne Cemetery and historic ruins. It is described as a marshland surrounded by a screen of ironwood trees that prevent the intrusion of the rapidly growing *Scaevola* plant. Biota observed in this area includes two species of fern, aquatic plants, and fish and eels. Additional information on wetlands, vegetation, and wildlife can be found in Chapter 4.

Figure 2.8 Marsh/Wetland habitat

2.5.7 Floodplains

Floodplains are low-lying lands subject to flooding due to excessive rains and resultant runoff of surface waters from higher elevations. In this sense, no floodplains exist on Diego Garcia because the elevation is quite low and nearly uniform. However, during high tide, rising lagoon waters inundate the landmass regularly at certain locations on the atoll.

2.5.8 Registered Historical Landmarks

No historical features on the atoll are registered historical landmarks. However, a 1997 Phase I Archaeological Reconnaissance Survey by Paul Rosendahl included approximately 2,000 acres (809 ha) of land occupied by NSF Diego Garcia. Thirteen (13) sites comprising 68 component features and 15 isolated objects dating from the 19th and 20th Century plantation period were identified. Evidence of a single WWII-era British gun emplacement, which includes two 6-inch naval guns, remains at Point Eclipse. The Point Marianne Plantation Complex and Point Marianne Cemetery are considered to be significant in terms of U.S. and British historic preservation standards. The other sites identified during the survey are potentially significant. Within the controlled area is the East Point Plantation—an abandoned coconut plantation village with structures that have been repaired.

Figure 2.9 East Point Plantation

2.5.9 Scenic Resources

The main scenic resource on Diego Garcia is its peaceful, tranquil setting, surrounded by ocean. Panoramic views of the lagoon can be seen from boats or from the shoreline. Although the number of land-based scenic resources on Diego Garcia may seem limited, the natural and cultivated vegetated areas create surroundings in stark contrast to those commonly associated with more urban settings. From the developed Navy base, the views of the uninhabited eastern shoreline of the island provide a more pristine setting, akin to what the island may have looked like in the past. Some of the wetland areas, such as the manmade wetland adjacent to the airport's passenger

Figure 2.10 Scenic view of lagoon

Figure 2.11 Forest view

terminal, have scenic value. The historic sites also have scenic value. The Point Eclipse WWII Gun Emplacement is located near the bachelor enlisted quarters along the jungle trail/para course. A picnic grove has been developed in the area. The Point Marianne Plantation area south of the runway is kept cleared to facilitate access and views of its many ruined structures, building foundations, and features. Within the plantation complex along the lagoon, about 2,625 feet (800 m) south of Point Marianne, is Banyan Tree Cemetery. The area is overgrown and there are few legible inscriptions, all in French, including entries from 1869, 1886, and 1902. Northwest of the historic ruins area and adjacent to DG-1 is the Point Marianne Cemetery. Burials there include earlier inhabitants and Indiansoldiers assigned to defend Diego during WWII.

2.6 Physical Infrastructure Capacities and Constraints

2.6.1 Roads

DG-1 is the island's main paved highway. Both paved and crushed coral spur roads provide vehicle access to various operational and support sites. DG-1 is paved from Eclipse Point south and around to the GEODSS site (7°24'30") on the east side of the island, where DG-1 becomes a coral dirt road through the controlled zone to the East Point plantation. The road beyond to Barton Point (restricted zone) is unimproved and practically impassable.

With the exception of construction contractor vehicles, there are no private vehicles on-island, and the number of government vehicles is minimized to curb freight and maintenance support costs. Planning to promote pedestrian-oriented living and work centers within the cantonment is emphasized. Residents walk, use bicycles, or ride the installation's shuttle bus service that connects the cantonment with working, living, and recreation areas located along DG-1 and major spur roads.

2.6.2 Utilities

2.6.2.1 Water

Groundwater in Diego Garcia is contained in a shallow freshwater lens that floats just below ground level, on top of the denser layer of seawater beneath the atoll. It is replenished by local rainfall, which averages about 100 inches a year. The lens is thickest in areas where the land area is widest. Fresh groundwater occurs in usable quantities in five principal areas: the cantonment, air operations, industrial and transmitter sites, and the GEODSS site. The system at Diego Garcia has been in operation since 1978. The island's two main freshwater well fields are located to the south and west of the cantonment area, and in the airfield area.

Water is drawn from the freshwater lens by means of low capacity, shallow wells. Currently, about 90% of the required freshwater is being supplied from the cantonment area well field. Use of the airfield area well field was temporarily suspended in 1991 due to a fuel spill in the area. Current usage is limited to about 20% of its sustainable yield, pending completion of the cleanup of contamination from both the 1991 fuel spill and a fuel leak discovered in 1997.

The water is aerated and chlorinated at the treatment plant in the cantonment area prior to distribution through the water lines. However, the chlorination reacts with humic material in the water to form "total" trihalomethane. Tihalomethane levels exceed the maximum allowable contaminant level of 100 parts per billion that has been established in the FGS.

Potable water for drinking and cooking is produced at two 20,000 gallons-per-day (76,000 liters/day) nano-filtration plants located next to the water treatment plants in the Cantonment Area and to the North Apron in the Air Ops Area. This water is delivered by truck to work areas and food service facilities and to storage tanks scattered throughout the bachelor quarters areas. Bachelor Quarter (BQ) occupants fill containers that are provided with each unit from these tanks as needed.

Most groundwater-monitoring wells are in or near both marshland areas. Twenty (20) monitoring wells are located in the cantonment area and with the "R and C"-Sites; 10 monitoring wells are within the Airfield Operations area, 2 in the I-Site South and 2 at T-Site. Data collected at various monitoring wells include conductivity and chloride concentrations as a quantitative measure of salinity.

2.6.2.2 Sewer

There are two centralized sewage treatment plants serving the island. The "R"-Site sewage lagoon collects sewage generated in the cantonment area and as far south as Palmsville Village. The Air Operations sewage lagoon serves all areas south of Palmsville to Camp Justice (i.e., Air Operations, POL, Supply Site, the Laundry, I-Site North and Seabreeze Village). The Industrial Site South, Transmitter Site and GEODDSS utilize sewage septic/holding tanks and leaching fields.

2.6.2.3 Power

Two power plants (one in "I" Site North and one in "I" Site South) serve NSF Diego Garcia. Combined, the island's generating capacity is roughly 23 megawatts, which is adequate for current and projected requirements. Standby emergency generators are located in mission-essential areas for such critical loads as aviation operations and communications. During "peacetime," the North Power Plant has sufficient generating capacity to meet demands. The South Power Plant was put on line after September 11, 2001, to provide the additional power required by additional personnel and increased operations.

2.6.2.4 Communications

NCTAMS PACIFIC DET operates the military telephone system and Cable and Wireless provides commercial long distance telephone and cable television services. An Improved Mobile Telephone System (IMTS) provides telephone service from the base to ships moored in the basin/lagoon.

2.6.2.5 Drainage Structures

Natural drainage flows direct sheet flows toward ponding areas rather than draining into the lagoon or ocean. This helps to maintain the finite groundwater reserves available on the atoll.