INTRODUCTION

Located at the southern end of the Mariana Islands archipelago and approximately 3,700 miles southwest of Hawaii, 1,500 miles east of the Republic of the Philippines, and 1,550 miles south of Japan, Guam is the western most territory of the United States. Comprised of six installations throughout the 212 sq mi island, Naval Base Guam (NBG) encompasses over 18,000 acres and employs over 10,000 military and civilian personnel. With over 16,000 acres covered under the Integrated Natural Resources Management Plan (INRMP) the natural resources team is responsible for maintaining a variety of significant habitats including limestone forests, ravine forests, wetlands, and coral reefs, as well as several threatened and endangered species (swiftlet, moorhen, fruitbat, hawkbill sea turtle, green sea turtle, and three candidate snail species) and two Ecological Reserve Areas (ERA). The natural resources team serves as a leader in conservation efforts on Guam, managing natural resources successfully while supporting NBG's mission to support the U. S. Pacific Fleet and other forces operating from or serviced by Guam and to support servicemen and their families stationed on the island.

BACKGROUND

Team Member Name	*Title*	*Employing Organization*
Captain Richard Wood	Commanding Officer	NBG
Commander Mike Thornton	Public Works Officer	NBG
Ronald Rossetti	Installation Environmental Program Manager	NBG
Gretchen Grimm	Natural Resources Specialist	NBG
Kevin Brindock	Natural Resources Specialist	NBG
Paul Wenninger	Natural Resources Specialist	NBG
Stephen Mosher	Natural Resources Specialist	JRM

POSITION DESCRIPTION

The natural resources team serves as an integral component of NBG's Public Works Department – Environmental Division, developing effective strategies for conserving and managing natural resources and consistently ensuring projects and activities are in compliance with environmental regulations. Three components of the Environmental Division, natural resources, cultural resources, and environmental compliance, are collectively responsible for managing the environmental programs at NBG. A team of efficient and accomplished staff manage the natural resources program, working collaboratively with other departments and other federal and local agencies to realize goals and objectives and continue the development of the natural resources program.

The natural resources team accomplishes a range of tasks and duties to ensure conservation goals and objectives outlined in the INRMP are met, the Navy remains compliant with environmental regulations, and the military mission is sustained. Primary duties include: (1) management of threatened, endangered, and candidate species

including collecting data on distribution and abundance, ensuring Navy projects are compliant with the Endangered Species Act (ESA), and implementing projects to meet conservation goals to protect and maintain federally listed species and their habitat; (2) managing marine resources through the execution of projects to evaluate the status and condition of marine resources, development of regulations to protect marine resources, and reviewing projects to assess potential impacts to marine resources; (3) management of terrestrial resources through the oversight of native wildlife and migratory birds including routine surveys evaluating trends in abundance and projects to maintain and enhance habitat; (4) implementing projects to control and reduce erosion; (5) developing outreach programs to engage the local community; and (6) maintaining a GIS database of natural resources data to provide the tools and information required to effectively manage resources. Through implementation of INRMP projects, community outreach, collaborating with other departments and outside agencies, and a consistent record of compliance, the natural resources staff successfully maintains the integrity of resources on Guam while continuing to support mission readiness.

AWARDS & SERVICES

The natural resources conservation team organizes and participates in community service work, including beach cleanups, programs for K-12 schools, and community events. Participation in community events, such as the Guam Earth Day Festival allows the team to share their knowledge and establish solid relationships with local community as part of their service work. Attendance at international conferences, such as the Annual Wildlife Society Conference and Asia & Pacific Coral Reef Conference, and participation in professional organizations, including American Ornithologists Union, Cooper Ornithological Society, Guam Invasive Species Council, Guam Plant Extinction Prevention Program, and The Wildlife Society, provides opportunities team members to exchange information and learn about new technologies and developments that will ensure the natural resources program at NBG maintains excellence. Additionally, through publications in professional journals, including the Journal of Wildlife Management and Wilson's Journal of Ornithology, the natural resources team establishes and maintains credibility in their field. In recognition of their efforts during FY10 and FY11 two members of the natural resources team were nominated for NAVFAC MAR Employee of the Quarter, with one member awarded this honor.

ACCOMPLISHMENTS

Overall Natural Resources Conservation Management

› *Planning, Programming, and Budgeting*

The natural resources team is responsible for the conservation and management of approximately 16,000 terrestrial acres and 36,000 acres of submerged lands around Guam. This is successfully achieved by strategic planning and programming of an approximate $1.6 million annual budget. Despite a significant growth in operations during FY10 and FY11 and an increase in workload for the department, the natural resources team planned, programmed, and budgeted projects to meet the increased demand without compromising integrity of the resources while maintaining compliance with environmental regulations.

› *Technology*

The success of the natural resources team is due to the implementation of well developed strategies, adaptive management, coordinating with other agencies, dedication to outreach and education, and the use of new technologies. During FY10 and FY11 the natural resources team began several new initiatives using technological advances to expand capabilities and benefit conservation efforts. The use of thermal and infrared devices to record data on threatened and endangered species, using remote sensing to classify terrestrial vegetation and develop benthic habitat maps, and employing specially engineered cameras to monitor corals are some of the ways the natural resources team is taking the program to new levels.

Coordinating with NAVFAC HQ the natural resources team is actively involved in the development of GIS requirement and standards for NAVFAC Environmental Business Line. These standards will streamline the application of GIS across installations and provide new tools to conserve and manage natural resources. Serving as one of 10 installations in a pilot project, a GIS database of all environmental data at NBG is being developed that will provide a framework to advance GIS utilities within the natural resources and other programs across NBG.

Mission Enhancement

› *Compliance*

One of the essential functions the natural resources program provides to the command is ensuring that projects and activities on NBG maintain compliance with environmental regulations. During FY10 and FY11 the natural resources program reviewed over 600 projects and hit a NBG record number of reviewed NEPA projects in one month. The natural resources team also conducted formal and informal Section 7 and Essential Fish Habitat consultations, successfully ensuring that conservation measures are addressed without compromising the military or civil works missions.

› *Critical Habitat*

Following strategies outlined in the INRMP for maintaining viable populations of threatened and endangered species and their habitat, the natural resources team has implemented projects providing conservation benefits for protected species without requiring designation of critical habitat. These efforts have resulted in Navy lands containing some of the best remaining habitat for threatened and endangered species on Guam, including approximately 12,000 acres of the Navy Overlay Unit of the Guam National Wildlife Refuge.

Land Use and Forest Management

› *Erosion Control*

The largest fresh water body on Guam, Fena Reservoir, is located on Navy lands and serves as one of the primary water supplies for the island, providing water to NBG and surrounding municipalities. The natural resources team has taken a lead in combating erosion around Fena Reservoir and surrounding rivers where sedimentation threatens water supply, degrades soil quality, and adversely impacts coral reefs. During FY10 and FY11 the natural resources team planted approximately 78,500 trees and 50,000 grass plugs covering approximately 100 acres on areas identified as eroded and contributing to sedimentation in the waterways.

› *Native Plants and Reforestation*

Committed to conserving native plant communities the natural resources team has implemented several projects to enhance the health of native forests and benefit native plant populations. Through a project inventorying plants and mapping their distribution NBG has begun identifying hot spots of declining species for additional conservation and protection measures. In FY11 the natural resources team began a project to develop new vegetation maps for NBG to provide updated information that will be used to manage threatened and endangered species, as well as other natural resources program areas.

› *Ecological Reserve Areas (ERA)*

The natural resources team manages two ERAs that were established as areas in which natural conditions are maintained by allowing natural physical and biological processes to prevail without human intervention. The Haputo ERA and Orote Point ERA contain 415 acres that protect terrestrial and marine resources. The natural resources team implemented several projects on ERAs during FY10 and FY11, devoting over $200,000 annually to managing and conserving these areas by inventorying and assessing the status of the flora and fauna, monitoring threatened and endangered species, estimating numbers of recreational users, studying the impact of activities on the resources, and installing interpretive signs for recreational users.

Fish and Wildlife

› *Threatened and Endangered Species*

With five federally listed species and additional candidate and state listed species on NBG, the natural resource team excels in wildlife management serving as a leader in protecting endangered species and their

habitat. During FY10 and FY11, NBG conducted approximately 500 surveys annually for threatened and endangered species and migratory birds, a significant increase from previous years, and implemented additional projects to protect these species.

Working with the Army Corps of Engineers' Engineering, Research, and Development Center, the natural resources team implemented a project to develop new methods using thermal imaging devices and infrared cameras to monitor the remaining population of the Mariana gray swiftlet at the last three sites occupied by this federally endangered bird on the island. This initiative will increase the accuracy of population estimates, enhance capabilities to study and monitor the species, and result in a labor cost savings for NBG. This technology has also been found to be an effective tool to monitor and control Brown Treesnakes, an introduced species responsible for the decline and extinction of several native birds on Guam, at caves occupied by swiftlets.

› *Seagrass Mapping*
Often called the canary of the marine ecosystem, seagrass is very sensitive and one of the first places where signs of environmental stress will be seen. The natural resources team is mapping the only seagrass bed on NBG property. Seagrass beds provide important habitat and forage for threatened and endangered sea turtles as well as nursery grounds for other juvenile marine species.

› *Migratory Birds*
Located along the migratory pathway of birds traveling between arctic breeding grounds and wintering sites in the Western Pacific, New Zealand, and Australia, Guam receives a number of migratory birds annually. Remaining dedicated to the conservation of wildlife on Guam the natural resources team surveys wetlands, coastal shorelines, and upland habitats to ensure adequate data is collected to protect migratory birds.

In FY10 the natural resources team began examining the relationship between mowing schedules of fields and migratory bird use to determine the best management practices to provide habitat for migrants dependent on these areas. The natural resources team also collaborates with Pac Fleet quarterly to monitor the northern island of Farallon de Medinlla for endangered species and migratory sea bird populations. This island is supports NBG's mission by providing a target range and no strike zone. Additionally, with the development of alternative energy programs on NBG, including wind turbines, the natural resources program has carefully examined projects to create solutions that encourage alternative energy development yet fulfill our commitment to protect migratory birds and other wildlife.

› *Fishing*
With approximately 30 miles of shoreline the natural resources team is responsible for the management of a significant portion of the marine resources around the island of Guam.

The team carefully manages these areas developing policies that permit use, such as fishing, while ensuring that the resources will persist. In FY10 the natural resources team developed new regulations for fishing using a strategy aimed at protecting coral reefs and conserving the marine organisms dependent on them. Based on data collected by NBG and local and federal agencies, this new policy is a complete overhaul of the former policy that will permit sustainable use of the resources, protect ecologically significant areas, and maintain the health of coral and fish populations.

Invasive Species Management

› *Control of Invasive Species*

Introduced species have had severe impacts on the native flora and fauna of Guam causing the decline and extinction of native species. Consequently, the natural resources team has worked rigorously to address invasive species concerns, collaborating with federal and local agencies to control and reduce the population of invasive species on Guam and minimize the potential for spread from Guam to other areas.

Responsible for the extinction of several birds and the overall decline of Guam's avifauna, the Brown Treesnake has been a primary focus of the natural resources team's invasive species management program. Through the deployment of over 1,000 traps, visual spotlight searches, and inspections by trained dogs over 5,600 Brown Treesnakes were trapped and removed during FY10 and FY11, successfully protecting nesting areas of endangered birds, improving quality of life for servicemen and their families, controlling the spread to other islands, and improving habitat quality for native wildlife. With new initiatives, such as a FY10 experiment coordinated with USDA to test a new method for reducing Brown Treesnake populations, the natural resources team continues to enhance efforts to control and reduce Brown Treesnake populations to benefit native species on the island.

Year	Brown Treesnakes Trapped	Household Goods Inspections	Vehicles Inspected	Warehouse Inspections	Pallets Inspected
FY10	2,771	1,796	1,222	1,992	72,011
FY11 (Oct 1 - 30Jun)	2,928	1,481	795	1,683	49,835

Feral ungulates (deer, pig, and carabao) threaten the health of ecosystems on Guam by foraging on native vegetation, causing erosion, and changing the forest composition. During FY11 the natural resources team began the development of a comprehensive plan to significantly reduce and control the population of these invasive species. Taking a lead role in managing invasive ungulates on Guam, NBG's Ungulate Management Plan will provide the strategy to implement reduction and control measures that will allow native forests to recover benefiting native wildlife.

Working with University of Guam and federal and local agencies the natural resources team has been monitoring the spread of the introduced coconut rhinoceros beetle on the island. The team collects data that is used to identify the beetle's presence and coordinate with the local rapid response team to remove infestations. In recognition of its efforts, NBG was acknowledged with an awards certificate in FY10 by the local agency responsible for invasive pest control on the island.

› *Education*

With a strong commitment to controlling invasive species, the natural resources team expanded its efforts by integrating education into its invasive species program. By providing interpretive materials on Brown Treesnakes to incoming personnel and conducting educational presentations to familiarize contractors and other workers with identification of invasive species, the natural resources team has shown excellence in managing invasive species on NBG and around the island of Guam.

Conservation Education and Community Relations

› *Volunteers*

By engaging the community and involving them in conservation efforts the natural resources team works to ensure that environmental goals and objectives extend beyond the natural resources program and will persist over time. One of the environmental program's successes with volunteers is the annual beach cleanups that are coordinated with NBG personnel, their families, and the local community. Expanding efforts to enhance the quality of natural resources around the island, the natural resources team schedules these events to occur on beaches on Navy properties and those in the surrounding community, targeting beaches that provide habitat for nesting sea turtles.

› *Community Outreach and Education*

NBG takes pride in its annual participation of the Earth Day Festival on Guam. This island wide event draws in thousands of people from around the island and provides a platform for NBG to reach out to communities across Guam. The natural resources team has played an active role in this event, providing interpretive displays and programs on conservation for thousands of adults and children.

With a strong commitment to educational outreach the natural resources team brought the environmental program to public schools during FY10 and FY11. Reaching out to local community schools, NBG worked with K-12 classrooms to bring students to the NBG Water Treatment Plant and NBG Solar Power Plant. By coordinating educational outreach projects and reaching out to audiences outside of NBG, the natural resources team successfully brings together multiple parties for conservation efforts to benefit the entire island of Guam.