



ROTA SPECIAL RESOURCE STUDY





CNMI Historic Preservation Office staff inspect one of the large latte capstones at As Nieves Quarry. Photo: NPS.

ROTA SPECIAL RESOURCE STUDY

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ACRONYMS AND ABBREVIATIONS

AAPI	Asian Americans and Pacific Islanders
CE	Categorical Exclusion
CFR	Code of Federal Regulations
CNMI	Commonwealth of the Northern Mariana Islands
DFW	Department of Fish and Wildlife
DLNR	Department of Lands and Natural Resources
DPL	Department of Public Lands
ENSO	The El Niño/Southern Oscillation
FUDS	Formerly Used Defense Sites
GIS	Geographic Information System
HPO	Historic Preservation Office
LWCF	Land and Water Conservation Fund
MARS	Micronesian Archaeological Research Services
MCCA	Mariana Crow Conservation Area
MVA	Marianas Visitors Authority
NEPA	National Environmental Policy Act
NKK	Nan'yō Kōhatsu Kabushiki Kaisha (South Seas Development Company)
NHA	National Heritage Area
NHL	National Historic Landmark
NHP	National Historical Park
NMD	Northern Marianas Descent
NNL	National Natural Landmark
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
SGCN	Species of Greatest Conservation Need

SRS	Special Resource Study
TCP	Traditional Cultural Properties
UNESCO	United Nations Educational, Scientific, Cultural Organization
U.S.	United States
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
WWII	World War II

A photograph of ancient stone ruins in a lush tropical jungle. The scene is filled with dense green foliage, including palm trees and various tropical plants. In the foreground, there is a thick layer of brown, fallen leaves. The ruins consist of several large, rectangular stone blocks, some of which are partially covered in moss and small green plants. A prominent tree trunk is visible in the middle ground. The overall atmosphere is one of a well-preserved but overgrown archaeological site.

EXECUTIVE SUMMARY



Mochong Latte Village Complex, on Rota. Photo: NPS.

EXECUTIVE SUMMARY

INTRODUCTION

On December 19, 2014, President Barack Obama signed into law the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015. The act authorized the National Park Service to conduct a special resource study of the “prehistoric, historic, and limestone forest sites on the island of Rota, Commonwealth of the Northern Mariana Islands” to evaluate the national significance of the sites and the feasibility of designating them as a unit of the national park system (P.L. 113-291, Title XXX, §3051; see Appendix A). The Rota study authorization was based on legislation that was originally introduced in the House in 2013 as H.R. 674, by Congressman Gregorio Kilili Camacho Sablan of the Commonwealth of the Northern Mariana Islands (CNMI).

RESOURCE OVERVIEW

Rota (*Luta* in Chamorro) is one of 15 islands in the Mariana archipelago of Western Micronesia. The majority of land area in the Marianas is found in the four southernmost islands of Guam, Rota, Tinian, and Saipan. Guam is politically distinct from the remaining 14 islands, which comprise the Commonwealth of the Northern Mariana Islands (CNMI). The CNMI is a United States territory (see Map 1: Mariana Islands).

Rota has a land area of 33 square miles (85 square kilometers) and is the fourth-largest island of the archipelago. Rota’s native limestone forest still covers a large proportion of the island, totaling 52% of the island’s area. The 10,943 acres of forest on Rota continue to exist in comparatively large and intact stands that have only been minimally impacted by human activities and invasive species. Rota’s forests exhibit a dense and varied structure that supports numerous endemic plant and animal species. While other examples of this rare forest type are found on Guam, Saipan, and Tinian, the ecosystems on these other islands have been compromised by invasive

species such as the brown tree snake (*Boiga irregularis*) and have been impacted by human clearing for agriculture and development. Unlike Rota, the other large islands were the sites of major World War II battles, which also resulted in the destruction of limestone forest resources.

Rota’s limestone forests are important culturally as well as ecologically, comprising an integral part of the homeland of the Chamorro people, who are the indigenous people of the Marianas. The forests contain ancestral settlements and burial sites revered by the people of Rota, past and present. They also support the perpetuation of cultural practices such as traditional horticulture, hunting, crafts, and medicinal plant collection.

In addition to its highly intact limestone forest ecosystems, Rota is rich in cultural resources. The Rota study area contains a diverse collection of well-preserved archeological sites associated with the ancestral Chamorro culture of the Mariana Islands. Rota’s Chamorro archeological sites include coastal and inland village sites, a quarry for latte (or ancient stone house supports), rock art sites, artifact scatters, and other site types reflecting a record of continuous habitation dating back at least 3,500 years. Many Chamorro regard these archeological sites and their surrounding landscape settings as sacred places inhabited by taotaomo’na, or ancestral spirits.

The Rota study area also includes resources associated with the Spanish, German, and Japanese colonial occupation of the island, as well as Japanese military installations from World War II. Because Rota was not invaded during World War II, the island’s cultural resources have suffered less damage than resources on other islands that experienced active combat. Several of the cultural resources sites on Rota have been listed in the National Register of Historic Places, including Chamorro archeological sites, sites from the Japanese colonial period, and sites from World War II.

SUMMARY OF FINDINGS

This special resource study was prepared following the process established by the National Parks Omnibus Management Act of 1998 (54 USC 100507), Additional Areas for the NPS System, and addresses the criteria for new areas outlined in NPS *Management Policies 2006*. Under the law, a study area must meet all four criteria below to be recommended as an addition to the national park system.

National Significance

LIMESTONE FOREST

The national significance of Rota's limestone forests was evaluated using National Natural Landmark (NNL) criteria, which consider a natural resource nationally significant if it is one of the best examples of a biological or geological feature considered a characteristic of a natural region. The limestone forests on Rota meet the NNL criteria for national significance and are an illustrative example of a rare functioning ecosystem type that has been less disturbed than other limestone forests. The functioning limestone forest ecosystem on Rota retains notable levels of diversity and value for science and education that support a finding of national significance.

CHAMORRO ARCHEOLOGICAL SITES

The NPS used the National Historic Landmark (NHL) criteria to evaluate the national significance of Rota's ancient and historic sites. Among the Chamorro sites identified by the NPS, the Mochong Latte Village Complex, the Alaguan Latte Village Complex, and the As Nieves Quarry were found to rise to the level of national significance individually. The remaining sites rise to the level of national significance as part of a complex that is unmatched in terms of overall integrity, concentration of unique and individually nationally significant sites, diversity and density of sites, and potential to yield information regarding multiple aspects of traditional Chamorro history and culture.

WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

The Ginalagan Defensive Complex and Chudang Palii Defensive Complex were found to meet NHL criteria for national significance. The World War II Japanese defensive complexes are outstanding examples of Japanese military fortifications designed specifically for the late-war defense-in-depth strategy. Extensive and well-preserved, Rota's defensive complexes have yielded and will likely continue to yield archeological and historical information about the evolution of the Japanese interior defensive strategy, as it was used on Rota and subsequently applied in pivotal World War II battles such as Peleliu, Iwo Jima, and Okinawa.

Suitability

To be considered suitable for addition to the national park system, an area must represent a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

LIMESTONE FOREST

Rota's limestone forests include examples of both lowland rain forest and montane rain forest. Lowland and montane limestone forests are not adequately represented elsewhere in the national park system, nor are there comparable sites which protect and interpret a similarly intact example of the limestone forest ecosystem. This is due to devastation of areas of native limestone forest on Guam during World War II, as well as the impacts of the invasive brown tree snake. The accidental introduction of the brown tree snake has virtually eliminated forest birds on Guam, resulting in a cascade of impacts to the food web and seed dispersal that will increasingly alter forest structure as time goes on. The limestone forests of Rota are therefore suitable for inclusion in the national park system because these forests protect the most intact example of this resource type in the United States and its territories, meeting the study criteria for suitability.



Aerial view of the island of Rota, looking toward the Taipingot Peninsular, also called Wedding Cake. Photo: NPS.



A view of the endangered tree, *Serianthes nelsonii*, in the limestone forest on Rota. Photo: Ann Marie Gawel.



The Mochong Latte Village Complex, a Chamorro archeological site identified as nationally significant during the study process. Photo: NPS.



Members of the NPS study team and CNMI Historic Preservation Office staff visit the Ginalagan World War II Japanese Defensive Complex. Photo: NPS.

CHAMORRO ARCHEOLOGICAL SITES

Rota's Chamorro archeological sites include an assemblage of architectural, habitation, ceremonial, and spiritual features; unique structures; rich artifacts; and midden assemblages that contribute to understanding the more than 3,500-year evolution of the indigenous culture of the Mariana Islands. The Rota study area is distinguished from other archeological site complexes in the Marianas by its exceptionally high level of integrity, diversity and density of sites, and concentration of unique and individual nationally significant sites. Rota's significant archeological sites provide exceptional opportunities for interpretation, education, and enjoyment of ancestral Chamorro culture. Where Chamorro archeological sites are present in the national park system, the sites are fragmented, disturbed, or in small clusters. The Chamorro archeological sites on Rota are some of the best surviving examples of the unique and distinct culture of the Native people of the Mariana Islands; sites associated with the Chamorro people are not adequately represented in the national park system.

WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

Many examples of Japanese military defensive sites are found in existing units of the national park system or as part of national historic landmarks. However, the Chudang Palii and Ginalagan World War II Japanese defensive complexes are the most intact and best remaining examples in the United States of Japanese inland defense structures constructed out of the natural landscape. Rota's defensive complexes provide a palpable illustration of daily life on a bypassed island during World War II and demonstrate the late-war shift to in-depth defense systems—themes that are not adequately represented in other comparably managed sites within the U.S. or U.S. territories. Rota's defensive complexes considerably broaden the interpretive potential of War in the Pacific National Historical Park, American Memorial Park, and the existing NHL sites by completing the story of the war in the Pacific.

Feasibility

To be considered feasible for addition to the national park system, an area's natural systems or historic settings must be of sufficient size and configuration to ensure long-term protection of resources and accommodate public use. The area must also have potential for efficient administration at a reasonable cost.

To be feasible, a national park unit on Rota would need to be supported by the CNMI government, as the CNMI is the primary landowner of the sites evaluated in the study area, and NPS ability to own and manage land in the CNMI is constrained by the 1975 Covenant that established the CNMI. The NPS would need to have some level of management authority over lands within the potential unit: this could be achieved through a management agreement with the CNMI government. The agreement would need to include a partnership or co-stewardship arrangement for management, and/or long-term leases, and/or limited acquisition of lands from willing sellers, consistent with the Covenant.

To be feasible, a national park unit would also be dependent on support from residents on Rota and in the CNMI. At this time, public support for a potential national park unit on Rota is varied. Based on public outreach conducted by the NPS in 2020, approximately half of those commenting favored the establishment of a unit. About one quarter of comments submitted expressed opposition to a unit, and another quarter requested more information about what an NPS unit on Rota would entail before forming an opinion. Individuals requested additional detail about local use and access, the management approaches for a potential park unit, the level of involvement of the CNMI government, and the potential economic impacts of a unit. Further description of an NPS unit proposal could address public questions and clarify the level of public support.

To be feasible, the budget for a national park unit on Rota would need to meet the operational requirements of a new park in a remote location. Rota presents unique

logistical challenges related to staffing and maintaining a national park unit on a remote Pacific island. Typically, a newly established park would be partially supported by staff from a nearby, existing park. For Rota, sharing resources with other national park sites would be difficult due to the isolated location and access challenges of the Mariana Islands. If the CNMI or other entities were to partner with the NPS and participate in a co-stewardship model, however, a new park unit would not be solely reliant on NPS operational funds and capacity. The operational costs of a national park unit on Rota could therefore be conditionally feasible dependent on adequate funding. One-time development costs for establishing a national park unit on Rota could be reasonable, provided the facility footprint is limited—such as for several trails, small parking lot and trailhead improvements, and a small, leased, administrative space.

There are exceptional opportunities for public enjoyment of the sites on Rota if safe public access can be provided. However, the limestone forest areas along the Sabana cliffs and the World War II Japanese defensive complex at Chudang Pali are not feasible for public access due to safety concerns associated with their challenging locations and rugged terrain. The defensive complex at Ginalagan is not feasible for public access due to the need to cross private lands.

An appropriate boundary configuration for a potential national park unit on Rota would encompass the limestone forest and Chamorro archeological sites listed below and surrounding area sufficient for resource protection and visitor facilities.

The following sites include resources with integrity sufficient for national park unit designation, and no current threats would preclude their management as a unit of the national park system: limestone forest along the south and east coasts, including the I'Chenchon Park Wildlife Conservation Area; Mochong Latte Village Complex; As Nieves Quarry; Alaguan Latte Village Complex; Måya Latte Site; Dugi Archeological Site (portions not designated as homesteads); Gampapa

Latte Village (portions not privately owned or designated as homesteads); and Chugai Cave.

Many of Rota's limestone forest areas and the majority of its Chamorro archeological sites are therefore conditionally feasible as an addition to the national park system, dependent upon support from the CNMI government and the development of a management agreement, support from Rota and CNMI residents, and sufficient funding for park operations.

Need for NPS Management

Under this criterion, management by public and private entities is evaluated to determine if these entities can effectively and efficiently provide long-term resource protection and visitor services or if direct NPS management is the optimal approach. If other entities can provide an equivalent or superior level of resource protection and visitor services, the National Park Service will determine that establishment of a national park unit is not needed, and other organization(s) should manage the area. To make this determination, existing management and several additional management frameworks are described and compared. These management frameworks include management by existing CNMI agencies with additional federal funding, designation as a world heritage site, designation as a national heritage area, designation as an NPS affiliated area, and CNMI and NPS co-stewardship of a national park unit.

The people of Rota have protected their resources for generations through cultural practices, local laws, federal financial assistance, and the dedicated efforts of CNMI agencies. The exceptional integrity of Rota's cultural and natural resources is evidence of the community's impressive and centuries-long tradition of stewardship. At likely NPS funding and staffing levels, the NPS contributions to existing management of Rota's significant resources would be limited. Similarly, NPS capacity to provide visitor services and facilities, interpretation, and educational programming would be limited given the expected budget and staffing levels

and logistical challenges of a new park unit on the island. Partnerships with interested organizations could provide additional capacity for research, interpretation, education, and visitor services under both NPS and non-NPS management.

The incorporation of Rota's significant sites into the national park system would provide an opportunity to represent the histories and heritage of the Chamorro people within a rare limestone forest ecosystem, which are underrepresented in the national park system. However, when compared against current management and other potential management frameworks, in light of the limited NPS financial capacity and the modest level of interest in NPS designation among the people and elected officials of Rota and the CNMI, NPS management is not needed at this time.

To enhance technical support and/or federal funding assistance for resources within the study area, Rota and the CNMI may choose to explore grants from the Land and Water Conservation Fund, the Office of Insular Affairs, and the Historic Preservation Fund and/or pursue world heritage site, national heritage area, or NPS affiliated area designation.

SPECIAL RESOURCE STUDY CONCLUSIONS

Based on the analysis performed through this special resource study, the National Park Service finds that the Rota study area does not meet all four criteria for inclusion in the national park system at this time. Resources within the study area meet established criteria for national significance and suitability, and a portion of the area is conditionally feasible for inclusion in the national park system, dependent on support from the CNMI government and the development of a management agreement, support from Rota and CNMI residents, and sufficient funding for park operations. However, analysis of existing management and several additional management frameworks does not demonstrate a clear need for direct NPS management at this time. The CNMI government is continuing a centuries-long tradition of resource stewardship while also providing visitor access and information about Rota's significant sites. Therefore, this special resource study concludes that Rota does not meet all criteria necessary to be considered eligible for designation as a new unit of the national park system.

A GUIDE TO THIS DOCUMENT

This special resource study is organized into seven chapters. Each chapter is briefly described below.

Chapter 1: Introduction provides a brief description of the study area and an overview of the study's purpose, background, and process. This chapter also summarizes the NPS findings on the special resource study.

Chapter 2: Context and Resource Description provides an overview and site description for the island of Rota (*Luta*). This chapter also describes the environmental, cultural, and historical contexts for Rota's limestone forest, Chamorro archeological, and World War II resources.

Chapter 3: Resource Significance describes the National Park Service analysis of nationally significant resources within the study area.

Chapter 4: Suitability describes the National Park Service analysis of whether nationally significant sites are suitable for inclusion in the national park system.

Chapter 5: Feasibility describes the National Park Service analysis of whether nationally significant and suitable sites are feasible as a unit of the national park system.

Chapter 6: Need for NPS Management and Study Conclusions describes the National Park Service analysis of whether direct NPS management is optimal when compared with other management options. This chapter also includes the overall conclusions from the special resource study process.

Chapter 7: Consultation and Coordination provides an overview of public and stakeholder outreach conducted as part of the study process.

Appendices include the legislation authorizing this special resource study, a description of a national park unit alternative analyzed during the study process, a list of selected limestone forest plants of Rota, descriptions of threatened and endangered species, descriptions of marine and submerged resources, references used in the study, and a list of study preparers.

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Members of the U.S. House of Representatives Committee on Natural Resources tour the As Nieves Quarry, February 2017. Photo: NPS.



1

INTRODUCTION



View of the trunk of the endangered tree, *Serianthes nelsonii*, in Rota's limestone forest. Photo: Ann Marie Gawel.

CHAPTER 1: INTRODUCTION

This chapter provides an overview of the purpose and scope of the study and describes the study process.

PURPOSE

On December 19, 2014, President Barack Obama signed into law the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015. The act authorized the National Park Service to conduct a special resource study of the “prehistoric, historic, and limestone forest sites on the island of Rota, Commonwealth of the Northern Mariana Islands” to evaluate the national significance of the sites and the feasibility of designating them as a unit of the national park system (P.L. 113-291, Title XXX, §3051; see Appendix A). The Rota study authorization was based on legislation that was originally introduced in the House in 2013 as H.R. 674, by Congressman Gregorio Kilili Camacho Sablan of the Commonwealth of the Northern Mariana Islands (CNMI).

This study provides information to aid the National Park Service in determining whether the study area meets eligibility, suitability, and feasibility criteria for designation as a unit of the national park system. The study follows the process established by the National Park System New Area Studies Act (54 U.S.C. 100507) and addresses the criteria for new areas outlined in *NPS Management Policies 2006*. The study is intended to provide Congress with information about the quality and condition of the study area and its relationship to established criteria for NPS units.

To meet the requirements of the study’s authorizing legislation, this report evaluates high-quality, intact areas of limestone forest on Rota, in addition to sites associated with the island’s Chamorro culture and heritage and its World War II history. The study does not analyze coastal areas, ocean waters, or nearby submerged shipwrecks because marine resources were not included in the legislation’s description of the study area. As part of the study process, the NPS ascertained

the public’s level of interest in nationally recognizing this part of United States’ cultural and natural history and evaluated whether one or more of the sites would be appropriate for designation as a national park system unit. As part of the evaluation, the NPS identified alternative strategies to manage and protect resources, and to provide or enhance public understanding, use, and enjoyment of Rota’s limestone forest, Chamorro, and World War II resources.

The National Parks Omnibus Management Act of 1998 requires each study to be “completed in compliance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)” (54 U.S.C. 100507). The most appropriate pathway under the Act (NEPA) for the study was determined to be a categorical exclusion (CE), which excludes the requirement for an environmental assessment or environmental impact statement because there is no potential for impacts on the human environment under normal circumstances. The applicable CE is in the category of: “Adoption or approval of surveys, studies, reports, plans, and similar documents which will result in recommendations or proposed actions which would cause no or only minimal environmental impact” (NPS 2015, 32).

STUDY AREA

Rota is one of 15 islands comprising the Mariana archipelago of Western Micronesia. The high volcanic and raised reef formation islands are dispersed along two north-south arcs extending over 400 miles (644 kilometers) from Guam in the south, to Farallon de Pajaros (Uracas) in the north. See Map 1: Mariana Islands. The majority (80%) of land area in the Marianas is found in the four southernmost islands of Guam, Rota, Tinian, and Saipan. Guam, the largest and southernmost island in the Mariana chain, is an unincorporated U.S. territory. Guam is politically distinct from

Rota Special Resource Study Map 1: Mariana Islands

National Park Service
U.S. Department of the Interior



Data Sources:
NOAA: Mariana Island Coastlines
ESRI: Country Boundaries

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Date: March 2022

the remaining 14 islands, which comprise the Commonwealth of the Northern Mariana Islands (CNMI). The CNMI was established as a U.S. territory through the 1975 *Covenant to Establish a Commonwealth of the Northern Mariana Islands in Political Union with the United States of America*.

Rota, the fourth-largest island of the Mariana archipelago, has a land area of 33 square miles (85 square kilometers). The island measures about 4.2 miles (6.8 kilometers) north-south by a maximum of 12.3 miles (19.8 kilometers) east-west. The current population of Rota, about 2,500, accounts for roughly 5% of the total population of the CNMI. Compared with Tinian and Saipan, Rota's population includes a higher percentage of people of Northern Marianas descent, or "NMD," which includes Chamorro and/or Carolinian people. Chapter 2: Context and Resource Description provides more detail about the indigenous Chamorro people in the Marianas, as well as the 19th-century settlement of migrants from the Caroline Islands. In 2016, Rota's NMD residents comprised 51% of the population, compared with 33% on Saipan and 37% on Tinian (CNMI DPL 2019, 3-10-3-15). About 63% of those living on Rota in 2016 were born in the CNMI, while most of the foreign-born residents—23% of Rota's residents—were born in the Philippines (CNMI DOC 2016).

Chapters 2 and 3 provide information about the study sites and an analysis of their significance. Chapter 5 includes more detailed information about Rota's population and economy.

STUDY PROCESS

Legislative and Policy Direction

Several laws and policies outline the criteria for units of the national park system. The National Park System New Area Studies Act (54 U.S.C. 100507) establishes the basic process for NPS studies of potential new national park areas. NPS management policies provide further guidance.

According to NPS *Management Policies 2006*, a proposed addition to the national park system

will receive a favorable recommendation from the NPS only if it meets all of the following four criteria for inclusion:

- 1. It possesses nationally significant natural or cultural resources.**

Study areas are evaluated for national significance by applying three sets of criteria: National Natural Landmark criteria, National Historic Landmark criteria, and special resource study criteria. As described in NPS *Management Policies 2006*, an area will be considered nationally significant if it meets all of the following conditions:

- It is an outstanding example of a particular type of resource.
- It possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage.
- It offers superlative opportunities for public enjoyment, or for scientific study.
- It retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource.

- 2. It is a suitable addition to the system.**

To be considered suitable for addition to the national park system, an area must represent a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

- 3. It is a feasible addition to the system.**

To be feasible as a new unit of the national park system, a resource must be 1) of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment, and 2) capable of

efficient administration by the NPS at a reasonable cost. In evaluating feasibility, the NPS considers a variety of factors for a site, such as: land use, ownership patterns, planning, and zoning; access and public enjoyment potential; boundary size and configuration; existing resource degradation and threats to resources; level of local and general public support; social and economic impact; and costs associated with development, restoration, and operation.

4. It requires direct NPS management, instead of alternative protection by other public agencies or the private sector.

Under this criterion, management by public and private entities is evaluated to determine if these entities can effectively and efficiently provide long-term resource protection and visitor services or if direct NPS management is the optimal approach. If other entities can provide an equivalent or superior level of resource protection and visitor services, the NPS will determine that establishment of a national park unit is not needed, and other organization(s) should manage the area.

These criteria are designed to ensure that the national park system includes only the most outstanding examples of the nation's natural and cultural resources. The NPS also recognizes that there are other management alternatives for preserving the nation's outstanding resources.

NPS management alternatives are developed for sites that meet all four of the criteria for inclusion listed above. Further definition of each of these criteria is provided in the related sections of this study.

Public Involvement

The National Park Service conducted public outreach for the study in 2017 and 2020. These outreach efforts provided important opportunities to engage members of the public

about the special resource study process, collect information, and gather opinions and comments about a potential new NPS unit on Rota. Detailed information about public involvement, consultation, and coordination is provided in Chapter 7: Consultation and Coordination.

Report Publication and Transmittal of Final Recommendations

This final report incorporates information gathered from the public, stakeholders, and Rota and CNMI elected officials and agency staff, and analysis conducted by NPS staff. Comments received during the public engagement phase in 2020 were used to refine the study's feasibility findings and evaluation of the need for NPS management. In 2021, the preliminary findings were shared with CNMI and Rota agency and elected officials as part of a technical review to ensure report accuracy. The final study report was then completed by the NPS. The final report is transmitted by the Secretary of the Interior to Congress, along with the Secretary's recommendations for the area.

RELATED STUDIES

Other studies have provided guidance and resource information for this study. In addition to the studies listed below, the special resource study was informed by the many archeological surveys and national register nominations that have been developed for Rota's cultural resource sites over the years. Chapters 2 and 3 and the study references provide an overview of these scholarly sources.

Finding a Path Forward: Asian American Pacific Islander National Historic Landmarks Theme Study (2017)

This theme study highlights the contributions of Asian American Pacific Islanders to our nation's history and recognizes the places (including buildings, structures, sites, objects, and districts) that are associated with that history. The theme study includes essays from 17 scholars of Asian American and Pacific

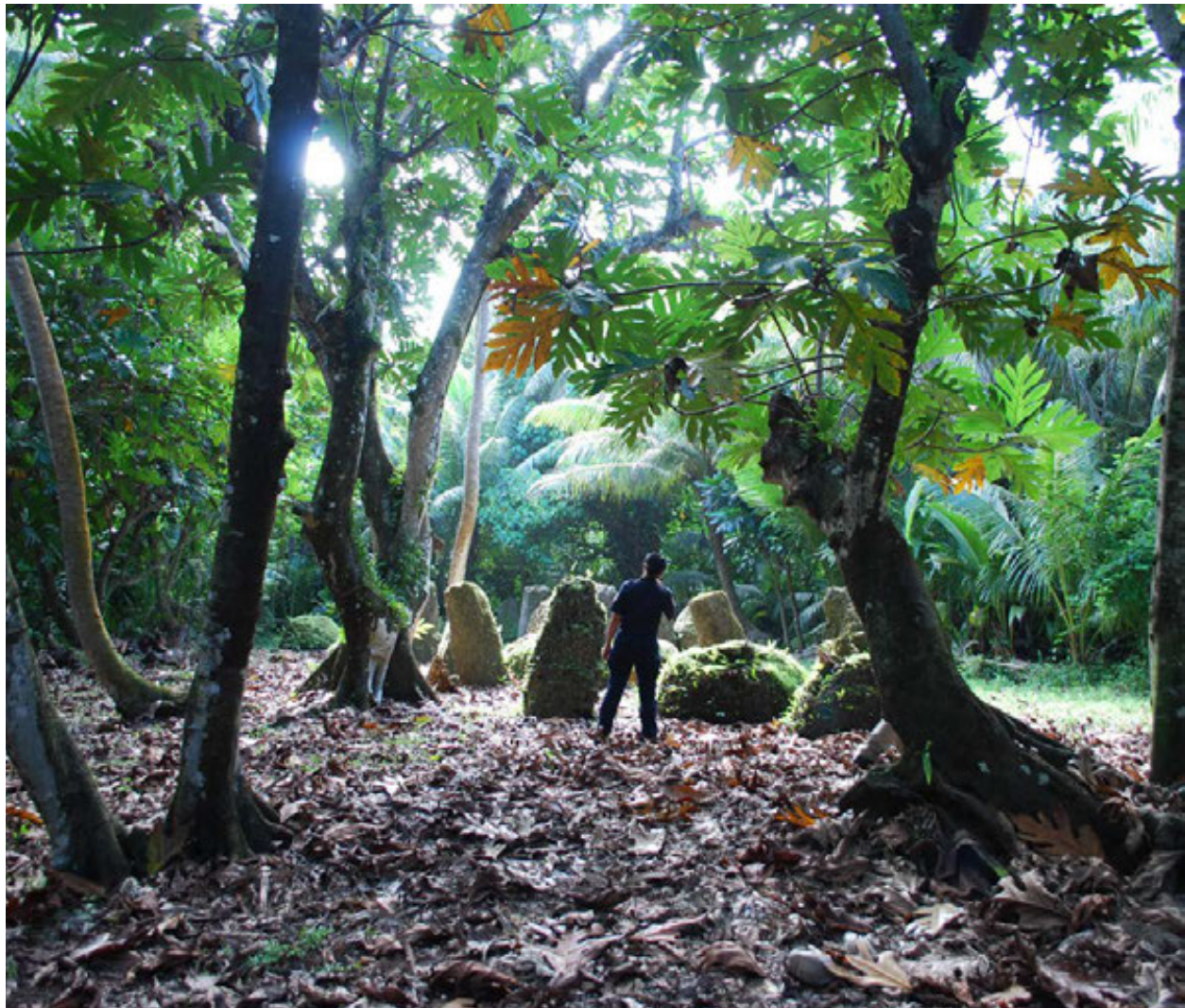
Islander history and culture. Theme studies provide a national historic context for specific topics in American history or prehistory.

Reconnaissance Survey: Significant Natural Areas and Cultural Sites, Island of Rota, Commonwealth of the Northern Mariana Islands (2005)

The National Park Service completed a survey of natural and cultural resources on Rota at the request of CNMI Senator Diego Songao. The survey included limestone forest areas, Chamorro archeological sites, and World War II-era resources. The 2005 reconnaissance survey indicated that resources on Rota were nationally significant and were likely to be suitable and feasible for inclusion in the national park system.

STUDY LIMITATIONS

Special resource studies serve as reference sources for members of Congress, the National Park Service, and other persons interested in the potential designation of an area as a new unit of the national park system. The analysis and findings contained in this report do not guarantee future funding, support, or any subsequent action by Congress, the Department of the Interior, or the National Park Service.

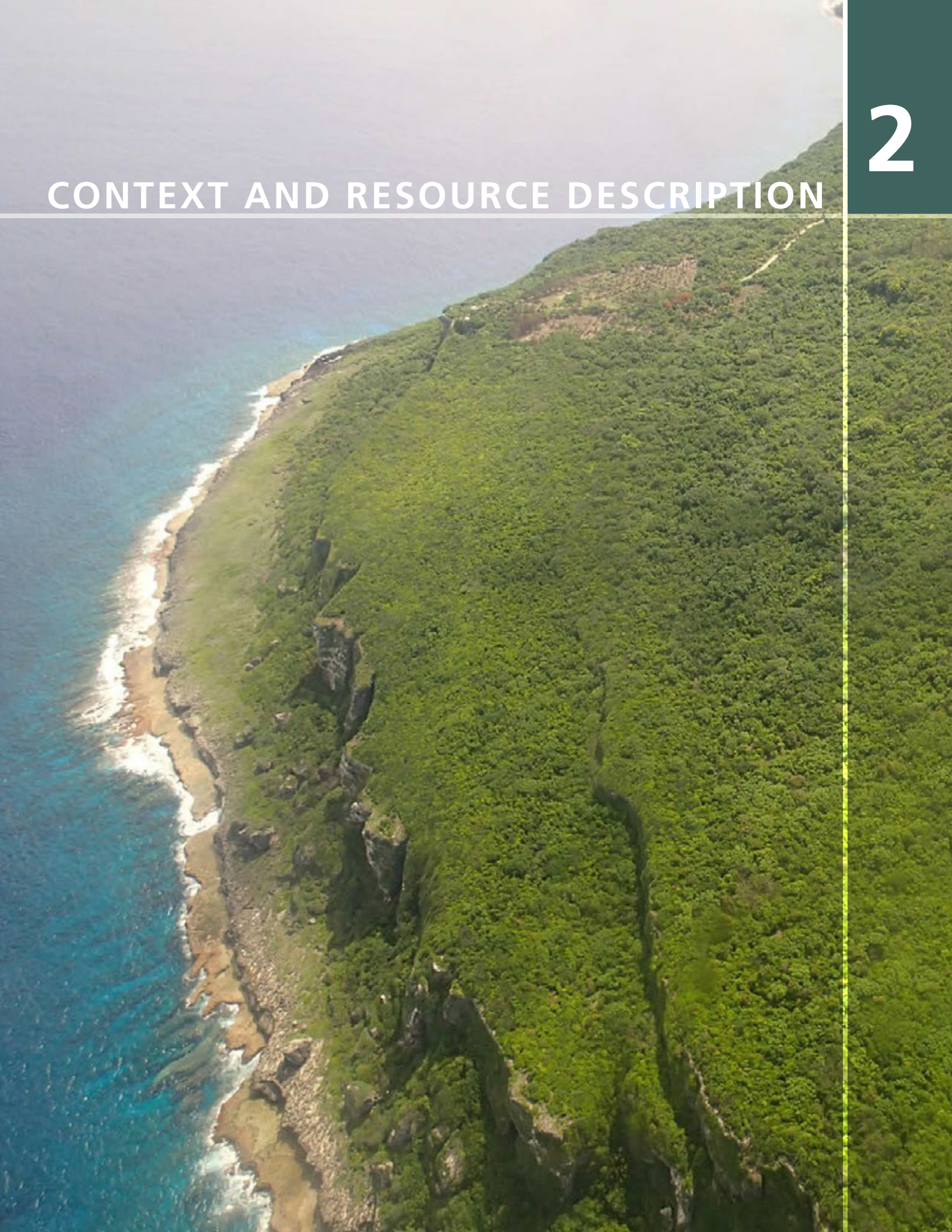


Mochong Latte Village Complex. Photo: NPS.



A standing latte haligi (or pillar) with fallen tasa (or capstone), Gampapa Latte Village. Photo: NPS.

CONTEXT AND RESOURCE DESCRIPTION





Aerial view of the l'Chenchon Park Wildlife Conservation Area, located along Rota's characteristic limestone terraces. Photo: Dave Lotz.

CHAPTER 2: CONTEXT AND RESOURCE DESCRIPTION

This chapter provides the environmental and cultural historical contexts for identifying resources on the island of Rota (Luta) and assessing their significance.

INTRODUCTION

Rota's natural resources were identified through a review of books, reports, and scholarly journal articles, as well as numerous interviews with resource managers and researchers with knowledge of the island's native limestone forests. Field visits were conducted by the NPS to gain familiarity with the resources, but the NPS did not conduct any original scientific or ethnographic research relating to limestone forests as part of this study.

Rota's cultural resources were primarily identified through research conducted by Micronesian Archaeological Research Services (MARS) on behalf of the NPS in 2016 and 2017. Most of these sites were identified through a review of books, reports, and scholarly journal articles. NPS and MARS conducted limited field research to locate, evaluate, and document the sites.

LOCATION

Rota, 40 miles (64.3 kilometers) north of Guam and 60 miles (96.6 kilometers) south of Tinian, is the southernmost island of the CNMI. See Map 1: Mariana Islands and the "Study Area" section of Chapter 1 for additional detail. The three southern islands of the CNMI—Rota, Saipan, and Tinian—are the largest and, except for a few individuals residing on Pagan and Alamagan, are the only permanently inhabited islands. Saipan, the seat of the commonwealth government, accounts for more than 90% of the population of the CNMI (47,329 in the 2020 Census). The majority of the remaining population resides in Songsong and Sinapalo (Sinapalu) Villages on Rota and San Jose Village on Tinian.

ENVIRONMENTAL CONTEXT

Geology

The Mariana archipelago is an above-ground projection of a submarine ridge on the west side of the Marianas Trench, the deepest known part of the ocean. The islands result from the active subduction of the Pacific tectonic plate beneath the smaller Mariana plate.

While political distinctions separate Guam from the remaining islands in the CNMI, groupings based on geologic and biologic factors cross the political distinctions and divide the islands into southern and northern groups. The southern islands—Guam, Rota, Tinian, and Saipan, along with the smaller Aguiguan near Tinian and Farallon de Medinilla north of Saipan—are geologically older than the northern islands. The northern islands are young, mostly active volcanoes. The southern islands consist of an older volcanic core (30 to 45 million years old) topped by limestone (6,000 years to 15 million years old). This limestone is formed from the remnants of coral reefs, which were uplifted via tectonic activity or revealed by dropping sea levels (Mueller-Dombois and Fosberg 1998). The southern islands have notably higher species diversity than the northern islands, due to their larger size, age, and lack of recent volcanic activity (USFWS 2014b).

Rota is composed of Pliocene and Pleistocene limestone overlying an Oligocene-Miocene volcanic basement (Sugawara 1934; Siegrist 1996; Dickinson 2000). A series of six limestone terraces rise in steps from the coastline to a maximum height of 1,627 feet (496 meters) above sea level on Mount Manira. The highest point of Rota is on the Sabana, the 2.5-mile by 1.5-mile (4- by 2.4-kilometer) plateau dominating the west end of Rota. The terraces are plains bounded by steep cliffs that

occur along fault lines. Numerous sinks and caves occur in areas of exposed limestone.

The most extensive of the limestone terraces is the broad plateau of Sinapalo, which stretches to the east of the Sabana at an elevation of 490 to 590 feet (149–180 meters) and contains the modern village of Sinapalo, the airport, and a few ranches and homesteads. The south side of the Sabana is bounded by a steep hillside descending to the Talakhaya region. The Talakhaya area and a small outcrop on top of the Sabana are the only places on Rota where volcanic rocks are present on the surface. The limestone outcrop of Taipingot is connected to the southwest end of Rota by a low-lying piece of land that supports Songsong Village. Taipingot Peninsula is commonly called Wedding Cake due to its distinctive multilayered terraces, remnants of uplifted fossil reefs. It rises to a height of 466 feet (142 meters) above sea level and is covered in low limestone forest. Extending to the northeast of Songsong are the coastal lowlands.

Most of Rota's 38-mile (61.1-kilometer) shoreline is characterized by vertical or overhanging limestone cliffs, ranging from 16 to 65 feet (4.8–19.8 meters) in height, occasionally interrupted by small coves such as Alaguan on the southeast coast. Only the island's north coast, from Songsong nearly to As Mâtmos, is lined by narrow sandy beaches, which abut the limestone slopes and terraces descending from the interior. Occasionally bordered by a very narrow fringing reef, Rota has no protected lagoon (Kayanne et al. 1993; Dickinson 2000). Weathering of the reef has produced pit and pinnacle limestone exposures emerging several feet above the water along much of the sandy shoreline.

Rota's coastline is characterized by heavy surf breaks on the raised reef margins, jagged limestone pinnacles, and exposed shelves. Sasanlagu, the slightly deeper water on the wide reef flat on the northwest side of Taipingot Peninsula, offers a somewhat protected lagoon environment that was historically dredged to support modern shipping. On the south side of Taipingot Peninsula is Sasanhaya Bay.

An estimated 90% of Rota's surface is composed of Takpochao and Mariana Limestones and their derivative soils (Mink 1969, 62; Young 1989). These thin, well-drained, mildly alkaline clay loams contain abundant calcium that renders them more fertile than soils on volcanic landscapes, but their thin, rapid-draining nature makes agriculture challenging. The volcanic exposures, mostly limited to Talakhaya and the higher elevation of the Sabana, generate deep, highly acidic, silty clays with very low fertility. Rota's soils are generally poorly suited to large-scale farming owing to shallowness, rapid draining, abundance of rock outcrops, and infertility. The best soils for farming are on the Sabana, in Sinapalo, and along the stream beds in Talakhaya.

Climate

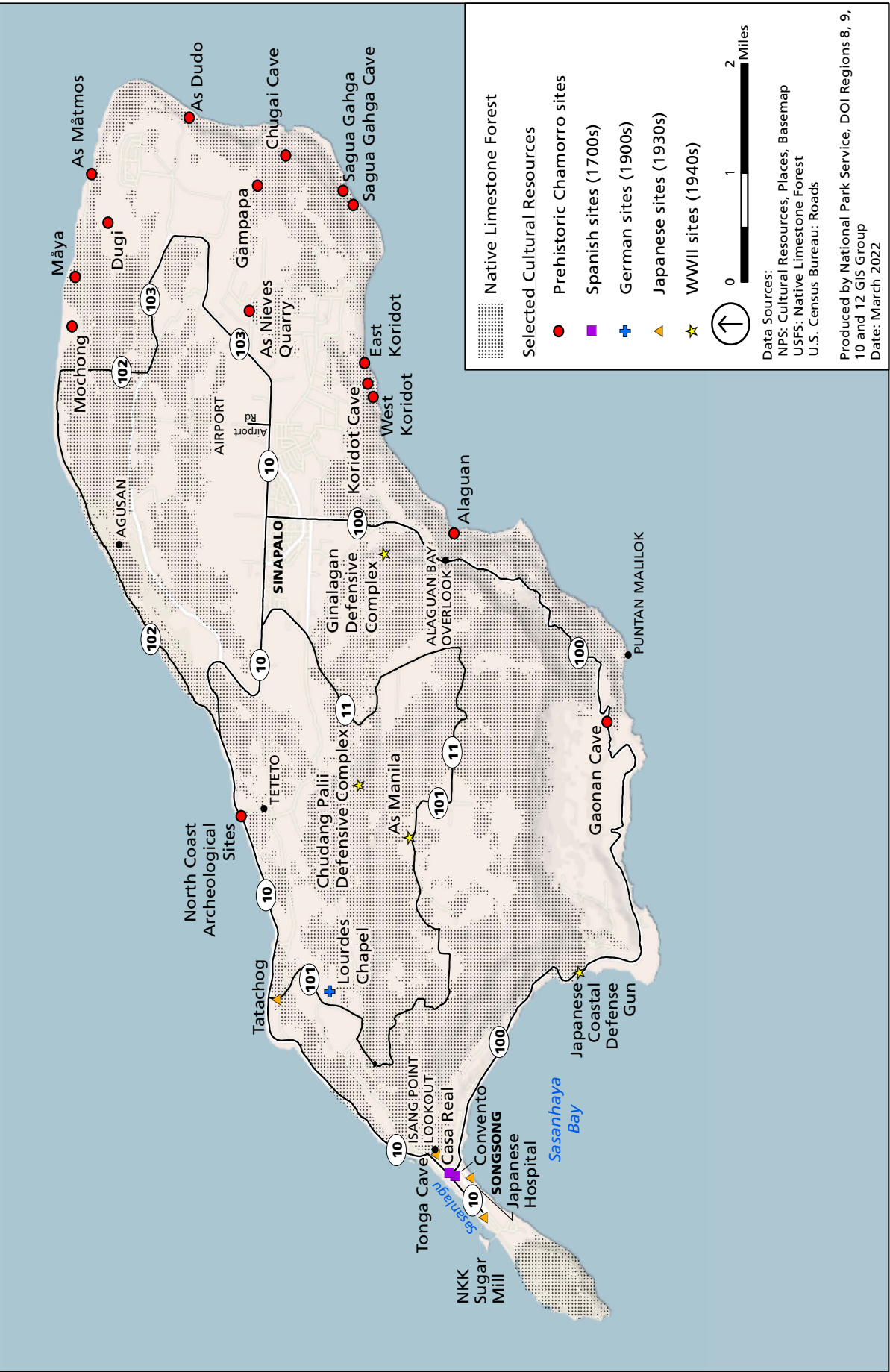
The Mariana Islands have a humid maritime tropical climate. Average monthly temperature ranges from 79 to 87°F, with daily variation in relative humidity between 65% and 100%. The climate is characterized by a pronounced wet and dry season with two-thirds of the approximately 94 inches (239 centimeters) of annual precipitation occurring between July and November (Young 1989; Lander 2004). Strong northeast trade winds tend to cause drier and cooler conditions during the remainder of the year. The rainy season is marked by southwesterly storms, as well as westward-moving typhoons that bring heavy rains, violent winds, and surging water onto coastal areas. The El Niño/Southern Oscillation (ENSO) ocean-atmosphere phenomenon is an important factor in the Marianas climate, resulting in frequent drought cycles of between two and seven years and an increase in typhoons (USGS 1986; CNMI Bureau of Environmental and Coastal Quality 2015).

Water Resources

Surface water is limited on Rota due to the highly porous limestone substrate. Rota's primary freshwater source is found in the water caves of the Talakhaya region, which is a terraced limestone cliff formation below the Sabana. Fed by rainfall on the Sabana,

**Rota Special Resource Study
Map 2: Cultural and Natural Resources**

National Park Service
U.S. Department of the Interior



Rota Special Resource Study

Map 3: Limestone Forest Resources

National Park Service
U.S. Department of the Interior



North coast forests have a greater history of disturbance because coastal plains are desirable locations for settlement and agriculture. Today, forests have begun to recover in some areas and provide habitat for species such as the endangered Mariana Crow.

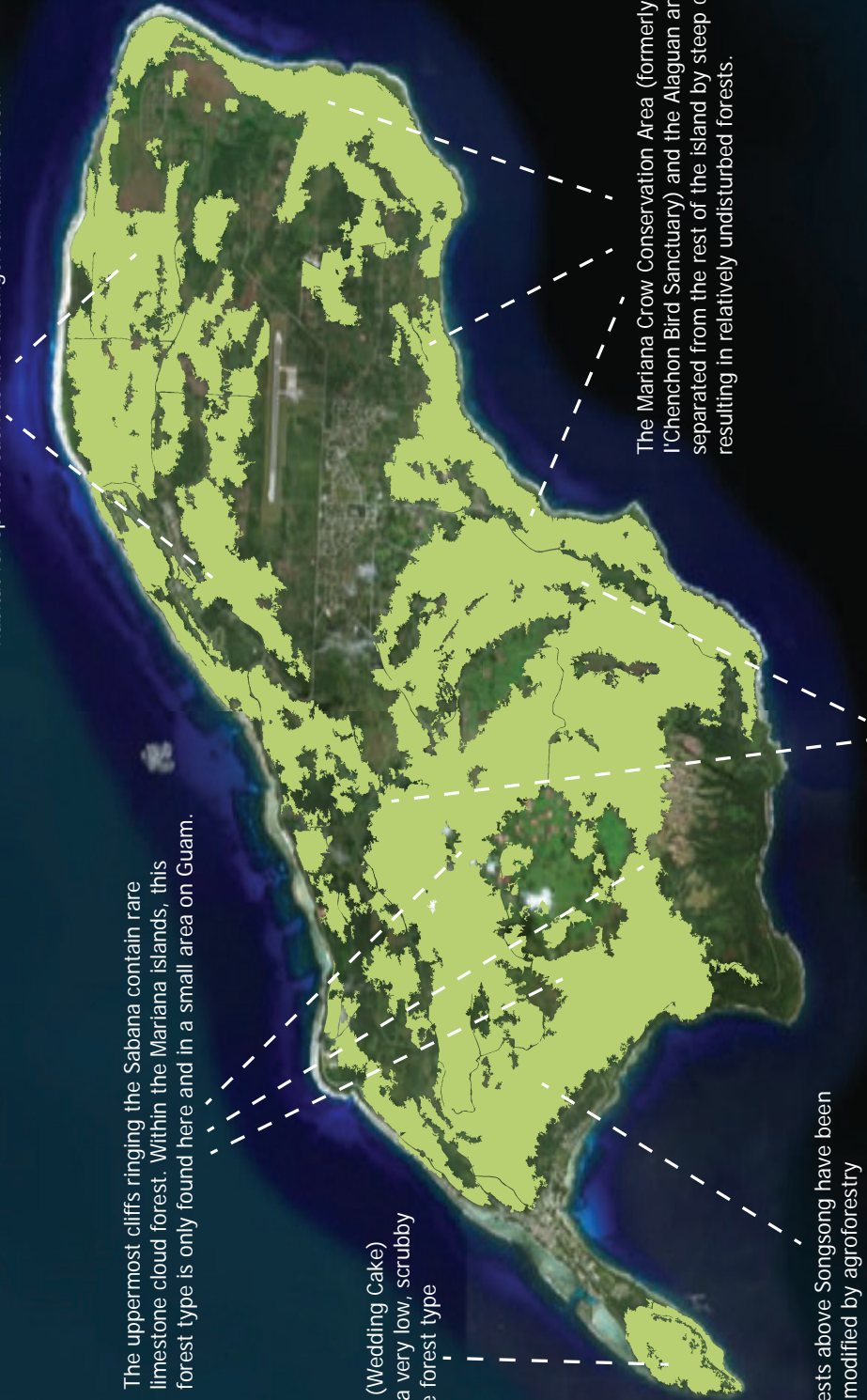
The uppermost cliffs ringing the Sabana contain rare limestone cloud forest. Within the Mariana islands, this forest type is only found here and in a small area on Guam.

Tapingot (Wedding Cake) contains a very low, scrubby limestone forest type

The forests above Songsong have been heavily modified by agroforestry

The lower cliffs around the Sabana contain excellent examples of minimally disturbed forest with very large trees.

The Mariana Crow Conservation Area (formerly I'Chenchon Bird Sanctuary) and the Alaguan area are separated from the rest of the island by steep cliffs, resulting in relatively undisturbed forests.



Native Limestone Forest

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

natural springs are found within the water caves (CNMI CUC 2015). The 4,900-acre (1,983-hectare) Talakhaya watershed is unique among Rota's five watersheds, because it possesses the only perennial streams on the south side of the island (CNMI BECQ 2020). These surface drainages occur where groundwater moving downward through the overlying limestone meets the impermeable volcanic basement at about 1,150 feet (350 meters) above sea level. Unable to penetrate the rock, fresh water collects into the two water caves—Matan Hanom, the “Water Cave,” and As Onan Spring—with overflow continuing down to Sasanhaya Bay in a series of deeply entrenched streams (Keel et al. 2005). Almost all of the fresh water on the island comes from these caves, however potable sources also include freshwater seeps along the coastal margin and the groundwater lens or aquifer that underlies much of the plateau east and north of the Sabana (Mink 1969; Stephenson and Moore 1980; Siegrist 1996,10; Stafford et al. 2002).

The Talakhaya watershed has been identified as a priority watershed by the CNMI and in 2007 was added to the Sabana Conservation Area under [Rota Local Law 15-8](#). The Talakhaya Watershed Conservation Area was created to protect the watershed's vital freshwater resources and acknowledge its importance in reef-to-ridge management by reducing soil erosion and sedimentation in the coral reefs below. See Chapter 5, “Conservation Areas and Summary of Existing Management” section for additional detail.

BIOLOGICAL RESOURCES

Vegetation and Land Use

Rota's current species composition reflects thousands of years of natural and cultural history. Prior to human settlement, the Mariana Islands were probably almost entirely covered in drought- and typhoon-resistant mixed forest species typically found on limestone substrate (Fosberg 1960; Raulerson and Rinehart 1991; Athens and Ward 2005). The earliest ancestral Chamorro voyagers arrived at least 3,500 years ago, establishing

small coastal settlements and introducing new species such as coconut and taro. Later populations expanded horticultural practices into inland areas. This involved clearing, terracing, and other modifications of forest and forest understory. Chamorro residents also made use of native forest species for food, tools, building materials, clothing, crafts, and medicine. Species composition, forest cover, and land use practices changed over time in connection with falling sea levels, fluctuations in climate, population increases, greater reliance on agriculture, introduction of new plants and animals, and contact with other island populations.

Spanish colonization dramatically reduced the Chamorro population of the Mariana Islands. The traditional village sites of Rota were largely depopulated by the late 17th century, prompting significant changes in land use and vegetation, including reforestation of former agricultural lands. The Spanish also introduced new animal species such as pigs, deer, goats, and cattle, which impacted native vegetation throughout the Marianas. Migration from the Caroline Islands and development of coconut plantations affected portions of the northern islands during the German colonial period from 1899 to 1914. From 1914 to 1941, Japanese colonists converted much of the islands' arable land to sugarcane production. Rota's soil composition proved unsuitable for large-scale agriculture, resulting in fewer impacts to native forest species compared to the other islands. World War II's extensive bombardment, battles, and post-battle military construction on Guam, Tinian, and Saipan caused widespread destruction of island vegetation. Tangantangan (*Leucaena leucocephala*), a nonnative species that rapidly spread in disturbed areas after the war, now occurs in dense stands throughout Saipan, Tinian, and Guam.

Less developed than the neighboring islands and having escaped much of the devastation of World War II, Rota is the location of the largest and most intact example of native limestone forest in the Mariana Islands (Falanruw et al. 1989; Zhanfeng and Fischer 2006; Donnegan et al. 2011). While the total area of Guam's limestone forest (17,600 acres/7,122 hectares)

is larger than Rota's (10,943 acres/4,428 hectares), the forests on Rota comprise a significantly higher proportion of the island's total area (52%) than they do on Guam, where limestone forest covers only 13% of the island (USFS 2006). Tinian and Saipan each have significantly less limestone forest, totaling 1,355 acres (548 hectares) and 255 acres (103 hectares) respectively (USFS 2006). Rota's forests additionally contain native plant species that are rare or absent on the other Mariana Islands. They also continue to support numerous species of cultural importance, including medicinal plants that are frequently collected and used by island residents (Nature Conservancy 2014, 10–11; Lizama 2014; Liske-Clark 2015, 3-6, 9-6; CNMI BECQ 2012, 16).

The following vegetation descriptions are based on those provided in Falanruw et al. 1989 and Donnegan et al. 2011. Acreages are derived from USFS 2006 mapping, which is also based on vegetation classes established by Falanruw et al. 1989.

Today a majority of Rota is forested, at 14,123 acres (5,715 hectares) or 67% of the island, according to 2006 USFS mapping. Most of the remaining island area is covered in grassland habitat (4,813 acres/1,948 hectares, or 23% of the island). Only 6% of the island consists of built or urban areas (1,390 acres/562.5 hectares), including the villages of Songsong and Sinapalo, as well as the airport and the maintained vegetation of the Rota Resort golf course. At the time of USFS mapping, 352 acres (142 hectares, 1.7% of the island) were in cultivation as cropland; however, some of the areas marked as grassland may be intermittently used for crops as well.

The dominant forest type on Rota is native limestone forest, comprising 10,943 acres (4,428 hectares) or 52% of the total island area. See Map 3: Limestone Forest Resources. As the primary focus of the natural resource evaluation in this study, a detailed description of Rota's limestone forest, including its worldwide context, is given in the next section. Limestone forest is a distinct forest type, occurring on areas of raised limestone. Limestone forest is uncommon in the tropical Pacific islands due to the specific series

of geologic events required to create the limestone substrate. Limestone is formed through the deposition of calcium carbonate, which comes from the exoskeletons of coral colonies. Once it has been uplifted out of the ocean through tectonic activity, it is weathered by rainwater, which slowly dissolves the limestone, making it very porous. Limestone substrate typically has very little soil, and surface water essentially does not exist due to the porous quality of the limestone. Plants are able to easily anchor into this porous rock, but nutrients are also easily washed away from the root zone as well. The limestone forest community takes a long time to form and is easily damaged (Raulerson and Rinehart 1991). A chart of selected limestone forest plants for Rota including scientific, Chamorro, and common names, as well as notes on their locations and cultural uses is included as Appendix C of this report.

Other forest types on Rota include mixed introduced forest, agroforest, tangantangan, and ravine forest. Mixed introduced forest covers less than 9% of the island and consists of a variety of native and introduced tree species. It typically occurs when areas that have been heavily disturbed or cleared begin to recover. Agroforest is forest that has been modified through human actions to produce forest crops and covers less than 4% of Rota's land mass. This includes native forest areas that were modified through selective clearing and planting; abandoned banana, coconut, and other plantations from colonial periods; and active plantations. Agroforestry often utilizes both the canopy (for tree fruits and wood) and the understory (for shade-tolerant food, medicinal, fiber, and ornamental plants). Tangantangan (*Leucaena leucocephala*) is a nonnative species that has been present in the Marianas since at least 1900, but greatly expanded in range after World War II as it colonized disturbed areas. It forms dense, often close to monocultural stands. These stands are much less common on Rota (1.5% of the island) than they are on the other southern Mariana Islands, given Rota's relatively lesser impacts from World War II. Ravine forest occurs on volcanic soils where weathering has created steep, deep ravines

with heavy soils. These weathered volcanic areas are mostly savanna, but small patches of forest occur in sheltered ravines, totaling 1% of the island.

Non-forest vegetation types on Rota include strand and grasslands. Strand **vegetation** occurs along the coastline above the high-tide line and is composed of small trees and shrubs, such as *Tournefortia argentea*, *Thespesia populnea*, and *Scaevola taccada*. Mangrove forest consists of salt-tolerant tree communities at or below the high-tide line, and persists as small, monospecific stands of *Pemphis acidula* along Rota's rocky coastlines, protecting the shoreline from storm damage, preventing erosion, and enhancing water quality by trapping sediments (Williams, pers. comm. 2022). Grassland areas occur on both limestone and volcanic soils. Savanna, which is grassland with scattered trees, is a common ecosystem type on volcanic soils. However, repeated burning of these areas for hunting purposes eliminates the trees. Limestone substrate would historically have been forested; however, areas that were cleared of forest for agriculture on Rota often have such thin, easily washed-away soil that the substrate is nearly solid rock. In many of these areas, a scrubby, weedy community has developed, which is classified as grassland. Historically, all limestone areas would likely have been forested (Mueller-Dombois and Fosberg 1992).

Terrestrial Wildlife

Terrestrial wildlife in the remote island chain of the Marianas is largely limited to animals that were able to survive long distances over open ocean, either as part of intentional migration patterns or as accidental travelers driven by storms or currents. As a result, birds and invertebrates have higher levels of biodiversity, while mammals, reptiles, and amphibians have low levels of natural biodiversity. Once a species arrives on a remote island, lack of contact with the source population often results in speciation, where the island population evolves into a different species. Speciation explains the islands' high levels of endemism, or species that are only found in one place in the world.

A number of wildlife species have also been intentionally or accidentally introduced by human travel to the islands, beginning with the earliest Chamorro arrivals. Some introduced species have become naturalized parts of the ecosystem, with little to no discernable impact on the natural functioning of the system, while others have become problematic invasive species, which disrupt native species and ecosystems.

BIRDS

Birds have some of the greatest species diversity on the islands, second only to invertebrates. On Rota, 31 species of birds have been recorded. Six of the eight native forest birds found on Rota are endemic, meaning they are only found in the Marianas (or in some cases, only on Rota). A variety of sea and shorebirds are found on the Marianas as well, though most of these have broader ranges than just the Marianas (Vogt and Williams 2004). Some migratory birds stop in the Marianas, but the islands are not on a major migratory pathway (Liske-Clark 2015).

Bird diversity in the Marianas was greater prior to the arrival of humans. Island birds evolved in a setting with few or no predators, which makes them particularly susceptible to hunting and predation by introduced predators such as the brown tree snake (*Boiga irregularis*) and feral cats (*Felis catus*) (Vogt and Williams 2004). On Guam, the introduction of the brown tree snake has virtually eliminated the forest birds. Of 12 native species, 10 have been extirpated (become locally extinct) from the island, while the remaining two species exist in severely reduced populations in areas difficult for snakes to access (Rodda and Savidge 2007).

MAMMALS

The only mammals native to the Marianas are three species of bats (*Pteropus mariannus mariannus*, *Pteropus tokudae*, and *Emballonura semicaudata rotensis*), all of which are endemic to the islands. The only mammal native to Rota and still present there today is the Mariana fruit bat (*Pteropus mariannus mariannus*), or fanihi in Chamorro. This species is found throughout

the Marianas, and Rota supports the largest population in the southern populated islands. The fanihi has been identified as a species of cultural importance and is listed as threatened by the U.S. Fish and Wildlife Service (Liske-Clark 2015).

Introduced ungulates including Philippine deer (*Rusa marianna*), pigs (*Sus scrofa*), cows (*Bos taurus*), and goats (*Capra hircus*) are considered problematic species due to their browsing and rooting of the forest understory (Berger et al. 2005). Deer and pigs are feral throughout Rota (Gawel 2012), and feral goats may be present on the Taipingot (Wedding Cake) Peninsula (Manglona, pers. comm., 2017). The damage caused by feral ungulates disrupts the forest ecosystem by killing young and adult trees and makes it easier for nonnative plants to become established. Forests in the Marianas evolved without large herbivores, and as a result, native plants generally do not have physical (thorn) or chemical (taste) defenses to browsing (Vogt and Williams 2004). Hunting of deer and pigs is a popular sport and subsistence practice on the islands. Feral cats and rats are known to feed on native bird eggs and nestlings and are thought to be contributing to the decline of some bird species (Liske-Clark 2015; Ha, pers. comm., 2017).

REPTILES AND AMPHIBIANS

Reptiles cannot easily cross oceans, so the species diversity is low. The indigenous reptiles of Rota include three geckos and three skinks. In many cases, it is difficult to determine when species arrived on the islands and whether they are truly indigenous or a pre-contact introduction. The monitor lizard (*Varanus indicus*) is an example of a reptile on Rota whose natural geographic distribution has long been debated, although recent research indicates that monitor lizards may be indigenous to the Marianas (Weijola et al. 2020). Two sea turtles (*Chelonia mydas* and *Eretmochelys imbricata*) live primarily in the marine environment and use beaches for nesting. A scattering of other reptiles have been introduced to the islands and range from fully naturalized to major invasive disruptors.

The brown tree snake (*Boiga irregularis*) has decimated the bird population on Guam, but so far has been prevented from establishing in the CNMI. There are no native amphibians in the Marianas, but the marine toad (*Rhinella marina*) was introduced to the southern islands including Rota in the 1930s for insect control (Summers et al. 2018, Vogt and Williams 2004, Wiles et al. 1990).

INVERTEBRATES

Invertebrates are the most numerous and diverse wildlife grouping in the Marianas, as they are worldwide. There are dozens of types and hundreds of species of invertebrates in the Marianas, ranging from flatworms to insects to crabs and more, both indigenous and introduced (Bourquin 2002). The coconut crab (*Birgus latro*), or ayuyu in Chamorro, is a species of cultural importance and is considered a local delicacy (Vogt and Williams 2004, Liske-Clark 2015). Subsistence hunting of ayuyu is a popular activity on Rota. A few butterflies, tree snails, and the Rota blue damselfly (*Ischnura luta*) have been federally listed as threatened or endangered.

Marine Resources

Rota's marine resources are unquestionably a critical part of island ecosystems and Chamorro cultural practices. However, marine resources are not discussed in detail in this report because the legislation authorizing the special resource study included only the "prehistoric, historic, and limestone forest sites on the island of Rota" in the NPS evaluation (P.L. 113-291, Title XXX, §3051; see Appendix A). Additional information about Rota's marine ecosystems and submerged resources is provided in Appendix E: Marine and Submerged Resources. Rota's inshore waters, coral reefs, and other submerged resources merit further study in the future, in particular for their species diversity and their importance as a food source for Chamorro residents past and present.

Threatened and Endangered Species

Rota is home to 24 species listed by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered under the Endangered Species Act. The Endangered Species Act provides legal protections for listed species including restrictions on take (harassment, harm, pursuit, hunting, shooting, wounding, killing, trapping, capture, or collection) and trade; protection from being jeopardized by federal activities; protection of critical habitat being destroyed or adversely modified; and federal aid to state and commonwealth conservation departments with cooperative endangered species agreements.

The federally listed threatened and endangered species are listed below, organized according to their primary habitat.¹ Additional descriptions of the species and their habitat, status, and primary threats can be found in Appendix D.

(T) = Threatened

(E) = Endangered

* = Endemic to (only found in) the Mariana Islands

** = Endemic to (only found on) Rota

Names are given as: scientific name, English name, Chamorro name, Carolinian name (if available).

FOREST

Animals

(T) * *Pteropus mariannus mariannus*, Mariana fruit bat, fanihi, pai'scheei

(E) * *Corvus kubaryi*, Mariana crow, aga, mwii'lup (critical habitat has been designated on Rota and Guam)

(E) ** *Zosterops rotensis*, Rota white-eye, nosa' Luta (critical habitat has been designated on Rota)

(E) * *Partula gibba*, Humped tree snail, akaleha', denden

(E) * *Samoana fragilis*, fragile tree snail, akaleha'

(E) * *Vagrans egistina*, Mariana wandering butterfly, ababbang, libweibwogh

Plants

(T) * *Bulbophyllum guamense*, Siboyan halom tano

(T) *Cycas micronesica*, Federico palm, Fadang

(T) * *Dendrobium guamense*

(E) * *Heritiera longipetiolata*, Ufa-halomtano

(T) * *Maesa walkeri*

(T) * *Nervilia jacksoniae*

(E) ** *Osmoxylon mariannense*

(E) * *Serianthes nelsonii*, tronkon guafi (Rota), Hayun lågu (Guam)

(T) * *Tabernaemontana rotensis*

(T) * *Tuberolabium guamense*

ROCKY COASTAL FLATS

Plants

(E) ** *Nesogenes rotensis*

FRESHWATER

Animals

(E) * *Gallinula chloropus guami*, Mariana common moorhen, pulåttat, gherel bweel

¹ In response to a 2014 USFWS proposal to list 23 Marianas species as threatened or endangered (USFWS 2014b), the CNMI Department of Lands and Natural Resources (DLNR) submitted a comment letter disagreeing with the listing of the four orchids *Bulbophyllum guamense*, *Dendrobium guamense*, *Nervilia jacksoniae*, and *Tuberolabium guamense*, as well as *Ischnura luta*, the Rota blue damselfly (USFWS 2015b).

(E) ** *Ischnura luta*, Rota blue damselfly, dulalas Luta

MARINE

Animals

(E) *Chelonia mydas*, green sea turtle, haggan, wong mool

(E) *Eretmochelys imbricata*, hawksbill sea turtle, haggan karai, wong maaw

(T) *Sphyrna leweni*, scalloped hammerhead shark

(T) *Acropora globiceps*, coral, kuraling, yeal

(T) *Seriatopora aculeata*, coral, kuraling, yeal

CNMI SPECIES OF GREATEST CONSERVATION NEED

The CNMI Department of Fish and Wildlife publishes a Wildlife Action Plan once every 10 years, which is based around Species of Greatest Conservation Need (SGCN). These species are selected based on their biological and/or cultural importance. Biological importance is evaluated as a combination of vulnerability (population size, population trend, species range/endemism, reproductive potential, and habitat specialization) and threats to the species. Cultural importance is based on stakeholder and public input. Unlike federally listed species, inclusion as a SGCN does not automatically confer any protected status to a species. Instead, the list of SGCN serves to focus the efforts of the CNMI Department of Fish and Wildlife and may result in a variety of conservation approaches such as outreach and education, captive breeding, animal relocation, predator control, fishing or hunting regulations, and/or more intensive monitoring.

To date the CNMI has only included animal species in this assessment. In the most recent Wildlife Action Plan (Liske-Clark 2015), 33 terrestrial and 26 marine species are considered SGCNs. The SGCN list includes all of the federally listed threatened and endangered animal species described

above, with the exception of the scalloped hammerhead shark.

ADDITIONAL SPECIES PROTECTIONS

Marine mammals are protected under the US. Marine Mammal Protection Act. The most commonly seen ones at Rota are spinner dolphins (*Stenella longirostris*).

The Migratory Bird Treaty Act protects any migratory bird from being harmed, killed, possessed, or sold—including living and dead birds, bird parts, and eggs. Most of the birds on Rota are protected under this act.

LIMESTONE FOREST RESOURCE DESCRIPTION

As noted above, limestone forest occurs infrequently in the tropical Pacific islands and is a slow-forming ecological community that is sensitive to damage. Within the territory of the United States, tropical Pacific limestone forest is limited to six islands in the southern part of the Mariana chain: Guam, Rota, Aguigan, Tinian, Saipan, and Farallon de Medinilla. Guam and Rota are the only two islands that retain substantial stands of intact native limestone forest. Japanese agriculture in the 1930s and World War II activities removed nearly all the native forest from Tinian and Saipan, and the islands have subsequently been colonized by mixed introduced forest and tangantangan forest. Small patches of native limestone forest continue to exist on these islands. Farallon de Medinilla has been used for aerial bombing practice since World War II and has little to no remaining forest vegetation. Uninhabited Aguigan has considerable limestone forest relative to the island's small size but contains large goat populations that have heavily impacted the forest ecosystem there (Esselstyn et al. 2003).

Intact, high-quality limestone forest can vary in stature from scrub to dozens of feet tall, depending on species composition and environmental conditions. Typhoons are common in the Mariana Islands, and vegetation in exposed areas becomes stunted from typhoon damage. Halophytic-xerophytic

scrub is considered a type of limestone forest and consists of extremely small, stunted plants on cliff edges exposed to salt spray and wind damage (Raulerson and Rinehart 1991). In contrast, in protected areas, the forest canopy may reach 22 to 45 feet (6.7–13.7 meters) in height, with emergent trees nearing 80 feet (24.4 meters) (Falanruw et al. 1989). In general, the largest trees are only found in undisturbed forest (Rogers and Gawel, pers. comm., 2016).

The species composition of limestone forest varies by location (see Appendix C: Selected Limestone Forest Plants of Rota). In many places, the mix is sufficiently diverse that there are no dominant species. Common canopy trees include *Artocarpus* spp., *Barringtonia racemosa*, *Hernandia* spp., *Elaeocarpus joga*, *Ficus* spp., *Pandanus* spp., *Pisonia grandia*, and *Premna serratifolia*, among others (Fosberg 1960; Falanruw et al. 1989). Common understory trees include *Aglaia mariannensis*, *Cynometra ramiflora*, *Eugenia* spp., *Meiogyne*

cylindrocarpa (*Guamia mariana*), and *Psychotria mariana*.

Limestone forest areas that have been completely cleared of vegetation and bulldozed to remove all karst substrate often never recover. The forest is typically replaced with a grass and scrub community, which may eventually turn into a mixed tangantangan forest (Rogers and Gawel, pers. comm., 2016). Frequent grazing or burning maintains the grass/scrub community and prevents succession to mixed forest. On Rota, most of the flat areas of the island were cleared for sugar cane production in the 1930s. While the thin soils of the island made this agriculture ultimately unsuccessful, the forest has not recovered, and former sugar cane lands are now mostly grass and scrub. In other locations, a mixed introduced forest developed, consisting of a greater proportion of introduced rather than native trees (USFS 2006). However, on steeper or otherwise less accessible portions of the island, forest was



Minimally disturbed limestone forest west of the I'Chenchon Park Wildlife Conservation Area. Photo: Ann Marie Gawel.



1. [Top] The least disturbed areas of limestone forest are generally found in areas unsuitable for agriculture, such as steep slopes or areas difficult to access due to cliffs. **2.** [Bottom] Limestone forest on the northern side of the Sabana. The field in front would have historically been forested as well, but after being cleared for agriculture it has been replaced by a grassland community. Photos: NPS.



1. [Top left] Limestone forest grows on porous, fast-draining limestone, with very little soil substrate. **2.** [Top right] A fanihi, also known as the Mariana fruit bat, flies high over the I'Chenchon Park Wildlife Conservation Area. **3.** [Middle] Fanihi flying over I'Chenchon at dusk. **4.** [Bottom] An aga, or Mariana crow, in a captive rearing program led by the University of Washington. Photos: NPS.





1. [Top] *Serianthes nelsonii*, called tronkon guafi on Rota. **2.** [Bottom] View toward the Tainpingot Peninsula from the limestone forest above. Photos: Ann Marie Gawel.

not cleared and remains intact today. Rota was not invaded during World War II and did not suffer the near total forest clearing that occurred on Saipan and Tinian as a result of war activities on those islands (Fosberg 1960). As a result, limestone forest on Rota today covers over half the island, a substantially larger portion than that of any other Mariana island (USFS 2006).

In addition, Rota’s limestone forest includes both low- and rare high-elevation forests. The high-elevation, or “cloud forests” are found along the steep cliffs of the Sabana and are characterized by higher levels of rainfall and persistent cloud cover, resulting in a wetter forest type. Drier, low-elevation limestone forests exist in the southern Marianas and on a number of other islands in Micronesia and the Pacific; however, Rota is one of only a few locations in the Pacific where the higher-elevation “cloud forest” can be found (Berger et al. 2005; Amidon, pers comm., 2017; Falanruw, pers comm., 2017).

It is important to emphasize that Rota’s limestone forests are significant culturally as well as ecologically, comprising an integral part of the homeland of the Chamorro people. The forests contain ancestral settlements and burial sites revered by the people of Rota, past and present. They also support the perpetuation of cultural practices such as traditional horticulture, hunting, crafts, and medicinal plant collection. Additional information about the past and present cultural significance of Rota’s forests is included in the “Cultural Historical Context” section below.

CULTURAL HISTORICAL CONTEXT

This section provides the cultural historical context for identifying and evaluating the significance of cultural resources on Rota. It includes a brief introduction to Marianas history, followed by a more detailed chronology of important events and patterns of change in the archipelago as a whole and Rota specifically. The context is divided into eight time periods:

- Pre-Latte Period (1500 BC–AD 1000)

- Latte Period (1000 AD–1700)
- Spanish Colonial Period (1521–1899)
- German Administration (1899–1914)
- Japanese Period (1914–1941)
- World War II (1941–1945)
- U.S. Naval Administration and the Trust Territory of the Pacific Islands (1945–1978)
- Commonwealth of the Northern Mariana Islands (1978–Present)

Introduction

The Mariana Islands are believed to have been settled at least 3,500 years ago (1500 BC) by Austronesian-speaking people originating from Island Southeast Asia (Rainbird 2004, 85; Hung et al. 2011). The earliest archeological evidence found on Rota dates to approximately 700 to 1,000 years later than initial settlement of the other large Mariana Islands (Carson and Kurashina 2012, Carson 2014a). A lack of habitable coastal lands due to a higher sea level at the time of the earliest migrations may have delayed the establishment of permanent settlements on Rota.

The history of the Mariana Islands prior to Spanish colonization is typically divided into two primary periods: the pre-latte and latte periods. Scholars further subdivide these periods into early, intermediate, and transitional phases based on changes in technology and social organization (Spoehr 1957; Craib 1990a; Moore 1983, 2002; Moore and Hunter-Anderson 1999). The pre-latte period extends from initial settlement of the islands ca. 1500 BC until ca. AD 1000, which marks the early appearance of latte architecture, distinguished by alignments of upright capped stone pillars (latte) used as house supports. The latte period represents a major period of demographic expansion and cultural flourishing in the Marianas. Latte are also considered the quintessential symbol of Chamorro history and cultural identity. The latte period extends from ca. AD 1000 to ca. 1700 when, after decades of warfare with Spanish colonizers, the surviving Chamorro

were forced to abandon their traditional village sites for new villages on Guam and Rota.

While the pre-latte and latte periods are typically described separately in the archeological literature, commonalities in the culture and lifeways of the ancestral Chamorro are also apparent in the archeological record. Many of Rota's archeological sites also contain artifacts from both periods, illustrating a continuous record of habitation in the same locations over time. The sites that span the pre-latte and latte periods are generally coastal village sites with deposits of archeological material from several time periods. They are also located in proximity to marine areas, forests, caves, and other locations important for resource collection, burials, and ceremonial practices.

The latte period also overlaps with the early period of Spanish contact beginning with the arrival of Ferdinand Magellan in 1521. Prior to the more aggressive colonization efforts of the late 17th century, impacts on the Chamorro way of life were limited, and the people continued to inhabit latte villages (Rogers 1995, 20). The end of the latte period is marked by severe demographic collapse resulting from disease epidemics, violent conflicts with the Spanish, declining birth rates, and forced removal of the surviving Chamorro from their traditional lands and villages by approximately 1700. Many Chamorro on Guam also resisted Spanish incursions, rebelling against church leadership and ambushing Spanish troops through the 1670s and 1680s. Many resisters sought refuge on Rota where the Spanish presence was limited. By the 1690s, however, increasing numbers of Spanish troops overwhelmed the surviving Chamorro (Rogers 1995).

Other significant events associated with Spanish colonization included conversion of the Chamorro people to Catholicism, suppression of traditional cultural beliefs and practices, and introduction of new plant and animal species resulting in impacts to native vegetation. Migrants from the Caroline Islands, the Philippines, and Mexico arrived during the Spanish period, intermarrying with Chamorro and contributing to population

growth throughout the islands. Spanish influence also introduced new technologies, language, goods, and foods. It also brought the people of the Marianas into a network of trade and exchange extending far beyond their traditional maritime world.

With the end of the Spanish-American War in 1898, Spain ceded Guam to the United States, while Germany took control of the Northern Marianas the following year. Germany relinquished the northern islands to Japan after World War I under a League of Nations mandate. By the 1930s, Japanese, Okinawan, and Korean tenant farmers had converted nearly all the arable land on Saipan, Tinian, and Rota to sugar cane production. On Rota, the Japanese administration built a narrow-gauge railroad circling the island, operated a sugar mill in Songsong, and engaged in phosphate mining on the Sabana. Japanese military expansion and defense build-up in the late 1930s and 1940s brought additional changes to the islands.

The events of World War II transformed the Mariana Islands, leaving behind physical devastation and initiating a period of dramatic social, political, economic, and environmental change. Because it was not invaded by the U.S., Rota was spared the level of destruction experienced on Guam, Saipan, and Tinian. Still, U.S. aerial bombardments significantly impacted island landscapes, villages, and infrastructure. The people of Rota took shelter in caves and rock shelters during the bombings, venturing out for food, water, and other scarce resources only under the cover of night. Beginning in 1944, Japanese forces mobilized more than 2,000 residents including Japanese civilians, Chamorro, and Carolinians for airbase construction and installation of defensive fortifications around the island.

Following a period of U.S. Navy administration after the war, in 1947 the Northern Mariana Islands became part of the United Nations-mandated Trust Territory of the United States. In 1951, administrative responsibilities transferred to the U.S. Department of the Interior. In 1975, the people of Saipan, Tinian, and Rota voted to form the Commonwealth of the Northern Mariana Islands (CNMI). The

first CNMI government took effect in 1978. Commonwealth status conferred citizenship to island residents, allowed for self-government, and created a special trade relationship with the U.S. Since 2008, CNMI has been represented by a non-voting delegate in the U.S. Congress.

Rota's rich cultural heritage and history is reflected in the island's natural and built environments. Ancient Chamorro sites, including the ruins of latte villages, provide links to the deep past. These sites yield information about changes in social dynamics, environmental interactions, and culture in the Marianas over millennia (Carson 2012). The latte that characterize many of these sites are also iconic symbols of Chamorro culture and identity (Carson 2012, Kurashina et al. 1999, Bevacqua 2018). Many of these sites are located in forest and coastal settings with access to sources of fresh water, food, and materials for sustaining life. Even with substantial changes from the pre-latte and latte periods, the limestone forests, coral reefs, and other environments of Rota continue to support Chamorro cultural practices such as traditional hunting, fishing, horticulture, crafts, and medicine, which connect past and present.

Historic properties associated with the successive waves of colonial history on Rota reflect the island's role in major world events of the modern era, including World War II. These resources also promote understanding of the Chamorro peoples' experiences of and agency in these events. They recall instances of extreme violence and loss, while also bringing attention to the resilience and adaptability of Chamorro culture to the present day. Historic and cultural properties identified for this study are described in the "Resource Section" at the end of this chapter. The following section provides additional information on each of the periods identified above with specific references to the history and culture of Rota.

PRE-LATTE PERIOD (1500 BC–AD 1000)

The earliest archeological evidence of settlement in the Marianas dates to approximately 3,500 years ago. The first colonists originated from Island Southeast

Asia, most likely from the northern Philippines (Hung et al. 2011). Their voyage of approximately 1,500 miles (2,414 kilometers) may have been the longest transoceanic population migration up to that time (Rainbird 2004, 85.). Early settlement sites in the Marianas are believed to be the earliest permanent human habitations in Micronesia, the region of small islands and atolls encompassing the Marianas as well as what is today the Federated States of Micronesia, Palau, Kiribati, the Marshall Islands, and Nauru. Settlement of the Marianas also likely predated the initial migration of the Lapita people, the ancestors of the Polynesian people, to Southern Melanesia (Kirch 1997; Carson 2014a, 11).

At the time of initial settlement, sea level in the Marianas was about 6 feet (1.8 meters) higher than at present, limiting habitation to sites with sufficient beach formation (Carson 2014b). The oldest archeological materials found on Rota date to approximately 700 to 1,000 years after initial settlement of the other large Mariana Islands. Further archeological investigations may help determine whether Rota remained unoccupied until a suitable low-lying coastal area was available, after the sea level drawdown, or if the earliest deposits have yet to be excavated. The island's earliest radiocarbon dates are 800 BC from the Songsong area (McManamon 1989; Henry et al. 1999), 600 BC from Teteto-Guata (Butler 1988), and 550 BC from Mochong Latte Village Complex (Craib 1990a).

The early phases of the pre-latte period were characterized by small groups living along sandy shorelines with easy access to marine resources, freshwater sources, and suitable cultivable land (Graves and Moore 1985). People likely made limited forays into the interior of the islands to forage and hunt for resources not available near the coast, such as plants and birds.

Transformations in social structure and technology during the intermediate phase of the pre-latte period are evident in the archeological record at sites across the Marianas, including on Rota (Spoehr 1957;

Craib 1990a; Moore 1983, 2002; Moore and Hunter-Anderson 1999). These changes occurred in connection with a gradual lowering of sea level, resulting in a more stable coastal plain and an expansion of habitable coastal zones (Carson 2014a, 8). This allowed for larger, more numerous settlements and a gradual population expansion involving adoption of new resource procurement strategies. Changes included greater reliance on agriculture and increased use of inland forest resources by the later phases of the pre-latte period.

By the transitional phase, most Chamorro lived in settlements on coasts or on suitable agricultural land just behind the coast. The limited pre-latte period deposits unearthed in interior sites (Moore 2002, 12) suggest that most Chamorro continued to make their homes closer to the shoreline with seasonal or intermittent periods spent in the interior of the islands (Welch et al. 2009). Hunters and gatherers may have used inland rock shelters and caves as semi-permanent dwelling places and burial places (Spoehr 1957, Hanson and Gordon 1989, Dixon and Schaefer 2014). Caves also may have been used for ritual practices, hunting ayuyu (coconut crab), collecting water, or as shelters during typhoons (Carson 2014a, 14). Rock art, generally in the form of pictographs in cave sites, appeared by approximately AD 600 if not earlier (Hunter-Anderson et al. 2013, 1007).

Fragments of thin-walled red-slipped pottery termed “Marianas Red” (or Redware) are the distinguishing archeological marker of pre-latte sites in the Marianas and have been shown to be similar to pottery originating in the northern Philippines (Hung et al. 2011, 913; Spoehr 1957). Other common artifact types include shell middens; lithic tools fashioned from chert, chalcedony, basalt, and limestone; and finely crafted shell beads and ornaments.

LATTE PERIOD (AD 1000–1700)

The start of the latte period around AD 1000 marked a transition in the ways Chamorros lived and subsisted in the Marianas. This transition is identified by the appearance

of latte architecture, a shift to sturdier ceramics suitable for boiled foodstuffs including rice, decorative beads made from *Spondylus* shell, and the presence of large stone lusong (mortars) and other stone tools (adzes, pounders, abraders) associated with agriculture.

The term “latte” refers to the upright capped stone pillars that are the distinguishing features of latte-period village sites in the Marianas. A distinct architectural form, latte are composed of a pillar, or haligi in Chamorro, capped with a cup-shaped cap, or tasa. Most latte range in size from 2 or 3 feet high (0.6–0.9 meters) to about 7 feet high (2.1 meters). The exceptionally large stones at House of Taga on Tinian measure more than 16 feet high (4.9 meters), while the partially excavated stones at As Nieves Quarry on Rota are even larger. Latte are typically arranged in two parallel rows forming a rectangular “set” used for supporting a house or other structure.

The latte period coincided with a general cultural efflorescence across Micronesia supported by the availability of abundant food resources—including seeded breadfruit—and a transition to a more stable, equitable climate (Peterson 2012, 205). Archeologist Mike Carson links the start of the latte period to a Pacific-wide “AD 1000 Event” involving “the fixing of social practice, religious beliefs, and claims of traditional ownership through large-scale and long-lasting stonework productions, monuments, burial traditions, and overall formalized ways of interacting with the landscape” (Carson 2018, 18). Although unique to the Marianas, latte architecture is comparable to megalithic structures found elsewhere in the Pacific and dating to approximately the same period. Examples include the ceremonial center of Nan Madol on Pohnpei, Lelu on Kosrae, Yapese stone money, the terraced hills and stone monoliths of Palau, Hawaiian heiau, and the Mo‘ai statuaries of Rapa Nui (Morgan 1988; Federated States of Micronesia 2015, 59–72; Carson 2018, Chapter 12).

Latte village sites on Rota consist of individual sets or clusters of generally 2 to 18 sets. The Mochong and Alaguan sites with 53 and 58

latte sets respectively are the largest known intact village sites in the Mariana archipelago. In comparison, Tinian has only 3 clusters of more than 10 latte sets, with the largest being the House of Taga with 18 sets (Hornbostel 1924–1925). Saipan’s largest latte cluster is the 11 sets at the Bapot Site in Laulau Bay (Spoehr 1957), while Guam’s largest remaining cluster, the interior Songsong Må’gas Site near Fena Reservoir, contains 33 latte sets (Dixon and Gilda 2011).

According to Chamorro oral traditions, the atypically large latte at House of Taga on Tinian were necessary to support the residence of the legendary Chief Taga, an exceptionally large and powerful chief in the Marianas. Chief Taga is also credited with establishing As Nieves Quarry on Rota but was forced to abandon the project for reasons that are still unknown. He then left Rota for Tinian where he ultimately built his home. Although precise radiocarbon dating is not available, these sites likely represent the climax of latte building, occurring in the 1500s and 1600s. This period is considered the apex of Chamorro sociopolitical development, extending into the early Spanish contact period and ending with the intensification of Spanish colonization efforts in the late 1600s (Madrid 2014).

Scholars have debated the degree to which the size and extent of latte structures reflect hierarchies in traditional Chamorro society. Some have suggested that large latte sets represent competitive displays in a period of intervillage rivalry (Graves 1986), while others note that larger latte sets often supported communal structures rather than individual homes and thus may not be indicative of social stratification (Craib 1986). While House of Taga is an exception, many of the largest standing latte sets in the Marianas are also located in upland areas, far from the coastal villages where higher-status individuals lived (Peterson 2012).

Most intact latte clusters in the Marianas are located along shorelines and in interior areas near freshwater sources and suitable cultivable soils. They are frequently found on beach berms directly behind active beaches and on low marine terraces behind the coastlines,

especially where access to marine resources or suitable agricultural land was easy. Latte sites are also found in productive inland agricultural areas and are especially common in upland areas with volcanic soils (Moore and Hunter-Anderson 1995). Current documentation suggests that on Rota, settlement began to spread along the coast after AD 1000, with inland settlements appearing later (Craib 1998a).

In general, coastal latte sites consist of dense clusters of latte sets, while inland latte settlements are more dispersed, with some composed of a single structure, possibly reflecting a scattered pattern of farming households (Welch et al. 2009, 188). Rota’s large inland latte sites of Gampapa and Dugi consist of open, loose arrangements of latte features. Although this difference in patterning may reflect the restricted topography of the coastlines, it could suggest that with the removal of topographic constraints the social arrangements that defined latte villages in spatial terms were relatively weak (Butler 1997, 329).

A large number of sites with latte period cultural materials are not associated with extant latte sets. This may be due to post-latte period agricultural expansion and development that destroyed, displaced, or otherwise disturbed most inland latte sets.

Around AD 1300, explosive population growth and associated expansion of agriculture appears to have occurred throughout the Marianas, including on Rota. This is archeologically evident in the enlargement of coastal settlements and a considerable expansion of permanent habitation to marginal areas, such as the interior or isolated valleys, beyond the optimal coastal environments (Dye and Cleghorn 1987, Hunter-Anderson and Butler 1995). On Rota, this settlement pattern is reflected in the establishment of the isolated settlement in Alaguan Valley by AD 1200 (Craib 1989a), permanent habitation of the interior latte villages of Dugi and Gampapa by AD 1300 (Craib 1986; Pantaleo et al. 1996), and the possible occupation of the limestone terraces along the southeast coast (Butler 1997). The

factors leading to this expansion, particularly into the marginal lands of the interior, may include dividing of earlier settlements or the search for suitable areas in the uplands on which to grow rice. It has been suggested that some inland complexes may have been only seasonally occupied in tune with agricultural productivity (Dixon and Gilda 2011).

Evidence of trade for important raw materials is also present in the archeological record. Rota's basalt sources, for example, are largely limited to the Talakhaya area, and it is likely that basalt was a valuable trade item and important to Rota's economy. The existence of basalt lusong, adzes, and other tools in locations where the stone is not naturally found is evidence of this trade. Other kinds of stone originating from Rota and other islands were used for slingstones, pounders, pestles and sharp-edged tools (Butler 1988).

Information on traditional Chamorro foodways can be gained from archeological data, early Spanish accounts, and oral histories. Excavations at latte village sites have revealed numerous artifacts associated with fishing. Remains of various fish and shellfish species have also been identified. Coconut crab, fruit bats, and monitor lizards may have also provided sources of protein during the latte period, although archeological evidence is scarce (Moore 2015). Plant residue found on pot sherds at latte village sites across the Marianas indicates a diverse diet of cultivars including coconut, taro, breadfruit, ti, yams, and rice, the latter of which appears to have been introduced around AD 1000. While little is currently known about the adoption of rice cultivation in the Marianas, it may indicate a second population migration, or it may have been the result of contact with other ocean-going peoples with links to Southeast Asia. The Marianas are the only known location in Remote Oceania (the region of the Pacific settled within the past 3,500 years) where rice cultivation predated European contact (Hunter-Anderson et al. 1995).

While evidence of food processing and consumption is abundant in village sites, a definitive archeological signature for former agricultural lands has not been identified for

the Marianas. However, as Mike Carson notes, latte sites are situated within larger "inhabited landscapes," which exhibit "potential" features associated with past land uses including agriculture (Carson 2012, 36–37). Studies of soil chemistry, pollen samples, rainfall patterns, reef passages, locations of freshwater sources, and other landscape characteristics have yielded, and will likely continue to yield, new information about latte period agricultural practices and changes in the natural environment of the Marianas (Carson 2012, Moore 2005, Dixon et al. 2012, Dixon et al. 2011). Future archeological surveys, especially in the inland areas of Rota, may reveal additional information about the development of agriculture in the islands.

Early Spanish writings on the Marianas provide additional information about Chamorro culture during the late latte period. Many observers commented on the speed and craftsmanship of Chamorro double-hulled proa, which sailed out to meet Spanish vessels. They noted that the people lived in tall, well-built wooden plank houses perched on stone pillars. The houses had windows, separate rooms, and were covered with palm thatch roofs. Furnishings included beds with woven palm leaf mats. Other structures included low cooking houses and canoe sheds. Early missionaries also described various customs of the Chamorro people, such as the chewing and sharing of betel nut, coloring of teeth, and use of coconut oil to anoint their bodies and hair. Women were observed bleaching their hair and adorning themselves with flowers and shell ornaments. The display of *Spondylus* shell necklaces was presumed to be a symbol of high status. While women were observed practicing healing using medicinal plants, men generally held the role of makhana, who intervened in healing rituals on behalf of the spirits (Cunningham 1992; Flores 2016).

Spanish accounts also described a social structure whereby individuals were born into a specific class through matrilineal lines of descent. Living in coastal villages, the highest class, called the matua or chamorri, were the leaders, warriors, sailors, boat builders, and traders. The matua were also involved in fishing and collecting shellfish. The middle

class, called the ach'ot, may have been relatives of the matua. The ach'ot assisted and supported the matua and lived with or close to the matua. The lower class manachang lived in the upland areas and were primarily farmers. Fray Juan Pobre observed that, "The people living along the beaches and close to the sea are held to be of higher status than those who live inland" (Driver 1983).

Status in traditional Chamorro society may have been more complex and less rigidly stratified than Spanish accounts indicated. Archeologist John Peterson, for example, notes that Pobre may have been projecting a hierarchical Spanish concept of class on a society that was actually more egalitarian and reflective of common Micronesian patterns of mutual respect and reciprocity (Peterson 2012, 202).

On Rota, a "symbiotic relationship" likely existed between the east coast upland (Gampapa and Dugi) and east and southeast coastal villages (As Dudo, Sagua Gahga, East Koridot, and West Koridot), with each group providing resources that the other lacked (Butler 1997). While important resources came from the ocean and agricultural areas near the coast, the inland villages provided building materials such as timber and cordage from Pandanus, hibiscus, breadfruit, and other trees; flour from fadang (cycad) nuts; materials for clothing, tools, and crafts; and medicine from native forest plants. Fray Juan Pobre de Zamora, a Spanish lay brother who lived on the island for several months in 1602, reported that people living along the coast exchanged fish for inland agricultural products such as roots and tubers (Driver 1993). Fish and shellfish remains found at inland sites on the eastern plateau of Rota lend support to Pobre's account (Pantaleo et al. 1996).

The forests of Rota provided critical resources for Chamorro villages during the latte period and have remained important for sustaining traditional cultural activities to the present day. The forests contain ancestral burials and are considered to be inhabited by taotaomo'na, spirits of the past (Kurashina 1999, 269). Many Chamorro continue to ask permission of the

taotaomo'na prior to entering limestone forest areas for hunting, medicinal plant collection, ritual practices, and other activities. Failure to do so can result in painful bruises or pinches, unexplained illness, and even death (Farrer and Sellmann 2014, 136).

The continuing practice of traditional medicine throughout the Marianas has been described as "the most intact survival of a cultural activity of the precontact Chamorro" (McMakin 1978, 14). Early Spanish accounts noted the role of healers, known as makâna and kakâhna, in treating sickness and easing pain using a variety of techniques including administration of medicine derived from forest plants. Later Catholic missionaries sought to ban the practice, associating it with the traditional religion. In order to continue, Chamorro healers halted the ritual use of human skulls and adopted the new titles suruhânu (for males) and suruhâna (for females), derived from the Spanish word for surgeon (*cirujano*). Suruhânu/a collected medicinal forest plants and applied various remedies including massages. They also kept their techniques secret, only passing them on through appropriate family members (McMakin 1978, Lizama 2014).

Today, some healers have become more willing to share their knowledge through apprentice programs to ensure the perpetuation of the practice into the future (Lizama 2014). Their services remain in demand. In surveys conducted on Guam between the 1970s and 1990s, significant percentages of Chamorro and Filipino respondents reported seeking treatment from traditional healers. In a survey of 96 people conducted in 1995, for example, 70% of respondents reported visiting a traditional healer when they were children and 59% said they continued to do so (Lizama 2014). In a recent survey on Rota, of the 78% of respondents who said they spent time in the forest, 19% reported that they went there to collect medicinal plants (Nature Conservancy 2014, 10). The people of Rota have also identified medicinal plants as species of cultural and ecological concern in conservation areas on the island (Liske-Clark 2015, CNMI BECQ 2012). A cultural use survey is recommended to gain additional

information about medicinal plant collection and other traditional uses of the natural and cultural areas evaluated for this study.

SPANISH COLONIAL PERIOD (1521–1899)

The first known contact between people of the Mariana Islands and Europeans occurred in 1521 with Ferdinand Magellan’s arrival on Guam. While impacts on the Chamorro way of life were limited during the 150 years following initial contact, Spanish colonization eventually brought major changes to the people and the landscapes of the Marianas. By the late 1600s, warfare, destruction of homes and villages, forced evictions, religious conversion, massive epidemics, and introduction of invasive species caused major disruptions to Chamorro society and the environment. While colonization brought profound suffering and loss, the Chamorro people also resisted Spanish incursions, fighting back against efforts to subjugate them and remove them from their homelands. They maintained what traditions they could while adapting their way of life to new circumstances.

The Spanish colonial period is subdivided into the early contact and colonization period (1521–1668), the *reducción* period (1668–1700), and the isolated outpost period (1700–1899) (Russell 2002). Each of these periods is important for understanding the impacts of colonization on the Chamorro people. They also provide context for interpreting surviving archeological and historic sites and evaluating current social, political, and environmental conditions on Rota.

Early Contact and Colonization Period (1521–1668)

Although infrequent, early European encounters with Chamorros were often violent and created a relationship characterized by distrust on both sides. Between 1521 and 1602, 74 ships passed through the Marianas, usually between Guam and Rota (Driver 1993). Brief encounters occurred at sea between the European ships and Chamorro *proa* (multihull sailboats) and occasionally on land when the Europeans came ashore and into the Chamorro villages. Initially, European

presence in the Marianas was sporadic, consisting of the crews of occasional passing ships (mostly Manila galleons, but Dutch and English ships as well), a few castaways, and some clerics who deserted ships to conduct mission work (Spoehr 1957; Hezel 1982, 1983; Hezel and Driver 1988; Driver 1988).

Early contacts with the Spanish prompted some changes in Chamorro culture. Communities quickly found value in iron obtained from Spanish vessels in exchange for fresh water and other supplies. They may have adjusted settlement patterns to favor coastal areas suitable for trade, which in turn may have contributed to an imbalance in social status within and among villages. Agricultural adaptations, including construction of stone features for growing introduced crops, also occurred in some areas (Dixon et al. 2012).

In 1565, Miguel Lopez de Legazpi planted a cross on Guam and claimed the Mariana Islands for Spain. Legazpi’s successful cross-Pacific voyage also initiated the annual circuit of the Manila galleon trade that continued until 1815 (Schurz 1939). Silver from New Spain (Spanish-colonized areas of North America, Central America, and the Caribbean) was exchanged for various luxury goods including spices, porcelain, ivory, lacquerware, processed silk cloth, and other valuable commodities obtainable at Manila (Philippines). The eastbound voyage to Acapulco steered far north of the Mariana archipelago but some galleons encountered heavy storms and were blown off track to wreck in the Marianas.

One of these shipwrecks was the ill-fated *Santa Margarita*. After being demasted in a storm, the ship floundered aimlessly at sea for eight months before eventually running aground off Rota’s north coast in 1601 (Woodman 2009). Fewer than 50 of the original 300 sailors on board survived. Some of the survivors were later reportedly killed by Chamorro in retaliation for abuses.

The Spanish initially referred to Rota as “Zarpana” or “Carpana,” although this may be a result of confusion between Saipan and Rota in labels on the first regional maps (Barrett

1975). Rota, compared to Guam, Tinian, and Saipan, was largely bypassed by early Europeans, in part due to its lack of sheltered anchorage for large ships.

In 1602, Fray Juan Pobre de Zamora and his companion Pedro Talavera began conducting missionary work on Rota, arriving on a Spanish ship stopping to pick up the *Santa Margarita*'s survivors. They were taken to Tatgua Village on Rota's north coast where they lived for the next seven months until being picked up by a passing Spanish ship. Pobre's journal provides a valuable account of Chamorro society before the dramatic cultural transformations of the following centuries (Driver 1993). At that time, Pobre reported as many as 50 villages and 12,000 Chamorro living on the island (Driver 1983). Later estimates indicated a population of approximately 8,000 on Rota during the early contact period (Underwood 1973).

Spanish-Chamorro Wars and Reducción Period (1668–1700)

The founding of a permanent Jesuit mission by Father Diego Luis de San Vitores on Guam in 1668 marked the start of a period of more aggressive colonization, resulting in the near destruction of indigenous Chamorro culture. During the *reducción* period (1668–1700), Spanish missionaries began an aggressive campaign to convert the Chamorro people to the Catholic faith. This included forcing changes to traditional cultural and religious practices they found offensive. These policies were consistent with patterns of colonization in the Americas and other Spanish-occupied territories. In the Marianas, Spanish missionary efforts further led to conflict and violence between the Chamorro people and the colonizers. These conflicts culminated with the Spanish-Chamorro Wars during which the Spanish mobilized military forces to burn villages, destroy food supplies, and crush local uprisings. To prevent further resistance, missionaries implemented the policy of *reducción*, which forced Chamorro populations to parish villages on Guam, a small mission on Saipan, and a parish on Rota (Hezel and Driver 1988).

Beginning around 1672, Chamorro who fought against Spanish troops and resisted mission activities on Guam sought refuge on nearby Rota. At the time, the Spanish were preoccupied with protecting themselves and stabilizing the situation on Guam. In 1680 and 1681, Spanish-led troops arrived on Rota to capture Chamorro resisters. The historical records are somewhat unclear, but it seems that sometime between 1668 and 1682 a church was established in Songsong, and priests converted many hundreds of local Chamorro to Catholicism. Chamorro on Rota also concentrated into two villages: Songsong in the western part of the island and Agusan to the north (Hezel 2015). However, some Chamorro continued to resist, twice burning the church in Agusan. In 1694, Spanish forces descended on Rota again, this time capturing Chamorro from Agusan and relocating them—26 canoes of people—to Guam “where they could be better looked after and their children educated in a mission school” (Hezel 2015). The Spanish also destroyed homes and burned food stores in villages across Rota. The Spanish-Chamorro Wars continued until 1695 when Spanish troops swept through the islands, capturing most of the last resistant Chamorro.

The Spanish also brought diseases to the Marianas, which caused widespread suffering and death while also contributing to lower birth rates. The Chamorro population of the Mariana archipelago has been estimated at about 40,000 to 100,000 prior to Spanish colonization (with between 8,000 and 12,000 on Rota). The population declined dramatically to about 26,600 by 1668 (2,500 on Rota), falling to under 4,000 (467 on Rota) by the early 1700s (Amesbury and Hunter-Anderson 2003, Shell 2001). By 1710, the number of inhabited villages on Rota had dropped from 50 to 4.

The Spanish additionally introduced a variety of plants, domesticated animals, and pests to the Marianas. Introduced plants included sweet potato, cacao tree, tobacco, mango, papaya, and pineapple, among many others (Pollock 1986, Moore 2015). The first corn (*Zea mays*) grown in the Mariana Islands was planted on Rota by Fray Juan Pobre de Zamora

in 1602 (Driver 1993), though it was eaten by rats before it ripened (Butler, pers. comm., 2017). Spanish colonizers also introduced horses, cattle, sheep, carabao, pigs, goats, dogs, chicken, and the Philippine or sambar deer (Wiles et al. 1999). These introduced animals, as well as changes in land use, dramatically affected the island ecosystems and resulted in the loss of indigenous species.

Isolated Outpost Period (1700–1899)

By the start of the 18th century, the Spanish were largely neglecting the Mariana Islands, which became a backwater of the colonial empire (Farrell 2011). Guam remained the focus of Spain's limited interest, although only a few thousand people lived on the island. By 1730, with the closing of the Spanish mission on Saipan, the remaining Chamorro population on that island was forcibly removed to Guam. A small population remained on Rota (Russell 1998).

The end of the Manila galleon trade in 1815 further isolated the islands. Sporadic contacts continued with visits by European scientific expeditions in 1819 (Arago 1823) and 1888 (Marche 1982). Spanish priests assigned to Rota found their existence extremely isolated, yet continued to minister and teach reading, writing, and basic trades. The Spanish built a stone church in Songsong, then the primary village, sometime in the early 19th century (Hezel 1989).

A series of typhoons during the early 19th century caused widespread destruction to crops and houses across the Marianas (Russell 2002). Storms also affected the Caroline Islands to the south. Native people of the Caroline Islands, or Carolinians, were displaced by the storms and requested permission to relocate to Tinian in exchange for transportation services, which the Spanish lacked. Through the 19th century, additional waves of Carolinian migrants established communities on Tinian and Saipan, with a smaller number settling on Rota. The census of 1884 indicated indigenous populations of 760 on Saipan and 231 on Tinian, with Carolinian in the majority. The indigenous population of Rota was listed as 499, with Chamorro

in the majority (Driver and Brunal-Perry 1996, Farrell 2011).

During the Spanish period, most Chamorro shifted to a reliance on small-scale farming supplemented by reef fishing (Thompson 1945, 112). As a result of Spanish prohibitions against Chamorro sea-going travel (enforced by the burning of Native boats) and the dramatic population decline, the Chamorro ceased deep-sea fishing to fish only on the reefs (Driver 2005, Amesbury 2013). Carolinians, also skillful sailors, continued to sail between Rota and the other islands of the archipelago to carry messages and cargo (Hezel 1983, Driver and Brunal-Perry 1996, Russell 2002, Driver 2005).

After the Spanish-American War in 1898, Spain lost all its colonies in the Pacific. While Guam and the Philippines were ceded to the U.S., the remainder of the Mariana Islands were sold to Germany in 1899.

GERMAN ADMINISTRATION (1899–1914)

By the late 19th century, an expanding German empire looked to the Northern Mariana Islands as an opportunity to pursue aggressive economic and commercial possibilities (Fritz 1901, 1986; Russell 1999; Spennemann 1999, 2007, 2008). Georg Fritz, the District Officer of the German Marianas, established an administration center at Garapan on Saipan. The German administration initiated major public works projects and was interested in developing an agricultural cash crop economy based on the production of copra (dried coconut meat used for oil).

Fritz offered free passage and land to Carolinians and Chamorro from Guam who agreed to resettle in the northern islands to plant coconut palms and harvest copra. Their children were taught in German schools and German Capuchin Catholic churches. Attempts to lure German farmers to the new colony with a similar homesteading offer met with far less favorable responses, although some lands on Rota were reportedly leased to foreign planters (Bowers 1950, 41).

Most of the German developments focused on Saipan, with Rota remaining an isolated outpost, although the island's potential for coconut production was exploited. In 1904, the German administration built a school, blasted a channel through the western reef to facilitate boat landings, and planted a thousand coconut seedlings. The few inhabitants of Songsong lived in thatched huts on two parallel streets that focused on a plaza surrounded by buildings dating to the Spanish colonial period. The plaza included an unusually large church, the Casa Real, and a school (Spennemann 2004). Needed supplies came from a small Japanese-run store. The store acquired its goods from passing Japanese ships that controlled close to 90% of Micronesia's trade (Russell 1983).

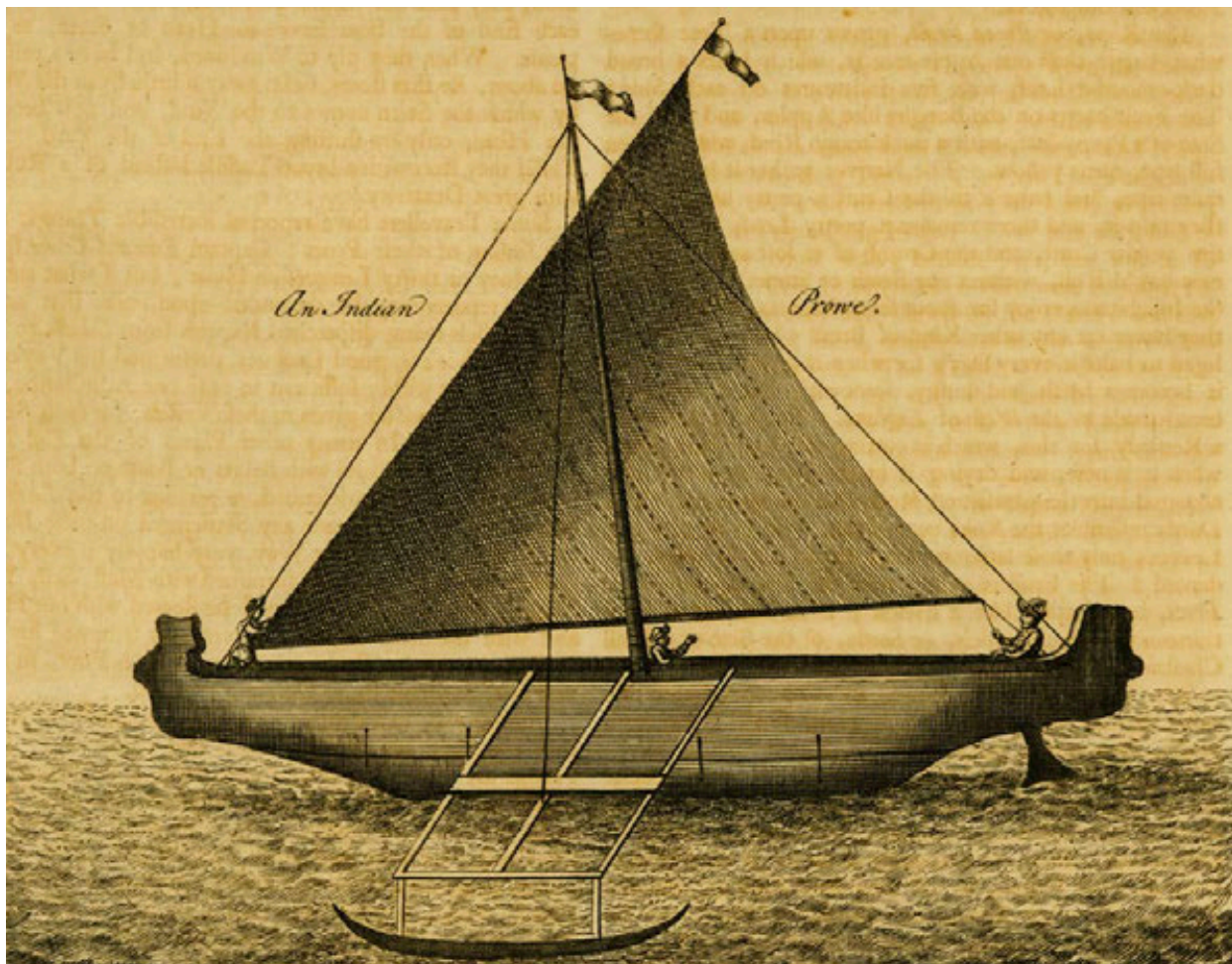
In 1902, Fritz reported 440 Chamorro, 49 Carolinians, and one foreigner residing in Songsong (Fritz 1986, 9). The population

continued to subsist by farming, including rice production in the Talakhaya region, breeding imported livestock, and fishing using some traditional techniques.

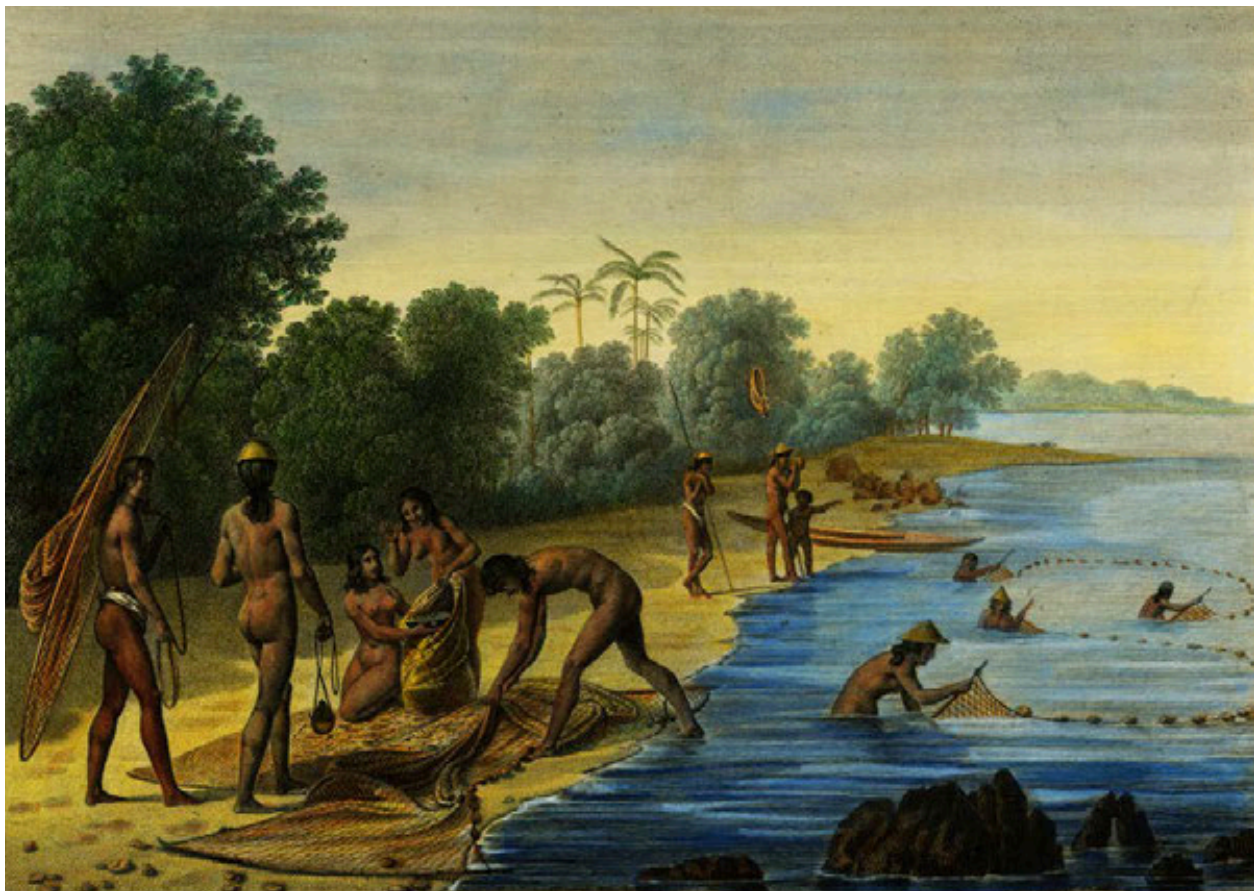
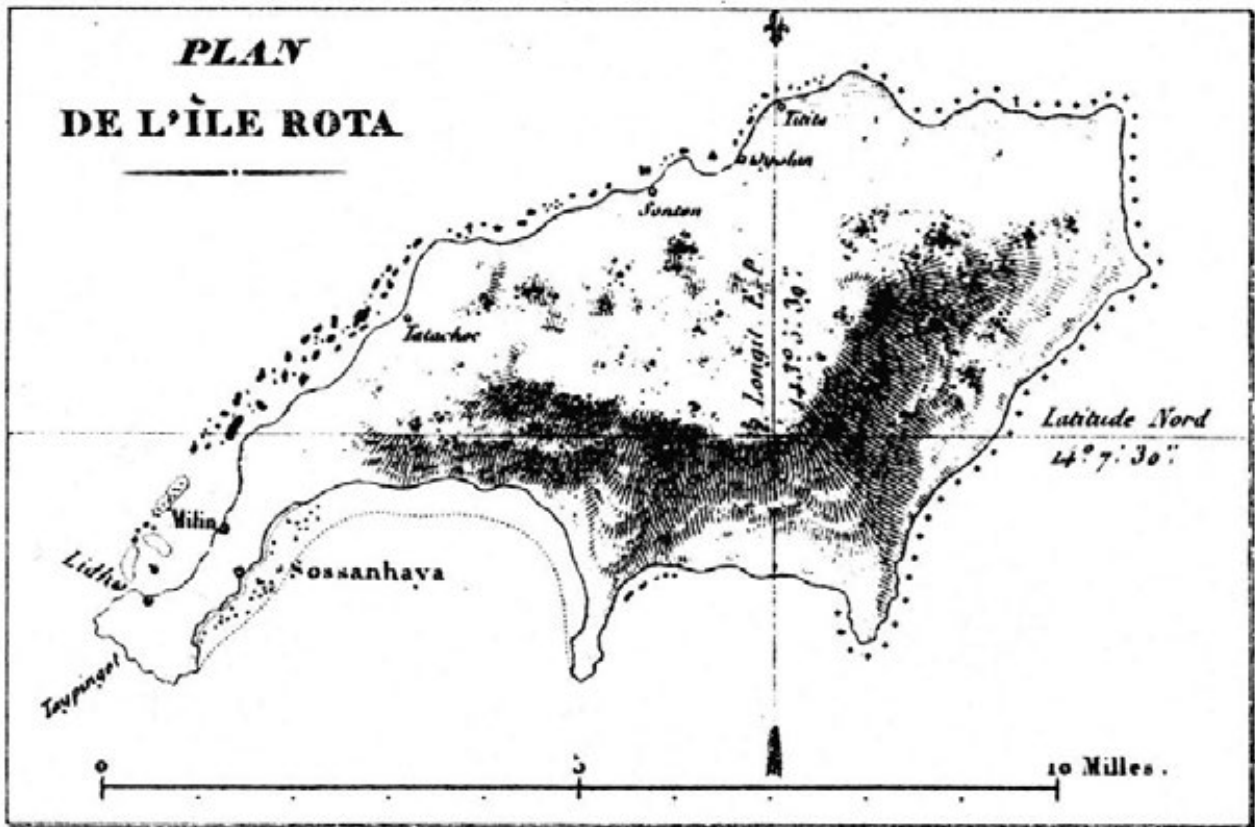
Following the devastation of young coconut plantations by five typhoons in the first two decades of the 1900s, the German administration ultimately concluded that their economic gamble to establish a viable colony in the Northern Mariana Islands had failed and that their Marianas possessions were a financial burden.

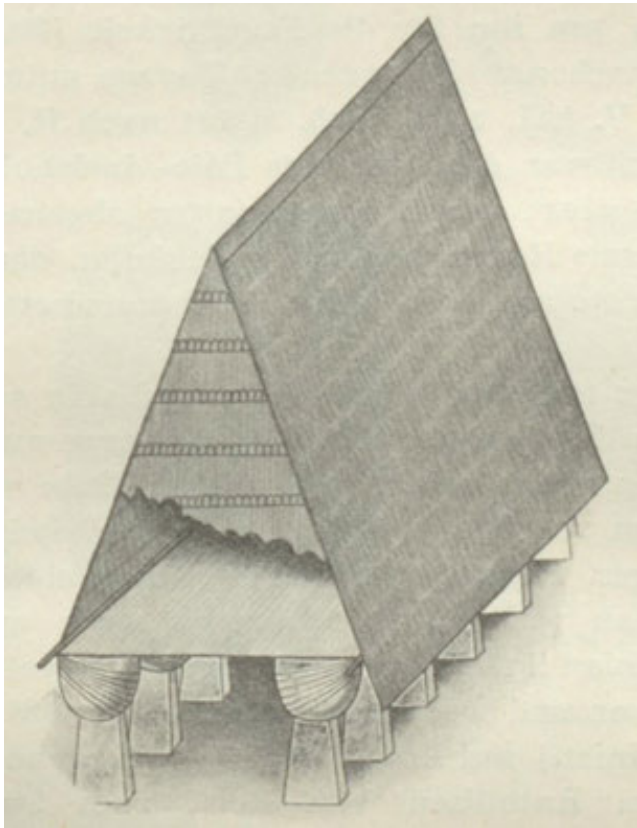
JAPANESE PERIOD (1914–1941)

In October 1914, a Japanese naval squadron seized control of Germany's possessions in Micronesia (Hiery 1995). The islands were placed under military jurisdiction and German nationals were expelled. In 1915, administrative authority over Micronesia

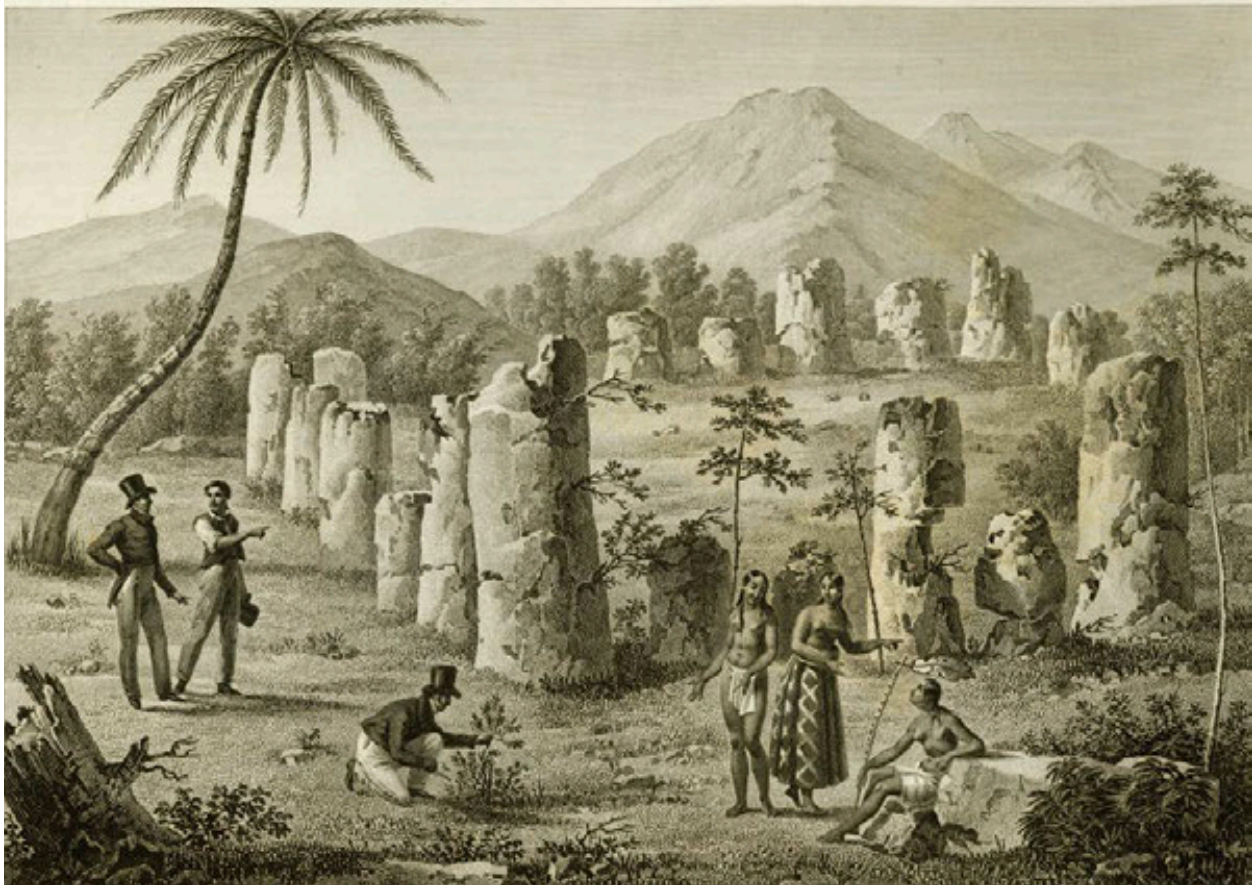


The Chamorro proa. Artist, date, and location unknown. Illustration courtesy of the Guam Public Library System.





1. [Opposite page, top] Inset showing a map of the island of Rota by Louis Claude de Freycinet, "Essai sur la géographie ancienne de l'île Gwam," 1819. Map: Guam Hydrologic Survey Library Historic Maps. 2. [Opposite page, bottom] Chamorros engaged in traditional fishing practices, illustrated by J. A. Pellion from Freycinet's *Voyage Autour du Monde* (Paris, 1823). Illustration courtesy of the Guam Public Library System. 3. [This page, top] Drawing of a Chamorro house supported by latte, from *Die deutschen Marianen* by Stanislaus von Prowazek, 1913. Illustration: Wikimedia Commons. 4. [This page, bottom] Illustration of remnants of Chamorro structures on Rota in the early 19th century, drawn by Jacques Arago and included in Freycinet's *Voyage Autour du Monde*. Illustration courtesy of the Guam Public Library System.



was transferred from the Japanese Navy to a civilian government, the Nan'yōchō (South Seas Bureau), with headquarters located in Palau (Yanaiharu 1940, Purcell 1976, Russell 1983, Peattie 1988, Hezel 1995). Saipan was declared the seat of government for the Marianas District and Japanese officials governed the islands from Garapan. In 1921 after World War I, the League of Nations awarded the German-held Micronesian islands (including all the Marianas except for Guam), to Japan with the stipulation that they could not be fortified for military use.

The Japanese government endeavored to establish an economy in the Northern Marianas based primarily on sugarcane. Japanese companies imported Korean laborers, Japanese tenant farmers, and Okinawan fishermen to tend the fields. With the drop in sugar prices after World War I, lack of localized agricultural knowledge, and corruption, the Japanese companies failed and investors fled, leaving behind nearly 1,000 laborers stranded and destitute.

The Nan'yō Kōhatsu Kabushiki Kaisha (NKK, or South Seas Development Company) restarted sugar production in the Northern Marianas in 1920. The NKK leased vast tracts of land on Saipan, the entire island of Tinian, and 30% of Rota to sublet to tenant farmers. Land not confiscated from the German administration was acquired by forcing local Chamorro to relocate or pressuring them to lease their holdings (Russell 2002, 51). The NKK continued to import Japanese, Okinawan, and Korean laborers to clear the land, build transportation networks, operate the sugar mills, and work the fields.

On Rota, early Japanese attempts to plant cotton, castor beans, cacao, and rice met with failure (Peattie 1988, Higuchi 2003). Rota remained an outpost until the early 1930s, when the NKK leased land to establish sugar production on Sinapalo, parts of the northwest coastal plain, and the more level areas of Talakhaya. Land was also leased for livestock grazing and for construction of infrastructure, housing, and factories (Bowers 1950, Russell 2002, Higuchi 2003).

About 6,862 acres (2,777 hectares) on Rota were cleared for sugar cane cultivation (Higuchi 2003). Gridded agricultural lots generally measuring 15 acres (6 hectares) were leased to tenant families, with each family living on the property, growing sugarcane to sell to the NKK, and gardening for subsistence. Small farming settlements were interspersed throughout the rural regions to provide service facilities such as clinics, public baths, stores, and police stations (Bowers 1950, 95; Dixon 2002).

A network of roads and a narrow-gauge railroad connected the farmsteads with the newly enlarged boat channel at Sasanlagu in Songsong Village (Higuchi 2003; Dixon 2002, 2014). The Japanese administration constructed roughly 20 miles (32 kilometers) of well-built roads and a bridge system, much of which is still in use today. Two water systems with more than 10 miles (16 kilometers) of pipe were constructed to carry fresh water from the Water Caves to Songsong to service the sugarcane industry and company housing and to Sinapalo to service the farmlands (Higuchi 2003, 9).

Songsong became a special-purpose Japanese company town built around the sugar industry (Higuchi 2003). In 1933, the village's Chamorro residents were relocated to Tatachog (Tatacho, Tatachok), a new village established on the island's northwest coast 2 miles (3.2 kilometers) northeast of Songsong that contained its own church and school. Songsong was prepared for the arrival of over 5,000 Japanese, Okinawan, and Korean immigrants by constructing a four-story sugar refining mill (completed in 1935), an elementary school, hospital, post office, and police station, as well as housing, commercial, and recreational districts. A new Japanese town sprang up just to the south of the older town of Songsong. Renamed Rota Town, it was developed as a model Japanese village with trolley cars, telephones, paved streets, and electric lights (Dixon 2002, 37).

NKK initiated mining activities on Rota in 1937. The Sabana's medium-quality phosphate deposits, estimated at over 50,000 tons, were extracted by hand from an open-pit mine

(Higuchi 2003). Phosphate was used for fertilizer and steel manufacture. The mineral deposits were transported from the high plateau to the phosphate processing plant on Sasanhaya Bay and onto cargo ships via an aerial tramway leading down the steep cliff, loading bridges, and conveyor belts (Dixon 2002). Phosphate laborers, mostly Okinawans and Koreans, lived next to the phosphate pit on the Sabana, near the road to the Sabana, and close to the processing plant.

Despite diligent efforts in improving soil quality, Rota's sugarcane was of such poor quality that the NKK stopped production in April of 1939 (Higuchi 2003). Some of the sugarcane land was then used by the South Seas Bureau for agricultural experimentation in plants useful to industrial production, such as Derris (source of the insecticide rotenone), hemp, and jute. In late 1940, the sugar mill was converted to a synthetic sake distillery to provide an alternative fuel source given the shortage of gasoline in the Japanese home islands. In late 1941, mining operations slowed down due to a shortage of petroleum, and the synthetic sake distillery ceased production. All phosphate mining on Rota came to a halt with the start of U.S. aerial bombardments in February 1944.

Chamorro and Carolinian residents of Guam (which was still held by the U.S.) continued fishing, cultivating sweet potatoes, pineapple, papaya, mango, coffee, and cotton through the Japanese period. Spanish Jesuits as well as Mercedarian missionaries who arrived in the Marianas in the early 1920s also continued to minister to the people (Russell 2002). Chamorro children attended school for at least three years and received access to public health services. Some cash-paying jobs were also available. Families subsisted by cutting wood, particularly ifit (*Intsia bijuga*), for railroad construction and making charcoal in Japanese-style kilns.

By the 1930s, Japan became increasingly militaristic and expansionist and, at first secretly, began fortifying its Pacific Island possessions. In anticipation of the impending Pacific war, Japan withdrew from the League of Nations in 1934, and the Japanese Navy

began to militarize the islands with the construction of airfields (Peattie 1988, 253). In 1939, most of the Chamorro and Carolinian population of Tinian was forcibly removed to Rota to make way for construction of Ushi Point Airfield (Peattie 1988, 252). On Tinian and Saipan, defensive fortifications, troop facilities, and anti-aircraft guns were installed in the hills and along the coastlines (Denfeld 1997). Rota was largely left alone during the initial military build-up.

Rota's population greatly increased during the Japanese period with the influx of Asian immigrants. In 1936, Rota's population was 5,590 (4,797 Japanese including Okinawan, 787 Chamorro, 68 Koreans, and 4 Carolinians). One thousand three hundred and ninety-two people resided in Songsong, with the remainder living in farming settlements (Higuchi 2003, 43). By July 1938, Rota's total population had increased to a peak of 7,892.

WORLD WAR II (1941–1945)

A day after the Japanese Imperial Navy's attack on Pearl Harbor in Hawai'i on December 7, 1941, squadrons of Japanese aircraft left airbases on Saipan and Ushi Point Airfield on Tinian to bomb U.S. military targets around Apra Harbor and Hagåtña on Guam (Hoffman 1950, Crowl 1960, Harwood 1994, Rottman 2004). The Japanese forces defeated the Americans by December 10, taking control of all the Mariana Islands.

Elsewhere in the Pacific, Japanese naval, air, and land forces conquered the Philippines, the rubber plantations of Malaya and the British base at Singapore, the oil fields of the Dutch East Indies (now Indonesia), and islands stretching eastward across the Pacific in an arc from Kiska in the Aleutians to Wake Island and south as far as New Guinea and the Solomon Islands. Their advance was stopped at the decisive naval battles of the Coral Sea in May and at Midway Island in June 1942, after which the Japanese military concentrated on defending their new domain against the inevitable American counter-offensive.

In the early years of the war, the Mariana Islands served primarily as rear-area supply

bases to support the Japanese military's Pacific garrisons and battlefields. As the American counter-offensive gathered momentum, in September 1943 the Imperial (Japanese) General Headquarters designated the Marianas part of an "absolute national defense sphere," with the goal of keeping American aircraft out of range of Japan's home islands. American war plans called for the capture of Saipan, Tinian, and Guam to serve as airbases for the newly developed B-29 Superfortress, the world's first long-range strategic bomber.

The Mariana archipelago thereby became a frontline position in Japan's absolute national defense sphere. Building and upgrading airfields, dramatically increasing the number of Japanese troops, and constructing fortifications became a priority (Denfeld 1992, 1997). By 1944, Japanese army and naval defense forces numbered 30,000 on Saipan, the cornerstone of the archipelago's defense, 20,000 on Guam, and 9,000 on Tinian. On Rota, a Japanese garrison of about 3,000 soldiers served under the command of Major Shigeo Imagawa (Russell 2002).

To effectively reach the Japanese home islands, American war plans called for the capture of Saipan, Tinian, and Guam to serve as airbases to conduct B-29 bombing raids. This was part of an overall strategy known as leapfrogging, or island-hopping, whereby the U.S. forces would strive to efficiently reach Japan without capturing every Japanese-held island on the way. The rationale for this approach held that cutting off supply lines to individual, heavily defended islands could be just as effective as invasion battles and reduce the overall loss of life. Unlike the other large islands in the Marianas, Rota was an island that was bypassed via the island-hopping approach.

The American invasion of the Marianas, code named Operation Forager, began on June 11, 1944, with systematic air and naval bombardment of Saipan and Tinian, before moving on to attack Guam. Fierce and bloody battles resulted in the end of Japanese-organized resistance on Guam, announced on August 10, 1944. The Battles of Saipan, Tinian, and Guam resulted in a massive loss of life; the death toll in the Marianas included

over 50,000 Japanese soldiers, 5,000 American soldiers, and over 30,000 civilians.

Even before the fighting ended, the U.S. Navy construction battalions, the Seabees, began bulldozing debris on the main Mariana Islands and constructing airfields, installations, and roadways to prepare for bombing the Japanese homeland. Saipan was the staging area for the invasion of Iwo Jima in February 1945, and Tinian, with a military population of some 50,000, became the largest operational airbase in World War II. The modified B-29s *Enola Gay* and *Bockscar* took off from Tinian to carry the atomic bombs, Little Boy and Fat Man, which were dropped on Hiroshima and Nagasaki respectively on August 6th and 9th, 1945, leading to the end of World War II.

Rota in World War II

Rota was the only major island in the Mariana archipelago not invaded by U.S. troops, largely because the Japanese military forces on Rota were isolated by submarines and aircraft and had no ability to threaten anything off the island. Furthermore, U.S. military planners did not regard Rota as a feasible target for invasion due to an inaccessible coastline, inadequate harbor facilities, and its inferiority as a naval and air base in comparison to the other large islands (Crowl 1960, 26). The island's Japanese military personnel and civilian population waited out the war while U.S. forces established military bases on nearby Tinian, Saipan, and Guam.

In contrast to Saipan, Tinian, and Guam, there may have been no Japanese military personnel or fortifications on Rota until early 1944 (Moore and Hunter-Anderson 1988, Peattie 1988, Mohlman et al. 2011, Higuchi 2003, Salo and Mohlman 2013), except perhaps elements of the 56th (Naval) Guard Unit. At that time, the Japanese military began construction on a small airfield at Sinapalo with the accompanying barracks, ammunition storage, air raid shelters, and facilities for use by Japanese fighter aircraft in preparation for an active defense (Higuchi 2003, 55). The Japanese Navy's 223rd Construction Battalion (which may have been the source of the Okinawan and Korean labor force) plus more than 2,000 of Rota's residents were

mobilized for airbase construction, including everyone above the fourth grade regardless of gender or ethnicity.

At the end of March 1944, Japanese army infantry—the 1st Battalion of the 10th Independent Mixed Regiment—arrived on Rota from Saipan with Navy forces dispatched from Tinian. Their command headquarters were at As Manila on the Sabana, with troops deployed to Songsong, Sinapalo, Tatgua, and Mua (Higuchi 2003). Most combat forces were located where they could react to likely landing sites on Rota—the Agusan area of the north coast and the area above Songsong (Butler, pers. comm., 2017). Extensive construction of Japanese fortifications did not begin on Rota until April 1944, and the building of defensive features continued long after the remainder of the archipelago had fallen. The Japanese military predicted U.S. forces could only land on the sandy beaches found along Rota's north coast and in front of Sasanhaya Bay. Initially, coastal defense positions were built to defend potential amphibious landing beaches at these locations (Denfeld 1992), and a field hospital was set up inside Tonga Cave above Songsong Village.

This shoreline defense concept changed when Japanese military commanders came to the conclusion that Japan had failed to defeat amphibious assaults at Tarawa, Kwajalein, Roi-Namur, Saipan, and Guam. This conclusion was possibly informed by the prolonged resistance of the Japanese garrison at Biak, which had fought for weeks from caves in the interior of the island in May 1944. One month later, during the battle for Saipan, the Japanese 31st Army Headquarters commanded other island units to alter their strategy: “Because fortifications built at the water's edge is [sic] extremely weak in strength, you are hereby ordered to have the key positions constructed in depth” (Gatchel 1996, 142). Accordingly, by August 1944, the focus of Rota's defensive positions moved inland, close to the Japanese military headquarters in the Sabana in “a four square kilometer area of Manira Yama” (Higuchi 2003, 56). Rota's Ginalagan and Chudang Palii Japanese defensive complexes are two of the few extant examples of this Japanese defensive strategy (Moore

and Hunter-Anderson 1988, Peattie 1988, Mohlman et al. 2011).

Defense-in-depth was an important departure from the long-standing Japanese doctrine of offensive warfare. The Japanese strategy implemented at the beginning of the war called for destruction of the invasion fleets in offshore naval actions and annihilation of the enemy on the beaches (Crowl 1960, Gatchel 1996). Japanese troops were mandated to stop the enemy at his most vulnerable—while coming ashore—and to launch powerful counterattacks before the landing forces managed to secure the beachhead. The revised Japanese strategic doctrine of defense-in-depth substantially neutralized the American advantage of naval gunfire, which couldn't hit most inland targets because of its flat trajectory; exhausted the attackers through a war of attrition; and exposed the supporting fleet to air attack for a longer period as the land battle took longer to decide, an effect multiplied by the introduction of kamikaze (suicide aircraft) tactics in the fall of 1944. Fully realized at subsequent battle sites on Peleliu, Iwo Jima, and Okinawa, this new strategy sharply increased U.S. casualties and delayed the end of World War II in the Pacific. From this point forward, Japan no longer expected to win each battle, but hoped that the higher cost of winning would drive the Americans to negotiate a more favorable peace.

The Japanese fortifications on Saipan, Tinian, and Guam reflect Japan's reliance on beach and coastal defenses with immediate counterattacks and minimal fallback positions. By not relying solely on the construction of coastal defenses, Rota's fortifications are unlike those of the other, larger islands in the Mariana chain. Perhaps the most comparable Mariana Island to Rota is the northern island of Pagan, which was also bypassed by American forces and possesses intact defensive features. While the Japanese placement of fixed weaponry on Pagan indicates a shift toward defense-in-depth tactics at the end of the war (Dixon et al. 2018), archeological surveys of Pagan's World War II tunnels suggest that the large majority are nevertheless located along the coastline and that all are

significantly smaller than the fortifications on Rota (Athens 2009, 239, 190–203). Elsewhere in Micronesia, elaborate interior defensive structures still exist on Peleliu, representing the late-war strategy that was exceptionally successful in exacting high costs from the September 1944 American invasion (Price and Knecht 2012). See Chapter 3: Resource Significance, for additional detail.

Despite never being invaded by U.S. forces, the Americans conducted periodic airstrikes on selected targets on Rota beginning in June 1944. These targets included Songsong and other villages, ships in the harbor, the sugar mill and phosphate plant facilities, and the small aircraft installation. Even after Saipan, Tinian, and Guam were secure, Rota continued to be subjected to frequent conventional air attacks by U.S. bombers taking off from nearby Guam and Tinian. Rota served as the training target for bombing runs by the specialized 509th Composite Group as they prepared for the atomic bomb raids on Japan (Garand and Strobbridge 1971, 427–429; Carter and Mueller 1973).

When the air raids on Rota began in earnest on June 11, 1944 (four days before the invasion of Saipan), Japanese soldiers, civilians, and the indigenous population fled from the villages and coastal areas to seek refuge in constructed and camouflaged fortifications, in natural and artificially expanded limestone caves, rock shelters, and in the thick jungle. Japanese civilians living in Songsong moved up the ridge to Ka'an, while Chamorro in Tatachog were first moved to the Akadot area, then to Sokayo (Hunter-Anderson et al. 1988; Peck 1997, 259–272). The population residing in the dispersed small settlements among the agricultural fields sought refuge in the nearest caves and rock shelters. The civilians gathered salvaged materials and built temporary shelters to protect them from strafing, bombing, and shelling. They also transitioned to a pattern of nocturnal activity, venturing out under the cover of darkness for food, water, and materials.

An even greater threat to Rota's survival was the growing scarcity of food, as for 14 months the population had to subsist off the island's

resources. Fishing became impossible due to the danger of air attacks, while the agricultural situation became desperate, despite the island being well-endowed with coconuts, breadfruit, bananas, mangos, and other fruits (Peattie 1988). By early autumn, limited agricultural production was taking place on the Sabana under the Japanese military command, although malnutrition and disease were commonplace among the Japanese military personnel and civilians (Peck 1997).

On September 2, 1945, the destroyer-escort USS *Heyliger* waited off the coast of Rota while a whaleboat went ashore to retrieve Major Imagawa and other Japanese officials. Aboard the *Heyliger*, Major Imagawa signed papers surrendering Rota to American forces. Formal U.S. administration of Rota began on September 3, 1945, with the landing of nearly 1,000 personnel from the 9th Anti-Aircraft Artillery Battalion (USMC) and U.S. Navy 48th Construction Battalion (Seabees).

All of the Japanese military personnel, totaling 2,665 men, were removed on September 4, 1945, and taken to prisoner-of-war camps on Guam (Richard 1957, 21). With Rota's economy in ruins, the 5,562 surviving civilians on the island were malnourished. These Japanese, Okinawan, Korean, and Chamorro civilian wartime survivors were placed in ethnically segregated internment camps administered by military Civil Affairs personnel (Bowers 1950, Russell 2002, Mohlman et al. 2011) and gradually relocated back to Songsong and cultivated areas. In 1946, the 1,019 Japanese, 3,572 Okinawan, and 181 Korean civilians residing on Rota were repatriated to their native homes. Seven hundred and ninety Chamorro remained on Rota (Russell 2002, Mohlman et al. 2011).

U.S. NAVAL ADMINISTRATION AND TRUST TERRITORY OF THE PACIFIC ISLANDS (1945–1978)

Within two months of Japan's surrender, island administration was transferred to a naval military government. Rota's U.S. military government maintained its headquarters in the ruins of Songsong, with overall responsibility for island administration resting with the

naval governor on Guam (Farrell 2011). As many as 30 U.S. naval administration staff, headquartered in Songsong, stayed on the island until 1947.

Once on island, the Seabees began clearing the ruins of Songsong for reconstruction of the village and infrastructure using salvaged materials from Tinian. Seabees also rebuilt the airport and transformed the narrow-gauge railroads into coral-filled highways (Dixon 2002, 40). Many Chamorro returned to live in Songsong and began farming to produce vegetables to sell to the U.S. military government on Saipan.

In 1947, President Truman signed Executive Order No. 9875, establishing the Trust Territory of the Pacific Islands whereby, under a United Nations mandate, the Micronesian islands formerly under Japanese control came under the administration of the U.S. Navy (Bowers 1950, Spoehr 1957, Farrell 2011). The Mariana Islands, with the exception of Guam, became a district in the Trust Territory. Guam remained under naval control until the Organic Act of Guam (HR 7273) was signed by President Truman in 1950, authorizing a civil government and establishing its status as an unincorporated U.S. territory, after half a century of U.S. military rule (though military presence on the island remains significant to this day).

The administrative headquarters of the Mariana Islands District were first located in Honolulu and eventually transferred to Guam. The Navy provided the Mariana Islands District with very little development or assistance to improve the islands' standard of living during this period. Due to their location in the western Pacific Ocean, the islands of the Trust Territory and Guam were considered strategically important during the Cold War. The U.S. occupation of Micronesia provided a network of military bases to support the "containment" policy that the United States had adopted toward Communism (Aaron 2011, 3-8).

In 1951, the U.S. Department of the Interior took over trusteeship responsibilities from the Navy. The following year, administration of Tinian, Saipan, and soon thereafter, the northern islands reverted back to the U.S. Navy. The Navy then established the U.S. Naval Technical Training Unit in the Marianas, where the Central Intelligence Agency (CIA) conducted trainings. Travelers and investors were restricted from entering the islands. Rota was spared from the administrative transfer to the Navy and remained a separate district of the Trust Territory of the Pacific under the Department of the Interior. Despite living under a different jurisdictional authority, Rota's residents were still subject to travel regulations for the next decade due to military restrictions and were prohibited from travelling to Saipan or Guam to visit relatives or to receive medical attention without special authorization.

A site inspection of the Trust Territories by the United Nations in 1961 produced a critical indictment of the U.S. administration of the territories, pointing out the lack of economic development and neglect of education and political development. This resulted in the Kennedy administration transferring responsibility for the Mariana Islands District to the Department of the Interior and relocating the headquarters from Guam to Saipan.

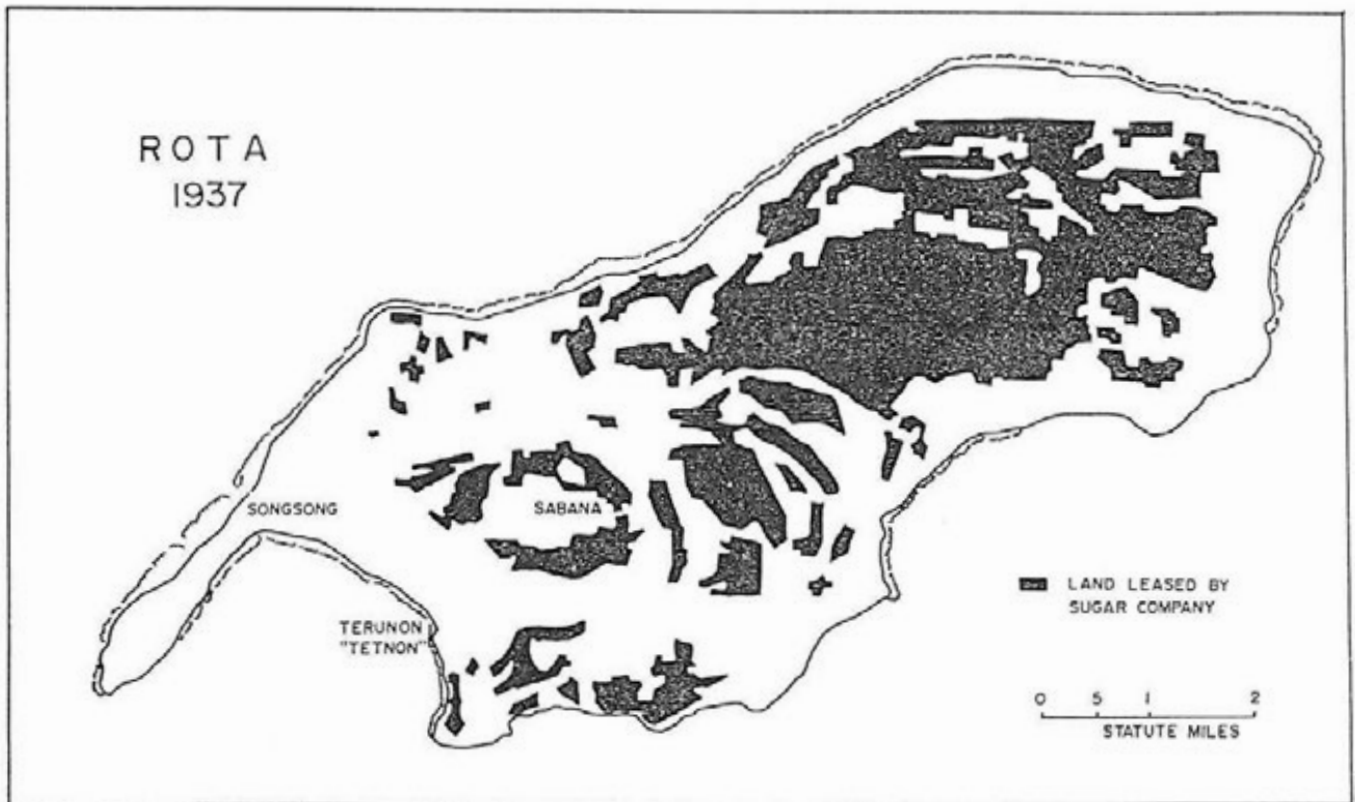
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS (1978–PRESENT)

In 1975, citizens of the Mariana Islands District voted to become a commonwealth of the United States. A year later an agreement was signed with the United States, and the Mariana Islands District became the Commonwealth of the Northern Mariana Islands (CNMI) (Public Law 94-241). The CNMI government went into effect in 1978. Commonwealth status provides for self-government as well as U.S. citizenship for residents.

圖料資誌地要兵島タロ
(製調月二年九十九和昭)



PALE FOREST	林 + 薄	→ - - -
SPARSELY GROWN WOOD	林 - 疎	○ ○ ○ ○
JUNGLE	林 + 密	○ ○ ○ ○
JUNGLE	林 + 密	○ ○ ○ ○
GRASSY PLAIN	地 草	△ △ △ △
ARABLE LAND	地 田	□ □ □ □
CHURCH	寺 堂	+
SCHOOL	学 堂	⊠
FLYING AIRFIELD	飛 場	⊠
WATER SUPPLY	水 井	○
SOURCE OF A RIVER	水 源	○
CABLE CAR	電 車	→
RANCH	牧 場	○
NAVY WATCH TOWER	海 軍 塔	○
WATCH HOUSE	観 望 所	○
PLACE FINE VIEW	観 望 所	○
OFFICE of AGRICULTURE	農 業 局	○
SIDEWALK	歩 道	—
ROAD + ELEVATION	道 路	—
ROAD	道 路	—
RAILROAD	鐵 道	—
REEF	礁 石	—
RIVERS	河 川	—
CLIFF	崖 壁	—
LEGEND	凡	凡



1. [Opposite page] 1934 Japanese map of land uses and environmental conditions on Rota. Map: Source unknown. 2. [This page, top left] Translated key for the 1934 map. Source unknown.. 3. [This page, top right] Japanese locomotive at the NKK Sugar Mill on Rota. Photo: NPS. 4. [This page, bottom] Map of Rota showing land use by the NKK Sugar Company in 1937 (notice the absence of farming on steeply sloped areas). Map: Moore and Hunter-Anderson 1988, 17.

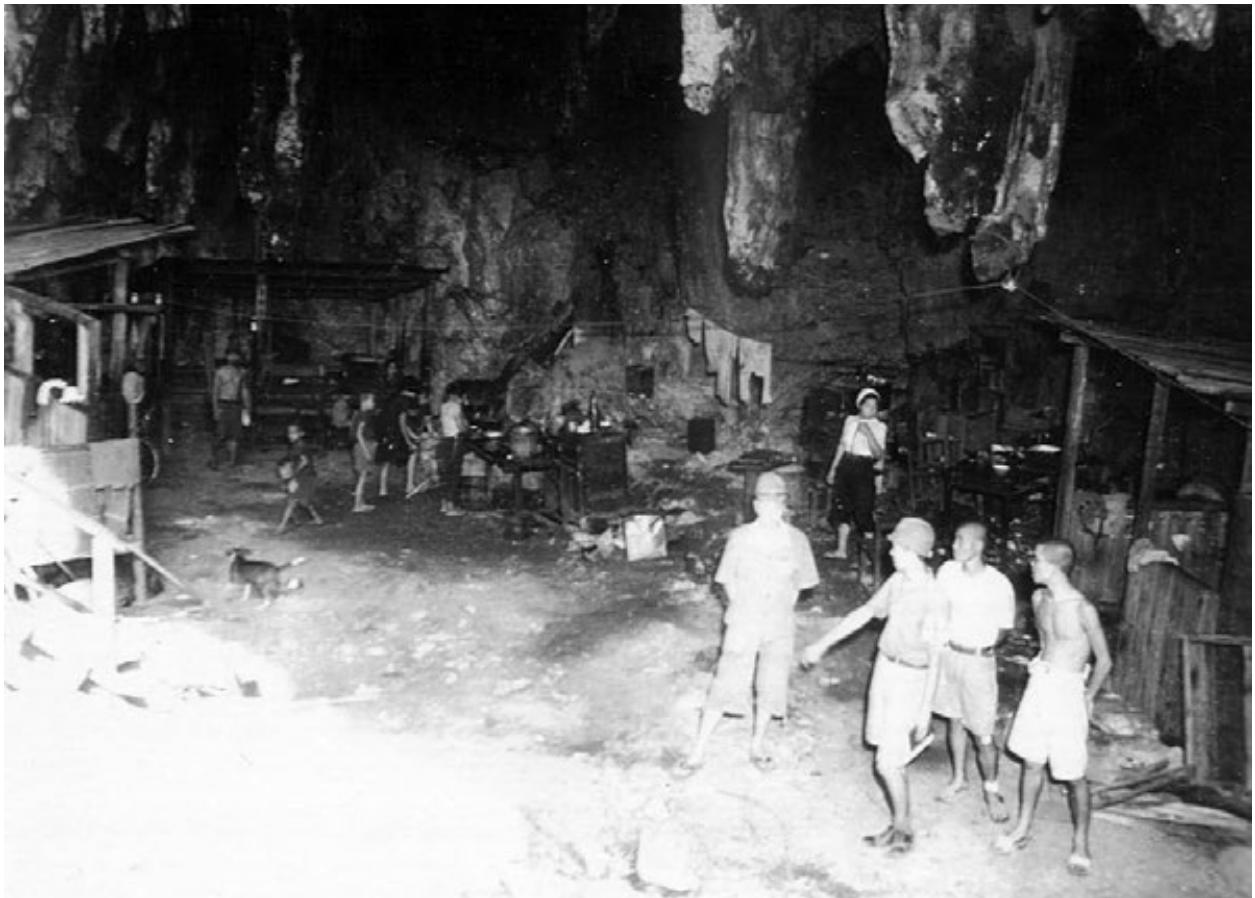
THE PACIFIC THEATER OF WAR 1941-1945



Map illustrating the dates of the American campaign in the Pacific, with the Marianas Campaign highlighted (June–August 1944). Map: Moore and Hunter-Anderson 1988, 22.



1. [Top] View of the NKK Sugar Mill in Songsong during a U.S. bombing raid on July 15, 1944. **2.** [Bottom] The Rota airfield during a U.S. air attack on the same day. Photos: National Archives and Records Administration.



1. [Top] Sinking of a Japanese transport ship by the U.S. military in Sasanhaya Bay, Rota, June 27, 1944. 2. [Bottom] Photo illustrating the conditions of the Japanese field hospital in Tonga Cave on Rota, taken on September 4, 1945, a day after Rota was surrendered to the United States. Photos: National Archives and Records Administration.

RESOURCE SECTION

Sites evaluated for this study were identified through research beginning in 2016. The study began with a list of sites documented in the National Register of Historic Places and properties identified by Rota's Historic Preservation Office (HPO). The list was broadened to include sites eligible for or potentially eligible for the National Register of Historic Places that were identified through subsequent review of existing documentation. For some of these sites, additional information is needed to determine the site's resources and significance. Additional ethnographic research, including oral histories and a cultural use study, is also recommended to assess if some resources may qualify as traditional cultural properties (TCPs). NPS guidelines define a TCP as a property associated with "cultural practices and beliefs of a living community that are (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998, 1). For the purposes of this study, properties that are less than fifty years of age are not included or analyzed because, as a general rule, they would not be considered eligible for listing in the National Register of Historic Places.

Given the breadth of Rota's history and limited archeological and ethnographic research that has been conducted on the island to date, there is a high likelihood that additional sites and resources could be found that could yield important additional information about Rota's natural and cultural heritage. It is important to note that only portions of the island have been surveyed for archeological resources, primarily areas with above-ground resources or construction projects. Only a few subsurface surveys have been conducted.

This study documents the known and larger-scale archeological resources on Rota. It is not intended to be a complete inventory of all sites. The CNMI HPO currently maintains a list of nearly 700 recorded archeological or historic properties. In order to complete this study, the NPS has relied on the best available data to identify and analyze cultural resources. In many cases, the extent of the description

corresponds to the availability of information about the history, sites, and resources.

Resources Associated with Pre-Latte and Latte Periods

Properties associated with pre-latte and latte periods include village complexes, village sites, habitation sites, shelters, quarries, and limited activity sites that may contain an array of artifacts such as latte sets; lusong; tools made from stone, bone, and shells; pottery; ornaments; faunal remains; and rock art. Archeological features including human burials, hearths, middens, and postholes are also present at some sites. The majority of the extensive village sites are located along coastlines. However, several latte sites illustrate habitation and land use in the upland areas of the island, including in limestone forest areas evaluated in the natural resource sections of this study. A complete list is included in Chapter 3 in Tables 3-4 through 3-7.

COASTAL SITES

The description of coastal sites is in clockwise order around the island beginning on the north coast of Rota.

North Coast Archeological Sites

Four coastal villages existed along 2 miles (3.2 kilometers) of coastline near what are today the U.S. Memorial Beach Park, Teteto Beach, and Guata Beach Park. The four villages are named Salug-Songton, Unginao-Uyulan, Teteto-Guata, and Tatgua. The earliest evidence of habitation dates to 2,600 years ago, with a continuous record of occupation until the late 1600s. These areas also include Japanese period and World War II-era resources. The 2-mile (3.2-kilometer) stretch was surveyed in 1984 as part of a road development project, and the following information only describes resources within that area. Other stretches of the north coast have not been surveyed and could contain additional resources.

The village locations were identified by concentrations of artifacts, such as shells, fishbone, pottery sherds, a range of tools, and lusong (Butler 1988). Only five latte

sets were identified, including two 12-pillar sets, two 10-pillar sets, and one 8-pillar set. The most prominent is the Tatgua Latte, a 12-pillar set that comprises some of the tallest latte on Rota, which would have elevated the structure over 9 feet (2.7 meters) tall. Over two dozen burials were also excavated, providing important physical anthropological information about Chamorro people and culture.

This area is of special significance because Tatgua Village was the location where for seven months Fray Juan Pobre and Pedro Talavera lived on Rota in 1602. Pobre's account of the Chamorro people, culture, and activities is considered the most detailed source of written information on the pre-colonial Marianas. Archeological research at Tatgua and nearby sites may provide additional context for interpreting his account. The 12-pillar Tatgua Latte may have been the house of Sunama, the chief whom Pobre referred to as his "master" (Rogers 1995, 19; Butler 1988). The north coast villages were occupied until the late 1600s, when the Chamorro residents were forced to resettle in Songsong or on Guam. The villages likely remained as ruins until around the 1930s, when Japanese farmers cleared the land for farming activities (Butler 1988). Further damage to the latte structures likely occurred during post-World War II activities and with construction of the road (Butler 1988).

Mochong Latte Village Complex
Mochong (also Mochon or Muchon) is a Chamorro village complex encompassing 30 acres (12 hectares) of undeveloped land bordered by a large sandy beach on the northeast end of Rota. Here, the island's northern plateau slopes gently toward the sea. The beach, the largest on Rota, is fringed with strand vegetation and sandy soils extend inland with small-diameter, mid-elevation limestone forest to the south and east of the site (CNMI BECQ 2012). Mochong consists of 53 latte sets, more than any other site in the Mariana Islands except for Alaguan, which is also on Rota. Other surface features found at Mochong include large mortars and a stone-lined well (Yawata 1944, Spoehr 1957, Takayama and Egami 1971, Takayama and

Intoh 1976, Marche 1982, Ward and Craib 1983, Morgan 1988, Fritz 1986).

Mochong appears to have been continuously inhabited for about 2,300 years, from approximately 600 BC, in the pre-latte period (1500 BC–AD 1000), through the latte period (AD 1000–1700). The surviving Chamorro residents were forced to abandon the village around AD 1700 in the aftermath of the Spanish-Chamorro wars and during the *reducción* period (1668–1700).

Mochong contains six 6-pillar sets, thirty-one 8-pillar sets, seven 10-pillar sets, two 12-pillar sets, and one 14-pillar set. Some sets are incomplete, and their size has not been determined. Two unique latte structures are present: a 14-pillar set, which is the largest known latte foundation in the Marianas, and a walled latte set. The walled set is composed of a row of typical pillars faced by a parallel row of stone slabs forming a wall (Yawata 1963 in Moore et al. 1986, 26; Marche 1982, 34). The only other example of this distinctive form of latte architecture is found at the Tachogna Latte Site on Tinian (Spoehr 1957, 74–85). As in other latte clusters, the Mochong structures are aligned end to end in an uneven line situated parallel to the shoreline; or in a linear arrangement with their long axis parallel to a prominent topographical feature, such as a bluff or ridgeline.

Evidence of long-term habitation at Mochong is found in the stratified deposits. Human burials have also been located underneath and near the latte sets. Artifacts recovered include earthenware pottery dating to the pre-latte period (Marianas Red or Redware, lime-filled impressed sherds) and latte period (Marianas Plainware), and dense middens primarily composed of fishbone and marine shell. Other types of artifacts recovered include adzes manufactured from *Tridacna* shell, basalt, and chert; basalt cutting tools, hoes, abraders, hammer stones, and pestles; limestone slingstones; shell scrapers, files, beads, and pendants; and human bone spear points, awls, and needles (Takayama and Egami 1971, Takayama and Intoh 1976, Ward and Craib 1983, Craib 1990b).

The several Marianas Plainware sherds recovered with rice impressions provide evidence that rice (*Oryza sativa*) was grown in the Marianas before the arrival of the Spanish in the early 1500s (Takayama and Egami 1971, Hunter-Anderson et al. 1995). The large basalt and limestone lusong found at Mochong may indicate an increased reliance on pounded food processing, possibly including rice and the nut of the fadang (cycad, *Cycas micronesica*).

The Mochong site also contains abundant artifacts related to fishing and gathering of marine resources. A wide variety of fishing implements have been identified, including one-piece and composite fishhooks (often in the form of J-shaped hooks), gorges, fishing weights, chumming devices, and spears or harpoons, most of which were fashioned from shell and bone (Leach et al. 1990). Also present were V-shaped gorges and limestone sinkers. Four bone spear points with grooves at right angles to the shaft may have been used for harpooning fish.

Analysis of the Mochong fish bone assemblage (Leach et al. 1990) identified 313 fish in at least 27 families. Parrotfish dominated the assemblage (21.7%), followed by pelagic fish (26.9%). Large pelagic fish remains included mahi-mahi or dolphinfish, marlin, sailfish, swordfish, wahoo, and yellowfin and skipjack tuna (see Amesbury and Hunter-Anderson 2008). The remaining fish comprised species that inhabit shallow, near-shore rock or coral reefs, and near-shore deeper waters. The probable methods used to catch the identified fish and the fishing gear unearthed indicate the Mochong community practiced netting as well as highly specialized fishing techniques and depended on reliable canoes and expert sailing techniques (Leach et al. 1990).

Māya Latte Site

The Māya Latte Site is located to the east of Mochong within an approximately 1.3-acre (0.5-hectare) area. Nine latte sets, isolated capstones, and a lusong have been recorded, along with associated cultural materials including pottery, shell, and historic artifacts (CNMI HPO Site Registration Forms for RT-1-03-1-0525 [1992] and RT-1-17-1-

0537 [1994]). The latte sets are generally oriented parallel to the coastline and consist of eight pillars. Some of the latte sets are intact, while others have been disturbed or destroyed, reportedly from pre-World War II activities, natural disasters (CNMI HPO 1994), and a Department of Natural Resources project undertaken before the 1992 HPO site registration form and described therein (CNMI HPO 1992, 5–6, 10, 14). Subsurface archeological excavations have not been completed to date. Additional documentation for the Māya site may have been lost in an office fire; therefore, additional resources could be found at the site that are not included in this description.

As Måtmos

As Måtmos is located at Rota's northeast point and is composed of a 195-foot-high (59.4 meters) limestone escarpment fronting the ocean. The escarpment contains a series of remnant flank margin caves (Stafford et al. 2002, Keel et al. 2005). Flank margin caves form on the margin of the freshwater lens on islands and coasts and are created when mixed sea and groundwater dissolve calcium carbonate rock. The As Måtmos caves and their potential use in the pre-latte and latte periods are noted in archeological literature, but no investigations have been conducted (Gordon et al. 1980, 18). The caves are of note due to their proximity to latte-period villages such as Māya and Mochong to the west along the sandy coastline, and Dugi on the Sinapalo Plateau.

A folktale suggests the site's association with the history of rice cultivation on Rota. According to the story, a chief on Rota forced the people of his village to plant rice on the island's rugged northern limestone plateau, an environment unsuitable for cultivation. The area was painstakingly leveled by hand, and soil was brought in for planting. In one version of the tale, the people were so angry with the chief that they pushed him from the cliffs into the sea where he drowned. In another version, the chief was humiliated when he learned that another chief had established a better rice growing area on the southern part of the island, and so jumped into the sea to take his own life. The name As Måtmos means

“drowned” and is believed to have come from this story (Hunter-Anderson et al. 1995, 75).

East and Southeast Coast Archeological Sites

Four coastal villages—As Dudo, Sagua Gahga, East Koridot, and West Koridot—existed along 3.8 miles (6.1 kilometers) of coastline in what is today the I’Chenchon Park Wildlife Conservation Area, or I’Chenchon Bird Sanctuary (Butler 1997). The four village sites are spaced about 0.6 miles (1 kilometer) apart along the coastal terraces in favorable locations. The total area spans 563.4 acres (228 hectares) and includes 36 separate sites containing 61 latte sets (mostly 8-pillar sets) within the four villages. Of the 36 sites, 24 are located on the coastal terraces and 12 on the second, higher terraces. The archeological evidence suggests these villages date to the late latte period, likely overlapping with the early Spanish contact period.

The 36 sites include permanent villages, small artifact scatters, and rock shelters. The area’s topography is organized into steps coming up from the waterline, with terraces divided by cliffs up to the upland plateau of the island. The four village sites are on the coastal terrace with access to the water via a canoe landing and access through the cliffs to the intermediate terraces. The access routes heading upland led to smaller sites which could have been gardens, fields, or forest areas for plant gathering and hunting. There are no apparent water sources in the area, and thus it is thought that the villages collected rainwater in pots. There are also several rock shelters or caves, three of which contain rock art. See the “National Significance Evaluation: Pre-latte and Latte Period Archeology” of Chapter 3 for additional detail about Chamorro rock art.

The village sites contain an array of artifacts that are typical of village sites. They include latte, shells, fishbone, pottery sherds, a range of tools, and lusong, pit features, and burials. One unique artifact at the largest village of As Dudo is a one-piece haligi and tasa combination latte. The sites appear less disturbed than many other sites on Rota, largely because of their isolated locations.

Alaguan Latte Village Complex

The Alaguan Latte Village Complex is the largest extant latte period village in the Mariana Islands (Craib 1990a, 27). The site is in the coastal valley of Alaguan on Rota’s south coast. The U-shaped valley is surrounded on three sides by almost vertical cliffs rising over 0.6 miles (1 kilometer) to the plateau above, with a poorly developed reef leading to the ocean on the east. The isolated site is compressed by the steep terrain into about 25 acres (10 hectares), a smaller area than Mochong Latte Village Complex. The valley is vegetated in tall-canopy native limestone forest.

Chamorro settled at Alaguan between AD 1200 and 1300, and the village attained its maximum size between AD 1400 and AD 1500 (Craib 1990a, Swift et al. 1992). The complex contains 58 latte sets, 24 large basalt and limestone mortars, an extraordinarily rich artifact scatter capping shallow cultural deposits, and two historic charcoal kilns. Soil mounds composed of black, greasy charcoal-rich soil, concentrations of fire-affected basalt rocks, ash lenses, and discrete hearth features are dispersed around the latte sets (Craib 1990a). Basalt sources are not found in the Alaguan Valley, suggesting that residents imported the resource to use as cooking stones, mortars, and tools.

Of the 58 latte sets, 51 have been categorized into size classes. These include twelve 6-pillar sets, thirty 8-pillar sets, six 10-pillar sets, and three 12-pillar sets. Alaguan contains the only fully intact latte pillar on Rota with a large latte column standing upright and its capstone still in place. The spatial distribution of latte sets within a complex was dictated to a large degree by topographic features. Hence, the latte are arrayed in tiers on the ascending terrain behind the lowest terrace margin at the mouth of the valley. The majority of latte sets are in a linear arrangement paralleling the inland cliff and the shore, with several oriented perpendicular to the shore.

As in the majority of pre-latte and latte sites in the Marianas, the most common artifact at Alaguan is earthenware pottery, in this case the typical latte period plainware sherds

with volcanic sand temper and thickened rims. The immense number of sherds present indicates the importance of pottery vessels to the villagers.

Common tools found at Alaguan include adzes of *Tridacna* shell and imported basalt, fishing gear such as shell hooks and gorges, bone barbs, weapons of limestone slingstones, and bone spear points. *Spondylus* shell beads were commonly associated with human burials. One artifact, a finely shaped stone bead, is unusual and likely originated outside of the Mariana Islands.

Processing tools and midden remains provide evidence of subsistence patterns at Alaguan. The large quantity of fishbone recovered indicate that the majority of fish consumed was parrotfish. Evidence for the consumption of mahi-mahi and marlin, both pelagic fish, was noted despite Alaguan's perilous ocean access. Parrotfish would likely have been taken from the local area by spearing and net fishing, while deep-sea fish would be caught through trolling or harpooning. Shellfish appears to have been a common, but not substantial, part of the local diet. Although a large amount of marine shell was recovered, this would not have provided much edible meat (Craib 1990a). Shellfish species identified in the archeological record continue to inhabit the narrow reef fronting the village site.

The large number of lusong at Alaguan suggests that the grinding and pounding of foods and probably medicines was an important activity. Some of the plants which need this kind of processing are the fadang (cycad), the nut of which can be pounded into flour, as well as taro and breadfruit. Although no taro is seen today at Alaguan, fadang and breadfruit trees are common in the surrounding limestone forest, as are a number of medicinal plants and species traditionally used for timber, cordage, weaving, and decoration. During the latte period, fadang nuts as well as other forest resources may have been exported to other communities on Rota in exchange for resources not available locally, such as basalt for manufacturing mortars, adzes, and cooking stones (Craib 1990a).

Difficult access by land, isolation, and perilous ocean access characterize Alaguan's location. Fresh water is also scarce and the shallow, poorly developed soil is unsuitable for agricultural production. While residents likely obtained resources from the surrounding limestone forests, the village appears to have existed as part of an extensive network and was likely sustained through social and economic ties with other parts of Rota and possibly other islands.

Similar to other late latte period sites, Alaguan likely experienced significant population decline due to disease and Spanish violence. It may have been abandoned following the Spanish-Chamorro wars during the reducción period. The loss of the economic trading network it depended on for survival may have also been a factor. Without a thriving population in more suitable environmental zones, the Alaguan community would have been cut off from the social and trade networks they needed to survive (Craib 1990a).

Southern Coast Archeological Sites
Additional archeological sites, including latte, have been identified on the coastal terraces west of Alaguan. The Rota Historic Preservation Office has recorded archeological materials and latte sites at Payapai, Pali, and Agatasi near Malilok. Additional research is needed to provide descriptive information about these resources.

INLAND SITES

As Nieves Quarry

The As Nieves limestone quarry on the Sinapalo Plateau of eastern Rota contains the largest-known latte in the Marianas. If erected, the pillar would stand close to 20 feet (6 meters) tall. Nine columns and seven capstones remain in their original quarry locations. As Nieves Quarry is popularly referred to as the Taga Quarry, after the legendary chief with super-human strength who is said to have carved the stones with the intent to build the biggest house in the Mariana Islands (Flood 2001, 81). According to oral traditions, Chief Taga was forced to abandon the project on Rota, leaving the

partially excavated stones in place. Afterward he moved to Tinian, where he built the House of Taga, which at nearly 16 feet high (14.9 meters) is the tallest standing latte structure in the Marianas. Immediately to the east of the 2.5-acre (1-hectare) As Nieves Quarry site are pits where more commonly sized latte components were procured (Lizama et al. 1981, Pantaleo et al. 1996).

Without associated radiocarbon dates, it is unknown when As Nieves was being quarried; however, the massive latte at As Nieves and House of Taga are believed to be associated with the peak period of latte building in the 1500s and 1600s.

The rectangular pillars at As Nieves range from 6.2 to 7.5 feet wide (1.9–2.3 meters), 3 to 4.3 feet thick (0.9–1.3 meters), and 13.5 to 17 feet long (4.1–5.1 meters), and they weigh up to 26 tons each, twice the weight of a typical column at the House of Taga (Cunningham 1981, Morgan 1988, April 2004). Each roughly 18.5-ton hemispherical capstone measures 8.2 to 9.5 feet (2.5–2.9 meters) in diameter and is about 5.2 feet thick (1.6 meters). If extracted and erected, the combined elements would stand some 19.7 feet high (6 meters), over 3 feet (0.9 meters) taller than the imposing House of Taga structure.

Each almost fully shaped structural component is isolated by a vertical-walled trench, more than 3 feet (0.9 meters) deep and wide and excavated into the limestone bedrock. One quarry pit is accessed by well-carved steps leading into it and another via footholds pecked into the wall. Cutting striations on the pit walls suggest that the stones were carved from the surrounding bedrock, likely with basalt adzes (Pantaleo et al. 1996, April 2005). Fire may have also been used to make the coral limestone easier to quarry (Hornbostel 1924–1925, 1926, 1935; Spoehr 1957).

Along one side of each pit the bank is cut away to form a lowered ramp, probably intended to aid in removing the stones. Extraction may have been intended through a process of levering and gradually backfilling with sediments and rocks to raise the giant stone

out of the pit, as exemplified by one of the As Nieves capstones resting on the surface. Island oral histories relate that spirits of the ancient ones, the taotaomo'na, carried the latte components to their respective village sites. That the Chamorro people possessed the technology to raise and transport massively heavy stones is demonstrated by the House of Taga, the columns and capstones of which were hauled from the quarry site for a mile (1.6 kilometers) to their final destination. How this extraordinary feat was accomplished is unknown.

The As Nieves megaliths may have been destined for assembly of a huge latte structure in the inland villages of Gampapa or Chugai some 0.8 miles (1.3 kilometers) distant. The nearest coastal setting, where the majority of latte villages are found, is 1.2 miles (1.9 kilometers) away and detached from the plateau by a 196-foot (60-meter) sheer escarpment. However, preliminary geological investigations suggest As Nieves is not the source of the latte currently in these inland villages (Siegrist 1996, 16). Quarry sites spatially separate from latte structures seem to be rare, suggesting that in many cases the stone was quarried or collected close to where the pillars were erected. Many latte sites had associated outcrops of coral limestone, which could have provided most of the stone needed, although many coastal limestone shelves that may have served as quarries are now silted over.

Oral histories and other evidence suggest possible reasons why the As Nieves Quarry was abandoned and the stones were left in place. While most stories describe both sites as associated with Chief Taga, one story suggests the sites resulted from competition between different high-ranking chiefs of Tinian and Rota whose final battle interrupted the completion of the As Nieves latte (Masga, pers. comm., 1994 in Pantaleo et al. 1996, 20). This story may indicate the emergence of powerful chiefs competing for dominance over all the Mariana Islands during the 16th and 17th centuries. Other factors may have contributed to the site's abandonment. Limited tensile strength due to the poorly cemented and inherently weak limestone may have prevented

moving the massive stones without breakage. Work may have stopped due to drought or famine. Introduced diseases, warfare, and other associated stressors related to Spanish colonization may have also forced the people to leave the work unfinished.

Dugi Archeological Site

Dugi is a latte period settlement located atop the northeast perimeter of the Sinapalo Plateau. The settlement is close to the edge of the plateau above the rocky coast of Måya and At Måtmos, some 0.3 miles (0.5 kilometers) to the north.

Dugi consists of between 15 and 23 distinct latte sets within an area of about 25 acres (10 hectares) (Gordon et al. 1980, 14; Butler 1997, 39). Artifact scatters, stone mortars, and soil/midden mounds are scattered throughout the site. The latte components are substantially sized and well-crafted. Fourteen of Dugi's latte sets are differentiated by size into two categories: small, represented by ten 4-pair latte sets, and large, represented by four 5-pair sets (Craib 1990a, 9-7). The four 5-pair sets are all comparable in area and pillar height.

The latte sets are arranged in two parallel rows, approximately 240 feet (73.1 meters) apart, paralleling the east-west coastline. The structures built from smaller stones are oriented around the large latte sets (Gordon et al. 1980, 14-15). One of the 5-pair sets is located near the middle of the seaward alignment of latte sets (Craib 1990a, 9-7). As in many latte clusters, Dugi's large latte sets are equidistantly spaced, with the distance between one 5-pair set to another consistently measuring about 65 feet (19.8 meters) (Craib 1990a, 9-12). Due to the parallel alignment with the coastline and the regular spacing, Craib (1990a, 9-7) considers Dugi the "classic" model of a latte village. According to the 1985 National Register nomination:

Dugi's location falls well outside of the optimal environmental zone, lacking both access to the ocean and fertile soil. It is possible that Dugi may represent a relatively late latte period settlement resulting from population pressure or warfare. It is

also possible that Dugi may have been a low ranking village whose inhabitants were forced to reside in a less than desirable environment because of status or perhaps the location was chosen with defensive considerations in mind (NPS 1985).

Gampapa Latte Village

The Gampapa site is a dispersed and disturbed inland concentration of late latte period resources located on the far eastern edge of the Sinapalo Plateau. The 25-acre (10-hectare) site may have been a village complex or more likely a loosely populated area with latte habitation sites spread across the landscape. It contains approximately 33 individually identified archeological sites including 33 latte sets, 55 charcoal-stained soil mounds, burials, several lusong, artifact scatters, and possibly a quarry (Pantaleo 1996). Photographs of several Gampapa latte sets display carefully fashioned *tasa* and *haligi* of considerable girth.

Gampapa occupies an area of highly productive soils and may have been an agricultural production zone during the latte period. The area's favorable soil quality also resulted in considerable disturbance to the site during Japanese period sugarcane cultivation and from more recent farming. During latte period settlement, those inhabiting Gampapa could have productively cultivated the surrounding terrain. The resulting produce could have been traded for needed marine resources with the closest potential trading partner being at As Dudo, a large latte settlement about 0.75 miles (1.2 kilometers) east, on the marginal landscape of Rota's east coast (Butler 1997).

A comprehensive description of the Gampapa settlement is lacking (Pantaleo et al. 1996). Butler provides an analysis of the available information:

The sites in the Gampapa valley may comprise a single large, sprawling village extending over 1200 m, but there are small clusters within this distribution. Settlement is concentrated at the eastern opening of the valley near the edge of the plateau, and further west where sites exist in two parallel rows along opposite sides

of the valley. This latter area resembles the arrangement at Dugi (Butler 1997, 40).

A geological assessment of the source of Gampapa's latte revealed they were manufactured from local Ponia or Mariana limestone formations, both of which include a high frequency of rhodoliths (Siegrist 1996). As Mátmos, on Rota's northeast coast, is the only known limestone facies (or body of rock) in the Mariana Island chain containing an equivalent concentration of rhodoliths. Neither of the nearby potential stone sources, the Gampapa fault scarp and the As Nieves Quarry, contain rhodoliths. This suggests that some of the latte in inland Rota were transported from quarries located in more distant areas of the island, including coastal locations.

Airport Property Latte Resources

Archeological resources, including latte sets, have also been identified within and north of the airport property on the Sinapalo Plateau. These resources, including the Mua Latte Sets, As Luriano Latte Set, and one disturbed set are registered with the Rota Historic Preservation Office (Moore and Hunter-Anderson 1995). Additional research is needed to provide descriptive information about these resources.

ROCK ART SITES

Rock art has been documented in large limestone caves and rock shelters on all the major Mariana Islands. The rock art is principally composed of pictographs with pigments made from limestone, charcoal, and iron-rich soils. Petroglyphs are occasionally found interspersed among the pictographs. The pictographs range from a couple of inches to a foot high (5 centimeters to 0.3 meters). They include anthropomorphic and zoomorphic forms and motifs composed of lines, squares, circles, and dots. Recognizable images include human stick figures (many missing heads or limbs), turtles, fish, geckos or other lizards, birds, handprints, and canoes with human passengers. It is unclear when the rock art was made. The only radiocarbon dated rock art in the Marianas is from Guam and was dated to the pre-latte period range of AD 590 to 666. It is speculated that much of

the rock art was of religious and ceremonial significance, possibly associated with burial practices and ancestor worship (Russell 1998, Cabrera and Tudela 2006, Cabrera 2012).

On Rota, the Chugai Cave, Sagua Gahga Cave, and Koridot Cave are set on the terraces overlooking Rota's southeast coast. Chugai Cave is close to the rim of the plateau, immediately above the second terrace inland (west) of Puntan As Fani. Close to the Chugai Cave, the Sagua Gahga and Koridot Caves are located within the extent of the East and Southeast Coast Archeological Sites area within the I'Chenchon Park Wildlife Conservation Area on the coastal terraces.

Chugai Cave

The 187-foot-long (57 meters) Chugai Cave (or Chugai Pictograph Cave) is the largest and most extensive of the rock art caves on Rota. Chugai Cave is accessed via a trail that descends about 655 feet (approximately 100 meters) downhill from the Japanese narrow-gauge railroad bed on Gampapa Ridge to stone steps that then lead down the cave passage to the opening. These steps presumably date to the World War II occupation (Butler 1997, 167). The cave's estimated floor area is 3,870 square feet (359.5 square meters). No other major pre-latte or latte period sites have been identified in the immediate vicinity or on the terrace below the cave; the closest documented clusters of latte sets on the plateau are at Chugai or Gampapa some 1,000 feet (304.8 meters) to the west.

Chugai Cave has approximately 90 pictographs including black and grey motifs executed from what are likely charcoal-based pigments. The majority of images are on the cave's south wall. As in other Mariana Island pictograph caves, the motifs were drawn deep in the cave where little daylight penetrates. Most are linear or rectilinear and have a geometric or "runic" character to them, while a small number are anthropomorphic, similar to the stick figure forms in the Sagua Gahga and Koridot Caves (Butler 1997, 168). Of the few zoomorphic motifs, the most realistic are the two well-executed sea turtles, each about 1-foot-high (0.3 meters), and an over 3-foot-long (nearly 1-meter) billfish or squid (Hunter-Anderson

2012a, 50). Long vertical lines extend beneath the turtles. The sketches produced by the Rota HPO (Russell 1998) show three-pronged rake patterns affixed to either end of a line and, in one instance, at ends of crossed lines, several crossed shield-like motifs, an ellipse bisected by a horizontal line, two potential representations of birds, and a circle with multiple lines that appears to be an image of the sun.

Sagua Gahga Cave

The rock art in the 200-foot-long by 3- to 26-foot-wide (61 meters by 0.9–7.9 meters) Sagua Gahga Cave was drawn by incising or scratching the chalky cave wall, pecking into the rock, and, in one instance, painting with black pigment (Butler 1997, 86–92). Numerous arced linear scratches overlay and obscure the seemingly random and hastily executed freehand sketches (Butler 1997, 91). The forms include a diverse assortment of simple linear elements without a clear pattern. The petroglyphs occur in five loose groupings along a 20-foot (6-meter) segment of the cave’s north wall. Naturalistic carvings include two outlines of human or turtle heads, a sea turtle, what may be a palm tree, a human stick figure lacking a head, and some “fishbone” motifs. The most remarkable image is a large (approximately 1.8 feet [0.5 meters] in diameter) well-made spiral ending in a definite base or tail at the bottom. The motif is not documented elsewhere in the Marianas. Butler (1997, 86) considers it very likely that Sagua Gahga Cave contains substantial habitation deposits. The cave is located about 250 feet (76.2 meters) west of the Sagua Gahga Latte Village and could have served as a storm shelter in addition to being a habitation site.

Koridot Cave

A panel of five petroglyphs is recorded at Koridot Cave on the southeast coast, 500 feet (152.4 meters) east-northeast of the West Koridot latte site (Butler 1997, 126–128). The cave is 200 feet (61 meters) long by 13 to 26 feet wide (4–7.9 meters), with an estimated floor area of 3,600 square feet (334.5 square meters). Other than the rock art no evidence of human use of the cave has been found. The small group of well-executed petroglyphs is found on the east wall about 100 feet (30.5

meters) inside the cave from the entrance. The motifs include three anthropomorphic stick figures (pecked) and two arrow or “fishbone” glyphs (incised). Unlike many other human stick figures in Mariana Island rock art, the Koridot images retain all their limbs and display circular heads with eyes. An additional pecked arc is adjacent to the middle stick figure, but it is not clear if it was meant to be part of the stick figure or a separate image.

Payapai Cave

Payapai Cave, in the vicinity of the Alaguan Village archeological site on the southern coast of Rota, has pictographs and petroglyphs. There is no known archeological survey of this site.

Gaonan Cave (Site RT-1-641)

Gaonan Cave is a 92-foot-long and 33-foot-wide (28 by 10 meters) limestone cavern on a terrace 1,640 feet (500 meters) above and to the west of Puntan Malilok, in the area of Gaonan on the southwest coast of Rota. It was documented by Dixon in 2000 to 2001. Deep in the cave interior are pictographs assembled on six panels measuring up to 36 square feet (3.3 square meters). The motifs are mostly drawn in black pigments, with very few executed in white paint. Although a lack of proper lighting prevented thorough investigation, the noted images include “human figures, numerous geometric patterns, a large fish, and a small canoe with a sail.” The light scatter of pottery sherds and a coral pounder inside the cave’s entrance suggested to Dixon that excavation of the sediments on the cave’s floor may unearth habitation deposits (Dixon 2002).





1. [Opposite page, top] The wide sandy beach at Mochong Latte Village Complex. 2. [Opposite page, bottom] Mochong. 3. [This page, top] Måya Latte Site. 4. [This page, bottom left] Cliffs at As Måtmos. 5. [This page, bottom right] Flank margin caves in cliffs at As Måtmos. Photos: NPS.



Figure 2: Site Map of Alaguan. Numbers represent latte, straight lines indicate long axis of latte.



1. [Opposite page, top] View of Alaguan Bay. Photo: Dave Lotz. **2.** [Opposite page, bottom] Archeological site map of Alaguan, showing the arrangement of the latte parallel to the shoreline. Map: Craib 1990a, 6. **3.** [This page, top] Alaguan Latte Village Complex. Photo: Dacia Wiitala and Isaac Merson. **4.** [This page, bottom] Standing latte tasa and haligi, Alaguan Latte Village Complex. Photo: Dacia Wiitala and Isaac Merson.



1. [Top] As Nieves Quarry, with its partially excavated latte. Photo: NPS. 2. [Bottom] The House of Taga on Tinian, c. 1920s. If the As Nieves Quarry stones were standing, they would be even taller than those of the House of Taga. Photo: Hans Hornbostel, Bishop Museum Archives.



1. [Top] CNMI Historic Preservation Office staff clear vegetation from latte at Gampapa Latte Village. 2. [Bottom] Latte recently cleared at Dugi Archeological Site. Photos: NPS.





1. [Opposite page, top] Marianas Red or Redware earthenware pottery, Mochong Latte Village Complex. Photo: NPS. 2. [Opposite page, middle] Lusong, or mortar, at Gampapa Latte Village. Photo: NPS. 3. [Opposite page, bottom] Lusong at Mochong Latte Village. Photo: NPS. 4. [This page, top] Pictographs of turtles in Chugai Cave. Photo: NPS. 5. [This page, middle left] Pictograph of a billfish or squid in Chugai Cave. Photo: MARS. 6. [This page, middle right] Geometric pictographs in Chugai Cave. Photo: NPS. 7. [This page, bottom] Geometric and zoomorphic pictographs, Chugai Cave. Photo: NPS.

Resources Associated with Spanish Colonial Period

Rota's Spanish colonial period (1521–1899) sites include the Spanish colonial town layout of Songsong and architectural remnants of the Casa Real, Convento, and plaza; and isolated Spanish artifacts at coastal archeological sites. To date, archeological investigations into Rota's Spanish colonial period have not been systematically conducted.

Songsong Spanish Colonial Area

Typical of Spanish colonial town centers, Songsong's town center included a plaza surrounded by a church, convent, and a Casa Real (municipal government building). Historic properties remaining today include the foundation and remnant walls of the Casa Real, the abandoned Convento building, and the central open space plaza. The contemporary San Francisco de Borja Church is situated on the site where it is believed the Spanish church was originally located before it was destroyed during World War II.

Casa Real

Rota's Casa Real dates to approximately 1700 or possibly earlier. The original building was likely constructed by the people of Rota under Spanish direction. Although dates of construction for the ruins present today are not certain (Russell 2007, Gordon et al. 1980), the site has been described as one of the most important Spanish-era properties in the Marianas (Madrid 2014, 49). It may contain the only surviving remnants of an 18th-century municipal building in the islands. The property is associated with significant events during the early colonial period and symbolizes the dramatic transformations in the Chamorro way of life on Rota under Spanish rule. The Casa Real served as a meeting place for community leaders and government officials and as a repository for official documents, including complaints against the government. Surviving records associated with the site document multiple instances of Chamorro protest against abuses committed by Spanish officials from the early 1700s to the late 19th century (Madrid 2014).

The ruins of the Casa Real are located north of the San Francisco de Borja Church in Songsong Village (Galván 1998, 91; Russell 2007, 56; Madrid 2014). When it was standing, the modest two-story building included a bodega on the bottom floor, a wood and thatched roof, and a stone stairway leading to the second floor. The remains present today retain elements of early Spanish vernacular architecture in the Marianas. They consist of thick, rough masonry walls of coral cobbles with signs of plaster on the interior walls, typical of the Spanish construction technique called "mampostería." The impressive front steps are also retained.

The building continued to be used during the German period and may have been altered during that time. Use continued through the early post-World War II years. The walls were protected by a thatched roof until the 1970s, when the covering was destroyed by a typhoon (Galván 1998, 91). Some of the walls were knocked over during a typhoon in the 1980s, although the wood beams that supported the roof are still present.

Convento

The Convento (parish house) is a mampostería and concrete structure that, while renovated many times, contains architectural components that may have been built around 1891. The abandoned Convento still stands, but the building is in imminent danger of collapse.

Similar to the Casa Real, it is unclear when the current Convento was constructed. Dates of construction associated with the site range from 1720 to the late 1800s (Hezel 1989, Driver 2000). The current Convento could be the final manifestation of a parish house that stood on the same location for the 200 years of the Spanish administration. The Convento of 1890 was a rectangular-shaped building with thick mampostería walls and *ifit* (*Intsia bijuga*) flooring.

The Convento remained in use until 1936, when the Japanese administration relocated the Chamorro from Songsong to Tatachog, and it is unknown how it was used during the Japanese period (Russell 2007, 56). The

Convento was damaged during World War II bombing raids but remained standing, so that with repairs it was still inhabitable by the local priest. After World War II, the Convento was used as a parish house until it was abandoned in the 1990s. At least one mampostería wall still stands and what appears to be ifit flooring is present in the rubble-strewn interior of the abandoned building.

Resources Associated with German Administration

The only identified historic site potentially associated with the German administration on Rota is the Lourdes Chapel located in Sakaya. Other potential resources associated with German administration could be the original channel for boat landings at Songsong, other remnant infrastructure, and remnant coconut palm plantations.

Lourdes Chapel

The Lourdes Chapel is a small, Catholic devotional shrine likely constructed during the German administration. It is located in the uninhabited interior area of Sakaya (Sokayo), about a mile (1.6 kilometers) inland of Tatachog Village and 2 miles (3.2 kilometers) north of Songsong. The chapel, built in honor of Our Lady of Lourdes, is still being used by the local community, and the building and grounds are well-maintained. Historical documentation of the Lourdes Chapel is limited, and an archeological survey has not been completed.

The chapel is a small, rectangular building constructed of mampostería. The water tank, adjacent to the rear of the building, may not be an original feature of the chapel (Russell 2007, 113). The chapel includes a German-style cross and has been renovated several times.

Church records indicate the chapel was constructed in 1912 by Father Corbinian Madre, a German Capuchin priest (Gordon et al. 1980, 20). However, in 1980 local informants insisted that the building actually dates to the Spanish colonial period (Gordon et al. 1980, 20). It is possible that Father Madre built the current structure on the

ruins of a Jesuit chapel, although why either the Spanish or Germans would construct a chapel far from the population center of Songsong is unknown.

Resources Associated with Japanese Period

Extant buildings, structures, and ruins associated with the Japanese period are found throughout Rota. These resources are evidence of the extensive sugar industry, mining activities, and supporting infrastructure and developments.

Nan'yō Kōhatsu Kabushiki Kaisha Sugar Mill (NKK Sugar Mill)

The NKK Sugar Mill site consists of the structural remains of a four-story sugar refining mill next to Songsong's west harbor (Jones 1980c, Cabrera 2005). Remaining on site are a long concrete and brick arched tunnel that served as a manifold to the chimney, a cylindrical structure that was the foundation for a steel chimney, three severely damaged rectangular brick structures, and miscellaneous rusted steel piping, tanks, and other equipment. Parked next to the mill is a locomotive for the narrow-gauge railroad system that hauled cane from about 7,000 acres (2,833 hectares) of sugarcane fields to the mill (Higuchi 2003).

The Japanese entrepreneur Haruji Matsue (known as the Sugar King) initiated large-scale sugarcane production on Rota in the 1930s. The mill was constructed in 1935. By 1939, Rota's sugarcane venture was deemed a failure and production ceased. In late 1940, the sugar mill was converted to a distillery for manufacturing alcohol and synthetic sake (rice-based sake diluted with distilled alcohol). Alcohol was also used as an alternative fuel source to supplement the gasoline shortage in the Japanese home islands. In late 1941, the mill/distillery ceased all production. The mill was largely demolished during the World War II bombing of Rota. Most of the damaged sections were removed in 1954 (Carrell 2009, 437). No archeological investigations of the sugar mill have been completed.

Japanese Hospital

The Japanese Hospital site consists of the damaged shell of a single-story concrete building in Songsong. The L-shaped building measures 56 feet by 74 feet (17 by 22.5 meters), with additional east and south wings. The wood-framed roof and portions of the floor no longer exist. Of the four exits, the south exit has a concrete platform and steps, which are curved in plain view. Near the south and east exits are remains of exterior toilets. In the curve of the “L” is a 10-foot (3-meter) diameter concrete water catchment area. Many of the building’s details are typical of Japanese structures built elsewhere on Rota, Tinian, and Saipan (Jones 1980b).

The building is a component of village expansion by the NKK during the mid-1930s for support of the sugarcane and mining industries. The Japanese Hospital was damaged during the World War II bombing of Songsong. It has been abandoned since that time. Currently, the structural remnants are heavily overgrown with vegetation, some of the roots of which pose a threat to the building. No archeological or historical investigations of the hospital site have been completed.

Tatachog Rectory and Chapel

The Tatachog rectory and the adjacent Catholic chapel are remnants of Japanese-period concrete buildings located in Tatachog (Tatacho, Tatachok), 2 miles (3.2 kilometers) northeast of Songsong. The two buildings were constructed in about 1936 for the Native population, which had been forcibly relocated from Songsong to the newly established village of Tatachog (Jones 1980d, Cabrera 2005).

The Japanese command established a military camp in Tatachog, inland of the village structures, in 1944 (Peck 1997, 265). The rectory may have been used as a barracks for Japanese soldiers after the death of the revered Priest Juan Pons on March 23, 1944 (Peck 1997, 241). At this time, soldiers vandalized the chapel and broke the statues of Holy Mother Nuestra Senora de Consolacion and Francisco de Borja into pieces, although they have been repaired to now stand on display in the Songsong church (Peck 1997, 241–242). The church was almost completely destroyed and

the rectory was heavily damaged during the June 1944 U.S. bombing of Tatachog. Neither building was used once the villagers moved back to Songsong after the war.

The rectory’s floor, framing, and roof have been destroyed with only the precast concrete foundation blocks and portions of the walls remaining. The two-story concrete L-shaped structure measures 45 feet by 65 feet (13.7 by 19.8 meters). Concrete stairs lead up to a concrete porch. A concrete water catchment tank is adjacent to the southeast. The building’s massive steps, regularly spaced windows, and relatively short spans are similar to Spanish-period structures, while the details used in the openings, porch columns, foundation blocks, and several other parts of the building are similar to construction during the Japanese period (Jones 1980d).

The dense jungle growth covering the remnants of the concrete church prevented thorough documentation for the National Register nomination in 1980. A partial description states that the nave walls are almost entirely destroyed, while part of the chancel and altar area remain. At the time, a concrete raised pulpit remained intact along with several notable elements, including a cross in relief on one of the fallen sections of the wall. The rectory is significant architecturally as a transitional structure, displaying building elements from the Spanish era, as well as materials and details from the Japanese period. It is one of a very few structures demonstrating the two influences (Jones 1980d). No archeological investigations of the Tatachog rectory and church have been completed.

Commissioner’s Office

The Commissioner’s Office comprises the ruins of three Japanese-period concrete buildings, one with mamposteria walls that housed the Tatachog Village commissioner from the mid-1930s until the village was abandoned in 1944 at the beginning of the U.S. invasion of the Marianas (Jones 1980a).

The Commissioner’s Office was built in the mid-1930s for the Native population, who had been forcibly relocated from

Songsong to the new village of Tatachog. The structures were occupied by the Chamorro leader of the village, or commissioner, who was appointed by and responsible to the Japanese authorities. The limited functions of the commissioner included notifying the community of laws and regulations; reporting on births, deaths, and general conditions; collecting poll taxes; and assisting with labor procurement (Jones 1980a).

The Commissioner's Office consists of the primary one-story rectangular structure, a wall structure, and what may be a shallow well to the south. The single-story building measures 25 feet by 44 feet (7.6 by 13.4 meters), opens to the north, and has an L-shaped extension attached to its southwest corner. The thick walls are constructed of mampostería. Rather than the typical lime mortar, the coral stones appear to be held in place by Portland cement. The regular arrangement of the windows is similar to Spanish-era structures. The detailing at the window openings is Japanese style, as is the cornice at the top of the structure (Jones 1980a). The lintels over the windows and doors are made of ifit (*Intsia bijuga*).

When the property was listed in the National Register of Historic Places in 1980, the north, east, and west walls of the main structure remained intact, although were noted as damaged. The original wood-framed roof has since been destroyed. The site is heavily overgrown with vegetation, some of which is damaging the structures. Like the rectory and chapel described above, the building is important as a rare surviving example of transitional Spanish-Japanese architecture, exemplifying the Spanish colonial-period construction technique of mampostería combined with Japanese details.

Japanese Period

Archeological Resources

Archeological resources from the Japanese period are extensive and found throughout the island. They include resources from the large-scale sugarcane industry, mining activity, supporting infrastructure, associated residential complexes for workers in the towns and uplands of the Sabana and Sinapalo Plateau, and limited use areas. Archeological

resources include, but are not limited to, railroad lines and stations, a locomotive near the Rota Resort, cisterns, water catchments, wells, concrete foundations, concrete basins and baths, concrete latrines, charcoal and sugarcane kilns, concrete walls, and a pier on Sasanhaya Bay. Associated artifacts include glassware, ceramics, and metal objects.

Resources Associated with World War II

Japanese military resources and World War II-era sites are found throughout the island. Rota's coastlines and limestone cliffs are replete with World War II cultural properties that represent Japanese defense of and survival on an island that was bypassed during the conflict. These resources are also associated with the experiences of Chamorro and Carolinian residents who lived through U.S. aerial bombardments and contributed to building Japanese defenses. Resources include tunnels, trenches, modified caves, and pillboxes along the potential landing beaches and inland along the cliff lines (Denfeld 1997, 129). War materiel consist of such items as a Japanese prime mover; unexploded ordnance; coastal defense, antiaircraft, and mountain guns with several still in place (Denfeld 1997, 129; Peck 1997, 235); and aircraft and weapons debris. Submerged wrecks of aircraft and auxiliary submarine chasers are located in offshore waters (Carrell 2009; see Appendix E: Marine and Submerged Resources). A concrete Japanese air operations and control tower at the airfield has recently collapsed. The small, simple refuge shelters that housed the civilian population and the complicated military shelter complexes are common sites within Rota's more accessible limestone cliffs.

The World War II Japanese defensive complexes were large-scale military complexes constructed to extract a high price from a potential U.S. invasion of Rota. Constructed in 1944 and 1945, these complexes were built into the limestone escarpments in the island's interior to provide in-depth defense for the Japanese soldiers occupying Rota. As noted in the "Rota in World War II" section, the defense-in-depth military strategy focuses on

delaying rather than preventing the invasion of an attacking force and is characterized by layers of defensive positions rather than a single defensive front line. This has the effect of prolonging the invasion and increasing casualties, as the attacker advances through lightly defended front lines and becomes spread out and exposed to potential counter attacks. After the U.S. invasions of Guam and Saipan in 1944, the Japanese military shifted their strategy from almost exclusively defending beaches to establishing layered positions within the interior of islands like Rota. In the event the U.S. were to successfully make landfall and advance on the island, Japanese troops could fall back to inland positions and wage guerilla warfare. This change in Japanese military strategy significantly delayed the U.S. pacification of Japanese-held islands captured in the Pacific and resulted in an increased loss of life (Mohlman et al. 2011, 162).

The two most prominent resources representing inland Japanese defensive complexes are the extensive defenses at Ginalagan (62 acres/25 hectares) and Chudang Palii (31 acres/12.5 hectares), which provide evidence of the Japanese inland defensive strategy. Contour maps indicate that the defenses at Ginalagan overlook the airfield on the central island plateau, while the defenses at Chudang Palii overlook and cover the approaches to the Ginalagan complex. These strong positions would have allowed the Japanese defenders to continue to resist American forces even after the Americans secured the beachheads. Several other World War II sites are located throughout the island at caves and rock shelters (Chugai Cave, Tonga Cave) and along the coastlines (Isang Point, Japanese Coastal Defense Gun), and include other military features (constructed tunnels and complexes at As Manila and a large hole at the Pit). The following list includes the documented larger sites.

The description below is not intended to be a complete inventory of all World War II archeological features. Additional known and unknown World War II sites along the north coast, in Songsong, and at other locations have not been well-documented.

Ginalagan World War II Japanese Defensive Complex

Ginalagan is the name given to the limestone cliff line that forms the southern boundary of the northern plateau of Sinapalo. The Japanese defensive complex is located on the cliff line on the northeast side of Mount Sabana and is enveloped by limestone forest. The position has a clear sight line to the airfield at Sinapalo. The complex is 1.5 miles (2.4 kilometers) east of the only other recorded Japanese defensive complex on Rota at Chudang Palii. Only 62 acres (25 hectares) of the Ginalagan complex have been documented, with the defensive fortifications continuing beyond the surveyed area (Peck 1984, Moore and Hunter-Anderson 1988).

The surveyed portion of the Ginalagan site is composed of 13 property types in 9 military complexes and 9 isolated features (Moore and Hunter-Anderson 1988). The more than 100 individual limestone, concrete, and earth features include 1,026 linear feet of terraces (312.7 meters), 508 linear feet of parapets (154.8 meters), caves (39), enclosures (27), bulwarks (11), sets of staircases (6), pillboxes (4), water tanks (4), revetments (4), depressions/pits (3), concrete slabs (3), vehicles (2), and a stove base. Caves up to 236 feet long (71.9 meters) and 11.5 feet high (3.5 meters) were hand-excavated into the limestone cliffs.

The rich collection of historic artifacts includes live and spent ammunition, tools (rakes, shovels, picks, pry bars), vehicles, mechanical equipment (motors, generators, pumps, pipes, batteries, wire), and domestic items (metal and ceramic pots, dishes, medicine jars, glass bottles, soap dishes, shoes, sinks, toilets).

The features and artifacts present suggest certain areas provided mechanical support for the rest of the complex, for example, generating electricity and conveying water (Moore and Hunter-Anderson 1988). Other portions of the complex contain features suggesting living quarters, gun positions, and storage for ammunition and supplies. A noteworthy difference in the Ginalagan cave complex compared with other defensive cave

complexes is the presence of a path bordered by a concrete-lined trench, fronted by a stone firing and blast wall extending along the front of the caves. The wall provided protection for the occupants but also served as a water-collecting device to prevent the critical water shortages suffered by soldiers in similar situations (Denfeld 1992, 41). At Ginalagan, the concrete-lined trench served to collect water that dripped off the overhanging limestone. Pipes diverted the water into concrete storage cisterns also located behind the parapet and into secondary storage tanks within the caves.

Chudang Palii World War II Japanese Defensive Complex

Chudang Palii encompasses an area of approximately 31 acres (12.5 hectares) in the Mananana Region of Rota. It extends for over 0.6 miles (1 kilometer) along the base of Chudang Palii, a prominent limestone bluff on the north side of Mount Sabana (Peck 1997, Swift et al. 1992, Mohlman et al. 2011). The complex is located between 1,000 and 1,300 feet (304.8–396.2 meters) above sea level to provide aerial camouflage, ground defensive positions, and excellent views of the north-central Rota shoreline.

Approximately 4,600 feet long (1,402 meters) and 425 feet wide (129.5 meters), the Chudang Palii Defensive Complex is composed of more than 130 features organized into 11 spatially discrete areas and 13 isolated features. Sixteen property types were identified, including walls (27), caves and tunnels (27), enclosures (13), terraces (10), stairs (7), depressions/pits (4), a bulwark, and a parapet. Feature types found at Chudang Palii also include overhangs (9), anti-aircraft guns (5; two Type 10 120-mm guns and three Type 96 25-mm machine cannon), ramps (5), trenches (4), berms (2), platforms (2), a chamber, and a rock shelter. Construction techniques are the same as at Ginalagan, with the use of dry-laid limestone rock walls and excavation of caves and tunnels into the limestone cliff. Compared to Ginalagan, however, the fortifications at Chudang Palii are composed almost entirely of local materials: the lack of concrete building materials at this site may reflect a later period of the war when

imported resources were scarce (Mohlman et al. 2011, 167).

Chudang Palii's artifact assemblage is considerably smaller and less diverse than that found at Ginalagan. The assemblage includes numerous glass sake/beer bottles, spent ammunition, rice bowls, pipes, corrugated tin, the head of a pickax, a tea pot, and a naval insignia from a uniform.

North Coast Tunnel Complex

This tunnel complex has not been formally recorded by archeologists, and therefore there is little documentation about this site. It is located near the Airport Road on Rota's north coast, near the intersection with the north coast road. The complex includes an extensive system of tunnels, holes, and a spiral staircase. Part of the tunnel complex traverses under the road (Cook 2010).

OTHER WORLD WAR II ARMAMENTS, SHELTERS, AND FEATURES

Tonga Cave

Tonga (Taga) Cave, a prominent landmark, is a large cave at the base of the cliff line adjacent to northern area of Songsong. The cave, a remnant of a flank margin cave, measures 215 feet long and about 100 feet wide (65.5 by 30.5 meters) and is oriented north-south. The cave consists of a large open chamber with a gaping entrance on the west side and a second, more commonly used high entrance off its southwest corner (Keel et al. 2005, 66).

During the strafing and bombing of Rota in 1944 and 1945, the cave served as a Japanese field hospital. The concrete and stone steps at Tonga Cave's southeast entrance, as well as numerous concrete slabs, steps, and a small shrine inside the cave may be remnants of its earlier use as a refuge cave or may reflect its World War II use.

Outside the east entrance are the structural remnants of a Shinto shrine (*jinja*), constructed in the 1930s, that now supports a small Catholic shrine. The shrine is associated with the state-sponsored nationalist religion known as State Shinto (Shuster 1982). Intended to promote a shared sense of special

destiny for Japan, State Shinto developed, in part, as a system of government patronage for the establishment of shrines across the empire. Special attention was given to distant colonies where civilian populations consisted largely of other colonized peoples including Okinawans, Koreans, and Native islanders. These shrines emphasized the divine origins of the emperor and were meant to instill devotion to the Japanese national mission (Hardacre 1989, Shuster 1982).

Several World War II-period tunnel entrances are located around the shrine, while above Tonga Cave are two Japanese gun emplacements made of coral. About 230 feet (70 meters) southeast of Tonga Cave are the caves of Ganas and Nanong Kastiyu that are connected with a constructed tunnel (Rogers and Legge 1992). Both of these caves have terraces held in place by stone walls that may have been constructed during World War II.

No archeological investigations of Tonga Cave have been completed.

Isang Point Lookout

Isang Point Lookout, also known as Songsong Village Overlook, is a concrete sitting area on top of the high cliff north of Songsong. The lookout provides a commanding view of the isthmus, the village, and the surrounding ocean. Similar to As Manila, Isang Point could have been used since the pre-colonial period as a lookout and a long-distance communication point. The structural remains of a Japanese surveillance point are in the immediate area.

As Manila

As Manila is the place name for the high point (1,612 feet [491.3 meters] above sea level) on the north edge of the Sabana that is identified by a tall rock outcrop. Adjacent to the rock outcrop is a Peace Memorial dedicated to the Japanese who lost their lives on Rota during World War II. The memorial was built in 1973 by the citizens of Japan. As Manila means “the place of the flame, illumination, light” in Chamorro. The name could date to pre-colonial use of As Manila as a surveillance point or for inter- and intra-island communication via smoke signals or bonfires.

When the Imperial Japanese Army arrived on Rota in 1944, Major Imagawa established his headquarters in the Sabana area of As Manila (Manira Yama in Japanese). He stationed the 1st Battalion, 10th Independent Regiment at As Manila, and they began to construct defensive tunnels in the caves in the escarpment below (Denfeld 1997, 129). The exact location of the Japanese command post at As Manila is unknown, as no archeological investigations have been conducted on the Sabana.

140mm Japanese Coastal Defense Gun

A 140-millimeter Type 3 (short) coastal defense cannon remains in its reinforced concrete casemate in the Ilekk cliff line above Sasanhaya Bay. Four nearby modified caves, one with a concrete lining, appear to have been modified in preparation to hold additional guns to form a battery.

The 140-millimeter (5.5-inch) pedestal-mounted naval gun overlooks the East Harbor anchorage. With an effective range of about 10.5 miles (16.9 kilometers), these guns, especially the Type 3, were commonly employed for use against ships and landing craft approaching the coast (Denfeld 1992, 56). The gun is in a casemate built into the cliffside and takes advantage of the terrain for camouflage; natural stones on the roof of the casemate break up the flat structural appearance. The gun was intended to protect East Harbor from seaborne attack.

The casemate, which is semi-circular in shape, measures 25 feet at its widest point and 22 feet deep (7.6 by 6.7 meters). The defense gun, which was forged in Japan in 1925, sits atop a metal pedestal that is anchored into the concrete flooring of the casemate by large bolts (Russell 1983).

The Pit

The Pit is a large vertical hole in the limestone of Sakaya (Sokayo), located about a mile and a half (2.4 kilometers) inland of Tatachog Village. Rota’s inhabitants tell how it was intended as a mass gravesite for Chamorro executed by Japanese military forces if U.S. forces invaded the island during World War II. Similar pits were reportedly excavated for the

same purpose in the Uyulan-Hyulo area, on the Sabana (Peck 1997, 261).

The Pit is 7 feet (2.1 meters) in diameter and about as deep “as a telephone pole” (Peck 1997, 260). It was hand-chiseled by Chamorro civilians under the supervision of Japanese military officers. Despite being told by the Japanese soldiers that the hole was being dug to locate the fresh-water lens below, the Chamorro residents knew there was “no water in these dry rocks” (Peck 1997, 261). In 1944, a Japanese soldier and cook, Katashi, told Manuel M. Ogo in secret the true nature of the Pit:

When the Americans attack us, this is what will happen: all Tatachog work crews and all their families from up the mountain will be called together to meet at the Pit. This is when you will all be shot and thrown into the Pit. Maybe I’ll be one of them who has to do the shooting. That’s what the Pit is for. That’s the craziness that our officers have, and what they talk about when they are alone and scared. They want you out of the way when the fighting starts, and they don’t want anyone left on the island if they’re all killed or must sacrifice themselves (Peck 1997, 264–265).

The Pit was excavated in the summer of 1944, after the frequent air raids on Rota had begun and a U.S. invasion of the island was expected to occur any day. During this terrifying period when Japanese loss appeared inevitable and invasion was at hand, Chamorro and Micronesians on other Japanese-held islands were victims of appalling atrocities perpetrated by Japanese military forces (Blaz 2008, Tanaka 2010).

Airfield

Constructed in 1944, the existing airfield was part of the Japanese military build-up on the island. World War II-era remnants include the alignment of the original airstrip, trenches, water catchments, airplane and bomb parts, concrete foundations, rock walls, and related artifacts. These features were documented in 1995 prior to construction work at the airfield.

It is unknown at this time what archeological features and artifacts still exist within the airfield area. An important and once-prominent structure is an air operations and control tower, which has recently collapsed.

Chugai Cave

In addition to the precontact pictographs, Chugai Cave also contains an extensive historic occupation component that dates to the World War II period (Butler 1997, 184–188). The short staircase cut into the bedrock and built from stacked rock on the canyon’s south wall is thought to have been constructed by those using the cave for refuge during bombing attacks. Along the cave’s south wall are numerous wood planks, poles, square-cut blocks, and shaped and notched beams representing at least six raised wooden platforms that likely served as family sleeping surfaces. Against the opposing cave wall is a small, rectangular enclosure constructed of poles and sticks that appears to be a poultry cage or a pen for goats kept for milking. Outside the cave, there is also a small, low, U-shaped rock wall interpreted as a protected position for a lookout or sentry (Butler 1997, 187). The associated artifacts include containers and cooking gear such as beer, soy sauce, and ink bottles; aluminum rice cookers; concrete water basins; enamelware and porcelain bowls; and braziers.

These historic remains indicate Chugai Cave was one of many caves on Rota that sheltered the island’s Native and Asian civilian and military population from aerial attacks during the last 15 months of World War II in the Pacific. The quantity of wooden platforms, the lack of military features, and the presence of domestic debris suggest an estimated 30 to 50 civilians sought refuge in Chugai Cave (Butler 1997, 188).

East and Southeast Coast Archeological Sites

Along the southeast coast in the I’Chenchon Park Wildlife Conservation Area at Fanasgan is a complex of caves, shelters, terraces, and rock walls that appears to have been used by both the Japanese military and the civilian population as shelter between June 1944 and September 1945 (Butler 1997).

Resources Associated with the U.S. Naval Administration and Trust Territory of the Pacific Islands

The rebuilding of Songsong, the airport, and roads were part of the American military's efforts to re-establish Rota's infrastructure immediately after the surrender and retreat of Japanese forces. Construction occurred during this period, though it is not researched as part of this study. No specific resources associated with this period were identified as part of this study.



Resources Associated with Commonwealth of the Northern Mariana Islands

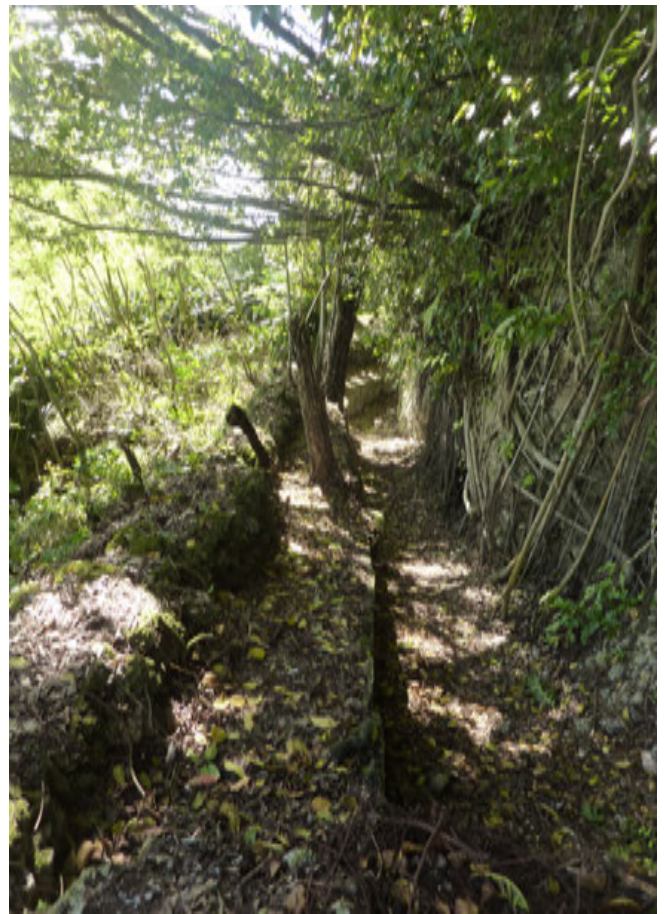
Resources associated with the CNMI are less than 50 years old, and other than the Sabana Peace Memorial, were not identified as part of this study.



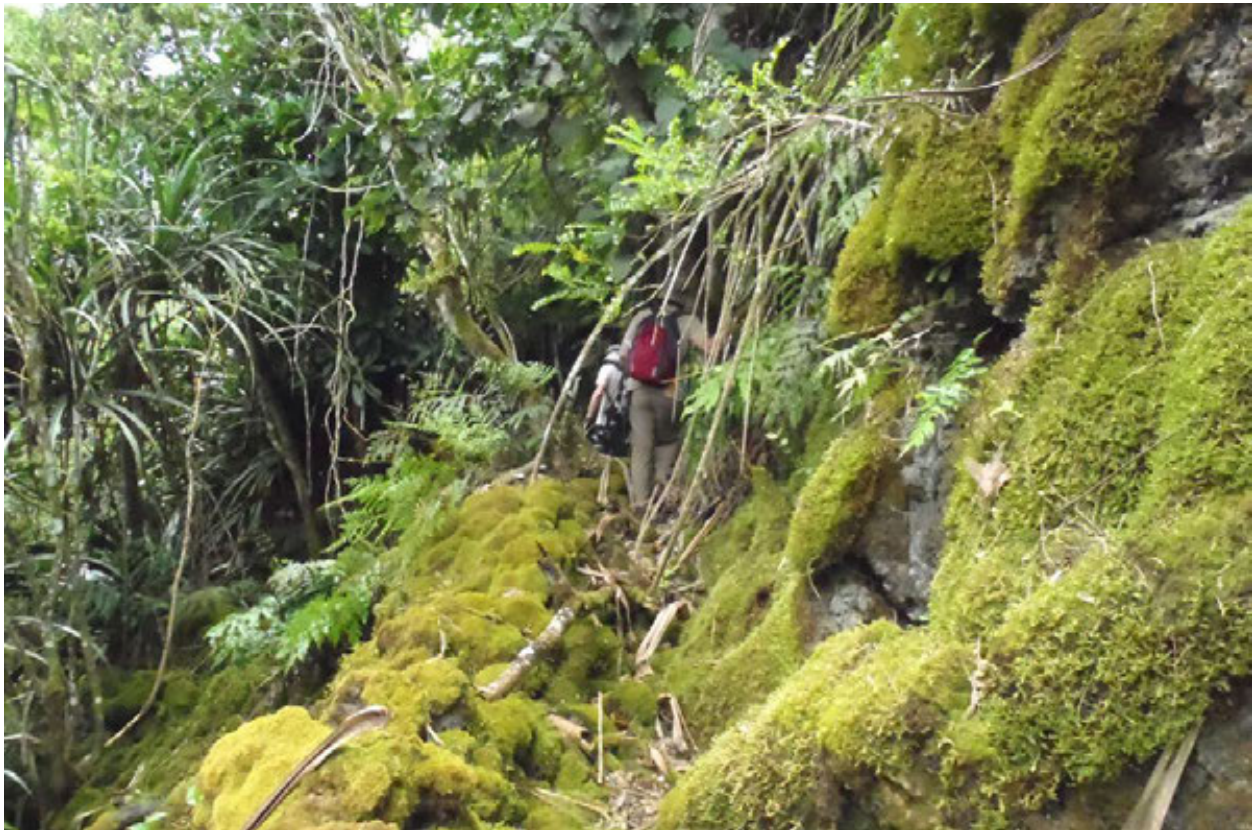


1. [Opposite page, top] The Songsong Convento was abandoned in the 1990s but may stand on the site of a parish house used during the Spanish colonial period. 2. [Opposite page, middle] Remaining mampostería wall at the Convento. 3. [Opposite page, bottom] The ruins of the Casa Real in Songsong, used during the Spanish colonial period for government meetings and for housing government records. 4. [This page, top] View of Songsong and Taipingot Peninsula (Wedding Cake) from Isang Point Lookout. 5. [This page, bottom] Lourdes Chapel. Photos: NPS.





1. [Opposite page, top] The Nan'yō Kōhatsu Kabushiki Kaisha (or NKK) Sugar Mill **2.** [Opposite page, middle] The NKK Sugar Mill with the Japanese locomotive in the foreground. **3.** [Opposite page, bottom left] The remains of the Japanese Hospital, damaged during the World War II bombing of Songsong. **4.** [Opposite page, bottom right] The ruins of the Tatachog rectory, from the Japanese period. **5.** [This page, top] View of the cliffs of the Ginalagan Japanese Defensive Complex from below. **6.** [This page, bottom left] An example of the concrete fortifications built into the limestone escarpment at Ginalagan. **7.** [This page, bottom right] A view of the terracing at Ginalagan. Photos: NPS.



1. [Top] Dry-laid limestone walls, now covered in moss, form the terracing at the Chudang Palii Japanese Defensive Complex. **2.** [Bottom] One of the anti-aircraft guns that is still in place at Chudang Palii. Photos: Dave Lotz.



1. [Top] A 140-millimeter cannon remains in its reinforced concrete casemate in the Ilek cliffline above Sasanhaya Bay. 2. and 3. [Bottom left and right] Tonga Cave in Songsong, used as a field hospital and shrine by the Japanese during World War II. Photos: NPS.



CNMI Historic Preservation Office staff undertake a site visit to the Chudang Palii Japanese Defensive Complex. Photo: NPS.

RESOURCE SIGNIFICANCE





Partially excavated latte in the As Nieves Quarry. Photo: NPS.

CHAPTER 3: RESOURCE SIGNIFICANCE

This chapter describes the National Park Service's analysis of nationally significant resources within the study area.

NATIONAL SIGNIFICANCE CRITERIA

Study areas are evaluated for national significance by applying three sets of criteria: national natural landmark criteria, national historic landmark criteria, and special resource study criteria. National Park Service (NPS) guidelines for special resource studies recommend that natural resources be evaluated by applying the national natural landmarks criteria for national significance and that cultural resources be evaluated by applying the national historic landmarks criteria for national significance. Under §1.3.1 of *NPS Management Policies 2006*, a proposed addition to the national park system must also meet four additional National Park Service special resource study criteria. These criteria state that a resource is nationally significant if it meets all of the following conditions:

- It is an outstanding example of a particular type of resource.
- It possesses exceptional value or quality in illustrating or interpreting the natural or cultural themes of our nation's heritage.
- It offers superlative opportunities for public enjoyment or for scientific study.
- It retains a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource.

National Park Service professionals, in consultation with subject matter experts, scholars, and scientists, determine whether a resource is nationally significant. This chapter describes the results of that analysis.

NATIONAL SIGNIFICANCE—NATURAL RESOURCES

For natural resources, the NPS evaluates national significance by applying the national natural landmark (NNL) criteria contained in 36 CFR 62 and summarized below. The findings of this analysis relate only to the determination of the area's national significance and do not confer NNL designation. While it relies on the same criteria to determine national significance, the process for NNL designation is distinct from the special resource study process.

National significance for natural resources describes an area that is one of the best examples of a biological or geological feature known to be characteristic of a given biophysiological province (also known as a natural region). The NPS uses the following primary criteria to evaluate the relative quality of areas under consideration:

- **Illustrative character:** The area exhibits a combination of well-developed components that are recognized in the appropriate scientific literature as characteristic of a particular type of natural feature. It should be unusually illustrative, rather than merely statistically representative.
- **Present condition:** The area has been less disturbed by humans than other areas.

In addition to these primary criteria, the following secondary criteria are also considered as supporting evidence or as a way to distinguish between sites that rank similarly under the primary criteria:

- **Diversity:** In addition to its primary natural feature, the area contains high-quality examples of other biological and/or geological features or processes.

- **Rarity:** In addition to its primary natural feature, the area contains rare geological or paleontological features or biological communities or provides high-quality habitat for one or more rare, threatened, or endangered species.
- **Value for science and education:** The area contains known or potential information as a result of its association with significant scientific discovery, concept, or exceptionally extensive and long-term record of on-site research and therefore offers unusual opportunities for public interpretation of the natural history of the United States.

The biophysiological provinces used by the NNL program were defined by the NPS in 1972 based on a modification of Fenneman's physiographic divisions (1928). These provinces are focused within the continental United States, Alaska, Hawai'i, Puerto Rico, U.S. Virgin Islands, and American Territory Islands of the Pacific (Guam and American Samoa), and do not extend across international boundaries. When evaluating a site for possible NNL designation, national significance evaluations do not consider whether a superior example exists in a neighboring country.

A review of recent literature indicates that there is no single agreed-upon division of the Pacific Islands into provinces, although Micronesia is frequently listed as a province (Mueller-Dombois and Fosberg 1998). For the purposes of this evaluation, the NPS has defined the biophysiological province as the Mariana Islands, including both Guam and the Commonwealth of the Northern Mariana Islands (CNMI).

If a resource is already designated as an NNL, the national significance criteria are met without further analysis being required. There are no existing NNLs on Rota. Four NNL sites exist on the Island of Guam, all of which were designated in 1972 for their geological resources: Facpi Point, Fouha Point, Mount Lamlam, and Puntan Dos Amantes. There are also no pending NNL nominations

for natural resources on Rota, nor were any potential NNLs previously identified on the island. A 1982 "Natural Landmarks Survey of the Islands of the Pacific," completed for the National Park Service (Abbott et al.), identified the Northern Mariana Islands as a potential landmark site, but the proposed area does not include the island of Rota.

Primary Criteria: Illustrative Character

Tropical limestone forest is found in tropical regions where limestone substrate is present. The forest in the Marianas is distinct from limestone forests elsewhere in the world. Due to the geographic isolation of the islands, a unique species composition has arisen. Many of the species found in the Mariana limestone forests are endemic, meaning they are found nowhere else in the world.

Rota has one of the largest acreages of native limestone forest in the Marianas, and the proportion of the island in limestone forest is much higher on Rota than on any other Mariana island. According to U.S. Forest Service (USFS) vegetation mapping based on satellite imagery, there are 10,943 acres/4,428 hectares of limestone forest on Rota (52% of the total island area), 17,600 acres/7,122 hectares on Guam (13% of the island area), 1,355 acres/548 hectares on Tinian (5%), and 255 acres/103 hectares on Saipan (less than 1%) (USFS 2006). See Map 3: Limestone Forest Resources.

Rota also contains the most intact limestone forest ecosystem in the Marianas. Rota and Guam both contain large areas of diverse forest, whereas Saipan and Tinian have very little forest remaining. The forest ecosystem on Rota has also not been impacted by the brown tree snake, which was accidentally introduced to Guam after World War II. On Guam, the snake has almost completely eliminated forest birds, which evolved in an ecosystem without this type of predator (Rodda and Savidge 2007). The lack of birds has ecosystem-wide consequences, including alterations to other levels of the food web (Rogers et al. 2012), reduced dispersal and germination of seeds (Caves et al. 2013, Wandrag et al. 2017,

Rogers et al. 2017), and potentially reduced regeneration of degraded forest (Caves et al. 2013). These impacts, particularly the reductions of seed dispersal and germination, will continue to alter the structure and species composition of the forest on Guam as time goes on.

A large number of species that are known to be invasive on other islands in the Mariana chain have not yet been found on Rota. As of the year 2000, 83 invasive plant species were found on Guam, Saipan, and/or Tinian that were not yet found on Rota (Space et al. 2000). Resource managers in the CNMI continue to report that Rota has many fewer invasive species problems than the other islands (Willsey, pers. comm., 2017; Berry and Chagnon, pers. comm., 2016). Intact limestone forests, like those on Rota, are also somewhat resistant to plant invasion because nonnative plants do not compete well with native limestone forest species (Rogers and Gawel, pers. comm., 2016).

The physical structure of the forest on Rota is also the most intact of the Mariana Islands. Compared to forests on Guam, forests on Rota have a denser physical structure with more understory and tall trees (Gawel 2012; Chagnon and Uchoa, pers. comm. 2016; Rogers and Gawel, pers. comm., 2016). In contrast, the forest understory on Guam has been reduced by deer herbivory and pig rooting to a greater degree than on Rota. On Aguiguan, the forest has been heavily impacted by goat herbivory (Esselstyn et al. 2003). Saipan's and Tinian's limestone forests only exist in small patches (Falanruw et al. 1989). While the structure of much of the forested area on Rota has become drier and more open due to agriculture, deer herbivory, and typhoons (Zarones et al. 2013), it remains the most intact example of limestone forest in the Marianas.

Primary Criteria: Present Condition

Rota's limestone forests exhibit less disturbance from human activities than those of the other large Mariana Islands. Rota was less intensively developed for sugarcane than Tinian and Saipan during the Japanese colonial

period. During World War II, the island escaped much of the war-related destruction experienced by Guam, Saipan, and Tinian. Rota was also never invaded by U.S. forces, though it was subjected to aerial bombardment (Engbring et al. 1986 in USFWS 2007a). In 1960, Fosberg observed that intact limestone forest existed only in patches on Saipan and Tinian. On Guam, much of the island was forested, but as a mosaic of varied small patches, most of them second-growth. Little undisturbed primary forest remained (Fosberg 1960). On Rota, in contrast, estimates based on aerial photography put the limestone forest coverage at between 25% and 50% (Fosberg 1960, Plentovich et al. 2005).

Limestone forest cover on Rota increased to an estimated 60% by 1977, declining to 52% as of 2006 (Falanruw et al. 1989, USFS 2006). Intact large-tree limestone forest continues to exist on steeper terrain, coastal cliffs, and portions of the Sabana, making up about 20% of the island. This includes the rare "cloud forests" located at higher elevations on the Sabana. About 30% to 35% of the island is covered by a more open-canopy, smaller-diameter limestone forest mixed with secondary vegetation. This includes areas that were scrubby or were newly recovering agricultural lands in 1945 and are now more than 70-year-old forest. While these recovered forests grow on an altered substrate (with more soil and less bare rock) and consist of a somewhat different species composition (Rogers and Gawel, pers. comm., 2016), they provide valuable wildlife habitat and ecosystem connectivity between remaining stands of primary limestone forest (Plentovich et al. 2005; Berry and Chagnon, pers. comm., 2016). Rota's limestone forest also continues to support numerous plant and animal species of cultural importance, including medicinal plants (Nature Conservancy 2014, 10–11; Lizama 2014; Liske-Clark 2015, 3–6, 9–6; CNMI Bureau of Environmental and Coastal Quality 2012, 16).

Rota has experienced less pressure from population growth, development, and military use than the other large Mariana Islands. U.S. military activities are limited on Rota, and only about 10% of the island is urbanized. Urban areas include the village of Songsong on the

western peninsula and Sinapalo (Sinapalu) Village on eastern Rota, adjacent to the airport. The nearby village of Dugi is in the process of being developed. The Rota Resort, located on the northeast coast, is currently the only large resort on the island. A number of small-scale subsistence farms and some larger farms and ranches exist, mainly on the Sinapalo Plateau. Lower-canopy mixed limestone forest surrounds and is interspersed with many traditional horticultural areas. Small community farms are also present on the Sabana Plateau, although farming has been discouraged in recent years due to concerns about impacts on the domestic water supply. Forest stewardship in CNMI is further supported by federal funding and technical assistance programs available to private property owners (CNMI SWARS Council 2010, 14).

Typhoons, introduced ungulates, and wildfire affect the condition of native limestone forests on all the Mariana Islands, including Rota. Typhoons can bring down large trees, especially in areas that are fragmented by agricultural lands. According to research by the CNMI Department of Fish and Wildlife, the replacement of mature forest with thickets of *Pandanus tectorius* on Rota's Sabana may be attributable to typhoon damage. However, researchers could not determine whether this is a successional stage in forest regeneration, or if factors such as ungulate browsing or increasing storm intensity and frequency may be hindering recovery (Liske-Clark 2015, 4–10). Browsing by introduced deer, feral pigs, and cattle also reduces forest understory and threatens endangered species. A CNMI Statewide Assessment and Resource Strategy completed in 2010 concluded that unsuccessful regeneration of *Osmoxylon mariannense* on Rota in recent years is likely the result of ungulate browsing and insect predation on seeds (CNMI SWARS Council 2010, 24). Arson fires in grassland areas, set by hunters to improve deer foraging habitat, can also threaten limestone forest edges. While the core limestone forest rarely burns, edge damage can gradually shrink the forest through repeated fires (Manglona, pers. comm., 2017). However, hunting is also a major cause of deer

mortality on Rota and has likely helped reduce adverse impacts to native forest species due to browsing since the 1980s (Wiles et al. 1999, 203).

Significant areas of limestone forest on Rota are currently protected under local and CNMI law. The Sabana Protected Area encompasses approximately 5.8 square miles (1,502 hectares). It was established by [Rota Local Law 9-1](#) in 1994 to provide for watershed protection and wildlife and forest conservation. Rota Local Law 9-1 allows for medicinal plant gathering, as well as the collection of plants “through normal agricultural activities,” but specifies that the Sabana is otherwise a no-take zone for plants and animals. The high plateau and adjacent cliffs contain dense stands of large tree limestone forest and include the only known examples of the endangered *Osmoxylon mariannense*. Rota's only population of endangered *Serianthes* trees is found on the Sabana's western cliffs. Also established in 1994 as part of Rota Local Law 9-1, the I'Chenchon Park Wildlife Conservation Area, or I'Chenchon Bird Sanctuary extends along Rota's eastern coast, consisting primarily of steep sea cliffs and narrow beaches that provide habitat for nesting sea birds, fruit bats, and the endangered Mariana crow. I'Chenchon is now included within the larger Mariana Crow Conservation Area (MCCA), which is a no-take area, except by permit from the CNMI Department of Fish and Wildlife (DFW). As indicated on the CNMI DFW website for Wildlife Conservation Areas, accessed in May 2021, the taking of plants for use in traditional healing practices is permitted within the MCCA. See Map 4: Existing Conservation Areas. Additional detail about Rota's existing conservation areas is provided in Chapter 5 in the “Designated/In Use Public Lands: Conservation Areas” section.

Secondary Criteria: Diversity

As noted above, Rota's limestone forests have not been impacted by the brown tree snake and therefore their species composition is more diverse and intact than forests on Guam. In addition, the limestone forest areas of Rota contain high-quality examples of

limestone karst geology. The geology of Rota demonstrates a classic terrace and scarp formation, where flat terraces are punctuated with steep cliffs to create Rota’s “wedding cake” shape. The limestone of Rota is generally younger than that found on Guam and Saipan. As limestone ages, it dissolves into fissures, caves, and other features, collectively known as “karst.” The younger age of the limestone on Rota means that this karst is less well-developed, though caves and other features are still common.

Secondary Criteria: Rarity

Rota’s natural resources include high-elevation limestone cloud forest, which within the United States is found only on Rota and in a small area on Guam. The native forest on Rota can be described generally as being of two types, high- and low-elevation. The higher elevations, found on the cliff sides of the Sabana, have a persistent accumulation of clouds and higher levels of rainfall, which supports a wetter “cloud forest” type. While the lower-elevation limestone forest type is found throughout the southern Marianas and on a number of islands in Micronesia and the Pacific, the upper-elevation wetter forest type is much rarer. Rota is one of the only places in the Pacific where this limestone “cloud forest” is found (Berger et al. 2005; Amidon, pers. comm., 2017; Falanruw, pers. comm., 2017).

Rota is also home to 24 federally listed threatened and endangered plant and animal species, which are listed in Chapter 2: Context and Resource Description and described in more detail in Appendix D. Of these species, 16 use or require limestone forest habitat. For instance, the endangered Mariana crow, or aga, usually nests in intact limestone forest and has better reproductive success there (Ha et al. 2011). The endangered Rota bridled white-eye, a species of bird known as *nosa Luta* in Chamorro, is only found on the island of Rota, primarily in high-elevation limestone forest (Amidon 2000). Nearly all of the threatened and endangered plants on Rota are found in limestone forest, including the plant *Osmoxylon mariannense*, which is only found on the Sabana of Rota.

Secondary Criteria: Value for Science and Education

The history of scientific study on the island of Rota has been limited, as has been research on the limestone forest ecosystem in general. However, as the site of some of the last remaining large stands of Pacific limestone forest on earth, the potential for research on Rota is immense. In recent years, a strain of research has arisen which uses the forests of Rota as a control to compare with the forests of Guam. One example of this research is the Ecology of Bird Loss Project at Iowa State University. Guam’s forests have been severely disrupted by the brown tree snake and the resulting elimination of birds and all the ecosystem roles that those birds play. The species composition of forests in Rota and Guam is relatively similar (with the exception of the presence of snakes and absence of birds in Guam), making this an excellent natural experiment by which to understand the impacts of highly disruptive invasive species.

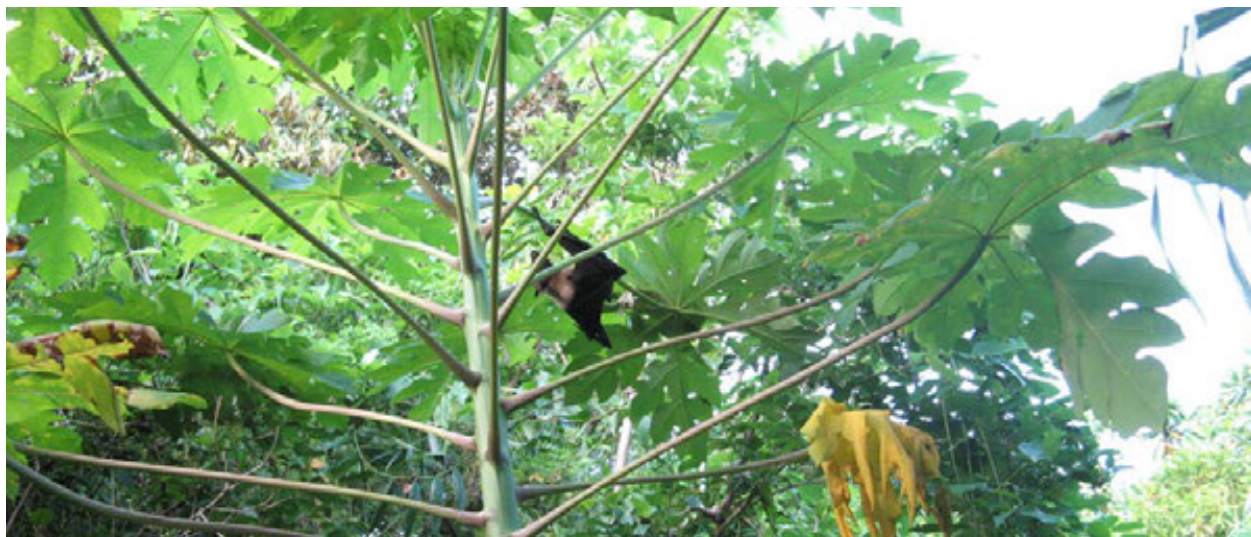
The educational value of comparing the forests of Rota and Guam is also excellent. The differences in forest character including bird song, spider web frequency, and understory density are apparent to even a casual visitor. With interpretation, these differences could provide a valuable educational tool about the impacts of invasive species on island ecosystems.



The endangered plant *Osmoxylon mariannense*. Photo: Ann Marie Gawel.

TABLE 3-1: LIMESTONE FOREST—SUMMARY OF NATIONAL SIGNIFICANCE CRITERIA FINDINGS

NATIONAL SIGNIFICANCE CRITERIA	FINDINGS
PRIMARY CRITERIA	
<p>Illustrative Character</p> <p>Exhibits well-developed components characteristic of a particular natural feature.</p>	<ul style="list-style-type: none"> ✓ Rota has one of the largest acreages of intact limestone forest in the Marianas. ✓ Rota contains the most intact ecosystem of any limestone forest in the Marianas. It contains a large extent of primary forest and is less impacted by invasive species than other islands. The physical structure of the forest is denser and less impacted by nonnative ungulates compared to other islands.
<p>Present Condition</p> <p>Area has been less disturbed than other areas.</p>	<ul style="list-style-type: none"> ✓ The limestone forests of Rota experienced fewer adverse impacts from activities associated with colonization, World War II, and post-war development than the other large Mariana Islands. Today, disturbances from population growth, development, and military activities remain limited on Rota in comparison to Guam, Saipan, and Tinian. ✓ The forest on Rota continues to exist in relatively large, ecologically functioning stands.
SECONDARY CRITERIA	
<p>Diversity</p> <p>In addition to its primary natural feature, contains high-quality examples of other natural features or processes.</p>	<ul style="list-style-type: none"> ✓ The limestone forest areas of Rota contain high-quality examples of limestone karst geology.
<p>Rarity</p> <p>In addition to its primary natural feature, contains rare natural features or provides quality habitat for endangered species.</p>	<ul style="list-style-type: none"> ✓ Rota’s forests include rare high-elevation limestone cloud forest. ✓ Rota is home to 24 federally listed threatened and endangered species, 16 of which use or require limestone forest habitat.
<p>Value for Science and Education</p> <p>Contains known or potential scientific information and opportunities for public interpretation.</p>	<ul style="list-style-type: none"> ✓ Scientific study on the limestone forest ecosystem in general has been limited. As the site of some of the last remaining large stands of Pacific limestone forest on earth, the potential for research on Rota is immense.



The endangered Mariana fruit bat, or fanihi (*Pteropus mariannus mariannus*), is found in the limestone forest of Rota. Photo: NPS.



1. [Top] The I'Chenchon Park Wildlife Conservation Area protects limestone forest and allows for public access. Photo: NPS. **2.** [Bottom] Karst underlying the limestone forest on Rota. The upper slopes of the Sabana support an unusual cloud forest type of limestone forest, influenced by the cooler temperatures and more frequent cloud cover found at these higher elevations. Photo: Ann Marie Gawel.



View of a native *Elaeocarpus joga* tree (yoga in Chamorro) on Rota. Photo: Ann Marie Gawel.

NATIONAL SIGNIFICANCE— CULTURAL RESOURCES

NPS *Management Policies 2006* calls for use of national historic landmark (NHL) criteria defined in 36 CFR Part 65.4 to evaluate the national significance of cultural resources. Properties designated as NHLs possess exceptional value or quality in illustrating or interpreting the heritage of the United States. Currently, over 2,500 places bear this national distinction. This study identifies cultural resources on Rota that meet NHL criteria for national significance. A separate process, detailed in 36 CFR 65.5, governs the procedures for NHL designation.

National Historic Landmark Criteria

The following criteria contained in 36 CFR Part 65.4 are used to evaluate national significance of cultural resources:

- a. Specific Criteria of National Significance: The quality of national significance is ascribed to districts, sites, buildings, structures, and objects that possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archeology, engineering, and culture and that possess a high degree of integrity of location, design, setting, materials, workmanship, feeling and association, and:
 1. That are associated with events that have made a significant contribution to, and are identified with, or that outstandingly represent, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained; or
 2. That are associated importantly with the lives of persons nationally significant in the history of the United States; or
 3. That represent some great idea or ideal of the American people; or
 4. That embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for a study of a period, style, or method of construction, or that represent a significant, distinctive, and exceptional entity whose components may lack individual distinction; or
 5. That are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity of exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture; or
 6. That have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts, and ideas to a major degree.
- b. Ordinarily, cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, and properties that have achieved significance within the past 50 years are not eligible for designation. Such properties, however, will qualify if they fall within the following categories:
 1. A religious property deriving its primary national significance from architectural or artistic distinction or historical importance; or

2. A building or structure removed from its original location but which is nationally significant primarily for its architectural merit, or for association with persons or events of transcendent importance in the nation's history and the association consequential; or
3. A site of a building or structure no longer standing but the person or event associated with it is of transcendent importance in the nation's history and the association consequential; or
4. A birthplace, grave, or burial if it is of a historical figure of transcendent national significance and no other appropriate site, building, or structure directly associated with the productive life of that person exists; or
5. A cemetery that derives its primary national significance from graves of persons of transcendent importance, or from an exceptionally distinctive design or from an exceptionally significant event; or
6. A reconstructed building or ensemble of buildings of extraordinary national significance when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other buildings or structures with the same association have survived; or
7. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own national historical significance; or
8. A property achieving national significance within the past 50

years if it is of extraordinary national importance.

If a resource is already designated as an NHL, the national significance criteria are met without further analysis being required. There are no existing NHLs for cultural resources on Rota. However, the NPS is supporting the preparation of an NHL nomination for the As Nieves Quarry, which is underway at the time of writing.

If a property is not designated an NHL, and not included in a theme study, it should be noted if the resource is related to a historic context that is the subject of a theme study. If a context has not been developed for the theme of history it represents, a context must be developed and the significance of the subject property in relation to comparable properties must be discussed.

Integrity

To meet NPS special resource study criteria for national significance, a property must retain a high degree of integrity as a true, accurate, and relatively unspoiled example of a resource. The evaluation of integrity is grounded in an understanding of the physical and spatial characteristics of a property and how they relate to its historical significance. Under NHL criteria, seven aspects of integrity are considered: location, design, setting, materials, workmanship, feeling, and association.

- *Location* refers to the place where the historic property was constructed or the place where historic events occurred.
- *Design* is a combination of elements that create the form, plan, space, structure, and style of a property.
- *Setting* is the physical environment of a historic property—the character of a place, its topography, vegetation, simple manmade features such as paths and fences, and the relationship between features and open space.

- *Materials* are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
- *Workmanship* is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory, is seen in elements in the large-scale landscape.
- *Feeling* refers to a property’s expression of the aesthetic or historic sense of a particular period of time even, in this case, despite the maturation of original landscapes.
- *Association* refers to the connection we make today between a particular place and an important historic event or person.

Process for Determining National Significance of Cultural Resources

The following evaluation is based primarily on research conducted by Micronesian Archaeological Research Services, Inc. (MARS) on behalf of the NPS. The evaluation draws on archival materials, archeological and anthropological reports, the NPS *Rota Reconnaissance Study* (2005), National Register of Historic Places nomination forms, and local knowledge of Rota’s important sites. The NPS reviewed this information and discussed resources with the CNMI Historic Preservation Office (HPO) staff and other experts. Resources assessed for national significance include properties already listed in the National Register of Historic Places (NRHP), sites determined eligible for NRHP listing, and additional documented sites associated with Rota’s history (see Tables 3-4 to 3-7).

Rota is rich in cultural resources associated with the ancestral Chamorro culture of the Mariana Islands. It also contains resources associated with the Spanish, German, and Japanese periods of colonization and significant events of World War II. Nearly 700

archeological sites have been documented, although the majority of the island has yet to be surveyed. Most of the recorded properties are not incorporated into a GIS-based map nor plotted on a topographic map and do not have associated site files. Some sites/areas have no available archeological, historical, or ethnographic documentation. Additional sites for evaluation may be identified with further research.

Based on the evaluation conducted for this study, properties that meet NHL criteria for national significance include archeological sites associated with ancestral Chamorro culture and World War II sites. The following analysis describes how resources within the study area meet the national significance criteria.

Rota Chamorro Archeological Sites: Statement of Significance

The Rota study area contains a diverse collection of well-preserved archeological sites associated with the ancestral Chamorro culture of the Mariana Islands. The sites are concentrated on eastern Rota and include coastal and inland village sites, a latte quarry, rock art sites, artifact scatters, and other site types. Three of the sites—Mochong Latte Village Complex, As Nieves Quarry, and Alaguan Latte Village Complex—are individually nationally significant as outstanding examples of traditional Chamorro history, culture, and architecture. While other sites within the study area are not considered nationally significant on their own, they form integral parts of an extensive site complex that exceptionally illustrates the way of life of the ancestral Chamorro, particularly during the latte period. Sites in the study area have yielded and will likely continue to yield archeological information of major scientific importance regarding Chamorro culture and environmental interactions during the latte and pre-latte periods. They also have potential to yield information about patterns of migration, settlement, environmental interaction, and socio-political development in Micronesia and the broader Pacific. Rota’s latte sites provide opportunities for

comparative analysis of the development of megalithic stone architecture across the Pacific, beginning around AD 1000. Additional contributing sites likely exist in portions of the study area that have not been surveyed.

The study area retains a high degree of integrity both at the landscape scale and the individual site level. Contributing sites remain in their original locations and retain patterns of design, workmanship, and use of materials that reflect the culture, knowledge, and lifeways of the ancestral Chamorro inhabitants. While some changes in vegetation coverage and species composition have occurred, the settings of most of the latte villages and rock art cave sites remain undeveloped and characterized by intact coastlines, native limestone forest, and connectivity to marine and inland areas traditionally used for resource procurement and other purposes. Some inland sites exhibit greater loss of integrity due to residential development, agricultural uses, and World War II damage, but not to a degree that substantially diminishes their overall integrity or potential to yield archeological information. Many sites have been carefully maintained by the people of Rota for generations and continue to evoke their sacredness and a strong sense of place. Integrity of feeling and association is further retained through continuing use of the coastal and limestone forest setting for traditional activities including subsistence hunting, fishing, horticulture, and medicinal plant collection.

NATIONAL SIGNIFICANCE EVALUATION: PRE-LATTE AND LATTE PERIOD ARCHEOLOGY

Pre-latte and latte period archeological sites such as those found on Rota are important links to the cultural history of the indigenous Chamorro people of the Mariana Islands. They are significant as sources of information about the past and as sacred sites associated with traditional Chamorro culture and connections to place. They also provide opportunities to research patterns of migration, settlement, sociopolitical development, environmental

interactions, and architecture in Micronesia and the broader Pacific.

Throughout the Marianas, numerous pre-latte and latte sites are currently listed in the National Register of Historic Places or have been determined eligible for listing. However, no sites are currently designated as NHLs or as units of the national park system. A comprehensive comparative analysis to evaluate sites for national significance has not been completed. Published in 2017, the NPS's *Asian American Pacific Islander (AAPI) National Historic Landmarks Theme Study* calls for greater recognition of nationally significant sites associated with the history and culture of indigenous Pacific Islanders, including archeological and cultural sites associated with Chamorro history and culture (NPS 2017c). This section draws on the theme study and other relevant materials to provide context and preliminary comparative analysis to support a determination of national significance for Rota's Chamorro archeological sites under NHL and NPS special resource study criteria. Additional research and comparative analysis are recommended to further develop statements of significance for Rota's archeological resources, and to identify other sites in the Marianas that might also qualify as nationally significant under the AAPI theme.

Archeologists typically divide Marianas history prior to the intensification of Spanish colonization into the pre-latte and latte periods. The pre-latte period extends from initial settlement of the islands around 1500 BC to the appearance of the first latte villages around 1000 AD. The period is further subdivided into early, intermediate, and transitional stages defined by changes in pottery, architecture, and settlement patterns (Spoehr 1957; Craib 1990b; Moore 1983, 2002; Moore and Hunter-Anderson 1999). Sea level at the time of initial settlement was approximately 6 feet (1.8 meters) higher than at present, limiting habitation to coastal areas with sufficient beach formation and access to marine resources (Carson 2014b). Later phases of the pre-latte period were characterized by gradual expansion of coastal settlements correlating with a drop in sea level and increasing but still limited use of

inland areas for resource procurement and other purposes.

Notable early settlement sites in the Marianas include Unai Chulu on Tinian, Unai Bapot and Achugao on Saipan, and Ritidian on Guam (Carson and Kurashina 2012). These locations are the earliest documented settlement sites in Micronesia and may have been among the first permanent habitations in what is known as Remote Oceania, the region of the Pacific settled within the past 3,500 years (Carson 2014b, 8). Common artifacts found at early settlement sites include shell middens, lithic tools, shell ornaments, and fragments of thin-walled red-slipped pottery termed “Marianas Red” (Hung et al. 2011, 913; Spoehr 1957). These sites are additionally significant as destination points for what may have been the longest transoceanic human migration up to that time, reaching as far as 1,500 miles (2,414 kilometers) from Island Southeast Asia (Rainbird 2004, 85). Hsiao-chun Hung and her colleagues point to comparable pottery found in the northern Philippines and at early habitation sites in the Marianas as evidence of this connection (Hung et al. 2011).

The earliest sites identified on Rota date to approximately 700 to 1,000 years after initial settlement of the other large islands, perhaps due to the lack of habitable coastal locations during the late Holocene high sea level stand. The island’s earliest documented radiocarbon dates are 800 BC from the Songsong area (McManamon 1989, Henry et al. 1999) and 600 BC from Teteto-Guata (Butler 1988). The most complete pre-latte record thus far found on Rota comes from the Mochong Latte Village Complex. Cultural artifacts include Marianas Red pottery sherds dating to approximately 550 BC (Takayama and Intoh 1976).

Due to its later period of settlement, Mochong likely does not rise to the national level of significance in terms of association with the earliest voyagers to the Marianas. Its significance derives instead from the presence of a continuous record of more than 2,000 years of habitation, and the high degree of integrity of the site. In this sense, the site is comparable with Ritidian (Litekyan) located

within the Guam National Wildlife Refuge on the northern tip of Guam. While Ritidian contains a longer sequence dating back to initial settlement around 1500 BC (Carson 2014a), Mochong and other sites on Rota’s northeast coast have similar potential to yield information about the interplay of cultural and environmental change over most of the pre-latte and latte periods. This includes new information about population expansion later in the pre-latte period, when lowering sea levels opened up more land for settlement. Excavations at Mochong in the 1970s also revealed similarities in pottery production during the transition from the pre-latte to latte periods, indicating a degree of continuity in cultural practices across those eras (Carson 2012, 337–338).

The latte period (c. 1000 AD–1700 AD) encompasses a major period of demographic expansion and cultural flourishing in the Marianas. Alignments of latte, known as “latte sets,” mark the locations of former villages throughout the archipelago. Latte are highly significant site features both from an archeological and cultural standpoint. These distinctive upright capped stone pillars, used as house supports, are the defining architectural feature of the latte period and have come to symbolize Chamorro culture (Kurashina et al. 1999, 268). Chamorro scholar and activist Michael Lujan Bevacqua describes latte as “an icon of Chamorro identity, empowerment and sacredness” (Bevacqua 2018).

Latte construction is also a significant example of monumental architecture in the Pacific. Although unique to the Marianas, latte sites are comparable to other megalithic sites in Micronesia and the broader Pacific. Examples include the ceremonial center of Nan Madol on Pohnpei (designated a World Heritage Site in 2016), Lelu on Kosrae (listed in the National Register of Historic Places in 1983), Yapese Stone Money sites on Yap and Palau (added to the World Heritage Tentative List in 2004), and Mo’ai statuary of Rapa Nui (designated a World Heritage Site in 1995), among other sites (Morgan 1988, Federated States of Micronesia 2016). Latte sites contribute to an understanding of broad patterns of demographic expansion, increasing

social complexity, formalization of settlement patterns, and monumental stone construction throughout much of the Pacific beginning around 1000 AD (Carson 2018). They also provide opportunities to study the deep ancestral ties connecting the Chamorro people to other Pacific and Island Southeast Asian cultures with similar architectural traditions (Laguana et al. 2012).

Other artifacts commonly found at latte villages include thicker-walled pottery sherds, lusong (stone mortars), stone and shell tools, slingstones, decorative stone and shell beads, and middens of shell and fishbone. Gardens, cooking areas, and freshwater wells are present at some sites. Burials are often located under or near latte sets. Collectively, these materials represent important aspects of Chamorro life during the latte period including changes in social organization and politics, subsistence practices, trade, technical and environmental knowledge, architecture, aesthetic values, religious beliefs, and ceremonial practices (Carson 2012, 7). Today, many Chamorro regard latte sites and their surrounding landscape settings as sacred places inhabited by taotaomo'na, or ancestral spirits (Kurashina et al. 1999, 269). They are places of reverence and reflection, providing opportunities to learn about and connect with traditional Chamorro culture.

Latte villages are found in coastal and inland locations. Major coastal village sites such as Mochong on Rota, House of Taga on Tinian, and Ritidian on Guam typically display a longer period of habitation, although studies of inland sites in southern Guam have revealed evidence of occupation as early as the first millennia AD (Dye and Cleghorn 1987, Dixon and Gilda 2011). Coastal villages are typically located in proximity to resource procurement areas. However, some sites occupied during the period of demographic expansion beginning between 1200 AD and 1300 AD are in less-optimal areas where populations would have been reliant on intervillage and likely interisland trade to obtain resources necessary for survival. Alaguan on Rota is an exceptional example of this type of site (Craib 1990a, Swift et al. 1992).

Many inland village sites are located in areas with fertile soils and may have been associated with agricultural production. Examples include Gampapa on Rota, sites in the vicinity of Fena Reservoir in southern Guam, inland sites in northern Guam, and Marpi Valley sites on Tinian (Butler 1997, Moore 2005, Dixon et al. 2011, Dixon et al. 2012). Although inland settlements are found throughout the archipelago, the interior latte clusters on Rota are extensive, accessible, relatively intact, and located in proximity to coastal village sites, offering opportunities for research on intervillage social, political, and economic relationships. Other latte period sites consist of rock shelters, soil mounds, pottery scatters, or other cultural materials but no latte sets. These may have been sites of work, ceremonial activities, or seasonal occupation associated with subsistence practices (Butler, pers. comm., 2017; Bulgrin 2006).

Quarry sites where latte were excavated have also been identified on all the large Mariana Islands. Research conducted at these sites has revealed information about the technical capacities, environmental knowledge, and processes involved in manufacturing and transporting latte (April 2004). Quarry sites also provide opportunities for comparative analysis of construction methods and social organization at other sites of megalithic architecture in the Pacific (Morgan 1988). The As Nieves Quarry on Rota is the largest and best-preserved latte quarry in the Marianas. It is notable for the exceptionally large latte columns and capstones, which are left in place. The site is also associated with the legendary Chief Taga who later built the massive House of Taga on Tinian.

Rock art sites, typically found in cave settings, are another significant site type. While pictographs (painted figures) are most abundant, petroglyphs carved into the rock are present in some locations. Marianas rock art is difficult to date and discern for meaning. Common motifs include animals, humans (often stick figures missing heads or limbs), and geometric patterns. Rock art sites on Rota and elsewhere in the Marianas are considered a “distinctive and important cultural phenomenon in Micronesia”

(Hunter-Anderson, pers. comm., 2017). The abundance and variety of pictograph forms in the Marianas is unique in Micronesia. The locations in cave settings are distinctive. Rock art sites also possess high artistic value. With the exception of decorative jewelry found at burial sites and the lime-filled impressions embellishing some pre-latte pottery, rock art is the only recorded physical example of ancient Chamorro art.

Marianas rock art is generally thought to be associated with Chamorro religion, burial practices, and ancestor worship (Cabrera and Tudela 2006, Russell 1998). However, a comprehensive inventory, classification, comparative analysis, and evaluation of the social meaning of rock art has yet to be accomplished (Hunter-Anderson 2012a). The caves where most rock art is found may also have been used for shelter, ritual practices, and burials through the latte period and possibly earlier. The Chugai Cave on Rota contains approximately 90 pictographs and is one of the best examples of rock art in the Marianas. Images include geometric shapes, as well as some anthropomorphic figures. Notable motifs include two realistic turtles, each measuring approximately 1 foot (0.3 meters), and a 3-foot-long (0.9-meter) depiction of a billfish (NPS 2005; Cabrera and Tudela 2006, 46–47).

ROTA CHAMORRO ARCHEOLOGICAL SITES NATIONAL SIGNIFICANCE SUMMARY

All the above resource types are exceptionally well-represented in the Rota study area. Three sites rise to the level of national significance individually:

- **Mochong Latte Village Complex** is the largest documented latte village site in the Mariana Islands, covering approximately 30 acres (12 hectares) and containing 53 latte sets. Located on Rota's northeastern coast, the site includes unique examples of latte-period architecture, including one of only two known 14-pillar latte sets in the Marianas and a rare "latte wall," a row of stone slabs forming one side

of a latte set. The site contains a rich assemblage of latte period artifacts associated with fishing and food processing. The latter include pottery and lusong showing evidence of rice production and consumption predating Spanish contact. Mochong also exhibits a continuous record of settlement extending back to approximately 550 BC, offering opportunities to study continuity and change in culture and environmental interactions over most of the pre-latte and latte periods. The site has been maintained at a high degree of integrity by local landowners, the Rota Historic Preservation Office, and the people of Rota.

- **As Nieves Quarry** features the largest latte known to exist in the Mariana Islands and is considered the best-preserved latte quarry in the archipelago. The site is a unique expression of traditional Chamorro architecture and engineering skill. It is believed to be associated with the life of the legendary Chief Taga, who lived on Rota before moving to Tinian, where he built the House of Taga, the largest standing latte structure in the Marianas. As Nieves is also the only documented latte quarry in the Marianas where the stones were left in place. If erected, the unearthed columns and capstones would have formed a gigantic structure exceeding the height of House of Taga. Maintained by the people of Rota for generations, the site retains a high degree of integrity and exemplifies the technical processes of latte house construction. Archeological research at As Nieves has yielded, and is likely to continue to yield, important new information about political, social, and economic changes in the later phases of the latte period, including changes related to Spanish contact and colonization. The site is also an exceptional example of indigenous megalithic stone architecture, offering opportunities for comparative analysis with other monumental sites

in Micronesia and the broader Pacific dating after 1000 AD.

- **Alaguan Latte Village Complex** contains the largest number of extant resources of any documented latte village site in the Mariana Islands. The site is extremely rich in surface materials and is considered among the best-preserved village sites in the Marianas. It also features the only intact standing capped latte on Rota, one of only a few remaining in the Marianas. First occupied around 1200 AD, the Alaguan complex exemplifies Chamorro adaptation to less-optimal island environments during a period of population expansion. The site is located at the base of a steep cliff above a reef terrace and is surrounded by intact high-canopy native limestone forest. It is distinguished by a challenging approach from both land and ocean, isolation, limited fresh water sources, and lack of access to suitable agricultural land. The site has yielded and will likely continue to yield information of major scientific importance regarding changes in social and political organization, patterns of trade and subsistence, use of native limestone forest resources, and intervillage and interisland interactions in the Marianas during the later phases of the latte period. Alaguan's difficult access and isolation, lack of modern development, intact reef terrace, and high-canopy native limestone forest setting contribute to its exceptionally high degree of integrity.

These sites are also part of an extensive site complex consisting of smaller coastal and upland latte village sites, rock art sites, rock shelters, artifact scatters, and other site types (described in more detail in Chapter 2 and in the NHL criteria evaluation below). The diversity, density, and uniqueness of archeological sites in the Rota study area make it an outstanding example of Chamorro culture in the Mariana Islands. Together, the sites exceptionally illustrate the sociopolitical, domestic, economic, technological, and

religious lives of the ancestral Chamorro, offering unique opportunities for public enjoyment, education, and research within a relatively concentrated area. Because Rota has remained less developed than the other large Mariana Islands and was not as heavily impacted by the events of World War II, the coastal and native limestone forest setting is also comparably well-preserved. While aspects of pre-latte and latte culture are well-represented at other sites in the Marianas, the Rota site complex is unmatched in terms of overall integrity, concentration of unique and individually nationally significant sites, diversity and density of sites, and potential to yield information regarding multiple aspects of traditional Chamorro history and culture.

ROTA CHAMORRO ARCHEOLOGICAL SITES—APPLICATION OF NHL CRITERIA

The national significance of Rota's Chamorro archeological sites is conveyed through the diversity, uniqueness, and density of well-preserved sites in a relatively undisturbed coastal and native limestone forest setting. Research conducted for this study supports a finding of national significance under NHL criteria 4, 5, and 6.

Criterion 4

That embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for a study of a period, style, or method of construction, or that represent a significant, distinctive, and exceptional entity whose components may lack individual distinction.

The village sites of Mochong and Alaguan contain latte structures that are exceptionally valuable for the study of traditional Chamorro architecture, construction techniques, and village layout and composition. Notable features include the 14-pillar latte foundation at Mochong, the walled latte set at Mochong, and the standing capped latte at Alaguan. Mochong and Alaguan are also the largest latte villages known to exist in the Marianas and are among the best-preserved. They embody numerous distinguishing characteristics of latte period architecture in their individual features and in their overall scale, composition,

layout, and orientation of features to the surrounding landscape.

The massive, unearthed latte at As Nieves Quarry are outstanding examples of latte house design and construction. Their partial excavation at the quarry site is unique in the islands, providing an unmatched opportunity to study the methods and technical knowledge involved in shaping, excavating, and transporting latte. While representing an architectural style unique to the Marianas, As Nieves is also an outstanding expression of the pan-Pacific phenomenon of monumental construction. It may provide tangible evidence of the competitive aspects in increasing social, political, and economic stratification, and serve as a symbol of the power of Chamorro chiefs or clans to mobilize a large labor force to build monumental structures.

Rota's complex of smaller coastal and upland latte villages embodies the scale and diversity of latte period architecture and village design. They outstandingly represent the range of latte village locations, layouts, construction styles, and functions. Documented sites including the North Coast sites, the small village of M̄aya near Mochong, village sites along the southeastern coast, and the inland villages of Dugi and Gampapa retain their original configurations of latte sets with distinctive linear arrangements paralleling shorelines, ridgelines, and valleys. Notable individual features include a unique one-piece pillar and capstone latte at the southeast coastal village site of As Dudo and the 9-foot-high 12-pillar latte set at the North Coast site of Tatgua.

The diversity of intact village sites on Rota offers unique opportunities for comparative analysis of architectural styles and functions of latte structures in different settings. Contributing sites also demonstrate the technical skill, environmental knowledge, and social organization required to quarry and transport latte and construct latte structures in a variety of topographic locations.

Criterion 5

That are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic

merit to warrant individual recognition but collectively compose an entity of exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture.

The Rota study area preserves a wide range of resource types associated with the ancestral Chamorro culture of the Mariana Islands. Although only three sites warrant individual recognition at the national level of significance, Rota's diverse complex of well-preserved sites collectively compose an entity of historical significance that outstandingly illustrates the Chamorro way of life during the latte period. The exceptionally large and unique sites of Mochong, As Nieves Quarry, and Alaguan represent the apex of Chamorro culture during the latte period, while the variety of smaller inland and coastal sites provide for a more complete picture of latte period social, economic, and environmental interactions. Rock art found at Chugai Cave and other sites within the study area exemplify ancestral Chamorro motifs, iconography, and methods of execution, and reflect the religious beliefs, ceremonial practices, artistry, and aesthetic preferences of the population.

Viewed alongside other major latte period sites in the Marianas, the Rota study area comprises a comparatively intact latte period settlement complex. The proximity and connectivity of multiple sites within a well-preserved coastal and native limestone forest setting further distinguishes the Rota study area from other sites in the Marianas.

Criterion 6

That have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts, and ideas to a major degree.

Rota's Chamorro archeological sites are significant under Criterion 6 because they have yielded and will likely continue to yield information of major scientific importance about Chamorro culture during the pre-latte

and latte periods. This includes information about the development of traditional settlements, politics, and economy, and the coevolutionary relationship between humans and their environment. Future ethnographic study can also yield important information about oral traditions, cultural values, and ongoing traditional practices associated with latte sites and the surrounding environment. The sites also provide opportunities to research broad patterns of migration, settlement, socio-political development, environmental interactions, and indigenous architecture in the Pacific. Additional sites contributing to the area's significance also likely exist in areas that have not been surveyed. Many known sites have limited documentation and may contain features of cultural significance not evaluated for this study.

Village sites on the north and northeast coast of Rota, including Mochong, Måya, and Tatgua, have potential to yield important new information regarding the origins and expansion of Chamorro settlement in the Marianas from the pre-latte period through the latte period. Research can shed light on the long-term evolution of social complexity, interactions between coastal settlements, interisland relationships, and the coevolution of environment and culture that shaped Chamorro society. The early artifact assemblages and DNA from burial sites can be compared and contrasted to cultures in Island Southeast Asia to assess their relationship.

Archeological investigations at sites with continuous occupation that span thousands of years, such as Mochong, as well as large complex sites, such as Alaguan, can lead to an understanding of long-term trajectories in Chamorro population growth and expansion, political economy, social structure, health, technology, and subsistence regimes. Traditional use of rock shelters and caves is also a potentially rich area for research, both for documenting earlier (pre-latte) uses and short-term, special purpose uses by later latte-period populations (Butler, pers. comm., 2017).

The coevolutionary relationship between humans and terrestrial and marine environments that is integral to the history of Pacific Island populations (Carson 2018) is well-illustrated on Rota. Changes in subsistence strategies identified in the archeological record can reflect overharvesting, adaptation to environmental changes, the introduction of nonnative species, technological innovations, or an expanding trade network that afforded a broader economic base. This information is important to understanding and interpreting Chamorro culture and survival in isolation by sustainable use of natural resources over many centuries.

The sites also have potential to yield archeological and anthropological information about broad themes in Pacific/Micronesian history. These include patterns of migration, settlement, and sociopolitical development. DNA research may provide additional understanding of cultural continuities possibly resulting from a shared heritage with Southeast Asian or other Pacific peoples. Rota also provides opportunities for research focused on indigenous responses to similar environmental opportunities and constraints in the Pacific, and the appearance of megalithic architecture across much of Remote Oceania around 1000 AD.

The As Nieves Quarry has yielded and will likely continue to yield archeological information of major scientific importance about the development of traditional politics and economy, and evolving sophistication in technology and engineering methods in the Marianas as well as throughout the broader Pacific. As Nieves also offers an opportunity to examine leadership strategies within Micronesian societies. Variations in the size of latte elements may reflect the emergence of semi-autonomous polities competing for limited resources, including through alliances and struggles for power. Archeologists debate whether variations in the size of latte elements reflect differentiation in the power and status of the occupants (Graves 1986) or signify seniority among members of a kin group that partition the village along horizontal and not vertical lines (Craib 1986). Others suggest that latte may have represented common

Micronesian concepts of belonging and inclusiveness rather than being symbolic of competitiveness and rank associated with status or wealth (Peterson 2012). Construction of latte could then have involved the cooperation of several domestic units or social groups, rather than coerced labor by powerful chiefs concerned with status and authority.

The coastal and interior latte villages can provide significant information on intra-village settlement patterns, health and disease, the relationship between kinship and land tenure, and social organization, including whether it followed cooperative or hierarchical patterns. At Alaguan, the nature of intra-village and intra- and interisland social structure, politics, and economics that organized Chamorro culture can be understood through the architectural remains, rich artifact and midden assemblages, and imported stone features present at the site. Difficult access, isolation, lack of fresh water, and shallow, poorly developed soil unable to sustain agricultural production contribute to Alaguan's marginality for human occupation. By participating in a sociopolitical network that maintained economic ties with other parts of Rota and likely other islands, the community at Alaguan was able to maintain a large population in a challenging environmental setting over centuries.

The Rota study area also provides opportunities to study population expansion into areas outside the optimal coastal environments beginning between 1200 and 1300 AD. This expansion may have been due to population increase or may have been an effort to utilize more diverse habitats in response to a deteriorating climate for agriculture. The Alaguan Latte Village Complex is especially valuable for illuminating the variables leading to this expansion and the strategies used to adapt to more marginal environments (Hunter-Anderson, pers. comm., 2017).

Rota is especially well-suited for research on interactions between inland and coastal latte villages. Latte villages located on narrow terraces above Rota's rocky east and southeast coastline (Sagua Gahga, East Koridot, West Koridot, and As Dudo) are important in this

regard. The limited availability of subsistence resources in those locations suggest that a symbiotic relationship may have existed between coastal and inland settlements. Each group of settlements may have provided resources the other lacked or was deficient in (Butler 1997, 322). Fishbones in the upland village sites are evidence that the inhabitants acquired marine resources. The inhabitants of Dugi would have had to access to the coastline or have a trade relationship with people living along the shore. Likewise, at Gampapa, produce could have been traded for marine resources from As Dudo, a coastal settlement about 0.6 miles (1 kilometer) to the east (Butler 1997). The proximity of the coastal villages to natural access routes to the Sinapalo Plateau is also suggestive of these relationships. Additional ethnographic and archeological research may yield information on routes of travel connecting inland and coastal villages and providing access to areas of resource procurement.

The possible connection between the Dugi and Gampapa sites on the plateau and the unsurveyed As Mátmos rock shelter site on the rocky coast below is also of considerable interest. Connections may have been political, social, ceremonial, or related to the quarrying and transportation of latte. A geological assessment of the source of Gampapa's latte, for example, revealed that they were manufactured from local Ponia or Mariana limestone formations, both of which include a high frequency of rhodoliths (Siegrist 1996). As noted in the "Resource Section: Inland Sites" portion of Chapter 2, As Mátmos is the only known location in the Marianas Islands with an equivalent concentration of rhodoliths, suggesting that at least some of the inland latte were transported over relatively long distances.

Study of basalt artifacts can provide additional information about trading networks on Rota and with other Mariana Islands. Although sources of basalt are limited on Rota, basalt mortars have been found at latte village sites across the island. Basalt was likely traded or transported from the Talakhaya region or from other islands. At Alaguan, the apparent exchange of resources could be studied.

How the large basalt mortars and latte were transported to the isolated valley is also a topic worth exploring.

Rock art sites on Rota are likely to yield important information concerning traditional Chamorro burial practices, ancestor worship, art, and aesthetic preferences. Currently, rock art is a little understood phenomenon in the Marianas. Limited information exists regarding when, by whom, for what purpose, and how the art was produced. The Rota images vary in color and motifs, displaying similarities and differences with other rock art sites in the archipelago. Rota's rock art sites are located in a wide range of geographic settings and exhibit variations in associated archeological features. Given the variability and high degree of integrity of Rota's rock art sites, future research can contribute to understanding the timing, evolution, and meanings of Marianas rock art, as well as the spiritual beliefs, lifeways, and artistry of the people who created them.

Sites on Rota can also yield information about effects of, and Chamorro responses to, Spanish contact and colonization. Most if not all of the documented village sites on Rota were inhabited during the early Spanish contact period. The sites provide opportunities to study changes in social organization, technology, agriculture and diet, patterns of health and disease, and intervillage and interisland politics and economics related to Spanish contact. The large Tatgua latte on the north coast of Rota (part of the complex of North Coast Archeological Sites) may be associated with Chief Sunama, who hosted the Spanish priest Fray Juan Pobre during his seven months on Rota in 1602. Pobre's account of his time on Rota is one of the most detailed sources of written information on the pre-colonial Marianas. Archeological research at Tatgua and nearby sites may provide additional context for interpreting Pobre's account. Research focused on burial sites and rock art on Rota might also reveal information about Chamorro experiences of and responses to Spanish conquest.

Rota also provides rich opportunities for ethnographic research on the past and present cultural significance of latte sites

and associated landscapes. The latte's form, size, spatial organization, and other features are expressions of traditional Chamorro culture, society, and spirituality. Taotaomo'na (ancestral spirits) are often said to inhabit latte and natural features of the surrounding landscapes, especially banyan trees. The spirits can be benevolent, looking out for their descendants and traditional lands. Others can be devious and cruel, causing sickness or even death. People continue to ask permission of the taotaomo'na prior to entering latte sites and forested areas for hunting, medicinal plant collection, ritual practices, and other activities (Farrer and Sellmann 2014, 136). Latte sites are also often located in proximity to coastal and forest areas that continue to support activities important for maintaining the cultural identity of Chamorro communities. A traditional cultural property evaluation documenting ongoing traditional uses of the Rota study area may yield important information regarding continuity and change in Chamorro cultural practices, beliefs, and values from the pre-colonial period to the present.

INTEGRITY

Rota's Chamorro archeological sites retain a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association. A strong sense of place and connection with the ancestral culture is retained through the diversity and density of well-preserved archeological sites, and in the comparably high degree of preservation of the natural environment. This includes coastal, marine, and limestone forest areas traditionally used for resource procurement and other purposes. All of the large Mariana Islands have undergone major changes since the end of the latte period, including changes in vegetation structure and species composition, population density, and development patterns. However, these changes are less substantial on Rota compared to the other islands and do not detract from the overall integrity of the sites.

Location

Rota's Chamorro archeological sites remain in their original locations along coastlines, on inland plateaus, and in cave settings. Some of the village sites, such as Mochong, may be the original habitation sites of the earliest people

on Rota. While many latte have been knocked down and/or damaged over the years, a large number remain in their original locations. Many sites are rich in *in situ* surface features and artifacts. This is especially true of Alaguan and other more isolated sites along the southeastern coast.

Design

The design of the latte villages is still clearly evident and continues to exhibit the intentionality of the original builders. The coastal villages still contain clusters of latte sets oriented parallel to the coastlines. The more dispersed spatial organization of the inland village sites is also retained, showing the variation in village layout and structure. At Gampapa, the latte sets continue to exhibit the designed layout of parallel rows of latte sets along opposite sides of a valley.

The differentiation in latte size and numbers of latte per set illustrates aspects of traditional Chamorro architecture, including consideration of the appropriate proportions, scale, and intended function of latte structures. Rare and unique features including the walled latte set at Mochong, the combined pillar and capstone latte at As Dudo, the large Tatgua latte, and the gigantic unearthed latte at As Nieves Quarry reflect a range of traditional design considerations, aesthetic preferences, and construction techniques.

The hand-drawn rock art at Chugai Cave and other sites illustrates the artists' design thinking, technology, and ability to communicate through artistic messages. The placement, form, size, and motifs of the rock art creates a direct link to the original artists' work and aesthetic preferences.

Setting

The Rota study area retains a high degree of integrity of setting. The area is minimally developed, with most contributing sites situated within or in proximity to intact coastlines and substantial areas of intact native limestone forest. Alaguan is located on the isolated south coast of Rota within one of the island's largest areas of intact high-canopy limestone forest. A number of contributing sites are protected within the P'Chenchon Park

and the Mariana Crow Conservation Area. These include the small southeast coastal villages of As Dudo, East and West Koridot, and Sagua Gahga, as well as the Chugai Cave rock art site. Other rock art caves exist at East and West Koridot and Sangua Gahga. These and other rock art sites are located in isolated, largely undisturbed settings.

The role of Rota's distinct topographic and geologic characteristics in affecting settlement patterns, social and political organization, economic practices, and land uses remains evident at the landscape scale and the individual site level. The lack of development allows for a high degree of connectivity to be retained between the southeast coastal sites and the richer agricultural lands surrounding the inland site of Gampapa. Landscape contours possibly used as traditional routes of travel between the coast and Sinapalo Plateau are still evident.

Rota's northeast coastal village sites including Mochong, Mâya, and the North Coast Archeological Sites are located in proximity to coastal and marine areas traditionally used for fishing and resource gathering. The sites are also surrounded by small diameter, mid-elevation limestone forest and retain a strong sense of place. Although the Rota Resort separates the North Coast sites from Mochong, the sites generally retain connectivity with the ocean, shoreline, forests, and other sites in the study area, including the As Mâtmos rock shelter site and the inland village of Dugi.

The As Nieves Quarry is located within a lightly populated area with some small homesteads nearby and has been cared for by the people of Rota for generations. The Rota branch of the CNMI Historic Preservation Office currently maintains the site, ensuring that it retains its historic appearance and a strong sense of place. This setting continues to evoke the feeling and challenging physical work of those involved in attempting to quarry the largest known latte in the Marianas.

The setting of the upland latte sites includes the level and still largely open plain of the Sinapalo Plateau. Thought to have been

used for agricultural production during the latte period, the setting of the inland villages of Dugi and Gampapa continues to be characterized by small-scale subsistence farming. While the vegetative layer and limited introduction of dirt roads represents a change from the latte period, most aspects of the setting are remarkably intact. The upland latte sites on the Sinapalo Plateau continue to be situated in geographic relation to the limestone scarps, valleys, shorelines, and nearby coastal village sites. Areas of small diameter mid-elevation limestone forest continue to exist in the vicinity.

Materials

Rota's latte villages contain much of their original materials, including latte constructed from limestone and in some cases basalt; surface features such as lusong (mortars); pottery; middens; and tools such as adzes, slingstones, and spear points. Variations in materials used for haligi (column) and tasa (cap) stones at the numerous latte sites illustrate decisions involved in selecting, quarrying, transporting, and constructing latte in different locations around the island.

All of the sites have sustained some damage to materials from natural forces, such as high winds, falling trees, scour and deflation from storms, and deterioration. As is the case throughout the Marianas, most of Rota's standing latte columns no longer support capstones, with the exception of the full standing latte at Alaguan and the one-piece As Dudo latte. Several latte sets at Gampapa were bulldozed during land clearing and are currently conglomerated into piles, while others have been transported to local homes for display. The sediments between each set in the dispersed clusters were considerably disturbed from vegetation clearing and sugarcane cultivation during the Japanese period, although intact deposits may remain beneath the till zone. World War II impacts include excavation, destruction, and moving of some site materials. The excavation of defensive slit trenches along the northeast coast, for example, may have disrupted some cultural deposits. At Mochong, a few latte pillars may have also been utilized in strengthening defensive positions. Some caves were also modified to serve as shelters

during the war. Overall, however, Rota's sites exhibit fewer impacts to original materials from Japanese-era agriculture, World War II activities, and modern development than latte sites on the other large Mariana Islands.

Workmanship

The workmanship of the latte pillars, lusong, rock art, and associated artifacts retain integrity. The size and shape of latte elements continue to reflect traditional Chamorro aesthetic preferences and construction methods. The distinctive tapered, hemispherical shapes of the tasa found at several sites, for example, exhibit traditional Chamorro workmanship.

The partially quarried latte at As Nieves provide clear evidence of the chiseling and extraction processes used in removing the latte from the quarry. While erosion has backfilled some of the pits to some extent and a few of the stones have split either during quarrying or as a result of earthquake or root action, the quarry nevertheless clearly conveys the workmanship of the original Chamorro latte builders.

Integrity of workmanship is also retained in the rock art sites, including in the use of pigments and methods for depicting both common and unique motifs. The sites continue to convey the techniques and ingenuity of the original artists.

Feeling

Integrity of feeling is retained in various tangible and intangible qualities which evoke a sense of sacredness and connection to the lives of the ancestral Chamorro inhabitants. These qualities include physical artifacts such as the latte (the numerous standing latte, as well as the massive unearthed latte at As Nieves), pictographs, stone tools, and burials. Although the surrounding environment has changed since the latte period, the largely intact native limestone forest landscape and lack of modern development allows the study area to retain views, sounds, smells, and other aesthetic qualities that convey an intimate connection with traditional Chamorro culture. Intangible qualities of place, which further connect past to present include oral traditions; ongoing traditional methods of fishing, hunting,

horticulture, and medicinal plant collection; and ritual practices such as asking permission of the taotaomo'na.

Association

Integrity of association with significant events, persons, and time periods in Chamorro history is retained in the massive, unearthed latte at As Nieves Quarry, the large Tatgua latte possibly associated with Chief Sunama and Fray Juan Pobre, and the diversity of village settings and site types. These characteristics provide direct links to patterns of Chamorro life, especially during the later phases of the latte period.



Lusong at Dugi Archeological Site. Photo: NPS.

TABLE 3-2: ROTA CHAMORRO ARCHEOLOGICAL SITES—SUMMARY OF NHL ANALYSIS FINDINGS

NATIONAL HISTORIC LANDMARK CRITERIA	FINDINGS
<p>Criterion 4</p> <p>Distinguishing characteristics of an architectural type.</p>	<ul style="list-style-type: none"> ✓ Contributing sites include outstanding examples of traditional Chamorro building styles and techniques, including rare and unique examples of latte architecture. ✓ As Nieves Quarry contains the largest-known latte components in the Mariana Islands and demonstrates the technical processes of latte construction.
<p>Criterion 5</p> <p>Integral parts of the environment that collectively compose an entity of significance, or commemorate/illustrate a way of life or culture.</p>	<ul style="list-style-type: none"> ✓ Rota's diverse complex of well-preserved sites including coastal and inland latte villages, As Nieves Quarry, rock art sites, artifact scatters, and other site types collectively compose an entity of historical significance that outstandingly illustrates the Chamorro way of life during the latte period. ✓ The proximity and connectivity of multiple latte sites within a well-preserved coastal and native limestone forest setting distinguishes the Rota study area from other sites in the Marianas.
<p>Criterion 6</p> <p>Yielded or may be likely to yield information of major scientific importance.</p>	<ul style="list-style-type: none"> ✓ The Rota study area has yielded and will likely continue to yield archeological information of major scientific importance regarding Chamorro culture during the pre-latte and latte periods. This includes information about the development of traditional settlements, politics, and economy, and the coevolutionary relationship between humans and the environment. ✓ Future ethnographic study can also yield important information about oral traditions, cultural values, and ongoing traditional practices associated with latte sites and the surrounding environment. ✓ Additional sites contributing to the area's significance likely exist in areas that have not been surveyed.
<p>Integrity</p>	<ul style="list-style-type: none"> ✓ Rota's Chamorro archeological sites retain a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association.



1. [Top left] Mochong Latte Village Complex 2. [Top right] Detail of the walled latte set at Mochong. 3. [Bottom] Māya Latte Site. Photos: NPS.



1. [Top] Visitors are dwarfed by the scale of the unearthed latte at As Nieves Quarry. Photo: NPS **2.** [Middle] Alaguan Latte Village Complex. Photo: Dacia Wiitala and Isaac Merson. **3.** and **4.** [Bottom left and right] Latte at Alaguan. Photos: Dacia Wiitala and Isaac Merson.



1. [Top] Gampapa Latte Village, located on the level and still largely open plain of the Sinapalo Plateau 2. [Bottom] Turtles and other markings in Chugai Cave. Photos: NPS.

Rota World War II Japanese Defensive Complexes: Statement of Significance

The World War II Japanese defensive complexes of Ginalagan and Chudang Palii are nationally significant as outstanding examples of Japanese military fortifications designed specifically for the late-war defense-in-depth strategy. Extensive and well-preserved, Rota's defensive complexes have yielded and will likely continue to yield archeological and historical information about the evolution of the Japanese interior defensive strategy, as it was used on Rota and subsequently applied in pivotal battles such as Peleliu, Iwo Jima, and Okinawa. This revised strategy allowed for Japanese forces to fall back to a well-defended interior and wage a war of attrition that significantly increased U.S. casualties and delayed complete pacification of Japanese-held islands in the Pacific. Unlike battle sites such as Peleliu, Rota's inland fortifications remain intact and undamaged by combat. Ginalagan and Chudang Palii therefore provide outstanding opportunities to experience the defensive structures as they were originally constructed by military personnel and conscripted civilians, by hand and using primarily local materials. Because the defensive complexes remain intact, they are also likely to yield additional information about the role of cave, or karst, defenses in the daily life of military personnel and civilians under the Japanese occupation. Additional contributing sites likely exist in portions of the study area that have not been surveyed.

Ginalagan and Chudang Palii retain a high degree of integrity both at the landscape scale and the individual site level. The two complexes remain in their original locations and retain patterns of design, workmanship, and use of materials that reflect the Japanese military's late-war defensive approach and determination to transform Rota's limestone escarpments into a final redoubt to resist an American invasion. As the American invasion never arrived, the two sites remain as they were built and therefore possess integrity of feeling and association in representing the experiences of those who survived the last months of the war on an isolated,

bypassed island. The landscape setting of the fortifications consists of rugged cliffs covered by limestone forest and has remained effectively unchanged since World War II. Diverse artifact assemblages are also present to communicate the experience of sheltering within the interconnected cave systems. Ginalagan and Chudang Palii are two of the few extant and intact examples of the Japanese in-depth defensive strategy, and are the only two of their scale, integrity, and variety of features and property types known to exist on American soil.

NATIONAL SIGNIFICANCE EVALUATION: WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

World War II fortifications exist in sites throughout the Pacific that have been designated as national historic landmarks or units of the national park system. However, many of these sites protect defensive features such as bunkers or pillboxes that are located along the shoreline. A comprehensive comparative analysis of in-depth fortifications in caves or tunnels (i.e., karst defenses), has yet to be conducted, and many interior defensive complexes in the Pacific have eluded study by historians and archeologists, in part due to difficulty of access (Mushynsky 2021, 4, 34). The 1984 *World War II in the Pacific: National Historic Landmark Theme Study* evaluated resources relating to the Pacific war, including locations with shoreline and in-depth defenses, and recommended certain sites for designation as national historic landmarks (NPS 1984). The areas surveyed included United States territory and Trust Territories, which at the time included the CNMI, the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau.

This section draws on the theme study and other relevant, more recent materials to provide context and preliminary comparative analysis to support a determination of national significance for Rota's World War II Japanese defensive complexes under NHL and NPS special resource study criteria. Additional research and comparative

analysis are recommended to further develop statements of significance for Rota's defensive complexes and to identify other sites within the U.S. and U.S. territories that might also qualify as nationally significant under the World War II in the Pacific theme.

As described in Chapter 2: Context and Resource Description, Rota's World War II history is distinct from that of the other large Mariana Islands. Unlike Guam, Saipan, and Tinian, Rota was never invaded by U.S. forces. In addition, the inland Japanese fortifications on Rota were constructed later in the war, and they reflect a different defensive strategy than the fortifications on Guam, Saipan, and Tinian, which were largely concentrated along the beach (Mohlman et al. 2011, 16–17).

This shift in military strategy arguably emerged as a response to the Japanese defeat at Tarawa, Kwajalein, Roi-Namur, Saipan, and Guam (Gatchel 1996). The successful U.S. amphibious invasion of these islands defied the conventional Japanese defensive doctrine, which held that the only way to defend islands against invasion was to stop the assault at the beach (Crowl 1960, Gatchel 1996). This "defense at water's edge" doctrine was reevaluated by the Japanese military after their heavy losses during the Marianas Campaign, and after the lengthy Japanese resistance on the island of Biak beginning in May 1944, where the local commander supplemented the island's beach defenses with a network of inland defensive tunnels created from limestone caves (Gatchel 1996, 103). The defense-in-depth strategy would thereafter be deployed to exact a high toll from invading U.S. troops in subsequent battles on Peleliu, Iwo Jima, and Okinawa (Moore and Hunter-Anderson 1988, Mohlman et al. 2011).

Construction of Rota's fortifications at Ginalagan and Chudang Palii coincided with this shift in focus to interior defensive structures. While limited coastal defensive structures were developed on Rota beginning in spring 1944, sited to protect the beaches along the north coast and at Sasanhaya Bay (Denfeld 1992), beginning in summer the emphasis had evolved to reinforcing inland defensive structures near the Japanese

headquarters on the Sabana (Higuchi 2003, 56). This timing aligned with the August 1944 release of a Japanese Imperial General Headquarters directive entitled "Defense Guidance on Islands," revising the Japanese defensive doctrine to include inland defenses in addition to attacking the enemy at the beach (Gatchel 1996, 143; Mushynsky 2021, 32).

The exact chronology of the development of Rota's defensive structures is not fully known. On August 18, 1944, the U.S. Marine Corps conducted an aerial reconnaissance flight over the island, including the cliffs along the Sabana, and did not identify the presence of any fortifications. This indicates either that the defensive complexes were not yet constructed or that they were very well-camouflaged (Moore and Hunter-Anderson 1988, 20; Mohlman et al. 2011, 25). Archeologists and historians have therefore determined that development of the interior fortifications on Rota continued from late 1944 or early 1945 until the surrender of the island's Japanese commanding officer, Major Imagawa, in September 1945 (Moore and Hunter-Anderson 1988, Mohlman et al. 2011).

The complex at Ginalagan includes various concrete features such as slabs, bulwarks, parapets, and pillboxes and possesses a large and diverse assemblage of artifacts (Moore and Hunter-Anderson 1988). Ginalagan appears to have been built earlier than the fortifications at Chudang Palii, which are composed primarily of dry-laid limestone structures, built by hand (Mohlman 2011). The near total lack of imported building material at Chudang Palii exemplifies late-war Japanese military strategy and adaptation to dwindling supplies (Mohlman 2011, 166), in particular when compared with Ginalagan, apparently built when small amounts of concrete, rebar, and aggregate were still available. Local, naturally occurring materials were also recommended by Japanese military leadership to enhance camouflage and may be another reason for the lack of concrete at Chudang Palii (Mushynsky 2021, 42). Because Rota was never invaded, the Japanese military had more time to develop the two complexes than they had on other islands, and the complexes were not damaged by combat. As a result, Mohlman

et al. argue that they are “the best-preserved examples of Japanese military interior island defensive systems in the Marianas,” and that they “embody and demonstrate the Japanese defensive strategy shift from pure coastal defense to a multilayered defensive strategy” (Mohlman et al. 2011, 165).

Rota was not the only bypassed island in the Marianas with Japanese fortifications, however. The island of Pagan is a valuable comparison because it was likewise spared the impact of a U.S. invasion, although like Rota it was regularly the target of American air raids. The fourth-largest island in the CNMI, Pagan is defined by two stratovolcanoes that have erupted regularly over the centuries. Pagan’s residents have been prohibited from returning since an eruption in 1981 forced their evacuation. As part of the build-up of military facilities in the Marianas before World War II, the Japanese built an airfield and other facilities on Pagan, in the narrow isthmus between the two volcanoes. By August 1941 the Japanese Navy had completed or was constructing the paved runway; a hangar; water systems including a supply pond, filtration plant, and concrete water storage tank; an oil tank; and a bomb storage area (Higuchi in Athens 2009, 73).

Wakako Higuchi reports that no additional defense installations were constructed on Pagan until May 1944, when the Japanese military installed several 25-millimeter machine gun emplacements to protect the airfield, and continued work on the airfield expansion. These efforts persisted until a U.S. bombing raid in June 1944 destroyed a set of barracks, a hangar, a runway, and the telephone system, after which the Japanese military took shelter in caves. As on Rota, the military and civilian population on Pagan suffered malnourishment and disease in the last year of the war due to a lack of food and medications (Higuchi in Athens 2009, 75).

An analysis of the fixed weaponry emplacements on Pagan, and their installation above the airfield to create a topographic trap, suggests the transition in strategy toward the defense-in-depth approach (Dixon et al. 2018). However, while numerous tunnels and

bunkers are still extant on the island, when compared with Ginalagan and Chudang Palii, their size and location do not as effectively illustrate the late-war shift in tactics to cave warfare. A 2008 cultural resources survey of portions of the island identified 146 historic sites, of which 86 are estimated to be associated with World War II (Athens 2009, 212). Of these, the majority of the World War II sites are tunnels and bunkers, although almost all of the tunnels and tunnel complexes surveyed are located near the coastline rather than toward the interior (Athens 2009, 222, 239). Moreover, even the largest documented tunnel complexes are substantially smaller than the interconnected fortresses created by Ginalagan and Chudang Palii (Athens 2009, 190–203).

The 2008 archeological report determined that Pagan’s tunnel features are significant, retain their architectural integrity, and are therefore eligible for listing in the National Register. Notably, however, the tunnels that could be accessed for survey did not contain any archeological artifacts (Athens 2009, 223–224). In contrast, the Chudang Palii and especially Ginalagan complexes on Rota contain a rich variety of artifacts including ammunition, mechanical equipment, and domestic items (Moore and Hunter-Anderson 1988, Mohlman et al. 2011). While additional research is required to fully understand the significance of Pagan’s fortifications in the context of late-war Japanese military strategy, based on existing documentation it appears that they are not as illustrative of interior island defensive systems due to their largely coastal locations, smaller scale, and lack of archeological artifacts.

The elaborate interior fortifications of Peleliu (Palau), Iwo Jima (Japan), and Okinawa (Japan) are considered the final and best-developed manifestation of the defense-in-depth strategy (Gatchel 1996; Mohlman et al. 2011; Mushynsky 2021, 32–33). However, national significance evaluations do not consider whether a superior example exists in a neighboring country. Thus, the extensive network of cave and tunnel systems on Iwo Jima and Okinawa are not included in this evaluation. Although Palau became an

independent nation in 1994, its status as a Freely Associated State, affiliated with the U.S., means it is eligible to receive historic preservation grants from the National Park Service's Historic Preservation Fund. The island of Peleliu is therefore retained for comparative analysis.

At Peleliu in September 1944, commanding officer Colonel Kunio Nakagawa famously engaged the rugged coral and limestone terrain to create a complex of fortresses built into the island's high ridges, in addition to traditional beach defenses (Gatchel 1996, Price and Knecht 2012). As a result of these fortifications, especially in the Omleblochel Mountain region, the U.S. invasion of the island was stretched from an expected 3 to 4 days to a brutal 74 days (Price and Knecht 2012). Palau is considered one of the bloodiest battles of the Pacific War.

A 2010 archeological survey of Peleliu by Price and Knecht documented 118 cave and tunnel systems, which the survey team estimated to represent 10 to 15% of the total number still on the island (Price and Knecht 2012, 33). The caves reflect in a visceral way the violence of the battle, with copious amounts of unexploded ordnance still present, along with human remains in many cases and a vast collection of military gear and personal items. The integrity of the sites and their ability to illustrate the trajectory of the battle, along with their exceptionally intact material remains has prompted Price and Knecht to describe the island as the "best-preserved battlefield of the Pacific theatre" (Price and Knecht 2012, 5).

The caves and tunnel complexes on Peleliu are distinct from those on Rota because of their role in a bitter and ferocious battle. The invading U.S. Marines used grenades and flamethrowers to clear the caves, and in some instances, aircraft bombed the caves with explosives, incendiaries, and napalm. The openings to some caves and tunnels were physically blocked by the Americans as a last resort (Price and Knecht 2012, 9), fundamentally altering the original structure and configuration of the fortifications. In this way they differ from Chudang Palii and Ginalagan, which were built up during the last

months of the war but never saw battle and therefore remain as they were constructed. While Peleliu's elaborate cave and tunnel systems provide a palpable illustration of the in-depth strategy used in combat, Rota's defensive complexes represent the distinct experiences of military personnel on a bypassed island.

While battles such as Biak and Peleliu point clearly toward a major shift in Japanese defensive strategy, culminating in Iwo Jima and Okinawa, the Japanese military also made use of terrain and interior fortifications in earlier conflicts (Mushynsky 2021). This may have been the result of individual commanders making decisions to leverage the topographical assets of a given site. For instance, the U.S. military first confronted karst defenses in Bataan, Philippines in early 1942 as part of the Battle of the Pockets (Morton 1953 in Mushynsky 2021, 31). Another example is the Japanese defense of the Aleutian island of Attu, in 1943, where troops entrenched along inland ridges at Massacre Valley significantly waylaid U.S. forces as they fought to retake the island (NPS 1984, 2017a). In addition to military defenses, historical sources also indicate that certain caves may have been dedicated to civilian use (Mushynsky 2021, 34). Many of Rota's plentiful natural caves and rock shelters were used in precontact times and likely also offered protection to civilians as well as the military during World War II (Butler, pers. comm., 2017).

Further documentation and analysis of karst defenses throughout the Pacific is needed to better understand the strategic purpose that these sites played during World War II, as well as their role in sheltering civilians (Butler, pers. comm., 2017; Mushynsky 2021). Based on research conducted to date, however, the defensive complexes at Ginalagan and Chudang Palii are two of the few extant and intact examples of the Japanese in-depth defensive strategy and are the only two of their scale and integrity that exist on American soil. Their ridgeline defensive networks demonstrate the final outcome of the Japanese military adaptation to the shifting tides of World War II in the Pacific.

WORLD WAR II JAPANESE DEFENSIVE COMPLEXES—ANALYSIS OF THE NHL CRITERIA

The Ginalagan Japanese World War II Defensive Complex and the Chudang Palii Japanese World War II Defensive Complex are evaluated as nationally significant under national historic landmark criteria 4 and 6.

Criterion 4

Embody the distinguishing characteristics of an architectural type specimen exceptionally valuable for a study of a period, style, or method of construction, or that represent a significant, distinctive, and exceptional entity whose components may lack individual distinction.

The Chudang Palii and Ginalagan Japanese World War II defensive complexes are nationally significant under criterion 4 in the area of Architecture, because they contain Japanese fortifications that outstandingly illustrate military architectural features in bypassed defensive complexes. The interior defensive networks at Peleliu, Iwo Jima, and Okinawa—while elaborate and extensive—were battle sites, and thus represent a different aspect of World War II history. The caves and tunnels of Peleliu, for example, are inscribed by the marks of the brutal conflict and loss of life that took place within and outside of them. In contrast, the Rota fortifications appear as they were built, thus illustrating how the Japanese military constructed and occupied the structures before the destruction of battle. They reflect a long period of construction and occupation, with the combined purpose of defense and long-term refuge as exemplified by built-in cisterns and water catchments, storage areas, camouflaged air raid shelters, and other features to support survival.

In addition to escaping the damage of battle, Rota's defensive complexes are larger and contain more documented property types than any other known fortifications in the Marianas. Their construction occurred during a pivotal moment in the Pacific war, as the Japanese military was revising its focus on shoreline defense to instead emphasize a well-defended interior and attrition warfare. The evolution of this approach and the Japanese

response to dwindling supplies at the end of the war are illustrated by the diversity of features and property types within the two complexes, as well as variations in their construction methods and materials.

Ginalagan has more than 100 individual limestone, concrete, and earth features, and Chudang Palii's defensive complex is composed of approximately 130 features, built primarily of stone and locally occurring materials. When compared with fortifications on Guam, Saipan, and Tinian, Rota's defensive complexes generally did not rely on large quantities of imported materials (Moore and Hunter-Anderson 1988, 127). This is likely the result of several factors: 1) the Japanese determination that Rota was not as strategically important in the war, 2) the reduction in available resources after supply lines were disrupted in summer 1944, and 3) a preference for indigenous materials to enhance camouflage (Moore and Hunter-Anderson 1988, Mohlman et al. 2011, Mushynksy 2021). Although the two fortified ridgelines have elements in common, a comparison between Ginalagan and Chudang Palii illustrates the evolution in approach to constructing these late-war features on Rota.

Mohlman et al. suggest that the additional concrete used at Ginalagan may indicate that it was developed somewhat earlier than Chudang Palii. Ginalagan is comparatively replete with manufactured materials, including a stone and cement parapet measuring more than 500 feet (155 meters), 11 stone and concrete bulwarks, four concrete pillboxes, and concrete water tanks and slabs (Moore and Hunter-Anderson 1988, 124). In contrast, Chudang Palii's network of caves, overhangs, tunnels, walls, terraces, trenches, ramps, and steps were all built by hand, and all walls were constructed of dry-laid limestone (Mohlman et al. 2011, 166).

It is likely that civilians were conscripted by the Japanese military to assist with the construction of Rota's fortifications, a practice that occurred throughout the Marianas as part of the build-up of Japanese defenses after the loss of the Marshall Islands in 1943. Each household on Rota was reportedly forced

to provide one person per day to support military construction projects (Moore and Hunter-Anderson 1988, 18; Mohlman et al. 2011, 22). Additional research is required to understand who constructed the complexes and the working conditions they were forced to endure. The work may have been completed by any of the civilians remaining on the island at the end of the war, including Chamorro, Japanese, Okinawans, and Koreans. According to accounts from survivors, the Japanese soldiers treated the civilian residents cruelly and demanded that they adhere to punishing work schedules (Moore and Hunter-Anderson 1988, 24; Mohlman et al. 2011, 22).

Given the lack of combat damage to the fortifications on Rota, the defensive structures afford the opportunity to better understand how such defenses were built and by whom, and how the Japanese military adapted to the 14 grueling months between the Marianas Campaign and the surrender of the island. Ginalagan and Chudang Palii are uniquely well-preserved (Moore and Hunter-Anderson 1988, 128; Mohlman et al. 2011, 165) and together illustrate the key features, materials, and methods of construction that characterize Japanese defensive tactics during the last phase of the war.

Criterion 6

Have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation over large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts, and ideas to a major degree.

The Chudang Palii and Ginalagan Japanese World War II defensive complexes are nationally significant under Criterion 6 because they have yielded, and will likely continue to yield, archeological information of major scientific importance about the Japanese World War II military strategy and adaptations by Japanese outlier garrisons to dwindling assistance from the home islands. These historic properties have yielded and will likely continue to yield archeological information about transformations in Japanese defensive

doctrine that significantly impacted the American approach to Japan, greatly increased Allied casualties, and ultimately made the atomic bombs seem like a less-ghastly alternative than the invasion of the Japanese homeland. In particular, Rota's complexes offer the opportunity to better understand the chronology of the development of the defense in-depth strategy, especially in the months preceding the Battle of Peleliu.

As Rota prepared for battle before the significant Japanese losses in the Marianas, the proximate and ultimate causes for the transformation from a linear beach defense to a defensive in-depth strategy are little understood. The underlying rationale may have been due to a multitude of overlapping factors, including the choice of the local commander, the time needed to fully implement an in-depth strategy, or island topography, among other variables (Crowl 1960; Denfeld 1997; Salo and Mohlman 2013). Salo and Mohlman (2013) suggest three reasons for construction of interior defenses on Rota that differed from the typical Japanese doctrine and fortification types prior to July 1944. They suggest that the (relative) lack of landing beaches on Rota induced the Japanese soldiers to build fortifications elsewhere. Furthermore, after it became apparent that rather than invading, U.S. forces would use the island for targeted air strikes and shore bombardment, the Japanese focused on anti-aircraft defenses and use of ridgeline caves for added protection. Finally, they suggest that because of a lack of materials and military personnel, the Rota garrison was forced to use local materials and on-island knowledge and skills to construct fortifications. Further research is required to determine how the defense in-depth directive was implemented on Rota and how it evolved between the construction of the two complexes.

Rota's fortifications have also yielded and are still likely to yield archeological information about World War II life in the Pacific under Japanese occupation. They illustrate the living conditions of the Japanese military in contrast to the living conditions of the Chamorro people and other civilians living on Rota during the war, provide insight into

the nature of the enemy, and illuminate the neglected social aspect of history as it relates to the Pacific war. The sites also illustrate the physical and psychological hardships experienced by Japanese soldiers and sailors in the final months of World War II. This affords an opportunity to better understand how the experience of the occupying Japanese military contrasted to that of civilians, including Native Chamorros, who were also living on the island.

The civilian use of caves and rock shelters has been highlighted as an area deserving further research (Butler, pers. comm., 2017; Mushynsky 2021). Historical accounts describe how the U.S. aerial bombardment of Rota drove the civilian community into natural and artificially expanded karst defenses, from which they could only venture under cover of nightfall (Moore and Hunter-Anderson 1988; Mohlman et al. 2011). Due to their isolation and lack of food and supplies, Rota's civilian inhabitants suffered from extreme deprivation, although their experiences on a bypassed island were very different from civilians on Micronesian islands who lived through active combat (Poyer et al. 2001). World War II histories in the Pacific have been described as “unbalanced,” often told from the U.S. perspective and neglecting the fact that the war involved entire civilian populations in addition to governments and military personnel (Schofield 2004 in Mushynsky 2021, 12). Julie Mushynsky observes that the archeological study of historic resources, such as karst defenses, can help rebalance the narrative by addressing “the evidence on the ground,” which “can question what is taken for granted [by historical accounts], challenge it, strengthen it, weaken it or put new twists on it altogether.” This “helps to convey the diversity of war experiences and establishes a more inclusive WWII history” (Mushynsky 2021, 12).

Although more documentation is needed to understand the importance of civilian caves on Rota, the fortifications at Ginalagan and Chudang Palii are likely to continue to yield important insights about the Japanese military's experience of the war from an isolated outpost, which may enrich the overall understanding of the significance of limestone

fortifications in the Marianas. Mushynsky's survey of karst defenses on Saipan concluded that “Karst defences are sites of dark, shared heritage. Civilians and military personnel experienced WWII at these sites. However, while the time and place are shared, civilian and military experiences at karst defences were not the same. While some experienced victory, others experienced death and violence” (Mushynsky 2021, 137). Rota's World War II defensive complexes, particularly because they didn't see battle, have the potential to reveal more complex, nuanced information about the role of karst defenses in day-to-day life under the Japanese occupation.

Future archeological research at Ginalagan and Chudang Palii could uncover additional discoveries to enrich the comparison between military and civilian life. Surviving indications of rations and other foodstuffs, for instance, could help define differences between soldiers and civilians. In addition, archeologists believe that the inland defensive complexes at Ginalagan and Chudang Palii are only a sample of this site type on Rota (Moore and Hunter-Anderson 1988, 30; Butler, pers. comm., 2017). Ginalagan and Chudang Palii are the only interior areas that have been archeologically surveyed to date. Further research and archeological surveys are needed to determine whether the complexes connect to one another, and whether there are additional complexes found along other steep limestone terraces in strategic locations. Japanese sources are another area of future research that may yield important new data.

Ginalagan and Chudang Palii have added and have the promise to add further nuance, depth, and understanding to the historical accounts of World War II. Their scale, integrity, and artifact assemblages reveal the evolution of the late-war Japanese defensive strategy and the experience of living on a bypassed island in the Pacific war.

INTEGRITY

Located in an undeveloped and little-accessed area of Rota, the Ginalagan and Chudang Palii Japanese World War II Defensive Complexes retain the essential physical features that

comprised their character and appearance during the period of their construction and use. The Ginalagan complex was attacked by U.S. planes attempting to destroy anti-aircraft positions, but these attacks did no major damage. The remote locations and steep escarpments have contributed to their preservation over the past 75 years. Although features have been damaged by falling trees, rockslides, or other natural causes, the Ginalagan and Chudang Palii complexes retain a high degree of integrity. Because Rota's defensive complexes did not experience combat damage, they represent in-depth fortifications as they were originally constructed. This is in contrast to other examples of interior Japanese defensive networks, such as at Peleliu, which were heavily damaged during battle and tell a very different story of the Pacific war.

Location

Ginalagan's and Chudang Palii's placement in the steep cliff faces and dense jungle illustrate their historic function of aerial camouflage, fortification, and commanding views. They remain in their original location in remote and high-elevation areas of Rota. The Ginalagan complex was strategically situated in the limestone cliffs overlooking and within range striking distance of Rota's only airfield. The Chudang Palii complex is near As Manila, the Japanese military headquarters on Rota, and overlooks the Ginalagan fortifications, covering the approaches to them with defensive fire.

Design

The strategic defensive design of both Ginalagan and Chudang Palii retains a high degree of integrity. Nearly intact, these military landscapes were constructed below, into, and above the limestone escarpments. Elements of the properties include caves, trenches, tunnels, rock walls, and other features. Some evidence exists that the Japanese developed manuals to guide the design and construction of fortifications, including karst defenses, however the instructions that have been discovered to date provide only general guidance, and the military necessarily adapted their designs to local conditions and materials (Denfeld 1992; Mushynsky 2021, 39). On Rota,

the linear spatial organization, circuitous and interconnected tunnel networks, concrete fortifications, walls, catch basins for water, and hand-piled rock terraces are evidence of the defensive design employed by the Japanese military and adapted to the cliff faces at Ginalagan and Chudang Palii.

Setting

The study area for Rota's World War II Japanese defensive complexes retains a high degree of integrity of setting. The landscapes surrounding the Ginalagan and Chudang Palii fortifications remain largely unchanged since they were constructed and inhabited during World War II. The natural limestone forest environment and undeveloped character along and below the cliffs reflect the World War II historic period, and the distinct topographical and geological characteristics that drove the selection of these locations remain evident.

Views from the fortifications today are essentially the same as during the historic period, and the fortifications themselves continue to be shrouded by dense native vegetation, as they appear in historic aerial photographs. Today's surrounding agricultural lands were also being used for agriculture in the 1940s, and the unpaved road to the Sabana present during the war is largely unchanged (Mohlman et al. 2011, 168). Although access to Ginalagan requires crossing private land, land uses have changed little over time and only minimal development is present. Indeed, the rugged terrain that characterizes the fortifications has effectively inhibited development along the cliffs, preserving a strong sense of place.

Materials

The original materials used to construct Rota's fortifications were collected primarily from the local environment and can still be experienced today. These include dry-stacked limestone and earth fill. Taking advantage of the natural landscape, the Japanese soldiers used locally available materials and hand tools to build the majority of the features. A comparison of materials and construction methods between the two defensive complexes provides information about the chronology of their development and may offer additional

insights about the evolution of the Japanese in-depth defensive doctrine in the later phases of the war. As Mohlman et al. note, Ginalagan possesses a higher proportion of imported materials than Chudang Palii and many more artifacts, indicating that it may have been constructed earlier (Mohlman et al. 2011, 167). Relatively small amounts of concrete and metal were used in the construction of the pillboxes, bulwarks, and water tanks at Ginalagan, where no such concrete structures have been identified at Chudang Palii (Moore and Hunter-Anderson 1988, Mohlman et al. 2011).

Although the rock and concrete structures in the defensive complexes remain relatively undisturbed, at Ginalagan many of the portable artifacts appear to have been displaced from their original locations, possibly by visitors to the site over the years (Moore and Hunter-Anderson 1988, 128). Archeological surveys throughout Chudang Palii have not identified the same density or diversity of artifacts as at Ginalagan, however the displacement of artifacts has not been

identified as an issue. Chudang Palii does possess large and prominent artifacts in the form of five anti-aircraft guns in their original locations, which communicate tangibly the intended purpose of the fortification (Mohlman et al. 2011). Compared with other Japanese World War II fortifications that were damaged in combat, Rota's defensive complexes retain their original materials to a high degree and remain nearly unchanged from the war.

Workmanship

The workmanship of the defensive complexes retains integrity, as evidenced by their dry-laid limestone walls, elaborately dug tunnel systems, and numerous constructed concrete features. The walls required intensive labor to find, haul, and stack the limestone rocks. The tunnel systems illustrate the intent of creating refuges as well as confusing tunnels with escape routes; they also still possess the pick marks along the walls indicating the strenuous labor that was required to excavate them. Workmanship is also evident in the numerous constructed concrete features at



1. and 2. [Left and right] Concrete fortifications at Ginalagan Japanese World War II Defensive Complex. Photos: NPS.

Ginalagan, such as walls, catch basins, and pillboxes. The sites continue to strongly convey the techniques, determination, and ingenuity demonstrated by the Japanese garrison at the end of the war (Butler, pers. comm., 2017).

Feeling

Integrity of feeling is retained in various tangible and intangible qualities that evoke a sense of time and place. Rota’s defensive complexes possess integrity of feeling due to their ability to convey the experience of Japanese military personnel sheltering in place and preparing to defend their position, even if it cost them their lives. The intact physical structures, displaying their hand-crafted, laborious construction methods, strongly evoke the late phase of the war, when the Japanese military made use of every available material and source of labor to construct a final redoubt. The evident arduousness of the labor required in their construction also strongly conveys the hardships that those constructing the fortifications were forced to endure, including Rota’s civilian population. Remaining artifact assemblages also help to represent the experiences of the people who survived the last 14 months of the war on an isolated, bypassed island. The integrity of the forested escarpments in which the fortifications were built allows the study

area to retain nearly unchanged views, and in many cases unchanged sounds, smells, and other aesthetic qualities that provide a close connection with the sites’ World War II history.

Association

Integrity of association with the events of World War II in the Pacific is retained by the large-scale interior fortifications at Chudang Palii and Ginalagan, which were developed to advance the Japanese defense-in-depth strategy, largely instituted as a result of the Marianas Campaign. Both sites are outstanding, intact, and comprehensive examples of late-war Japanese military defenses designed to significantly increase casualties among invading U.S. troops. The lack of combat damage to the structures also illustrates Rota’s role as a bypassed island and illuminates the U.S. military’s strategy of island-hopping, which was designed to allow the U.S. to efficiently and quickly reach Japan without capturing every Japanese-held island in sequence.

TABLE 3-3: WORLD WAR II JAPANESE DEFENSIVE COMPLEXES—SUMMARY OF NHL ANALYSIS FINDINGS

NATIONAL HISTORIC LANDMARK CRITERIA	FINDINGS
<p>Criterion 4</p> <p>Distinguishing characteristics of an architectural type.</p>	<ul style="list-style-type: none"> ✓ The fortifications of Ginalagan and Chudang Palii are outstanding, intact, and comprehensive examples of interior Japanese military fortifications. ✓ The building materials and construction methods represent the evolution of the defense-in-depth strategy and the increasingly distressed Japanese military adapting to dwindling supplies.
<p>Criterion 6</p> <p>Yielded or may be likely to yield information of major scientific importance.</p>	<ul style="list-style-type: none"> ✓ The complexes have yielded and are still likely to yield archeological information about Japanese defensive strategies and the chronology of their development during the last phase of World War II in the Pacific. ✓ Further archeological study of the complexes may provide greater understanding of the role of cave, or karst, defenses in daily military and civilian life on Rota during the Japanese occupation.
<p>Integrity</p>	<ul style="list-style-type: none"> ✓ The defensive complexes retain a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association.



1. [Top] Fortification built into the limestone cliff at Ginalagan World War II Japanese Defensive Complex. **2.** [Bottom left] A cistern for water storage at Ginalagan, designed and constructed to support long-term survival. **3.** [Bottom right] Cave and tunnel system at Ginalagan. Photos: NPS.



1. [Top] Dry-laid limestone terracing at Chudang Palii World War II Japanese Defensive Complex. **2.** [Bottom left] Detailed view of a dry-stone wall at Chudang Palii. **3.** [Bottom right] View from one of the gun emplacements at Chudang Palii toward Rota's north-central shoreline. Photos: Dave Lotz.

NATIONAL SIGNIFICANCE CONCLUSION

The limestone forest resources of Rota meet all of the criteria for national significance. They represent an illustrative example of a large extent of functioning limestone forest ecosystem. They exhibit fewer disturbances from human activities than the forests of the other large Mariana Islands, and today represent a considerable extent of intact primary forest.

Rota's Chamorro archeological sites possess exceptional value in illustrating the history and culture of the indigenous Chamorro people of the Mariana Islands. Three of the sites—Mochong Latte Village Complex, As Nieves Quarry, and Alaguan Latte Village Complex—are individually nationally significant as outstanding examples of traditional Chamorro history, culture, and architecture. While other sites within the study area are not considered nationally significant on their own, they form integral parts of an extensive site complex which exceptionally illustrates the sociopolitical, domestic, economic, technological, and religious lives of the ancestral Chamorro, offering unique opportunities for public enjoyment, education, and research within a relatively concentrated area. Because Rota has remained less developed than the other large Mariana Islands and was not as heavily impacted by the events of World War II, the coastal and native limestone forest setting is also comparably well-preserved. While aspects of pre-latte and latte culture are well-represented at other sites in the Marianas, the Rota site complex is unmatched in terms of overall integrity, concentration of unique and individually nationally significant sites, diversity and density of sites, and potential to yield information regarding multiple aspects of traditional Chamorro history and culture.

The Ginalagan and Chudang Pali World War II Japanese defensive complexes are nationally significant archeological sites that represent the Japanese defense-in-depth strategy as it was applied to pivotal battles at the end of the war. The two fortifications, built into steep limestone escarpments, possess remarkable

integrity due to their protected locations and because Rota, as a bypassed island, was never invaded by U.S. troops. Each interconnected defensive complex is composed of a large variety of features and property types that viscerally represent the experience of Japanese military personnel during the last 14 months of the war, as well as the hardships endured by Rota's civilians who were forced to assist with construction. Although Japanese interior fortifications are represented at other sites in the Marianas, Micronesia, and the Pacific at large, Rota's defensive complexes are unmatched on U.S. soil due to both their scale and level of development and the fact that they were unscathed by battle. As such, they have the potential to yield information about the evolution of the defense-in-depth strategy in the late phases of the war, as well as the daily experiences of those trying to survive on an isolated Pacific island.

CULTURAL RESOURCES: EVALUATION OF OTHER SITES

MARS evaluated more than 40 properties to determine their levels of significance. Of these, ten properties are listed in the National Register of Historic Places (NRHP). The listed properties include four latte-period sites, four Japanese-period sites, and two World War II sites. Several properties were determined to be potentially eligible for listing in the National Register of Historic Places but will require further research to fully evaluate whether they meet NRHP criteria and/or possess integrity. These include several latte villages and rock art sites, three Spanish-period sites, one site associated with the German period, and three that are associated with Japanese World War II events. Eight properties require further study before a determination can be made. One of these properties, the Sabana Peace Memorial, dates to the Trust Territory period.

Tables 3-4 to 3-7 below provide a brief description of the sites that were evaluated and their status. Some sites are grouped together based on their site survey and evaluation. This list includes the best-documented and -known sites on Rota but does not represent a comprehensive list of Rota's precontact

and historic sites, which is not within the scope of this special resource study. Sites that have been determined to be individually nationally significant through this study or are collectively nationally significant as part of a broader precontact cultural landscape are noted below. The remaining sites do not meet the NHL criteria and/or lack integrity or need further study before determining their significance.

Rota's cultural resources would benefit from further study and more thorough analysis. Many sites have limited or no documentation.

In addition to the eight properties identified in Table 3-7, information is especially lacking on rock shelters and caves, some of which were modified for sheltered living areas during World War II. They include dry stone walls, terracing, and other features, probably built by the Japanese military. For instance, the West Fanasgan Complex is a series of closely spaced shelter sites that has potential significance as an example of wartime life (Butler, pers. comm., 2017).



View toward the north-central shoreline of Rota from Chudang Palii, strategically covering approaches to the Ginalagan complex. Photo: Dave Lotz.

TABLE 3-4: NATIONALLY SIGNIFICANT SITES

SITE NAME(S)	TIME PERIOD(S)	LOCATION	DESCRIPTION
Mochong Latte Village Complex	Pre-latte and latte period	Mochong; east side of north coast	A 30-acre (12-hectare) coastal village site with 53 latte sets, mortars, stone-lined well, deeply stratified cultural deposits, burials, and artifact/midden scatters. Listed in the NRHP on September 11, 1985 as the Mochong Archeological District (#85002301) for areas of significance related to prehistoric archeology, architecture, and exploration/settlement. Determined to be individually nationally significant through this study.
As Nieves Quarry	Latte period	As Nieves; east side of Sinapalo Plateau	Latte quarry with nine very large latte columns and seven capstones in limestone pits. Listed in the NRHP on December 23, 1974 as the Rota Latte Stone Quarry (#74002225) for areas of significance related to prehistoric Chamorro culture, architecture, and engineering. Determined to be individually nationally significant through this study. The NPS is supporting the preparation of a national historic landmark nomination for the quarry site, which is currently underway.
Alaguan Latte Village Complex	Latte period	Alaguan Valley; south coast	A 25-acre (10-hectare) coastal village site with 58 latte sets, 24 basalt and limestone mortars, burials, rich artifact scatter, and midden mounds. Determined to be individually nationally significant through this study.
Dugi Archeological Site	Latte period	Dugi; east side of Sinapalo Plateau	25-acre (10-hectare) dispersed inland village site with 15 to 23 latte sets, mortars, midden mounds, and artifact scatters. Listed in the NRHP on February 11, 1985 (#85000287) for areas of significance related to prehistoric archeology, architecture, exploration/settlement, and social/humanitarian. Determined to be nationally significant as part of an extensive site complex through this study.
Chugai Cave	Pre-latte and latte period. Secondary period: World War II.	Cave in limestone terraces bordering north Rota's east coast	Rock art site including 90 pictographs, World War II Japanese structural remains for sleeping platforms, livestock pens, stacked rock features, and abundant artifacts. Listed in the NRHP on August 31, 1998 (#98001066) as the Chugai Pictograph Site for areas of significance related to archeology, prehistory, ethnic heritage, and Pacific Islander religion. Determined to be nationally significant as part of an extensive site complex through this study.
Måya Latte Site	Latte period	East of Mochong	A 1.3-acre (0.5-hectare) coastal village site near Mochong. Nine latte sets, one mortar, and artifacts. Determined to be nationally significant as part of an extensive site complex through this study.
Gampapa Latte Village	Latte period	Gampapa; east side Sinapalo Plateau	A 25-acre (10-hectare) disturbed and dispersed inland village site with minimum 13 latte sets, mortars, burials, soil/midden mounds, artifact scatters, and possible quarry. Determined to be nationally significant as part of an extensive site complex through this study.

TABLE 3-4: NATIONALLY SIGNIFICANT SITES, CONTINUED

SITE NAME(S)	TIME PERIOD(S)	LOCATION	DESCRIPTION
North Coast Archeological Sites: Salug-Songton, Unginao-Uyulan, Teteto-Guata, and Tatgua	Pre-latte and latte period	U.S. Memorial Beach Park, Teteto Beach, Guata Beach Park	Four coastal village sites with continuous distribution of latte, artifacts, and burials. The 12-pillar Tatgua latte set is very tall. Determined to be nationally significant as part of an extensive site complex through this study.
East and Southeast Coast Archeological Sites: As Dudo, Sagua Gahga, East Koridot, and West Koridot Villages	Latte period. Secondary periods: Japanese period, World War II.	I'Chenchon Park Wildlife Conservation Area	A 563.4-acre (228-hectare) area of coastal village sites. The 36 total sites include four latte villages and several lesser sites. The villages collectively contain 61 latte sets, burials, and the typical village archeological features and artifacts. Japanese and World War II periods include 31 sites, including charcoal kilns, a possible Japanese fishing camp, and World War II sites organized into complexes consisting of caves, rock shelters, and stacked rock features. Determined to be nationally significant as part of an extensive site complex through this study.
Ginalagan Japanese World War II Defensive Complex	World War II	Limestone cliff on northeast side of the Sabana.	A 62-acre (25-hectare) defensive complex with approximately 100 limestone, concrete, and earth defensive features. Determined to be individually nationally significant through this study.
Chudang Palii Japanese World War II Defensive Complex	World War II	Mananana; limestone cliff on north side of the Sabana.	A 31-acre (12.5-hectare) defensive complex with more than 130 features, including five anti-aircraft guns and limestone, concrete, and earth Japanese defensive features. Listed in the NRHP on May 1, 2012 (#12000250) for areas of significance related to the military. Determined to be individually nationally significant through this study.



Songsong and the Taipingot Peninsula, seen from the Sabana communication tower. Photo: NPS.

TABLE 3-5: SITES LISTED IN THE NATIONAL REGISTER OF HISTORIC PLACES

The sites below are listed in the National Register of Historic Places but have not been determined to be nationally significant at the time of writing.

SITE NAME(S)	TIME PERIOD(S)	LOCATION	DESCRIPTION
Nan'yō Kōhatsu Kabushiki Kaisha Sugar Mill (NKK Sugar Mill)	Japanese period	Liyo, Songsong	Structural remnants of sugar refining mill and Japanese locomotive. Listed in the NRHP on April 16, 1981 (#81000665) for areas of significance related to architecture and industry.
Japanese Hospital	Japanese period	Songsong	Structural remnants of a single-story concrete building. Listed in the NRHP on April 16, 1981 (#81000664) for areas of significance related to architecture.
Tatachog Rectory and Church	Japanese period	Tatachog	Structural remnants of two concrete buildings. Listed in the NRHP on April 16, 1981 (#81000666) for areas of significance related to architecture.
Commissioner's Office	Japanese period	Tatachog	Structural remnants of three concrete buildings, one with mampostería. Listed in the NRHP on April 17, 1981 (#81000663) for areas of significance related to architecture and politics/government.
Japanese Coastal Defense Gun	World War II	Ilek cliffline, above Sasanhaya Bay	A 140-millimeter coastal defense gun, Model 3, in reinforced concrete casemate. Listed in the NRHP on November 2, 1984 (#84000422) for areas of significance related to historic archeology, architecture, and the military.



Tatachog rectory, constructed during the Japanese period on Rota. Photo: NPS.

TABLE 3-6: SITES POTENTIALLY ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES

The sites below have been determined to be potentially eligible for listing in the National Register of Historic Places. Additional research is needed to fully evaluate whether each site would meet NRHP criteria, and the integrity of each site needs to be determined. These sites have not been determined to be nationally significant at the time of writing due to lack of information.

SITE NAME(S)	TIME PERIOD(S)	LOCATION	DESCRIPTION
Airport Area	Latte period	Airport and area to the north	Documented inland latte sites include the Mua Latte Sets, As Luriano Latte Set, and one disturbed latte set within the airport expansion area. It is unclear how many latte sets are in this area, however many sites may meet NRHP criteria.
Gaonan Cave (Site RT-1-641)	Pre-latte and/or latte period	West of Alaguan	Rock art site with six panels of pictographs. May meet NRHP criteria C (latte-period architecture) and D (potential to yield important information).
Southern Coast Sites: Payapai, Palii, and Agatasi	Latte period	West of Alaguan, near Malilok	Coastal village sites, including latte.
Casa Real	Spanish period	Songsong	Structural remnants of modest mampostería municipal building. Only surviving Spanish-period civic structure in the Marianas. Likely to meet NRHP criteria A (association with Spanish colonization), C (mampostería architecture), and D (potential to yield important information). Further study is also needed to evaluate it under NHL criterion 1 for its representation of Spanish political forces in the Mariana Islands and criterion 4 as the only example of a Spanish municipal building in the Mariana Islands.
Convento	Spanish period	Songsong	Structural remnants of abandoned mampostería and concrete structure and parish house. May meet NRHP criteria A (association with Spanish colonization), C (mampostería architecture) and D (potential to yield important information). There have been significant historic and modern renovations to the building, and its integrity is likely compromised.
Santa Margarita Shipwreck	Spanish period	Off northern coast	Spanish galleon shipwreck. May meet NRHP criteria A (association with the Manila Galleon trade, an event that made a significant contribution to the broad patterns of Marianas history) and D (potential to yield important information). Marine and submerged resources were not evaluated as part of this study; however, Appendix E includes a brief description of the shipwreck.
Lourdes Chapel	German period	Sakaya	Small Catholic devotional shrine of mampostería. Initial construction may have occurred during the Spanish period. May meet NRHP criteria C (mampostería architecture) and D (potential to yield important information).

TABLE 3-6: SITES POTENTIALLY ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES, CONTINUED

SITE NAME(S)	TIME PERIOD(S)	LOCATION	DESCRIPTION
Tonga Cave	World War II	Songsong	Hospital with concrete slabs, remains of Shinto shrine, and possible Japanese defensive tunnels. Could have been used in the precontact era. May meet NRHP criteria A (association with World War II) and D (potential to yield important information).
The Pit	World War II	Sakaya	Man-made vertical hole in limestone said to be intended as a mass gravesite for Chamorro after execution by Japanese forces. May meet NRHP criterion A for its association with World War II.
Shōun Maru Shipwreck	World War II	Sasanhaya Bay	4,396-ton bulk cargo ship, sunk by an American torpedo bomber in 1944. May meet NRHP criterion D (potential to yield important information). Marine and submerged resources were not evaluated as part of this study; however, Appendix E includes a brief description of the shipwreck.

TABLE 3-7: SITES REQUIRING ADDITIONAL RESEARCH

The sites below have been identified as needing further study before a determination of significance or integrity can be made.

SITE NAME(S)	TIME PERIOD(S)	LOCATION	DESCRIPTION
Payapai Cave	Latte period	Alaguan Valley; south coast	Rock art site with numerous pictographs. No known archeological survey of this site.
As Måtmos Caves	Pre-latte and/or latte period	As Måtmos; northeast end of Rota	Coastal rock shelters. Ethnographic information about the cultural site exists, however there is no archeological data.
Railroad and Japanese Locomotive	Japanese period	Railroad corridors throughout Rota	Alignment of the railroad system found throughout the island. In addition, a Japanese locomotive on a section of railroad tracks is parked next to a concrete loading platform in the Mua area of northern Rota.
North Coast Tunnel Complex	World War II	Near the intersection of the Airport Road and North Coast Road	Undocumented tunnel complex.
As Manila	World War II	Northern edge of the Sabana	Japanese World War II defensive tunnels. The structural remains of a Japanese surveillance point are in the immediate area.
Airfield	World War II	Sinapalo Plateau	Airfield constructed by the Japanese, destroyed during World War II, and reconstructed by the Seabees. Rota's current airport was constructed over the Japanese airfield.
Isang Point	World War II	Songsong	Japanese defensive feature; the structural remains of a Japanese surveillance point are in the immediate area.
Sabana Peace Memorial	Trust Territory period	Northern edge of the Sabana	Monument erected in 1973 by Rota in honor of Japanese who lost their lives in World War II.



The endangered tree *Serianthes nelsonii*, called tronkon guafi on Rota. Photo: Ann Marie Gawel.



SUITABILJTY



Standing latte tase and haligi, Alaguan Latte Village Complex. Photo: Dacia Wiitala and Isaac Merson.

CHAPTER 4: SUITABILITY

This chapter describes the National Park Service analysis of whether nationally significant sites are suitable for inclusion in the national park system.

INTRODUCTION

To be considered suitable for addition to the national park system, an area must represent a natural or cultural resource type that is not already adequately represented in the national park system, or is not comparably represented and protected for public enjoyment by other federal agencies; tribal, state, or local governments; or the private sector.

Adequacy of representation is determined on a case-by-case basis by comparing the potential addition to other comparably managed areas representing the same resource type, while considering differences or similarities in the character, quality, quantity, or combination of resource values. The comparative analysis also addresses rarity of the resources, interpretive and educational potential, and similar resources already protected in the national park system or in other public or private ownership. The comparison results in a determination of whether the proposed new area would expand, enhance, or duplicate resource protection or visitor use opportunities found in other comparably managed areas. Only those resources determined nationally significant are evaluated for suitability.

NPS THEMATIC FRAMEWORK

Every unit of the national park system preserves important aspects of our nation's natural and/or cultural heritage. The National Park Service (NPS) uses a series of natural history and cultural themes to categorize the important resources protected by national park units. The themes are used to evaluate whether resources in a study area would broaden and diversify resources protected by the national park system. Nationally significant natural and cultural resources in the study area are organized by these themes. Some natural and cultural themes represented by nationally

significant resources in the study area are not currently represented in the national park system. This analysis evaluates whether these resources would expand, enhance, or duplicate resource protection or visitor use opportunities in other national park units or comparably managed areas.

Natural History Themes

NATURAL REGION

For natural resources, the publication *Natural History in the National Park System and on the National Registry of Natural Landmarks* (NPS 1990) describes natural regions and a series of natural history themes. In this publication, Guam and the Trust Territories (the Northern Mariana, Caroline, and Marshall Islands) are listed as the two natural regions in the western Pacific. The Trust Territories no longer exist as a political entity: the Marshall and Caroline Islands are now sovereign nations, and the Northern Marianas have become a commonwealth of the United States. The division of Guam from the Trust Territories in this 1990 publication was presumably done to reflect political administrative differences, because as a single island chain, there is no natural resource-based reason to separate Guam and the Northern Marianas. For purposes of this comparison, we are defining the natural region as the Mariana island chain, including both Guam and the Commonwealth of the Northern Mariana Islands (CNMI). This is also consistent with the biogeographic province used in the evaluation of significance in Chapter 3. The Marianas natural region provides the context for determining whether nationally significant natural resources within the study area are adequately represented in the national park system or other comparably managed areas.

NATURAL HISTORY THEMES

Natural history themes are a series of categories encompassing the natural phenomena of the country. Only one theme applies to Rota's limestone forest: Land Ecosystems (Group 3), Theme 28: Tropical Ecosystems. The theme "Land Ecosystems" represents vegetation types as well as the animal populations and physical environmental features that are often important elements in identifying and evaluating sites. Two subthemes are represented in the study area:

- Lowland rain forest
- Montane rain forest

Lowland Rain Forest

Lowland rain forest is characterized by temperatures that are generally constant and warm, with any tendency toward a dry season offset by a period of cooler temperatures. This is typically an evergreen forest. Most of the limestone forest on Rota falls into this subtheme. This is also the limestone forest type which is found in most of the Mariana Islands. National Park Service units and comparably managed areas with lowland limestone forest are described below.

Montane Rain Forest

Montane rain forest is the evergreen forest of the cooler, misty upper slopes of mountains in the tropics. High-elevation limestone forest on Rota falls into this subtheme and is recognized as distinct from lower-elevation forest: it is often shrouded in clouds and supports a different vegetation assemblage. High-elevation limestone forest is only potentially found in one other location in the Marianas, near Mt. Lamlam on Guam (Amidon, pers. comm., 2017), though the forest on Guam is not well-documented. There are no National Park Service units or comparably managed areas that fall into this subtheme.

COMPARATIVE SITES OVERVIEW— NATURAL RESOURCE THEMES

Guam is the primary comparative island for limestone forest as, except for Rota, it contains

the largest expanses of relatively intact forest. Limestone forest on Guam is found mostly on the northern end of the island, and there is also a smaller extent of forest along the Mt. Lamlam–Mt. Alifan ridge. This comparative analysis looks at NPS-managed as well as comparably managed areas. To be considered comparably managed, an area needs to provide both resource protection and visitor opportunities. Comparably managed areas on Guam are described in more detail below and include War in the Pacific National Historical Park (NPS), Guam National Wildlife Refuge–Ritidian Unit (U.S. Fish and Wildlife Service), and the Anao Conservation Area (Government of Guam).

Significant acreage of limestone forest is also found within military bases on Guam. Specifically, Andersen Air Force Base and the adjacent Finegayan Naval Computer and Telecommunications Station contain large areas of lowland limestone forest, and the Ordnance Annex of Naval Base Guam contains some small patches of both lowland and montane limestone forest. Most of these areas are within the Guam National Wildlife Refuge–Overlay Units, which have a dual purpose of protecting wildlife on undeveloped military lands while keeping these lands available for national defense needs. However, since these areas are only open to the public on a restricted basis, they cannot be considered comparably managed to a national park site.

Saipan contains very limited acreage of intact limestone forest due to extensive clearing in the first part of the 20th century, as described in Chapter 3: Resource Significance. A number of CNMI conservation areas on Saipan protect recovering forested areas, as well as small fragments of undisturbed limestone forest on cliffs. These conservation areas include the Nightingale Reed-Warbler and Micronesian Megapode Conservation Areas in Marpi, the Saipan Upland Mitigation Bank, the Bird Island Wildlife Preserve, the Kagman Wildlife Conservation Area, and terrestrial portions of the Bird Island and Forbidden Island Sanctuaries. Though these areas are protected for resource conservation and public enjoyment, the limestone forest resource itself is not comparable to that on Rota due to

the history of disturbance. Tinian, Aguiguan, and Farallon de Medinilla do not contain any areas of limestone forest that are comparably managed to a national park site.

National Park Service Units

War in the Pacific National Historical Park

War in the Pacific National Historical Park on Guam contains three small remnants of limestone forest: along Asan Ridge in the Asan Beach Unit, on the north slope of the Fonte Plateau Unit, and on the upper edge of the Mt. Alifan Unit. Each of these sites contains fewer than 20 acres (8 hectares) of limestone forest. These forests are managed as a natural resource by the National Park Service. While not closed, public access is limited and there is only one designated trail, which is found in the limestone forest at Asan Ridge. Signage provides the public with information about key plant species. The Asan Ridge and Fonte Plateau unit remnants are recovered from areas that were severely damaged in World War II; photographs of Asan Ridge from shortly after the Battle of Guam show a ridge with essentially no remaining vegetation. Though these forests are considerably recovered today with native plants and animals, they are not comparable to the forests of Rota, which did not experience such devastation.

The Mt. Alifan unit contains a small acreage of limestone forest on the uppermost slope. This area is a very small slice of the edge of the forest that runs along the Mt. Lamlam–Mt. Alifan ridge, the remainder of which is not comparably managed. Some areas are private or within the Ordnance Annex and not open to the public, other areas could be accessible to the public if trails were constructed but they are not in any formal protected status.

The boundaries of War in the Pacific National Historical Park were drawn primarily to protect cultural resources and the landscape related to the Battle of Guam; limestone forest was included incidentally and in very small patches. Better and more extensive examples of limestone forest exist elsewhere on Guam and other islands in the Marianas.

Other Public and Private Sites

Guam National Wildlife Refuge, Ritidian Unit (USFWS)

The Ritidian Unit of the Guam National Wildlife Refuge protects 1,217 acres (492.5 hectares) of terrestrial and nearshore habitat, including more than 300 acres (121 hectares) of limestone forest connected to additional limestone forest covering most of the northern part of the island. The limestone forest of the Ritidian Unit is also home to rare plants and animals, including the federally endangered tree *Serianthes nelsonii*, the federally endangered Mariana eight-spot butterfly (*Hypolimnys octocula marianensis*), and the federally endangered Mariana fruit bat (*Pteropus mariannus mariannus*). However, the brown tree snake has greatly impacted the integrity of the limestone forest ecosystem and plant and animal communities.

The Ritidian Unit is open to the public and includes a visitor center with interpretive exhibits, trails, picnic areas, and interpretive and educational programming provided by U.S. Fish and Wildlife staff. The area provides recreational opportunities for approximately 90,000 visitors annually, who participate in activities such as hiking, fishing, snorkeling, scuba diving, wildlife observation, and nature photography. The Ritidian Unit also serves as an important resource for environmental education on Guam, providing free environmental education presentations and hosting thousands of students annually on educational field trips and volunteer projects.

Anao Conservation Area (Government of Guam)

The Anao Conservation Area protects 764 acres (309 hectares) of coastal cliffs and plateau in northeastern Guam. Anao includes approximately 600 acres (243 hectares) of limestone forest. This limestone forest is part of a larger extent of limestone forest that runs along the northeast coast of Guam and connects to the limestone forest covering most of the northern part of the island. As at Ritidian and elsewhere on Guam, however, the brown tree snake has impacted the integrity of the limestone forest ecosystem. The Anao

Conservation Area is open to the public and minimally developed with a footpath. It is used by hikers, hunters, and fishermen (Guam Division of Aquatic and Wildlife Resources 2006).

CONCLUSION—NATURAL RESOURCE THEMES

War in the Pacific National Historical Park does not contain a comparable example of limestone forest to that found on Rota, as the limestone forests in the park are recovering from World War II disturbance and are very small fragments that do not compare to the extent and diversity of forest found on Rota. The Anao Conservation Area and the Ritidian Unit of the Guam National Wildlife Refuge protect a comparable resource with comparable management to a national park

unit. However, the brown tree snakes in the limestone forests on Guam have resulted in a cascade of impacts to the food web and seed dispersal that will increasingly alter forest structure as time goes on (see Chapter 3: Resource Significance for further discussion of this topic).

The limestone forest of Rota is suitable for inclusion in the national park system. This forest represents the most intact example of this resource type in the United States. Lowland and montane (high-elevation) limestone forests are not adequately represented elsewhere in the national park system, nor are there other comparable sites that protect and interpret a similarly intact example of the limestone forest ecosystem.



Hiking through the recovered limestone forest at Asan Ridge, War in the Pacific National Historical Park, Guam. Photo: NPS.



1. [Top] The Mt. Alifan unit at War in the Pacific National Historical Park protects a small acreage of limestone forest. **2.** and **3.** [Bottom left and right] Views of the limestone forest at the Guam National Wildlife Refuge, Ritidian Unit. Photos: NPS.

Cultural Themes

In evaluating the suitability of cultural resources within or outside the national park system, the NPS uses its “Thematic Framework” for history and prehistory. The framework is an outline of major themes and concepts that help to conceptualize American history. It is used to assist in the identification of cultural resources that embody America’s past and to describe and analyze the multiple layers of history encapsulated within each resource. Through eight concepts that encompass the multifaceted and interrelated nature of human experience, the thematic framework reflects an interdisciplinary approach to American history. Six of the eight concepts apply to the nationally significant cultural resources of Rota, including the Chamorro archeological sites and the World War II Japanese defensive complexes. The concepts are:

- I. Peopling Places
- III. Expressing Cultural Values
- IV. Shaping the Political Landscape
- VI. Expanding Science and Technology
- VII. Transforming the Environment
- VIII. Changing Role of the United States in the World Community

Each of the themes rests on a framework of topical subthemes that are used to describe and explain the significance of the primary theme.

Evaluation of Cultural Themes Represented on Rota

CHAMORRO ARCHEOLOGICAL SITES

The significant Rota Chamorro archeological sites include the Mochong and Alaguan Latte Village Complexes, the As Nieves Quarry, the complex of coastal and upland latte villages, and the rock art sites. Inhabited by the Chamorro people for thousands of years, the archeological sites represent several

interconnected themes and associated topics from the NPS thematic framework. The collective archeological sites are associated with these themes due to the numerous architectural, habitation, ceremonial, and spiritual features; unique structures; and rich artifact and midden assemblages that contribute to understanding the over 3,500-year history of the indigenous culture of the Mariana Islands. In addition, these sites are integral to the ongoing cultural practices of the Chamorro people, who visit latte villages to connect with taotaomo’na, or ancestral spirits (Kurashina et al. 1999, 269).

I. Peopling Places. This theme examines human population movement and change through prehistoric and historic times. Life in America and the Marianas began with migrations many thousands of years ago. Centuries of migrations and encounters have resulted in diverse forms of individual and group interaction, from peaceful accommodation to warfare and extermination through exposure to new diseases.

Communities, too, have evolved according to cultural norms, historical circumstances, and environmental contingencies. The nature of communities is varied, dynamic, and complex. Ethnic homelands are a special type of community that existed before incorporation into the political entity known as the United States. Distinctive and important regional patterns join together to create microcosms of America’s history and to form the “national experience.”

Within the Peopling Places theme, the significant Rota Chamorro archeological sites represent the topics of migration from outside and within; community and neighborhood; ethnic homelands; and encounters, conflicts, and colonization. The topics of migration from outside and within and ethnic homeland are represented by the successive waves of settlers from different areas of Island Southeast Asia, New Guinea, and Oceania who navigated over one of the longest expanses of ocean ever crossed to eventually populate and thrive on the Mariana Islands. The importance of movement and voyaging to Pacific Islander identities and lifeways is described in the 2017

Asian American and Pacific Islander National Historic Landmark Theme Study (Marsh and Na'puti 2017, Stillman 2017). Rota's latte villages, other habitation sites, and rock art sites represent these topics of migration and ethnic homeland.

Encounters, conflicts, and colonization are represented by the long-term maritime interactions between Chamorro groups and Carolinian voyagers, the dramatic changes in Chamorro culture resulting from European and Japanese colonization of the Marianas, and the extermination of the majority of the Chamorro population through exposure to new diseases introduced by Spanish colonizers. The abandonment of the latte villages and of the As Nieves Quarry provide evidence of encounters, conflicts, and colonization. The latte villages, trails and other access corridors, and the interrelationships between the inland and coastal villages represent the topics of community and neighborhood.

III. Expressing Cultural Values. This theme covers expressions of culture—people's beliefs about themselves and the world they inhabit. This theme also encompasses the ways that people communicate their moral and aesthetic values.

Within the Expressing Cultural Values theme, the Chamorro archeological sites, including latte villages, other habitation sites, and the As Nieves Quarry, represent the topic of architecture. The rock art sites represent the topics of visual and performing arts and popular and traditional culture.

The latte villages contain precontact structures that represent traditional Chamorro building styles and construction techniques. The form, size, spatial organization, composition, and associated features of the latte demonstrate precontact Chamorro architecture. Mochong and Alaguan are the largest-known extant latte complexes in the Marianas and contain rare latte elements. If extracted and erected, the As Nieves Quarry would stand 19.7 feet (6 meters) high, over 3 feet (0.9 meters) taller than the only other extant huge latte set on the Marianas, the imposing House of

Taga on Tinian. The architectural remains at As Nieves convey the cultural values of the indigenous community through providing tangible evidence of increasing social, political, and economic stratification through increasing architectural size. The varying size and extent of visible latte features may reflect differentiation in the power and status of the occupants, signify seniority among members of a kin group, or be a symbol of elaborate political hierarchies.

As distinctive architectural remnants of the Chamorro culture, latte are so significant to the local community that they have become the contemporary icon of traditional culture. As noted in the *Asian American and Pacific Islander National Historic Landmark Theme Study*, tangible examples of cultural heritage, such as latte sites, are valued by Micronesian communities for their ability to sustain traditional cultural systems. The preservation of traditional cultural practices is considered critically important, in some cases even more so than the preservation of the physical resources themselves (Marsh and Na'puti 2017, 247).

The rock art sites, including Chugai Cave, are surviving artistic expressions distinctive of the Chamorro culture of the Marianas. In addition to the precontact grave goods of decorative jewelry and the lime-filled impressions embellishing some pre-latte period pottery, rock art provides important tangible evidence of ancient Chamorro art.

VI. Expanding Science and Technology. Science is modern civilization's way of organizing and conceptualizing knowledge about the world and the universe beyond. Technology is the application of human ingenuity to modification of the environment in both modern and traditional cultures. Technologies can be particular to certain regions and cultures.

Under the theme of Expanding Science and Technology, the Chamorro archeological sites represent the topics of experimentation and invention and technological applications. Latte villages located on the narrow coastal terraces illustrate the technological advances

of Chamorro cultural groups in quarrying, transporting, and constructing latte structures in topographically challenging places. The existence of earthenware pottery, lusong, adzes, slingstones and other stone tools composed of basalt and other types of stone not found in the latte villages or on Rota illustrate the evolving technology and use of materials.

Fishing artifacts including fishhooks, spears, and harpoons and an analysis of the fishbone assemblage at Mochong provide evidence of evolving technology used for fishing and the highly specialized fishing and sailing techniques used by the Chamorro inhabitants. Middens and cave paintings show the unique skills used to catch large pelagic fishes, which also depended on traditional technologically advanced sailing vessels. The As Nieves Quarry represents these topics by providing tangible evidence of the sophisticated engineering and technological skill attained by the ancient Chamorro. That the island population could quarry, extract, transport, and erect latte elements weighing between 17 and 23 tons without the use of metal tools or the wheel is an extraordinary achievement.

VII. Transforming the Environment. This theme examines the variable and changing relationships between people and their environment, which continuously interact. The environment is where people live, the place that supports and sustains life. The American environment today is largely a human artifact, so thoroughly has human occupation affected all its features. This theme acknowledges that the use and development of the physical setting is rooted in evolving perceptions and attitudes.

Under the theme of Transforming the Environment, the Chamorro archeological sites represent the topic of manipulating the environment and its resources. The Chamorro culture developed through interactions with and adaptations to the environmental constraints and opportunities inherent to their surrounding land and seascape. Past human use of the land and seascape and the ecosystems contained within them leaves ecological legacies with socioeconomic and

environmental consequences for future generations. These legacies may be in the form of dramatically changed island flora caused by the intentional and inadvertent introduction of invasive species as well as food crops, medicinal plants, and other economically important plants.

Island ecosystems like the Marianas are fragile due to their small size and isolation. For instance, erosion and sedimentation severely impact the availability of marine food and freshwater resources, while overharvesting can lead to severely diminished resources, thus restricting the food supply. Thousands of years of Chamorro history on the islands speak to Chamorro people's ability to ensure long-term sustainability of the resources that supported their island community.

COMPARATIVE SITES OVERVIEW— CULTURAL RESOURCE THEMES, CHAMORRO ARCHEOLOGICAL SITES

This overview identifies similar resources to the Rota Chamorro archeological sites that are already protected in the national park system or through comparably managed areas in public or private ownership. The geographic scope of the analysis includes the full Mariana archipelago, the ancestral homeland of the Chamorro people. In the Marianas, precontact Chamorro resources are found throughout the islands, including on Guam, Rota, Saipan, Tinian, Aguiguan, Sarigan, and Pagan. Although hundreds of sites have been documented, there has not been a comprehensive survey of sites or organized data to conduct a thorough comparative analysis.

Latte Village and Quarry Sites

National Park Service-Managed Sites and National Historic Landmark Districts

There are no units in the national park system exclusively dedicated to the preservation and interpretation of Chamorro cultural resources, and there are few examples of other significant tangible resources associated with the entire sequence of the Chamorro culture in the national park system and in NHL districts in the Marianas. Of the NPS units and other

NPS-recognized sites in the Marianas, all of which are focused on the World War II experience, only War in the Pacific National Historical Park (Guam), American Memorial Park (Saipan), and North Field District (Tinian) protect minimal precontact resources. Moreover, these resources are tangential to the purpose and significance of the sites. At these sites, remnant traditional latte sets or elements are occasionally found as isolated fragments with few associated features, little stratification, and no extensive intact cultural deposits.

War in the Pacific National Historical Park, Guam

Below the War in the Pacific National Historical Park's Mt. Tenjo Unit, there is a disturbed 4-pair and 5-pair latte set on the slopes (Mulrooney 2006). Intact precontact subsurface deposits have been found at the park's Asan Beach Unit and may be present in the Agat Unit (Davis 1994 in Wells and Hommon 1999, 27). The park does not currently interpret these resources.

American Memorial Park, Saipan

Within the boundaries of American Memorial Park on Saipan, precontact subsurface deposits dating to the latte period have been identified (Wickler 1990 in Robins and Filimoehala 2021, 33). Although Hans Hornbostel's archeological investigations in the Marianas in 1924–25 described extensive latte settlement along Saipan's west coast, in the vicinity of the present-day park, no latte sets or fragments have been discovered in the park. This is likely due to extensive land grading and filling activities on the island in the years before and after World War II (Thomas and Price 1979 in Robins and Filimoehala 2021, 27).

North Field National Historical Landmark District, Tinian

At and around the North Field National Historical Landmark District, there are fragments of latte or disturbed small latte sets at Unai Chulu, Dangkulo, and Masalok (Welch and Tuggle 2008). Archeological investigations have yielded subsurface information from the precontact era at the North Field District, particularly in beach deposits at Unai Chulu

and Unai Babui (Craib 1998b, Haun et al. 1999, Tuggle 2009).

While a number of the NPS and NHL sites on Guam, Saipan, and Tinian may be comparable in condition and integrity to some of the smaller individual sites on Rota, they are disturbed and are mostly remnants or fragments of latte and other archeological resources. By contrast, Rota has a broader selection of site types in close proximity, located in a largely well-preserved setting. Therefore, the quality and quantity of resources representing the precontact Chamorro culture in the national park system and NHL districts do not compare to those of the significant Rota Chamorro archeological sites and their representation of the themes of Peopling Places, Expressing Cultural Values, Expanding Science and Technology, and Transforming the Environment. In addition, the cultural themes related to the indigenous culture of the Mariana Islands are not well-represented at the current NPS sites, where the focus is on commemorating and interpreting the bravery and sacrifice of those who participated in World War II in the Pacific.

Other Public and Private Sites

Precontact Chamorro cultural sites are also found on lands managed by local governments and other entities. On public and private lands, sites that are protected and allow for visitor opportunities are included in this comparative analysis. Some sites are actively protected, while others are protected because of their remoteness, lack of development, and restricted access. Most of the private lands have not been archeologically surveyed.

Compared to sites on Rota, the remaining protected village sites are mostly small in area and have fewer and less complex latte resources. Many precontact village sites are highly disturbed, and several sites have been destroyed. For example, Tinian and Saipan contain mostly remnant latte village sites impacted from clearing of land for agriculture during the Japanese period. Likewise, many villages on Guam were impacted during the Spanish period and World War II. Several sites are owned by the Government of Guam and provide public access, while other sites are

privately owned or owned and managed by the military with limited or restricted access. Other islands, including Aguiguan, also have village sites on public land but are very difficult to access.

Among the larger precontact Chamorro sites that are accessible to the public, the most comparable sites to Rota are Pãgat on Guam and House of Taga and Taga Quarry on Tinian. These sites are described in detail below. Other sites were considered for analysis but were not comparably managed to a National Park Service unit or did not include a comparable quality or diversity of resources to those found in the collective Rota Chamorro archeological sites.

The Naval Ordnance Annex on Guam is an example of a site considered for analysis but not carried forward due to its current management. Owned and managed by the U.S. Navy, the Annex provides evidence of an inland Chamorro settlement that is comparable to the interior latte clusters on Rota. The site includes Fena Valley, Almagosa Watershed, and Mepo, and contains extensive Chamorro archeological resources, including one 12-pillar latte set, rock shelters, caves, and mortars. Although there are vast resources in this area, it is closed to the public for the purpose of national security. It is highly unlikely that public access will be allowed in the near- and long-term future, therefore it cannot be considered comparably managed to sites where visitor opportunities are provided.

Pãgat, Guam (Government of Guam)

Pãgat is an important, large precontact coastal Chamorro village site on Guam and is listed in the National Register of Historic Places. It is one of the best archeological sites on Guam and is generally considered to be the best site on Government of Guam land. Pãgat is publicly accessible, although it is difficult to reach along a rough trail. Pãgat contains several intact occupation and other use sites. Resources include latte sets, rock shelters, walls, a rock-lined trail, and a spring water source in a cave. There are heavy midden pottery concentrations, tools, sherds, and numerous basalt and limestone lusong. The

site is within limestone forest and is intact and still used to collect medicinal plants (NPS 1974b, Craib 2021). Compared to the sites on Rota, Pãgat also provides excellent representation of the cultural themes, but as an individual site it does not represent the themes to the same degree and breadth as the collective sites on Rota.

House of Taga, Tinian (CNMI Historic Preservation Office)

The House of Taga on Tinian contains the largest known standing latte in the world. The site is listed in the National Register of Historic Places, is located on CNMI land on the southwestern coast of Tinian, and is accessible to the public. In addition to the size of the latte, this site is also important in its connection with Chief Taga, who led a unifying campaign that resulted in his assuming the monarchy of the Marianas Chamorro population (NPS 1974a). According to legend Taga was a giant, hence the need to build the House of Taga with the large latte.

Only one of the latte (a single tasa and haligi) remains standing, measuring approximately 15 feet (4.5 meters) high. The other 11 of the set of 12 latte structures have fallen. World War II shelling on Tinian shattered one of the haligi that was still standing in the early 1940s and sheared the tasa of another (Russell 1997). The House of Taga was once part of a larger village including 18 latte sets, which stood as an intact site until the 1920s (Russell 1997). The more modest latte structures of the original site, surrounding the House of Taga, were destroyed by earthmoving and construction projects undertaken during the 20th century, including the construction of a dock and breakwater and expansion of San Jose village by the Japanese before the end of World War II (Russell 1997, NPS 1974a). Although little systematic archeological work has been conducted at the site, the archeological surveys that have been completed reveal latte period deposits and pre-latte period artifacts, subsistence remains, and features (Russell 1997).

The House of Taga is a significant Chamorro archeological site—notable for the immense

size of its latte and its depiction in traditional Chamorro oral history through the story of Taga—and represents the same cultural themes as those illustrated by the Rota collective sites. However, the House of Taga arguably represents these themes to a more limited extent due to the diminished integrity of its setting. The House of Taga’s surrounding landscape context, including the larger village site, was substantially disturbed by 20th-century development activities and World War II bombardment. In contrast, Rota’s latte village sites are located in limestone forest and coastal settings that are largely well-preserved, providing the opportunity to experience and understand precontact Chamorro villages within their broader cultural landscape.

Taga Quarry, Tinian (CNMI Historic Preservation Office)

At the Taga Quarry, the latte were removed, transported, and erected to form the House of Taga about 1 mile (1.6 kilometers) away. The quarry is also on the western coast of Tinian, south of the House of Taga at present-day Taga Beach Park (April 2004). Except for the Taga Quarry, there are no other known latte quarries that compare to As Nieves in extent and clarity of the activity being conducted. Many of the other latte quarries are composed of a hole in the limestone, which can debatably be a natural karst shape or a quarry.

Although there are many small quarries throughout the islands, where a few stones were extracted near latte sites, larger well-documented quarries in the Marianas are rare. In addition to Taga and As Nieves, there are only two other well-documented quarries in the islands: Urunao on Guam and Agingan on Saipan. These quarries are all found on limestone coastlines, rather than inland where the As Nieves quarry is located. Unlike As Nieves, the majority of their quarried elements are removed from their quarry pits. In addition, the latte elements at Urunao and Agingan reflect more rudimentary quarrying techniques than do the elements at either Taga or As Nieves (April 2004).

The As Nieves Quarry depicts the ability and skill of the Chamorro people to

implement complex extraction and engineering techniques to produce megalithic architecture representing their cultural values. The enormous size of the megaliths and their continued placement within their quarry pit at the As Nieves Quarry provide superlative opportunities for visitor interpretation and education.

Rock Art Sites

Rock art sites in the Marianas are found on Guam, Saipan, Rota, and Tinian and are mostly found in caves. Several caves are on public lands and are accessible, while others require guided access. The meanings of pictographs in the Marianas have yet to be determined, and Chugai Cave and the other rock art caves along Rota’s east coast provide excellent opportunities to study Chamorro rock art.

The motifs in Chugai Cave differ from those of the other Marianas rock art sites. The cave does not appear to contain any representations of human stick figures, which is the most common image found in rock art sites in the islands. The human motif has supported the interpretation that the rock art is associated with ancestor worship and burial practices. Instead, Chugai’s motifs are geometric, with a few notable zoomorphic images, including two sea turtles and a billfish or squid (Hunter-Anderson 2012a, 50). Additionally, Chugai motifs are composed of black paints, rather than the more common white. Located within the I’Chenchon Park Wildlife Conservation Area, the rock art cave is protected by the CNMI government.

Compared with the other well-recognized pictograph sites of Litekyan Cave at Ritidian, Gadao’s Cave, Mahlac Cave, Talagi Cave, As Quiroga Cave, and Kalabera Cave, Rota’s Chugai Cave is not clearly preeminent, although with approximately 90 motifs it is one of the largest sites. Based on the limited documentation and radiocarbon dates for rock art sites on Rota and in the Marianas, more data would be needed for an informed comparative analysis of rock art sites in the Marianas. While rock art sites in the Marianas may be adequately represented as a protected, publicly accessible cultural resource type, Rota’s Chugai and East and Southeast

Coast Caves are unique for their inclusion in a nationally significant archeological site complex composed of multiple resource types.

CONCLUSION—CULTURAL RESOURCE THEMES, CHAMORRO ARCHEOLOGICAL SITES

The significant Rota Chamorro archeological sites exemplify the NPS cultural themes of Peopling Places, Expressing Cultural Values, Expanding Science and Technology, and Transforming the Environment. Overall the character, quality, quantity, and rarity of the resources representing the precontact Chamorro culture in other public lands and private lands do not compare to those of the collective Rota sites. The comparative sites do not contain any settlements of the same magnitude of Mochong, Alaguan, and As Nieves on Rota, nor do they possess the spatial or contextual relationship to other coastal and inland latte sites and rock art sites.

Rota includes the two most extensive coastal village sites, Mochong and Alaguan, which are the only remaining latte villages in the Marianas with intact 14-pillar latte sets. There are no other protected large complex village sites. Additionally, the proximity of the inland sites to coastal sites and rock art sites and the high degree of preservation of many of the sites on Rota provide a rich context for understanding the relationships among these various communities and places, including

their evolution over time and their use of the island's resources through a changing environment. In addition, these sites are carefully protected by the community and are still used today to support Chamorro cultural practices. The extent, composition, and preservation of Mochong and Alaguan within a native tropical environment offer exceptional opportunities for interpretation and education about Chamorro culture. The other coastal and interior latte clusters on Rota are relatively accessible and offer prime opportunities for research.

Where precontact Chamorro archeological resources are present in the national park system, they are fragmented, highly disturbed, or small disturbed clusters. Although precontact Chamorro culture sites are also found on military lands, other public lands, and private lands, as individual sites they do not fully illustrate all of the themes that are represented by the collective sites of Rota.

The Rota Chamorro archeological sites—including Mochong and Alaguan Latte Village Complexes, the As Nieves Quarry, the complex of coastal and upland latte villages, and the rock art sites—are suitable for inclusion in the national park system. These sites depict the unique and living culture of the Chamorro people of the Mariana Islands, which is not adequately represented or protected elsewhere in the national park system.





1. [Opposite page] Latte at Masalok, on Tinian. Photo: NPS. 2. [This page, top] Standing and fallen latte at House of Taga, on Tinian. If the As Nieves Quarry stones were standing, they would be taller than these. Photo: NPS. 3. [This page, bottom] The House of Taga in the nineteenth century, as depicted by Jacques Arago for Freycinet's *Voyage Autour du Monde*, 1823. Courtesy of the Guam Public Library System.



1. [Top] The first recorded illustration of the House of Taga on Tinian, by George Anson in 1742. All twelve stones were standing. Courtesy of the Guam Public Library System. **2.** [Bottom] View of the Taga Quarry on Tinian, about a mile (1.6 kilometers) from the House of Taga site. Unlike As Nieves Quarry on Rota, the stones were removed to construct the immense nearby latte structures. Photo: NPS.

WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

The significant WWII Japanese defensive complexes of Chudang Palii and Ginalagan are constructed inland fortification networks that were also used for long-term refuge during the final 14 months of World War II in the Pacific (June 1944–August 1945). The defensive complexes represent several interconnected themes and associated topics from the NPS thematic framework.

I. Peopling Places. This theme examines human population movement and change through prehistoric and historic times. Life in America and the Marianas began with migrations many thousands of years ago. Centuries of migrations and encounters have resulted in diverse forms of individual and group interaction, from peaceful accommodation to warfare and extermination through exposure to new diseases.

Within the Peopling Places theme, Chudang Palii and Ginalagan World War II defensive complexes are associated with the topics of encounters, conflicts, and colonization. Beginning with the Japanese mandate, a substantial new population of Japanese colonists came to Rota for commercial opportunity. During World War II, the population dramatically increased with a huge influx of Japanese military personnel to fortify the island. In 1939, Rota's population was approximately 3,900. In 1944, as the Japanese military increased their presence in the Marianas, a Japanese garrison of about 3,000 soldiers arrived on Rota.

As the nearby islands were invaded that June, the civilian population sought refuge in caves and wooded areas and searched for food wherever they could scrounge it. In contrast, Japanese military personnel were able to live within their elaborate defensive positions at Ginalagan and Chudang Palii, where they had stockpiled rations and incorporated water catchments in preparation for a prolonged resistance. The demoralized Japanese troops began to physically, verbally, and psychologically mistreat the Chamorros. By 1944, many of the indigenous people felt

certain the Japanese army was intent on their mass extermination.

The stresses on the Chamorro civilians living on a bypassed island within a war zone, the contrasting tensions of the Japanese troops, and their fraught interrelations with each other over a 14-month siege are a major element of the Peopling Places theme that is distinctly reflected on Rota, in contrast with the experience of the other larger Mariana Islands, which were invaded.

In September 1945, the Japanese soldiers were removed from Rota, and the following year, Japanese, Okinawan, and Korean civilians residing on Rota were repatriated to their native homes. This dramatic change in population left Rota with 820 Chamorros remaining to reestablish their lives.

III. Expressing Cultural Values. This theme covers expressions of culture—people's beliefs about themselves and the world they inhabit. This theme also encompasses the ways that people communicate their moral and aesthetic values.

Within the Expressing Cultural Values theme, Chudang Palii and Ginalagan World War II defensive complexes are represented under the topic of architecture. These extensive complexes were built into the limestone escarpments in the island's interior to provide in-depth defense for the Japanese soldiers occupying Rota and typify the kind of fortification networks used in the final stages of the war to make American amphibious assaults more and more costly. These complexes blend into the landscape of the island's interior and include features for generating electricity and conveying water. These defensive complexes were likely constructed by hand and illustrate the hardships faced by the soldiers and the people of Rota during World War II. They are undamaged by battle and are thus better representatives of this significant type of fortification than can be found on island battlefields. The material culture associated with these sites adds to their ability to transmit their feeling, setting, and association with the lives of Japanese soldiers. In addition, the sites

illustrate the defensive prowess of the Japanese military and its ability to use the landscape and limited available materials to maximum advantage, as well as the extraordinary determination of the Japanese to never surrender but fight for their Emperor and die if necessary.

IV. Shaping the Political Landscape. This theme encompasses tribal, local, state, and federal political and governmental institutions that create public policy and those groups that seek to shape both policies and institutions. The political landscape has been shaped by military events and decisions, by transitory movements and protests, as well as by political parties.

Under the Shaping the Political Landscape theme, the fortifications are contained under the topics of military institutions and activities and political ideas, cultures, and theories.

The two defensive complexes are outstanding examples of Japanese interior defensive networks that illustrate the change in Japanese World War II military doctrine from island defense at the shoreline to an in-depth defensive strategy.

This revised Imperial Japanese doctrine is exemplified in well-preserved fashion at Rota and was fully realized in the brutal and extended battles on Peleliu, Iwo Jima, and Okinawa. By re-shaping their own policies and approaches to strategic warfare, the Imperial Army forced the U.S. to accept much higher casualties as they contended with Japanese forces in their push northward to conquer the Japanese home islands. Hence, this shaping of military institutions and theories instigated by the Imperial Army not only significantly increased U.S. war casualties, but also led directly to the conclusion that the use of atomic weapons was an acceptable alternative to the carnage to be expected in an invasion of Japan.

The theme of Rota as a bypassed island in World War II in the Pacific is represented by the largely intact Chudang Palii and Ginalagan World War II Japanese defensive complexes. Those on Rota waited 14 months for the war

to end, while U.S. forces established massive military bases on nearby Tinian, Saipan, and Guam and conducted frequent bombing raids on Rota (see Chapter 2: Context and Resource Description, for more information about Rota in World War II). Understanding the experience on bypassed islands gives context to the broader Pacific War, as American forces bypassed numerous islands, their garrisons, and the civilian population, from Bougainville in the Solomons to Yap and Chuuk (Truk) in the Caroline Islands. This representation is apparent through the presence and the integrity of these cultural properties.

VIII. Changing Role of the United States in the World Community. This theme explores diplomacy, trade, cultural exchange, security and defense, expansionism—and, at times, imperialism. The interactions among indigenous peoples, between this nation and Native peoples, and this nation and the world have all contributed to American history.

America has never existed in isolation. While the United States, especially in the 19th and 20th centuries, has left an imprint on the world community, other nations and immigrants to the United States have had a profound influence on the course of American history.

The emphasis in this category is on people and institutions—from the principals who define and formulate diplomatic policy, such as presidents, secretaries of state, and labor and immigrant leaders, to the private institutions that influence America’s diplomatic, cultural, social, and economic affairs.

Under the theme of the Changing Role of the United States in the World Community, the fortifications represent the topics of international relations and expansionism and imperialism. These interwoven topics are considered together in the following discussion.

While the population of 8,200 on Rota did not experience the combat and widespread destruction of those on Guam and Saipan, those on Rota were still subjected to a prolonged period of fear and deprivation. Rota’s population of Japanese military

personnel, other Asian conscripts, and Chamorros were stranded on the island for over a year, cut off from all supplies and support while the war raged around them. Amid a growing scarcity of food and basic provisions, inadequate medical attention, and a lack of shelter, Rota's civilians scraped by in fear for their lives, families, and livelihood. Without a food reserve, with their gardens and cultivated fields destroyed in bombing raids, and with fishing largely impossible due to the dangerous and sudden air attacks, malnutrition and disease became rampant among Rota's inhabitants.

The suffering and hardships imposed on the Chamorro population of Rota (and the broader Marianas) helped shape the American political landscape in the islands. Civilians in the Northern Marianas initially greeted the prospect of an American invasion with anxiety, due to Japanese rumors that American capture would result in civilian torture or execution. Ultimately, the arrival of the U.S. military with food and supplies in September 1945 instilled a sense of relief and gratitude in the islanders, although perspectives on the U.S. presence would become increasingly complex and ambivalent over time (Poyer et al. 2001). Thus continued the evolving relationship between indigenous populations and the American political process of territorial acquisition, as the U.S. attempted to bring the entire Pacific Ocean into its zone of influence during the Cold War. After World War II, the U.S. expanded control of many islands throughout the western Pacific—whose island nations eventually became commonwealths, or independent nations with compacts of free association with the United States. This created new social, economic, political, and cultural opportunities as well as dilemmas for Rota's Chamorro population and once again dramatically altered the circumstances of the indigenous population.

COMPARATIVE SITES OVERVIEW— CULTURAL RESOURCE THEMES, WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

This overview identifies similar resources to Rota's World War II defensive complexes

that are already protected in the national park system or through comparably managed areas. The geographic scope of the analysis includes the full Mariana archipelago, as well as other sites within the U.S. or U.S territories that still possess Japanese defensive structures from World War II. In the Marianas, Japanese military defensive structures are found on other islands, including Guam, Saipan, Tinian, and Pagan. Some of these resources are included within NPS-managed sites and national historic landmarks (NHLs). Defensive structures are also found on other public, military, and private lands.

Elsewhere in Micronesia, Wake Island is analyzed as an NHL that contains World War II fortifications from both the American and Japanese occupation periods. In Alaska, the Aleutian Islands of Kiska and Attu were occupied by the Japanese during World War II and still protect Japanese defensive structures as part of the Aleutian Islands World War II National Monument.

Other sites were considered for analysis but were not comparably managed to a National Park Service unit or did not include a comparable quality or diversity of resources to those found in the World War II Japanese defensive complexes on Rota.

The 1984 *World War II in the Pacific: National Historic Landmark Theme Study* was undertaken for Congress and the Secretary of the Interior's Advisory Board in partial fulfillment of the requirements of P.L. 95-348. In addition to historic sites on Guam, Saipan, and Tinian already discussed and already designated as nationally significant, historic resources on the islands of Chuuk (Truk), Majuro, Pohnpei (Ponape), Yap, and Ulithi were analyzed because they were U.S. Trust Territories at the time and contained extensively fortified Japanese bases bypassed for the duration of the war. Of these, Chuuk was identified as nationally significant. However, since none of these islands remain U.S. territory, they are presently excluded from further consideration. Rota received cursory study in the 1984 study because it "was a bypassed island in the Central Pacific Campaign" containing "[s]ome evidence

of the Japanese period remains: sugar mill ruins, a coastal gun, and a hospital cave” (NPS 1984, 11).

The extensive fortifications on Peleliu, which is part of the island nation of Palau, were likely influenced by the Marianas Campaign and thus represent an outstanding example of Japan’s late war in-depth defensive strategy (see Chapter 3: Resource Significance). Although the 1984 study concluded that Peleliu was eligible as a National Historic Landmark, the island is no longer a U.S. territory and is therefore infeasible for inclusion in the national park system. Furthermore, recent surveys indicate that public access to the fortifications would be challenging: although many of the features are remarkably intact and visceral reminders of the fierce battle, the caves are dangerous places still containing live ammunition and unstable booby-traps (Price and Knecht 2012).

The island of Pagan is another site possessing numerous World War II resources. Like Rota, Pagan was not invaded during World War II and includes many Japanese fortifications that remain largely intact. Based on an analysis of fixed weaponry placement, Pagan also illustrates the late-war shift in Japanese military strategy to defense-in-depth (Dixon et al. 2018). Pagan’s World War II-era resources include an airfield constructed by the Japanese, along with barracks and other features, air raid shelters, building foundations, airplane wreckage, concrete water cisterns, concrete bunkers and lookouts, and defensive tunnels, among other elements (Athens 2009, 172). The majority of the World War II sites are tunnels and bunkers, including five tunnel complexes (Athens 2009, 189, 222).

Additional research is required to compare the character and quality of Pagan’s tunnel complexes to the significant defensive fortifications on Rota. However, almost all of Pagan’s surveyed tunnels and tunnel complexes are located near the shoreline, in contrast to the interior defenses at Ginalagan and Chudang Palii (Athens 2009, 239). In addition, even the largest documented tunnel complexes on Pagan are significantly smaller than the two defensive complexes on Rota

(Athens 2009, 190–203). As noted in Chapter 3: Resource Significance, no archeological artifacts have been discovered to date within Pagan’s tunnels (Athens 2009, 224), in contrast to the rich variety of artifacts found in Rota’s defensive complexes, particularly at Ginalagan (Moore and Hunter-Anderson 1988, Mohlman et al. 2011).

Therefore, the Pagan tunnels arguably do not represent to the same degree the shift in Japanese defense doctrine or the experience of Japanese soldiers on a bypassed island. Moreover, Pagan is not accessible to the public at this time due to its remote location and the difficulty of providing air or water access. It is unlikely that public access would be allowed to the tunnel sites on Pagan in the near- or longer-term future, therefore the area cannot be considered comparably managed to sites where visitor opportunities are provided.

National Park Service-Managed Sites and National Historic Landmark Districts: Mariana Islands

The NPS themes of Peopling Places, Expressing Cultural Values, Shaping the Political Landscape, and the Changing Role of the United States in the World Community are represented in the Mariana Islands through Japanese defensive features included within War in the Pacific National Historical Park on Guam and American Memorial Park on Saipan. These themes are also represented by two National Historic Landmark Districts: the Landing Beaches, Aslito/Isely Field, and Marpi Point on Saipan and the Tinian Landing Beaches, Ushi Point Field, and North Field on Tinian. These parks and landmarks were created to commemorate the bravery and sacrifices of those involved in World War II in the Pacific. The defensive complexes on Rota would further enrich the representation of the themes.

War in the Pacific National Historical Park, Guam

War in the Pacific National Historical Park preserves and protects World War II landing beaches, weapons, and beach fortifications as examples of the Allied island-hopping military campaign against the Japanese. The

predominant World War II resources found at the park are Japanese defensive structures, including pillboxes, cave bunkers, foxholes, gun pits, and slit trenches; cave tunnels (some extending from ridge-tops down to the beach below); gun emplacements; fire control stations; and concrete slabs that once held observation platforms and other superstructures.

American Memorial Park, Saipan

The American Memorial Park on Saipan protects World War II structures, including Japanese pillboxes, storage tanks, buildings, bunkers, and a bathhouse complex.

Landing Beaches, As Lito/Isely Field, and Marpi Point National Historic Landmark, Saipan

The Landing Beaches, As Lito/Isely Field, and Marpi Point National Historic Landmark District include the remnants of the Japanese airfield, As Lito, which was developed by American forces into Isely Field, as well as Suicide Cliff and Banzai Cliff at Marpi Point. It is from Isely Field that the B-29 Superfortress took off to bomb the Japanese home islands beginning in November 1944. At Marpi Point, large numbers of Japanese civilians and military personnel jumped to their deaths rather than surrender to U.S. forces. Japanese fortifications in the NHL District on Saipan include the blockhouse and other concrete structures associated with As Lito Field. Cave fortifications and Japanese pillboxes are scattered across the district, including at Obyan Beach and below Banzai Cliff. Landing beaches contain remnant Japanese defensive features including pillboxes, a partially constructed gun emplacement, and a small Japanese tank that has been set on a pillbox.

Tinian Landing Beaches, Ushi Point Field, and North Field National Historic Landmark, Tinian

The Tinian Landing Beaches, Ushi Point Field, and North Field National Historic Landmark District is nationally significant for its association with defining events of World War II, including Japanese colonial

and military expansion into the Pacific, the U.S. Central Pacific Drive, the launch of B-29 Superfortress strategic and incendiary bombing raids on Japan, and the deployment of the atomic bombs to Hiroshima and Nagasaki, which ended the war in the Pacific and World War II. Contributing features to the district include the two U.S. landing beaches, White Beach 1 (Unai Chulu) and White Beach 2 (Unai Babui), and World War II resources associated with the Japanese Ushi Point Airfield and the overlying American North Field. The North Field features include four B-29 runways, taxiways, and service aprons, including the atomic bomb loading apron. Studies conducted since the 1984 NHL district nomination have documented a number of additional resources that possess identical or similar significance values and integrity as those identified in the initial evaluation both inside and outside the historic district.

The North Field NHL District includes numerous surviving Japanese military-reinforced concrete buildings and structures (NPS 2016). Japanese resources associated with the former Ushi Point Airfield consist of the service apron, the air administration building, the air operations building, and two air raid shelters. In the limestone cliffs within the southern boundary of the district are Japanese defensive bunkers, modified caves, tunnels, and rock shelters. At the north end of Unai Chulu is a Japanese pillbox. Additional Japanese military features include the south pillbox at Unai Chulu, an ammunition storage bunker, a fuel storage bunker, a power plant, aviation tie-downs, a drainage canal, and cisterns at the air administration building. Similar features are also found outside the district boundary.

Despite the considerable number of World War II defensive features in the Mariana Islands, the complexes at Ginalagan and Chudang Palii provide unique representation of military architecture due to their complexity and their location in the island's interior. In comparison to the extensive defensive features on Rota built into the limestone cliffs, the other Japanese World War II sites in the Marianas are not concentrated into contiguous large-scale military complexes but are found

as individual structures, often with mutually supporting nearby fortifications clustering around key invasion areas (e.g., around the Orote Peninsula on Guam). While the list of property types found in the comparative sites on Guam, Saipan, and Tinian is not complete, there is a greater diversity of known property types identified at Ginalagan and Chudang Palii (13 and 16, respectively). These property types include walls, caves and tunnels, enclosures, terraces, stairs, depressions/pits, overhangs, anti-aircraft guns, ramps, trenches, berms, platforms, concrete slabs, pillboxes, revetments, vehicles, water tanks, a chamber, a rock shelter, a bulwark, and a parapet. No other known sites in the Marianas possess the extent of property types.

The other comparative World War II sites in the Marianas reflect Japan's reliance on a linear beach defense with immediate counter-attacks, but minimal fallback positions. They are generally not found in inland locations but are largely constructed on shorelines, back-beaches, and atop the first bench or ridgeline overlooking the shoreline. On Guam, Saipan, and Tinian, the Japanese wartime structures found far inland generally represent the central administration or are airfields, magazines, and bomb shelters. By not relying on the construction of coastal defenses, Rota's fortifications are unique and atypical for the Mariana Islands.

The construction techniques used at other Japanese World War II sites in the Marianas also differ from those found at Ginalagan and Chudang Palii, where the underlying foundation for the features and structures was the limestone escarpment. Features were constructed with dry-laid limestone walls and excavation of caves and tunnels into the limestone, supplemented by concrete. On Guam, Saipan, and Tinian, fortifications were largely built of concrete, timber, and earth. Use was made of existing caves, some modified and extended, with a line of sight to the coastline or just inland to shelter the high command and key command posts.

In comparison to Ginalagan and Chudang Palii, where wartime damage is less evident, the other Japanese World War II sites in

the Marianas display sometimes extensive damage from strafing, bombardment, and heavy combat. Thus, the fortifications on Rota provide a better opportunity to understand construction techniques and the lives of the soldiers and sailors who built them and lived in them, while the features on other islands are more closely associated with battle, methods of destruction, and soldier's deaths.

Other National Park Service-Managed Sites and National Historic Landmark Districts

Wake Island National Historical Landmark

Wake Island, technically an atoll composed of three smaller islands, is an unincorporated U.S. territory located just west of the International Date Line. The historic properties at Wake Island Atoll are nationally significant for their association with pivotal events of World War II in the Pacific, notably the American defense of the island after the December 8, 1941 attack; the ensuing Japanese occupation and execution of American prisoners of war; and the final defeat of the Japanese military in September 1945 (McAllaster and Davidson 2011, 1). Compared with Rota, the defenses of Wake Island are more reflective of the early phases of the war. These include the American beach defenses that were used at the outbreak of hostilities, as well as traditional Japanese defenses at the water's edge that were constructed during the Japanese occupation, from 1942 to 1945. Even if an in-depth defense system had been desired by the Japanese, the small, flat coral atoll would not have supported the type of fortifications that were possible on larger and more mountainous Pacific islands.

Japanese defensive features on Wake Island were primarily located parallel to the beaches and include large anti-tank ditches, linear embankments, coral-lined trenches and rifle pits, depressions and revetted structures, concealed emplacements, and coral mounds. The Japanese also constructed above-ground structures such as concrete blockhouses, bunkers, and pillboxes (McAllaster and Davidson 2011, 7). Wake Island's beach defenses thus illustrate the strategic thinking of the early years of the Pacific war, equivalent to the Micronesian atolls of Midway or

Tarawa, and not the Marianas' much later battles. Furthermore, the occupation at Wake Island included no indigenous population, therefore—unlike Rota—the resources don't illustrate the impact of the war on Micronesian communities to the same degree. Lastly, travel to Wake Island is heavily restricted by the U.S. Air Force and the U.S. Fish and Wildlife Service. Because the island is not accessible to the general public, the area cannot be considered comparably managed to sites where visitor opportunities are provided.

Japanese Occupation Site, Kiska Island and Attu Battlefield and U.S. Army and Navy Airfields National Historic Landmarks

The national historic landmarks in the Aleutian Islands of Kiska and Attu preserve the remains of Japanese bases constructed during Japan's World War II occupation of the islands. The islands are managed today by the U.S. Fish and Wildlife Service as part of the Alaska Maritime National Wildlife Refuge and represent two of three sites commemorated by the Aleutian Islands World War II National Monument.

The Japanese World War II resources on Kiska include an airfield, a seaplane base, a midget submarine base, gun batteries, power stations, and water systems. A series of tunnels were dug for underground air raid shelters, barracks, hospitals, and storage rooms (Spennemann 2011). Attu is the site of the only land battle fought in North America during World War II. The Japanese intended to construct an airfield on Attu, as well as anti-aircraft and coastal defense positions, but U.S. forces interrupted the completion of these facilities. Today, the landscape has thousands of shell and bomb craters, Japanese trenches, foxholes, tunnels, and gun emplacements.

The islands of Kiska and Attu contain extensive resources, but they differ from the defensive complexes on Rota in numerous ways. Both of the Aleutian Islands have landscape features including tunnels, trenches, and underground rooms, and entrenched Japanese positions on Attu provided a notable advantage against the U.S. retaking of the island (Spennemann 2011, NPS 2017a). However, both islands also featured prominent

beach defenses, especially Kiska, where the defenses were traditionally placed along the shoreline of likely landing sites. In addition, Rota's defensive structures did not suffer invasion damage as they did on Attu and Kiska. The removal of the civilian population on the Aleutian Islands during the war is another difference in the representation of the topics of encounters, conflicts, and colonization under the Peopling Places theme.

In addition, the Aleutians were a secondary theater in the war, in contrast to the Marianas. Ground cover and climate were completely different and affected the battle and the resources in different ways. The Aleutian Campaign took place earlier in the war, before the establishment of the "absolute national defense sphere" in September 1943. The early phase of the war and its different tactics is reflected in a different configuration of fortifications on both islands: the Battle of Attu defense consisted of a maneuver around a base of fortifications, concluding with a banzai charge. The fortifications at Kiska were fixed anti-landing defenses concentrated to defend the seaplane and submarine bases.

Travel to Kiska and Attu is also regulated by the U.S. Fish and Wildlife Service, and air and sea access opportunities are extremely limited. Because the islands are not readily accessible to the general public, the area cannot be considered comparably managed to sites where visitor opportunities are provided.

CONCLUSION—CULTURAL RESOURCE THEMES, WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

The Chudang Palii and Ginalagan World War II Japanese defensive complexes have the potential to enhance and expand resource protection and opportunities for visitor use under the NPS cultural themes of Peopling Places, Expressing Cultural Values, Shaping the Political Landscape, and the Changing Role of the United States in the World Community. Rota's defensive complexes provide a palpable illustration of daily life on a bypassed island and demonstrate the late-war shift to in-depth defense systems—themes that are not adequately represented in other comparably managed sites within the U.S. or

U.S. territories. The comparative sites do not contain fortifications of the same character, quality, and rarity of those at Ginalagan and Chudang Palii.

War in the Pacific National Historical Park, American Memorial Park, and the national historic landmarks on Saipan and Tinian incorporate aspects of Japanese colonial and military expansion into the Pacific, Japanese defense during World War II, and the brutal island-hopping campaign that characterized the U.S. military operations in the Central Pacific. The national historic landmarks at Wake Island, Kiska, and Attu illustrate much of this history as well. However, these protected areas do not contain defensive networks that illustrate the change in the Japanese military's strategy, which shifted from a focus on defense at the water's edge to defense from the interior. The revised Imperial Japanese Army strategic doctrine of in-depth defense exemplified at Rota and used at subsequent battle sites in the Pacific provides broader representation of the topics of military institutions and activities; political ideas, cultures, and theories; international relations; and expansionism and imperialism. The change in wartime strategy was fully implemented at Chudang Palii and Ginalagan World War II Japanese defensive complexes during the 14 months that Japanese

forces on Rota anxiously awaited death in battle.

While these topics are represented to various degrees at other sites, such as Peleliu, Yap, Pohnpei, and Pagan, these sites are not comparably managed to a national park unit (in the case of Pagan) or are no longer U.S. territories (in the case of the other islands).

The Chudang Palii and Ginalagan World War II Japanese defensive complexes are tangible reminders of a transformative Japanese defensive policy that negatively impacted American forces in the Pacific Theater. As important, they provide an opportunity to expand and strengthen the story of a colonizing force in an indigenous landscape during a prolonged wartime occupation. The complexes considerably broaden the interpretive potential of War in the Pacific National Historical Park, American Memorial Park, and the four NHL sites by completing the story of the Imperial Japanese Army's garrison life, preparation for battle, and reaction to the devastating losses in the Marianas and the consequences of this reaction on protracting and escalating the casualties of the war in the Pacific.





1. [Opposite page] A ranger leads a tour to a Japanese fortification at Ga'an Point, War in the Pacific National Historical Park. Photo: NPS. **2.** [This page, top] View of the Marpi Point Field from Suicide Cliff, Saipan. Photo: NPS. **3.** [This page, middle] Runway Able, North Field National Historic Landmark District, Tinian. Photo: NPS. **4.** [This page, bottom left] Air Administration building at the Japanese Airfield, Tinian North Field NHL. The building displays damage from the U.S. invasion of Tinian, which took place between July 24 and August 1, 1944. Photo: NPS.



1. [Top] Japanese fortifications at Wake Island National Historic Landmark. Photo: Wikimedia Commons. 2. [Middle] Anti-aircraft gun left by the Imperial Japanese Army on Kiska Island, Alaska. Photo: Dirk Spennemann, NPS. 3. [Bottom] An American Landing Vehicle Tracked left after the Battle of Peleliu. Photo: National Archives and Records Administration.



SUITABILITY CONCLUSION

NATURAL RESOURCE THEMES

The limestone forest of Rota is suitable for inclusion in the national park system. Rota's forest represents the most intact example of this resource type in the United States. Lowland and montane limestone forests are not adequately represented elsewhere in the national park system, nor are there other comparable sites which protect and interpret a similarly intact example of the limestone forest ecosystem.

Limestone forest is a rare ecosystem type in the U.S. and U.S. territories. In addition to Rota, the island of Guam protects areas of relatively intact limestone forest; however, Rota's forest ecosystems are more extensive and less impaired than those on Guam. War in the Pacific National Historic Park does not contain a comparable example of limestone forest to that found on Rota, as the limestone forests in the park are recovering from World War II disturbance and are very small fragments that do not compare to the extent and diversity of forest found on Rota. The Ritidian Unit of the Guam National Wildlife Refuge and the Anao Conservation Area protect a comparable resource with comparable management to a national park unit. However, the brown tree snakes in limestone forest on Guam have resulted in a cascade of impacts to the food web and seed dispersal that will increasingly alter forest structure on the island as time goes on (see Chapter 3 for further discussion of this topic).

CULTURAL RESOURCE THEMES

Chamorro Archeological Sites

The Rota Chamorro archeological sites are suitable for inclusion in the national park system. These sites depict the unique and living culture of the indigenous people of the Mariana Islands, the Chamorro, which is not adequately represented or protected elsewhere in the national park system. In the Mariana Islands, there are no examples that compare to the magnitude of sites such as Mochong, Alaguan, and As Nieves, or their location within a long-occupied settlement cluster. The extent, complexity, and proximity of the inland and coastal latte sites and rock

art sites offer outstanding opportunities for education and interpretation and provide a rich context for understanding the evolution of Rota's communities over time. The character, quality, quantity, and rarity of the Chamorro archeological sites on Rota represents the NPS cultural themes (Peopling Places, Expressing Cultural Values, Expanding Science and Technology, and Transforming the Environment) to an exceptional degree.

Where precontact Chamorro archeological resources are present in national park sites, they are fragmented, highly disturbed, or small disturbed clusters. The NPS cultural themes are not well-represented at NPS units and other NPS-recognized sites. Although precontact Chamorro culture sites are also found on military lands, other public lands, and private lands, they do not represent the breadth and integrity of resources found on Rota and therefore do not reflect the NPS cultural themes to the same degree as the collective sites on Rota.

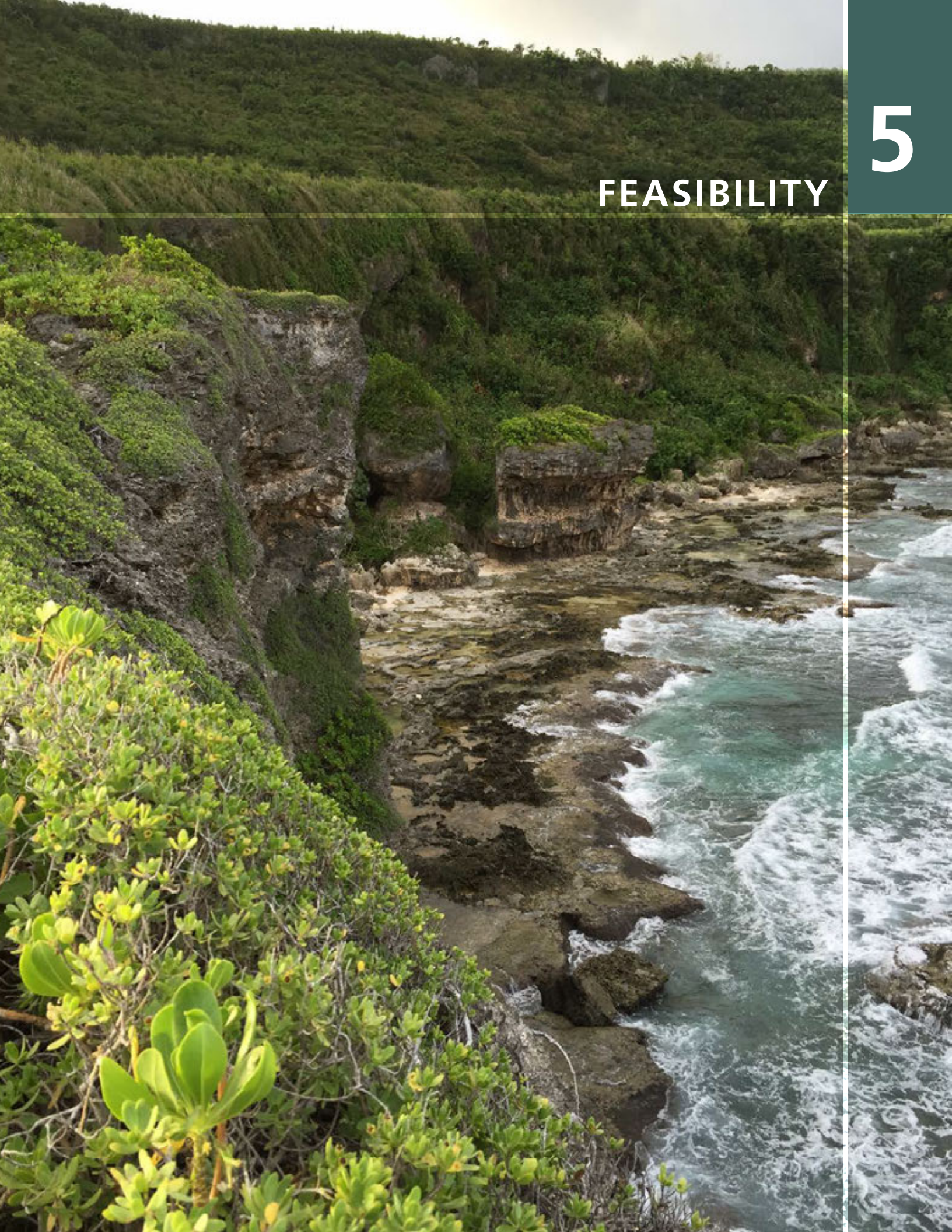
World War II Japanese Defensive Complexes

The Chudang Palii and Ginalagan World War II Japanese defensive complexes on Rota are suitable for inclusion in the national park system. Among the comparative sites analyzed, Chudang Palii and Ginalagan are the most intact and best remaining examples in the United States of extensive in-depth defensive structures constructed by the Japanese military. These resources help to illustrate the revised Imperial Japanese strategic doctrine of in-depth defense that significantly increased U.S. war casualties and delayed the end of World War II in the Pacific.

The NPS cultural themes of Peopling Places, Expressing Cultural Values, Shaping the Political Landscape, and the Changing Role of the United States in the World Community are well-represented by the two defensive complexes on Rota. The Pacific War had a tremendous and enduring impact on American families, economy, social life, and politics. The defensive complexes on Rota further add to the breadth of World War II sites throughout the U.S. where the scope of World War II can be visualized, interpreted, and understood on American soil.



Japanese anti-aircraft gun at Chudang Palii. Photo: Dave Lotz.



FEASIBILITY



Gagani Point, along Rota's south coastline downhill from the Sabana. Photo: NPS.

CHAPTER 5: FEASIBILITY

This chapter describes the National Park Service's analysis of whether nationally significant and suitable sites are feasible as a unit of the national park system.

INTRODUCTION

Feasibility

To be feasible as a new unit of the national park system, a resource must be 1) of sufficient size and appropriate configuration to ensure sustainable resource protection and visitor enjoyment, taking into account current and potential impacts from sources beyond proposed park boundaries, and 2) capable of efficient administration by the National Park Service (NPS) at a reasonable cost.

In evaluating feasibility, the NPS considers a variety of factors for a site, such as the following:

- Land use, ownership patterns, planning, and zoning
- Access and public enjoyment potential
- Boundary size and configuration
- Existing resource degradation and threats to resources
- Level of local and general public support
- Social and economic impact
- Costs associated with development, restoration, and operation

The feasibility evaluation also considers the ability of the NPS to undertake new management responsibilities in light of current and projected availability of funding and personnel. An overall evaluation of feasibility is made after taking into account all of the above factors. These evaluations, however, may sometimes identify concerns or conditions, rather than simply reaching a yes or no conclusion. For example, some sites may be feasible additions to the national park system only if landowners are willing to sell or lease, or if the boundary encompasses specific areas necessary for visitor access, or if local governments will provide appropriate

assurances that adjacent land uses will remain compatible with the site or sites' resources and values (NPS 2006).

EVALUATION OF FEASIBILITY FACTORS

The NPS identified and studied the island of Rota's limestone forests and known precontact and historic sites for their potentially significant natural and cultural resources. This analysis of feasibility focuses on sites determined to be nationally significant and suitable for inclusion in the national park system, as described in Chapters 3 and 4. These sites include:

- **Rota's Limestone Forest**
- **Chamorro Archeological Sites**
 - Mochong Latte Village Complex
 - As Nieves Quarry
 - Alaguan Latte Village Complex
 - Complex of Coastal and Upland Latte Villages
 - North Coast Archeological Sites
 - Māya Latte Site
 - Dugi Archeological Site
 - Gampapa Latte Village
 - East and Southeast Coast Archeological Sites: As Dudo, Sagua Gahga, East Koridot, and West Koridot Villages
- **Rock Art Sites**
 - Chugai Cave
 - East and Southeast Coast Rock Art Caves: Sagua Gahga, Koridot Caves
- **World War II Japanese Defensive Complexes**
 - Ginalagan Japanese World War II Defensive Complex
 - Chudang Palii Japanese World War II Defensive Complex

The following evaluation explores the feasibility of these sites as potential units of the national park system.

Land Use, Ownership Patterns, Planning, and Zoning: Overall Study Area

The majority of lands on Rota are in public ownership (72%, or 15,523 acres/6,282 hectares) compared with 28% in private ownership (5,960 acres/2,412 hectares). Lands in public ownership primarily fall into the Designated/In Use Public Land category (48%), comprising those lands that are actively managed for a specific use, and the Undesignated/Not In Use Public Land category (42%), which includes undeveloped lands for which a use has not been designated. A small portion of Rota's public lands are classified as Grant of Public Domain Land (8%), which are given in fee simple without a specified use, and Leased Public Land (2%) (CNMI DPL 2019, 15). See Map 5: Land Use and Landownership.

Any future use of public lands on Rota is determined by the CNMI Department of Public Lands (DPL), through development and approval of a Comprehensive Public Land Use Plan. This plan encompasses all public lands in the CNMI and identifies areas that should be reserved to protect critical resources, sites that are suitable for homesteading, and lands that should be considered for exchange to improve manageability of existing public lands and/or otherwise serve the public good (CNMI P.L. 15-2 §105f). The plan is scheduled to be updated every five years, and the most recent update was completed in 2019. In addition to the land use plan for the CNMI, the Rota Mayor's Office is beginning the process of developing a 20-year master plan for the island itself, which is not yet available (CNMI DPL 2019, 289).

The land use and landownership analysis in this chapter is based on GIS data received from DPL in 2017 and cross-checked against the 2019 Comprehensive Public Land Use Plan. Additional parcel-level research is needed

to fully confirm land use and landownership designations (Bubb, pers. comm., 2022).

CURRENT AND HISTORIC LAND USES



A significant portion of Rota's lands (10,943 acres/4,428 hectares, or 52% of the island) are covered by limestone forest, and approximately 5,750 acres (2,327 hectares) of habitat area are protected by shoreline and wildlife conservation areas (USFS 2006). Limited urban development exists primarily in the villages of Sinapalo and Songsong and includes the airport, schools, community parks, and a small marine port. Commercial uses on the island are limited and consist of a few small hotels, convenience stores, and restaurants. The Rota Resort & Country Club on the north coast is the only resort on the island and features a hotel, three restaurants, and a golf course. There are many small-scale subsistence farms and grazing areas throughout Rota, and some larger-scale farms and ranches exist, especially on the eastern part of the island. Community farms are present on the highest plateau of the Sabana, although farming has been largely discontinued over the years due to concerns about adverse impacts to the domestic water supply (NPS 2005).


Throughout Rota's history, most of the development and farming activities have taken place on the more level and lower-elevation portions of the island. As noted in Chapter 2: Context and Resource Description, Rota was almost completely forested historically, with only small areas of land cleared for subsistence agriculture. Large-scale clearing did not occur until the early 20th century, when the Japanese converted much of the island's arable land to sugarcane production. The planting occurred mainly in lower-elevation areas with gentler slopes. However, Rota's lands proved unsuitable for large-scale farming due to the shallowness of the soil, infertility, rapid draining, and an abundance of rock outcrops. In addition to planting sugarcane, the Japanese mined phosphate on the Sabana in the years before World War II and built a narrow-gauge railroad system and network of roads (Higuchi 2003; Dixon 2002, 2014).



**Rota Special Resource Study
Map 4: Existing Conservation Areas**

National Park Service
U.S. Department of the Interior



 Conservation Areas
  Public Land

 I'Chenchon Park

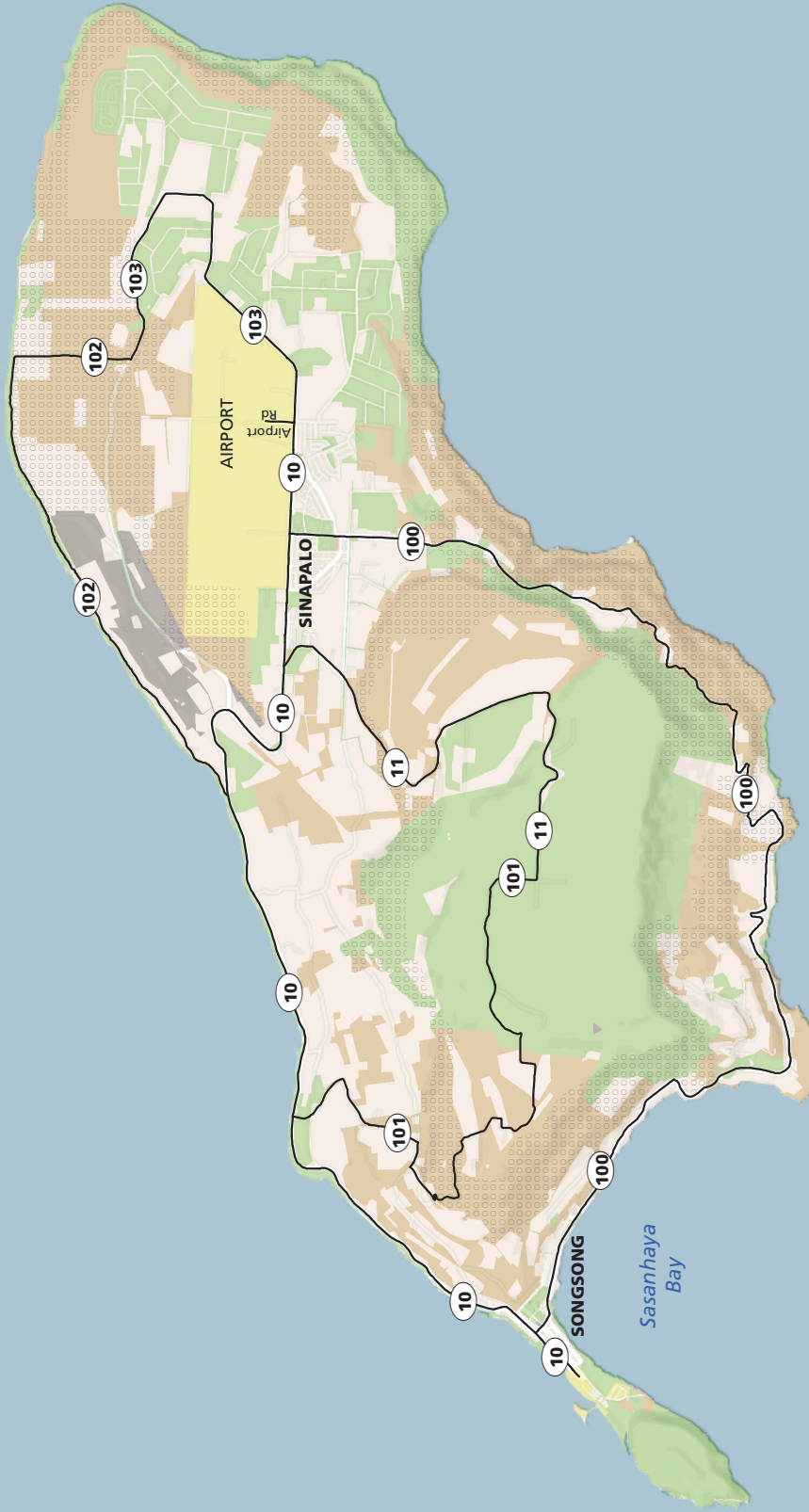
Data Sources:
 NMI: Conservation Areas, I'Chenchon Park
 CNMI/DPL/NPS: Public Land
 U.S. Census Bureau: Roads
 NPS: Basemap

Produced by National Park Service, DOI Regions 8, 9, 10 and 12 GIS Group
 Date: March 2022

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Rota Special Resource Study Map 5: Land Use and Landownership

National Park Service
U.S. Department of the Interior



Data Sources:
 CNMI/DPL/NPS: Parcels
 US Fish and Wildlife Service: Mariana Crow Critical Habitat
 U.S. Census Bureau: Roads
 NPS: Basemap
 Produced by National Park Service, DOI Regions 8, 9, 10 and 12 GIS Group
 Date: March 2022

- USFWS Mariana Crow Critical Habitat
- Grant of Public Domain Public Land
- Leased Public Land
- Undesignated/Not In Use Public Land
- Private Land
- Designated/In Use Public Land (includes Existing and Proposed Homesteads)

The data on this map is derived from the CNMI government and other agencies. The National Park Service gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of the maps and is not liable for positioning inaccuracies, subsequent updates, errors, or unintentional omissions of data. These graphics are not legal documents and are not intended to be used as such.

DESIGNATED/IN USE PUBLIC LANDS

Conservation Areas

Major portions of Rota's public lands are currently protected under Rota Local Laws 9-1, 9-3, and 15-8. See Map 4: Existing Conservation Areas. Lands are protected as watersheds or for natural resource values, such as sea bird sanctuaries or as conservation areas for forests and wildlife. The CNMI Department of Land and Natural Resources, Division of Fish and Wildlife (DFW) manages those public lands designated as conservation areas, which constitute 22% of the island (Liske-Clarke 2015, 2-4). The largest of these is the 3,759-acre (1,521-hectare) Sabana Protected Area (or Sabana Heights), established in 1994 under [Rota Local Law 9-1](#). This high plateau in the southwestern portion of the island constitutes over a third of Rota's area and was established to provide watershed protection and wildlife and forest conservation. In 2007, [Rota Local Law 15-8](#) amended Local Law 9-1 to include the 220-acre (89-hectare) Talakhaya Watershed Conservation Area in the Sabana Protected Area to safeguard wildlife, vegetation, soils, and marine resources. For more detail on Talakhaya watershed management efforts, see the "Summary of Existing Management" section below.

Rota Local Law 9-1 also created the 610-acre (247-hectare) I'Chenchon Park Wildlife Conservation Area (or I'Chenchon Bird Sanctuary), along the eastern side of the island. This area consists primarily of steep cliffs above the shoreline, interspersed with narrow benches and covered with high-quality limestone forest. The sanctuary provides habitat for the largest colony of nesting sea birds in the archipelago, a Mariana fruit bat (*fanihi*, *Pteropus mariannus mariannus*) roosting area, and important habitat for the endangered Mariana crow (*aga*, *Corvus kubaryi*). In 2014, the Mariana Crow Conservation Area (MCCA) was established by the CNMI Department of Land and Natural Resources to protect critical habitat for the Mariana crow. At 1,136 acres (460 hectares), the MCCA covers much of the same area the I'Chenchon Park Wildlife Conservation Area and includes areas of

limestone forest habitat extending onto the plateau above the sea cliffs. As stated by the CNMI Administrative Code (Subchapter 85-30.4), the area is managed by DFW to "insure appropriate use of the MCCA for the enjoyment and general welfare of the public while protecting the area in its natural state to serve as a refuge for native wildlife, with emphasis on the Mariana Crow." The MCCA protects a portion of the 6,033-acre (2,441-hectare) Mariana crow critical habitat area designated by the U.S. Fish and Wildlife Service in 2004.

The other conservation areas on Rota are the Liyo Conservation Area, at the western tip of the island, and the Sasanhaya Bay Fish Reserve, also known as the Coral Gardens Marine Protected Area, on the eastern edge of Sasanhaya Bay. The 280.5-acre (113.5-hectare) Liyo Conservation Area encompasses Taipingot, or Wedding Cake Mountain, and was established in 1994 under [Rota Local Law 9-3](#) to conserve the indigenous wildlife and forest vegetation that exists on and around Mt. Taipingot. The Sasanhaya Bay Fish Reserve was set aside by [Rota Local Law 9-2](#) in 1994 and became the first marine protected area in the CNMI.

Rota's terrestrial conservation areas—the Sabana Protected Area, I'Chenchon/MCCA, and the Liyo Conservation Area—were established for species and habitat protection and do not allow activities that would disrupt wildlife within the area or destroy plant life or soils. These conservation areas are no-take zones for plants and animals, with the exception of medicinal plants. The collection of plants "through normal agricultural activities" is additionally allowed in the Sabana Protected Area, as specified in Rota Local Laws 9-1 and 15-8. The "no-take" provision in Rota Local Laws 9-1 and 15-8 specifically refers to hunting, fishing, trapping, harvesting, logging, and gathering in such a way that disrupts the normal patterns of behavior of wildlife or results in the destruction of plant life or soils. The laws' definition of "take" does not explicitly include the collection of specimens for scientific or other educational purposes, and the CNMI regularly grants access to conservation areas to universities and

agencies for research. However, both laws give the Department of Natural Resources and the Division of Fish and Wildlife the discretion to prohibit other activities deemed detrimental to the aquifer in the Sabana area.

Other Locally Protected Public Lands

In addition to the conservation areas, there are several public park and precontact and historic sites located throughout the island. All of these protected areas and parks are under the jurisdiction of the CNMI Department of Public Lands (DPL). The CNMI Department of Community and Cultural Affairs' Historic Preservation Office (HPO) maintains the precontact and historic sites that are located on publicly owned land. The HPO is responsible for implementing [Public Law 3-39](#), known as the Commonwealth Historic Preservation Act of 1982. The law directs the agency to “promote the preservation of the historic and cultural heritage of the Northern Mariana Islands” and “to prohibit the taking of historic properties and artifacts from the Northern Mariana Islands.” As part of the public engagement conducted for the 2019 update to the CNMI Comprehensive Public Land Use Plan, many of Rota’s residents expressed strong support for the preservation of historically and culturally important sites on the island (CNMI DPL 2019, 38).

Homestead Program

The Department of Public Lands is required to set aside a portion of public land for a homestead program, which allows an individual to receive up to one agricultural and one village homestead site (CNMI P.L. 15-2, Public Lands Act of 2006). Landownership data received from DPL in 2017, in the form of GIS parcel layers, illustrates the current distribution of homestead sites on Rota. See Map 6: Existing Management. Additional parcel-level research and analysis is recommended to fully confirm the homestead designations (Bubb, pers. comm., 2022). Agricultural homestead parcels are located primarily in the eastern portion of the island, on the Sinapalo Plateau, with a few designated homestead sites east of the Sabana. Village homestead sites are predominately clustered in Sinapalo Village.

LANDOWNERSHIP IN THE CNMI

The CNMI was established as a U.S. territory through the 1975 *Covenant to Establish a Commonwealth of the Northern Mariana Islands in Political Union with the United States of America* (Covenant). The Covenant is the fundamental agreement between the CNMI and the United States, and its provisions determine U.S. landownership authority in the CNMI. The CNMI Constitution, first drafted in 1976, is the means by which the CNMI establishes its local system of government and includes provisions mandated by the Covenant.

Section 805 of Article VIII of the Covenant, on Property, provides the CNMI government with the authority to restrict land acquisition to persons of Northern Marianas descent, “notwithstanding the other provisions of [the] Covenant, or those of the Constitution, treaties or laws of the United States applicable to the Northern Mariana Islands.” Section 806(a) of Article VIII states that:

The United States will continue to recognize and respect the scarcity and special importance of land in the Northern Mariana Islands. If the United States must acquire any interest in real property not transferred to it under this Covenant, it will follow the policy of seeking to acquire only the minimum area necessary to accomplish the public purpose for which the real property is required, of seeking only the minimum interest in real property necessary to support such public purpose, acquiring title only if the public purpose cannot be accomplished if a lesser interest is obtained, and of seeking first to satisfy its requirement by acquiring an interest in public rather than private real property.

In addition, §3.2 of *NPS Management Policies 2006* states that if land acquisition is proposed for a national park unit, the National Park Service’s preferred practice is to acquire lands or interests in lands only from willing sellers.

The CNMI is the primary landowner of the sites evaluated in the study area. In view of NPS policy and the landownership restrictions described above in the Covenant, significant cooperation and a management agreement between the CNMI government and the NPS would be necessary for a national park unit on Rota to be feasible. The agreement would need to include a partnership arrangement for management, and/or long-term leases, and/or limited acquisition of lands from willing sellers, consistent with Section 806(a) of Article VIII of the Covenant.

Access and Public Enjoyment Potential: Overall Study Area

ACCESS

The island of Rota can currently be accessed by commercial flights from Guam and Saipan provided by the airline STAR Marianas. The frequency of airline service to Rota has changed over time according to demand and tourism levels, and it will likely continue to shift in the future to respond to evolving market conditions. While the number of flights has decreased in recent years, especially in response to the global COVID-19 pandemic, it can reasonably be expected that flight frequency could increase again to support additional visitation to the island. Typhoons are also a common occurrence in the Mariana Islands and have historically disrupted flight frequency and caused a decrease in tourism.

Once on Rota, visitors have the opportunity to rent a car and travel a mix of paved and dirt or coral roads to access the archeological sites and the limestone forest setting. Rota currently does not have a fixed route public transportation system; however, taxis and hotel shuttles are sometimes available, and the CNMI Commonwealth Office Transit Authority operates an on-demand system that will soon be expanded with ADA-accessible transit vans (CNMI COTA 2020). Despite these additional transportation options, the vast majority of visitors will likely travel to sites using a rental car, which can be reserved at the airport. Although rental car availability is somewhat limited at present, it could be

expected to increase with additional demand from visitors.

Many of the sites in the study area already welcome visitors, including the Mochong Latte Village Complex, As Nieves Quarry, and I'Chenchon Park Wildlife Conservation Area. Other sites, such as Alaguan, Gampapa, and Dugi, are currently not served by trails, parking areas, or other visitor facilities. Rota has long been an internationally recognized destination for scuba diving, and the island has marketed itself as a haven for ecotourism, welcoming tour groups (Mariana Visitors Authority 2019, 10; Sabuco 2004).

Per the CNMI Constitution Article XIV: Natural Resources, Section 3, "Places of importance to the culture, traditions and history of the people of the Northern Mariana Islands shall be protected and preserved and public access to these places shall be maintained as provided by law." Public access for a potential NPS unit on Rota would need to be provided in accordance with CNMI law and policy, including the 1975 Covenant and the CNMI Constitution.

PUBLIC ENJOYMENT POTENTIAL

Rota's limestone forest and archeological resources offer opportunities for visitors to be immersed in the largely undeveloped landscape of the island and its 3,500 years of human habitation and Chamorro culture. Rota offers visitors the chance to interact with a highly intact and extensive complex of Chamorro latte sites within their original coastal and limestone forest settings. Standing in these sites, it is possible to imagine what they were like when they were first established. For many Chamorros, these sites afford a powerful spiritual connection to their ancestors. Chamorro people have described latte sites as a sacred living link to their cultural identity, symbolizing not only the technical innovation of their ancestors but also their connection to the natural world and the resilience of their culture (Bevacqua 2018, Kurashina et al. 1999).

Within Rota's forest and coastal settings, visitors can be surrounded by the sounds

of birds and of the ocean below, see large fanihi (fruit bats) flying through the sky or encounter enormous ayuyu (coconut crabs), and experience stands of mature limestone forest with its towering trees. The location of defensive fortifications in Rota's rugged cliffs convey in a very palpable manner the in-depth Japanese military strategy during the later years of World War II, providing unique opportunities to interpret the evolution of the war in the Pacific and its impact on local civilians.

Site by Site Analysis: Land Use, Ownership Patterns, Access, and Public Enjoyment Potential

LIMESTONE FOREST

Because development on the island was historically concentrated in areas with gentler slopes, native limestone forests remain relatively intact on Rota's steeper terrain, the coastal cliffs, and portions of the Sabana. Approximately 20% of Rota is still covered by large-tree limestone forest. A more open-canopy, small-diameter limestone forest mixed with secondary vegetation covers an additional 30 to 35% of Rota (NPS 2005, USFS 2006).

Due to the island's high proportion of public landownership, most of Rota's limestone

forest is located on publicly owned land. The areas of forest considered to be highest quality, with mature large trees, are found primarily along the east and southeast coast, as well as along the north and east slopes of the Sabana. High-elevation, or montane limestone forest is located along the steep cliffs below the Sabana. See Map 3: Limestone Forest Resources. As noted above, these areas of the island are either part of or adjacent to established conservation areas, which are managed to protect limestone forest resources in addition to wildlife.

Agricultural homesteads border the limestone forest that is located south and east of the Sinapalo Plateau. Portions of the Sabana have also historically been used by the community for informal subsistence farming. However, as noted above this use has been largely discontinued and recent guidance in the 2018 Sabana Land Use Management Plan calls for additional regulation of agricultural activity and the development of more sustainable economic activities in the area, including ecotourism (CNMI BECQ 2020). The 2019 CNMI Comprehensive Public Land Use Plan proposes future agricultural and village homestead sites east of the Sabana, in areas that overlap partially with limestone forest (CNMI DPL 2019, figure R-9).



Limestone forest along the steep cliffs in the I'Chenchon Park Wildlife Conservation Area. While many areas of the cliffs are inaccessible, public access is possible to key locations. Photo: NPS.



1. [Top] Limestone forest area on Rota and existing two-track unpaved road. **2.** [Bottom] Existing public facilities at the l'Chenchon Park Wildlife Conservation Area. Photos: NPS.



Sabana Conservation Area, managed by the CNMI Department of Lands and Natural Resources. Photo: NPS.

Public access to limestone forest is challenging in some areas. For example, the portions of forest along the Sabana cliffs are characterized by steep and rugged escarpments that are largely infeasible for trail development and safe public access. However, there are expanses of forest in more gently graded areas, within reasonable proximity of a roadway. A significant portion of the island's high-quality limestone forest is protected by the I'Chenchon Park Wildlife Conservation Area, which already provides visitor facilities, including a paved trail with interpretive waysides, an overlook, and a parking area. The CNMI has identified the need to further enhance public access to visitor facilities in I'Chenchon Park. The 2009 CNMI Final Comprehensive Highway Master Plan includes widening and upgrading roadways between Sinapalo and I'Chenchon in its list of long-range (5–14-year) highway improvements for Rota (CNMI DPW 2009). An update to the highway master plan is beginning at the time of writing but is not yet available.

The development of additional trails through feasible areas of limestone forest could allow both guided and individual hikes and

the opportunity to be immersed in a rare ecosystem. Interpretive and educational programming could be provided that does not exist elsewhere at a comparable scale, or with resources that are so intact. During public outreach for this study in fall 2020, a few commenters supported the idea of additional hiking facilities on the island. Hiking as an activity also aligns with Rota and CNMI goals to promote ecotourism and community interest in additional trail development (CNMI OGM 2020, 74–75).

CHAMORRO ARCHEOLOGICAL SITES

Mochong Latte Village Complex

The 30-acre (12-hectare) Mochong Latte Village Complex is adjacent to a broad sandy beach on the northeast coast of the island, located on public land that was transferred to the CNMI through a land exchange with the owners. Mochong has been carefully maintained by the CNMI HPO to allow visitation to the numerous latte sets still extant on the site. While it is bordered by private lands to the east and west, these lands are currently in residential use and are effectively screened from the site by strand vegetation and small-diameter limestone forest. Publicly

owned land to the south of Mochong is classified as Undesignated/Not in Use and extends east around the privately owned lands to encompass the Māya Latte Site.

Site maintenance and interpretation at the Mochong Latte Village is currently provided by the CNMI HPO. In addition to experiencing the 53 extant latte sets, visitors have the chance to enjoy the large pristine beach adjacent to the site and understand the settlement's reliance on nearby marine resources. Access to Mochong is provided from the unnamed road that parallels the beach and leads east to As Mātmos from Highway 102 (the Coconut Village Road). The 2009 CNMI Highway Master Plan calls for upgrading and paving Highway 102 in its list of long-range roadway improvements for Rota (CNMI DPW 2009).

As Nieves Quarry

The As Nieves Quarry is located within a lightly populated area east of the airport, surrounded by agricultural homesteads with privately owned lands nearby. The quarry has been cared for by the people of Rota for generations. The CNMI HPO currently maintains the site, ensuring that it retains its integrity and a strong sense of place. The 2.5-acre (1-hectare) quarry site itself is located within a larger publicly owned parcel of about 6.3 acres (2.5 hectares), approximately half of which is covered in vegetation buffering the quarry on its eastern side. Currently the viewshed around the site is compatible with the cultural landscape, however future development on privately owned lands or agricultural homesteads could impact the visual integrity of the setting.

The quarry is open to the public for visitation and is accessed via Monsignor Louis Antonelli Road. Informal parking currently occurs along the roadside. The CNMI HPO maintains and interprets the site, which features a large contemporary statue of Chief Taga in proximity to the megalithic stones still extant in the quarry. Walking amid the giant latte in the quarry inspires a sense of wonder in visitors and appreciation for the technological feats accomplished by the ancient Chamorro.

Alaguan Latte Village Complex

The Alaguan Latte Village Complex covers approximately 25 acres (10 hectares) on publicly owned land classified as Undesignated/Not in Use. The archeological site is located 300 feet (91.4 meters) below the Pali'e Road (Highway 100) and at present can only be reached by hiking a steep, winding trail that crosses private land (Craib 1990b). A public overlook is provided above the site, just off the road, and there is a tract of publicly owned land that is contiguous to the site as well as to the roadway. This publicly owned area currently does not have a trail, although trail development in this location could be feasible, assuming that appropriate design measures to address slope conditions are possible. The feasibility of access from the ocean would require additional analysis: access from the ocean may be possible but is likely difficult due to the rocky shoreline and tidal action.

In its list of long-range improvement projects, the 2009 CNMI Highway Master Plan identifies the need to widen and pave Highway 100 from Songsong to the airport, which would enhance public access to the area (CNMI DPW 2009). The 2019 CNMI Comprehensive Public Land Use Plan proposes that a wedge-shaped parcel of publicly owned land uphill from the village site and adjacent to the road be considered for future agricultural homestead properties (CNMI DPL 2019, figure R-9).

The Alaguan Village and limestone forest is remarkably intact, in large part due to its isolation. The valley is surrounded by high cliffs on all sides, except to the east, where it meets the ocean. Visitors reaching the site would be surrounded by some of the best mature limestone forest on the island and would be able to explore the largest-known latte complex in the Marianas (NPS 2005, Craib 1990b).

Complex of Coastal and Upland Latte Villages

North Coast Archeological Sites

The four North Coast Archeological Sites are coastal villages dating to the pre-latte period, located along 2 miles (3.2 kilometers) of coastline near what are today the U.S. Memorial Beach Park, Teteto Beach, and Guata Beach Park. The four villages are named Salug-Songton, Unginao-Uyulan, Teteto-Guata, and Tatgua. Like Mochong and Mâya, the villages are an example of north coast habitation sites in proximity to marine areas traditionally used for fishing and resource gathering. However, the North Coast sites are located on privately owned lands, in proximity to one of the island's major roads (Highway 10). Due to their private ownership, the North Coast sites are not accessible to the public at this time.

Mâya Latte Site

The Mâya Latte Site is located on public land that is categorized as Undesignated/Not in Use. The 1.3-acre (0.5-hectare) Mâya site is currently open to the public, and as at Mochong, the CNMI HPO maintains and interprets the site. The public lands on which Mâya is located are bounded by privately owned parcels to the west and one private inholding within the public land boundary to the east of the site. Also similar to Mochong, adjacent private land uses are well-screened from the Mâya site by strand and limestone forest vegetation. Mâya is reached by visitors via the same unnamed road that connects Mochong to As Mâtmos. A long, unpaved driveway lined with coconut palms leads to the site from the road.

Dugi Archeological Site

Dugi is located on the northern edge of the Sinapalo Plateau just above the As Mâtmos coastal area. While the approximately 25-acre (10-hectare) archeological site is in public ownership, portions of the site are located in areas designated for village homestead sites by the CNMI DPL. Dugi is also bordered to the south by agricultural homestead sites.

An unmaintained two-track road currently leads to the area's archeological features, which are spread across the upland plane and are not readily visible because of dense vegetation. Highway 103 (or the Gampapa Road), which leads toward Dugi, has been slated for upgrading and paving in the 2009 CNMI Highway Master Plan's list of long-range improvements. In addition, the list of long-range projects in the plan includes an expansion of roadway infrastructure to the Dugi area from Highway 103 (CNMI DPW 2009).

Dugi offers potential for public enjoyment as an example of an inland Chamorro settlement in a challenging location, without access to the ocean or fertile soil. Public access to Dugi could also allow visitors to make a tangible comparison between coastal and upland villages as they experience views of Mochong on the north coast.

Gampapa Latte Village

The 25-acre (10-acre) inland latte site at Gampapa extends across a valley, with latte sets and other archeological features distributed over publicly owned lands (Undesignated/Not in Use), agricultural homestead sites, and privately owned parcels. Portions of the site also overlap with I'Chenchon Park Wildlife Conservation Area and the MCCA. One of the large publicly owned parcels (Undesignated/Not in Use) to the west of Gampapa is proposed as a potential future solar farm site in the 2019 CNMI Comprehensive Public Land Use Plan (CNMI DPL 2019, figure R-9). This is located to the south and east of the extant archeological features.

Access to the publicly owned, non-homestead portions of Gampapa is provided by the unnamed road that leads southeast from Highway 103 to the Chugai Cave trail. This roadway was a former narrow-gauge railroad established by the Japanese to transport sugarcane from Dugi and Gampapa to the mill in Songsong (Butler 1997, 166; Pantaleo 1993, 86). The gentle topography in the area could allow development of trails and trailheads to access the dispersed habitation sites, with

trail alignments located to avoid impacts to archeological resources. There is high potential for public enjoyment in this location, given that it is an excellent illustration of an extensive inland settlement in an area with productive soils. Gampapa's proximity to present-day agricultural homesteading sites could enhance interpretation opportunities and illustrate the environmental history of this portion of the Sinapalo Plateau.

East and Southeast Coast Archeological Sites: As Dudo, Sagua Gahga, East Koridot, and West Koridot Villages

Chamorro archeological sites along the east and southeast coasts of Rota include As Dudo, Sagua Gahga, East Koridot, and West Koridot Villages. Together these settlement locations cover more than 563 acres (228 hectares), encompassing 36 sites with four latte villages and several lesser sites. All of the villages are located on public land along the coastal terraces below high cliffs, and all are located within the I'Chenchon Park Wildlife Conservation Area.

Butler notes that these Chamorro villages were sited in effectively the only locations along the east and southeast coasts that provide connectivity to both the sea and the upland terraces. When Butler conducted his survey in 1995, each of the four sites possessed a trail leading up the cliffs, though he notes that the trails from East and particularly West Koridot are especially challenging. Of the West Koridot trail, he states that it is "so difficult that one marvels that anyone would put a settlement there at all" (Butler 1997, 318). West Koridot and East Koridot are accessible from one another, although the trail up out of East Koridot is considered almost as difficult and dangerous as its western neighbor (Butler 1997, 103). By comparison, the trail connecting the Sagua Gahga village to its upland terrace is considered comparatively safe, crossing a talus slope and climbing up through an eroded notch in the cliff (Butler 1997, 69). The trail to As Dudo is obscured by vegetation and difficult to find, but it follows the stepped character of the cliff and as a result is relatively safe as well (Butler 1997, 130).

Rock Art Sites

Chugai Cave

Chugai Cave is also located within I'Chenchon Park, on the rim of a plateau immediately above the second terrace inland from the coast. A short trail and rock stairway currently provide access to the pictograph cave, and most of the trail and the associated parking area are located outside the conservation area, on Undesignated/Not in Use public land that is part of the MCCA. The parking area connects to a road following the former railroad alignment leading through Gampapa.

The cave consists of a single passageway about 185 feet (56.3 meters) in length and averaging about 15 feet (4.6 meters) in width (NPS 2005). Public access to the cave is currently allowed through advanced coordination with the CNMI HPO. Chugai Cave affords visitors the opportunity to experience one of the largest rock art sites in the Marianas and see distinctive pictographs illustrating unique geometric and zoomorphic motifs. Little is known about the meanings of pictographs in the Marianas, and Chugai Cave provides an excellent opportunity for research and interpretation of Chamorro rock art.

East and Southeast Coast Rock Art Caves: Sagua Gahga, Koridot Caves

The Sagua Gahga and Koridot rock art caves that are found along the east and southeast coast of the island are in comparatively close proximity to the Chamorro village sites in the same area. Sagua Gahga Cave is located about 250 feet (76.2 meters) west of the Sagua Gahga latte village, and Koridot Cave is less than 500 feet (152.4 meters) to the east-northeast of the West Koridot village site (Butler 1997). Therefore, they are similarly sited on publicly owned land, all within I'Chenchon Park.



Existing access drive to M̄aya Latte Site. Photo: NPS.



1. [Top left] and 2. [Top right] Existing interpretive waysides at Mochong and Måya. 3. [Middle] As Nieves Quarry and its proximity to Monsignor Louis Antonelli Road. 4. [Bottom] As Nieves Quarry, also known as Taga Quarry, showing the adjacent road, current signage, and informal parking areas. Photos: NPS.



1. [Top] View from Dugi area to the north coast, toward Māya Latte Site. Photo: NPS. **2.** [Middle] Clearing vegetation from latte at Gampapa Latte Village. Located on the Sinapalo Plateau, Gampapa and Dugi are characterized by gentle slopes. Photo: NPS. **3.** [Bottom] In contrast, the terrain at Alaguan Latte Village Complex consists of steep cliffs sloping down to the ocean. Photo: Dave Lotz.



1. [Top left] Hikers descending into Alaguan. Photo: Dave Lotz. 2. [Top right] Entrance to Chugai Cave. Photo: NPS. 3. [Bottom] Trail to Chugai Cave. Photo: NPS.

WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

Ginalagan Japanese World War II Defensive Complex

The 62-acre (25-hectare) Ginalagan defensive complex extends almost a mile (1.6 kilometers) northwest from the site of the Alaguan overlook, adjacent to the Pali'e Road (Highway 100). Although the complex is located on publicly owned land (both Designated/In Use and Undesignated/Not in Use), access to the tunnels, caves, terraces, and other archeological features is provided from the lands below and to the east, which are privately owned. The 2019 CNMI Comprehensive Public Land Use Plan proposes village and agricultural homestead sites in the more gently sloping lands both above and below the cliffs (CNMI DPL 2019, figure R-9).

Moore and Hunter-Anderson surveyed the site in 1988 and described the “extremely difficult” conditions they encountered in the southern portion of the area and at the top of the cliff, due to “deep fissures and sinkholes and thick limestone forest” (Moore and Hunter-Anderson 1988, 3). Despite these challenges, the overall complex at Ginalagan seems to be more stable than that at Chudang Palii, inspiring Moore and Hunter-Anderson to recommend that the central portion of the site be developed as a park with interpretive trails (Moore and Hunter-Anderson 1988, 128).

Chudang Palii Japanese World War II Defensive Complex

The 31-acre (12.5-hectare) Chudang Palii complex extends 0.6 miles (1 kilometer) east to west along the north side of Mount Sabana. The eastern edge of the complex begins near the road to the Sabana (Highway 11), where it is easy to access an extant 120-mm Japanese naval gun, signed “Japanese Cannon” from the roadside. From here the complex extends west in a steep network of fortifications. The complex is located on public land, a mix of the Sabana Protected Area, Undesignated/Not in Use lands, and agricultural homestead sites.

Although access to the site is possible over public lands, it requires crossing exceptionally steep and rugged terrain, as well as unstable

unreinforced concrete and loose dry-stacked stone features. Loose rocks are easily dislodged from the stacked-rock fortifications, as they were built without mortar. After their archeological survey of the site in 2011, Mohlman et al. concluded that public access to the complex, whether guided or self-guided, is not advisable due to the safety concerns posed by the terrain and unstable features. They did suggest that more active interpretation of the complex take place from the site of the 120-mm gun, with an additional wayside linking to a podcast and interpretation on the HPO website (Mohlman et al. 2011, 171–72).

Conclusion: Land Use, Ownership Patterns, Access, and Public Enjoyment Potential

Current land use and ownership patterns associated with the limestone forest, Chamorro archeological sites, and World War II Japanese defensive complexes could generally support the management of a national park unit on Rota. However, the establishment of an NPS unit within the study area is conditionally feasible, dependent on support from the CNMI government and the development of a management agreement for park lands. This is due to the landownership restrictions of the 1975 Covenant as well as NPS policy, as described above in the “Landownership in the CNMI” section.

The North Coast Archeological Sites and portions of the Gampapa Archeological Site would not be compatible with use as a national park unit at this time, due to their location on private lands. Access to the Ginalagan Defensive Complex would also require crossing private land, which would not be feasible for a national park unit, unless willing landowners were to grant permission through an easement or other means. Due to their partial overlap with village homestead sites, the Dugi Archeological Site and Gampapa Latte Village could only be feasible as a unit of the national park system in areas of public land that are not designated for homesteading use. If these privately owned and homestead sites were to become available for a national park unit, additional analysis would be needed

to determine the feasibility of management options, public enjoyment potential, and associated costs.

The predominant land uses in the rest of the study area include agriculture, conservation, tourism and recreation, and public lands with currently undesignated uses. All these land use types could support establishment of a national park unit. The existing regulations associated with Rota's conservation areas—the Sabana Protected Area, I'Chenchon Park Wildlife Conservation Area, and the Mariana Crow Conservation Area—could be compatible with management of a potential future national park unit. Although the harvesting of plants and animals is prohibited by CNMI in these conservation areas, the collection of medicinal plants for traditional healing practices is allowed and would need to be specifically permitted by any possible legislation authorizing a national park unit or by an agreement between the CNMI and the NPS for management of a national park unit.

The local community engages in a variety of traditional practices on public lands that are outside the conservation areas. These practices include hunting, fishing, traditional horticulture, crafts, and medicinal plant collection, and their cultural importance to the people of Rota cannot be overstated. A management approach for a potential national park unit would need to take into consideration the location and type of traditional use to be allowed in each area, with careful evaluation for higher-visitation sites, such as the latte villages, where certain uses such as hunting might be incompatible. Legislation authorizing a national park unit could allow traditional uses (including hunting) to occur within the park boundary.

Many of the sites in the study area are already open for public visitation and would require only minimal development of facilities, such as formalized parking areas and additional interpretation, to support public enjoyment. These sites include Mochong, As Nieves, Måya, Chugai Cave, and the limestone forest areas within the I'Chenchon Park Wildlife Conservation Area. Other sites would require more extensive facilities, specifically trails

and trailheads, to facilitate public enjoyment opportunities. Sites in this category include Alaguan, Dugi, and Gampapa. Access to these sites would only be considered feasible if trails and trailheads can be located on public land in proximity to existing roads, and in locations where slope and other site conditions allow development.

Public access to limestone forest areas along the Sabana cliffs, the East and Southeast Coast Archeological Sites and Rock Art Caves, and Chudang Palii is not feasible due to the challenge of reaching the sites and significant safety concerns posed by their rugged terrain. An exception is the Japanese naval gun currently located below Chudang Palii and near Highway 11, which could be enhanced with additional interpretation about the defensive complex.

In addition to public access to significant sites, facilities could be needed on the island to provide visitor contact/interpretation and office space, and to support unit maintenance and operations. Existing buildings on Rota could be used by the NPS to provide these functions through existing authorities, such as leases and agreements. These types of facilities could align with the local community's interest in establishing a visitor and cultural center, as proposed in the 2019 CNMI Comprehensive Public Land Use Plan (CNMI DPL 2019, 40) and during public outreach for this study in fall 2020 (see Chapter 7: Consultation and Coordination).

A national park unit on Rota could enhance the visitor opportunities that are currently provided on the island by increasing interpretation and educational programming, offering additional potential for research, and providing access to areas that are currently not open to the public. Site developments such as trails, trailheads, signage, restrooms, and small-scale interpretive facilities could allow visitors to be immersed in the island's unique ecosystems and explore its exceptional archeological resources, while complementing the local community's goals to promote ecotourism.



1. [Top] View of a portion of the Ginalagan cliffs from the east. Photo: NPS. **2.** [Bottom] Access to Chudang Palii Japanese World War II Defensive Complex is challenging due to the rugged terrain and unstable fortifications built without mortar. Photo: Dave Lotz.

Boundary Size and Configuration

An acceptable boundary configuration for a potential national park unit on Rota would need to include and effectively protect the island's nationally significant resources, while considering the other feasibility factors analyzed in this chapter. In the case of cultural resources, such as the Chamorro archeological sites and World War II Japanese defensive complexes, a suitable boundary might include the site itself as well as sufficient surrounding area to provide a proper setting for the resources.

In the case of Rota's limestone forest, effective protection of the resource would require that a boundary encompass continuous limestone forest areas rather than remnants of forest. Rota's limestone forest has been identified as nationally significant because it remains highly intact, covers a comparatively large area, and provides sufficient habitat for endemic species. To protect the aspects of the limestone forest that make it nationally significant, a national park boundary would therefore need to include continuous areas of limestone forest and would not be feasible if forest areas were fragmented.

Additional considerations include whether there is an opportunity to interrelate a group of resources through a boundary configuration and whether a potential boundary includes sufficient land for appropriate use and facility development.

BOUNDARY SIZE AND CONFIGURATION: LIMESTONE FOREST

A suitable national park unit boundary to encompass Rota's limestone forest resources could include areas of the forest that represent both the high-elevation (montane) and low-elevation limestone forest types, as well as areas containing mature, large-diameter trees. These areas of forest are found along Rota's east and southeast coast and along the cliffs that border the Sabana to the north and east. See Map: 3 Limestone Forest Resources. Regardless of maturity, limestone forest areas that surround Rota's nationally significant archeological sites could also be suitable for inclusion in the boundary, to protect the

integrity of the cultural landscape settings (including viewsheds).

To effectively protect limestone forest resources, as noted above, a potential park unit boundary would need to include continuous areas of forest. This would serve to provide habitat connectivity and to support the suitability finding that Rota's limestone forests are an unusually extensive and intact resource that is not adequately represented in the national park system. The areas protected would additionally need to be expansive enough to allow for the development of hiking trails that can be accessed by existing roads, in order to provide an immersive visitor experience.

A suitable boundary configuration around the limestone forest resources would include only publicly owned lands and follow existing parcel boundaries. Limestone forest boundaries would exclude those public lands that are currently designated for homesteading, unless the CNMI and Rota governments were to decide to make those lands available for use as a national park. To complement existing land uses, regulations, and resource protection goals, it would be appropriate to include limestone forest areas that are already within existing conservation areas, including the I'Chenchon Park Wildlife Conservation Area and the Mariana Crow Conservation Area.

Although much of the limestone forest encircling the Sabana is of high quality and is protected by a conservation area, it would not be feasible for inclusion because of challenges with public access and managing a linear strip of land along the cliffs.

BOUNDARY SIZE AND CONFIGURATION: CHAMORRO ARCHEOLOGICAL SITES

Unlike the limestone forest area, a suitable boundary for the Chamorro archeological sites could feasibly include disparate locations. This is because many of the sites are in comparatively close proximity to one another (less than 5 miles, or 8 kilometers, apart at the most) and in similar conditions that don't

require substantially different management approaches. In general, a suitable national park unit boundary would include National Register district boundaries, where they exist and where they are located on publicly owned land. In all cases, a boundary would be of sufficient size and configuration to ensure resource protection. This could include encompassing enough of the site's coastal, limestone forest, and/or agricultural setting to protect the integrity of the cultural landscape.

A suitable national park unit boundary could comprise not only the individually nationally significant sites (Mochong, As Nieves, Alaguan) but could additionally protect the coastal and upland villages and the rock art sites that lend complexity and richness to the resources protected on Rota. Boundary configurations for the Chamorro Archeological Sites would only include publicly owned lands.

Mochong Latte Village Complex

A suitable boundary around the Mochong complex could encompass the existing National Register of Historic Places archeological district boundary. A suitable boundary could also include publicly owned lands to the south to maintain the site's limestone forest setting and provide a connection to the Mâya coastal site to the east.

As Nieves Quarry

The National Register boundary could be a suitable boundary for the quarry site. The boundary would not include adjacent public lands that are currently designated for agricultural homesteads. However, if such lands were no longer needed for homesteading, they could potentially be included later through a boundary expansion if the CNMI and Rota governments were to agree. In its current configuration, the boundary around the As Nieves site is of sufficient size to ensure resource protection.

Alaguan Latte Village Complex

A feasible boundary for the Alaguan complex would need to contain the 25-acre (10-hectare) valley and provide a contiguous expanse of public land from the site up to the Pali'e Road (Highway 100), to ensure public access across publicly owned land. To provide

a contiguous expanse of the area's exceptional limestone forest, the boundary would also encompass the publicly owned lands to the east where West Koridot and East Koridot and the other East and Southeast Coast Archeological Sites are located, within the I'Chenchon Park Wildlife Conservation Area.

Complex of Coastal and Upland Latte Villages

North Coast Archeological Sites

The four North Coast Archeological Sites are not feasible for inclusion in the national park system, due to their private landownership, and they are therefore not appropriate for inclusion in a national park unit boundary at this time.

Mâya Latte Site

As noted above, a suitable boundary encompassing Mâya could connect the site with the Mochong Latte Village Complex. Including public lands to the south of Mâya could maintain the site's limestone forest setting, and extending the boundary to the east would connect the sites to high-quality stands of forest along the island's northeast coast.

Dugi Archeological Site

As noted above, portions of Dugi fall within homesteading lands and portions fall within undesignated public lands. The area of the site described in Dugi's National Register nomination has boundaries between the 100-meter contour line to the north and the 120-meter contour to the south (NPS 1985). The area described in the nomination is currently within a designated village homestead site and is therefore not suitable for inclusion in an NPS unit boundary at this time. However, the northwest section of the site could feasibly be included in a boundary that protects the coastal sites of Mochong and Mâya, along with their landscape settings. If the CNMI and Rota governments were to determine that homestead sites at Dugi were no longer needed, additional analysis could be undertaken to identify an appropriate location for a larger boundary around the full archeological site.

Gampapa Latte Village

As noted above, Gampapa includes latte sets and other archeological features located on publicly as well as privately owned lands. A suitable boundary for Gampapa could encompass publicly owned lands that are not designated for homesteading and could connect to the I'Chenchon Park Wildlife Conservation Area to the east, where Chugai Cave is located. The configuration of the boundary around Gampapa, like other boundaries, would need to be determined in partnership with the CNMI government and avoid designated future public land uses, such as the proposed solar farm to the west (CNMI DPL 2019, figure R-9). It is therefore anticipated that a boundary configuration would have no or limited effects on the authorization, construction, operation, maintenance or improvement of energy production and transmission or other infrastructure associated with the proposed solar farm.

East and Southeast Coast Archeological Sites: As Dudo, Sagua Gahga, East Koridot, and West Koridot Villages

While the East and Southeast Coast Archeological Sites themselves are not safely accessible by the public, they are located within the existing I'Chenchon Park Wildlife Conservation Area. At a minimum, a suitable boundary around these sites could encompass all four of them and extend as far north as the prominent notch in the cliffs at Finá Atkos, thereby including the surveyed archeological sites of the area. As noted above, a suitable boundary could also extend far enough to the west to include the nearby Chugai Cave and the inland sites at Gampapa, in order to illustrate the relationship between coastal and inland latte settlements.

Rock Art Sites

Chugai Cave

Chugai Cave itself is within the I'Chenchon Park Wildlife Conservation Area, although most of the trail accessing the cave is located on Undesignated/Not in Use public land immediately to the west. As noted above, I'Chenchon could be included in a boundary

for the limestone forest areas on Rota. A suitable boundary around Chugai Cave could include I'Chenchon as well as the lands to the west on which the trail and the parking area are sited. These public parcels could also be included in the boundary configuration proposed for the Gampapa Latte Village.

East and Southeast Coast Rock Art Caves: Sagua Gahga, Koridot Caves

A suitable boundary for the East and Southeast Coast Rock Art Caves could be the same as the boundary for the archeological sites in the same area. At a minimum, the boundary could extend north to Finá Atkos and west to connect with Chugai Cave and Gampapa.

BOUNDARY SIZE AND CONFIGURATION: WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

Ginalagan Japanese World War II Defensive Complex

Public access to Ginalagan is not currently feasible because it requires crossing privately owned land. If public access were to be provided in the future, additional analysis would be needed to identify a suitable boundary configuration. Moore and Hunter-Anderson's 1988 archeological survey proposed a National Register district boundary that extends 0.9 miles (1.5 kilometers) northwest from the Alaguan overlook site, following the curve of the cliff line (Moore and Hunter-Anderson 1988, 33).

Chudang Palii Japanese World War II Defensive Complex

A suitable boundary for Chudang Palii could conform at a minimum to the National Register district boundary described in the nomination for the site: located between the 300-meter and 400-meter contour line along the north side of Mount Sabana, and partially bounded on the north and east side by the road to the Sabana (Highway 11). The limestone escarpment of Chudang Palii defines the district with a cliff rising 65 to almost 300 feet tall (19.8 to 91.4 meters) at its upper portion (Mohlman et al. 2011, National Register Nomination Form 6). However, public access to this site is not

feasible due to safety concerns associated with the extremely rugged terrain and unstable archeological features.

Conclusion: Boundary Size and Configuration

Rota's limestone forest sites and most of the Chamorro archeological sites are of sufficient size to include and protect their primary resources, in this case limestone forest ecosystems and a diverse archeological site complex that outstandingly illustrates the Chamorro way of life during the latte period. Notably these sites are characterized by their proximity and connectivity within a well-preserved coastal and limestone forest setting. The sites additionally include adequate surrounding area to protect this setting for the resources, and sufficient land is available for appropriate use and development of visitor facilities.

Boundary configurations are not proposed for sites that are in private ownership, that are currently designated for homesteading use, or where public access is not feasible.

These include limestone forest areas along the Sabana cliffs, the North Coast Archeological Sites, portions of Dugi and Gampapa, Ginalagan, and Chudang Palii. If changes in landownership or land use occur that would allow these sites to be compatible with a national park unit, additional analysis could be undertaken to determine acceptable boundary configurations. Existing and proposed National Register boundaries are available to inform future analysis of Dugi, Ginalagan, and Chudang Palii if appropriate. Latte village sites and rock art caves along the east and southeast coast are located within the limestone forest boundary configuration around I'Chenchon Park, even though NPS analysis indicates that public access to these areas is likely infeasible.

Existing Resource Degradation and Threats to Resources

The nationally significant sites and resources on Rota are generally of high quality and have a high degree of integrity. Nevertheless, the introduction of invasive species and unmanaged visitor use may pose a threat to some of these resources.



Members of the U.S. House Committee on Natural Resources tour the As Nieves Quarry, February 2017. Photo: NPS.

EXISTING RESOURCE DEGRADATION AND THREATS TO RESOURCES: LIMESTONE FOREST

Nonnative and/or Invasive Species

Rota's limestone forest was spared much of the destruction that occurred to forests on Guam, Saipan, and Tinian during World War II. To date, it has also been spared the devastating impacts of the brown tree snake (*Boiga irregularis*), which has had such a calamitous influence on forest ecosystems in Guam (see Chapter 2: Context and Resource Description). Due to their evolutionary history, ecosystems in the Marianas are notable for their high rates of endemism and are especially vulnerable to introduced species. Given the sensitivity of Rota's limestone forests and the isolation and careful management that have historically protected them, any additional visitation to the island as well as the shipment of goods and materials increases the risk of introducing nonnative and/or invasive species. These include the brown tree snake; other invasive plants, animals, and insects; and fungal diseases. The potential introduction of these species poses the most serious threat to Rota's fragile limestone forest ecosystem and to the ongoing cultural practices that it sustains.

The invasive coconut rhinoceros beetle (*Oryctes rhinoceros*) was detected on Rota in 2017. Since discovery, the CNMI DLNR has been actively engaged in detecting and trapping the beetles with support from the U.S. Department of Agriculture (OIA 2021). The coconut rhinoceros beetle is of particular concern because it attacks coconut trees, which are both culturally and economically important to communities in the Marianas. The beetle has destroyed 20 percent of Guam's coconut trees, and DLNR staff on Rota are working rigorously to limit its spread and control infestations on the island (OIA 2021).

Nonnative ungulates (pigs and especially the Philippine deer, *Rusa marianna*) currently on the island already pose a significant risk to high-quality limestone forest areas, due to herbivory. Rota's residents value the deer as a food source, reducing some of its impacts by subsistence hunting. Although hunting

invasive species such as deer does limit their population, it doesn't eliminate the problem if they can continue to access susceptible vegetation for browsing. In addition to grazing, feral ungulates can also increase the risk of invasive species and erosion through hoof action, rooting, or wallowing (Liske-Clark 2015, 4-23). Fencing is required in addition to animal control to adequately protect forest resources.

While debate exists about whether the monitor lizard (*Varanus indicus*) is indigenous or a precontact introduction (Weijola et al. 2020), monitor lizards are considered a threat to the Mariana crow, or aga (*Corvus kubaryi*), because they prey on aga eggs (Camacho, pers. comm. 2021). Aga population decline is also due to predation by feral cats, habitat degradation, and the brown tree snake on Guam.

The CNMI Division of Fish and Wildlife (DFW) recognizes the grave threat posed by invasive species. DFW has established both regulations and programs to minimize risk, in particular to prevent the arrival of devastating species already present on Guam, such as the brown tree snake and little fire ant (*Wasmannia auropunctata*). The Office of Insular Affairs, within the Department of the Interior, coordinates the Brown Tree Snake Control Program, which provides grant funding to support prevention, detection, and rapid response efforts in the CNMI. The 2015–2025 Wildlife Action Plan for the CNMI calls on DFW to continue these efforts while developing a comprehensive biosecurity program with new regulations and protocols (Liske-Clark 2015, 7-2). On Rota, the CNMI Forestry program (under the Division of Agriculture) is currently tasked with invasive species control and is replanting native limestone forest species that are listed as threatened or endangered. The Division of Forestry is also working with private landowners, the non-profit Micronesia Islands Nature Alliance, and the U.S. Fish and Wildlife Service to collect seeds, raise, and outplant endangered native species such as *Serianthes nelsonii* and *Osmoxylon mariannense* (USFWS 2021).

Increased visitation to Rota could increase the risk of invasive species spread. Other economic or tourism development activities on the island would carry the same risk. Future monitoring, prevention, education and interpretation, and response efforts could reduce potential impacts.

Storm Damage and Climate Change

Although Rota's existing limestone forest has been largely protected due to its location on steep rugged terrain, areas that are protected from development are highly vulnerable to typhoon damage because of their elevation and exposure. The strongest typhoon to hit Rota in recent years was Typhoon Mangkhut, in September 2018 followed in October 2018 by Super Typhoon Yutu, the strongest typhoon ever recorded in the Marianas. However, storms of lesser intensity strike the islands fairly regularly.

Typhoon damage to limestone forest is a concern because areas of mature native forest tend to convert to thickets of *Pandanus tectorius* as canopy trees are destroyed. This is exacerbated by clearing on the Sabana, which increases the area of forest that is exposed to high winds (Liske-Clark 2015, 4-10). Typhoons may also adversely impact animal species, such as fanihi, by destroying the trees that provide their food (Liske-Clark 2015, 6-9).

Climate change is expected to impact the frequency and intensity of tropical cyclones (including tropical storms, typhoons, and tropical depressions). While it is anticipated that tropical cyclones will decrease in frequency, those that do hit the Marianas are more likely to be intense (Grecni et al. 2021, 21). Additionally, climate change is likely to have a ripple effect on the limestone forest ecosystem and its food webs, although impacts are difficult to predict at this time. Expected changes in precipitation patterns and increased typhoon intensity will likely alter forest structure and composition (Liske-Clark 2015, 6-6). The frequency of typhoons and their damage to forests and other impacts from climate change would occur regardless of whether a national park unit were established on Rota.

Human Activities

Current human activities that pose a threat to limestone forest resources on Rota include unrestricted grazing in agricultural areas adjacent to forests, clearing of forest areas for agriculture, fire-setting to attract game, and illegal hunting of protected species (fanihi and aga). The CNMI DFW enforces regulations that prohibit these activities in designated conservation areas, and the agency's Wildlife Action Plan calls for additional funding to support enforcement and improved communication around conservation area boundaries and allowable uses (Liske-Clark 2015, 7-2). The recently completed Talakhaya Integrated Watershed Management Plan identifies intentionally set fires as one of the primary threats facing the watershed. The plan provides strategies to increase monitoring and raise awareness about the damaging effects of fire to the watershed and to general forest health (CNMI BECQ 2020).

The presence of a national park unit could increase the risk of damage to limestone forest resources by attracting additional visitation and foot traffic. This could be mitigated by the development of trails in appropriate locations, with minimal impact to resources. Trails have been identified as a key strategy to increase public support for conservation in the CNMI Wildlife Action Plan (Liske-Clark 2015, 7-2).

EXISTING RESOURCE DEGRADATION AND THREATS TO RESOURCES: CHAMORRO ARCHEOLOGICAL SITES

The Chamorro archeological sites on Rota have been carefully maintained by the local community for generations and continue to provide a tangible and powerful connection to Chamorro cultural heritage. As a result, the sites in general possess a high degree of integrity. Some of the sites experienced damage from agricultural activities during the Japanese period and from the construction of defensive structures during World War II, however the occurrence of such damage is minimal, especially because Rota was not invaded during the war.

Current threats to Chamorro archeological resources include overgrown vegetation,

which can cause latte to crack, as well as damage from natural disasters, such as typhoons and earthquakes. Sea-level rise due to climate change also poses a risk to those resources adjacent to the coast in low-lying areas. While development pressure on Rota is comparatively low, the increasing pressure for homesteads may threaten the settings of the archeological sites, in particular those that are located on more gently sloping, arable land. However, due to the cultural significance of these sites, any loss of features connected with Rota's Chamorro heritage could likewise be an issue of concern to island residents and to residents throughout the CNMI.

The establishment of a national park unit on Rota could increase the risk to Chamorro archeological sites due to increased visitation and a greater likelihood of damage to or theft of exposed resources. The NPS could help mitigate this risk by assisting the HPO with visitor use management, documentation, and interpretation, though any on-site NPS staff capacity for resource protection would be limited.

EXISTING RESOURCE DEGRADATION AND THREATS TO RESOURCES: WORLD WAR II JAPANESE DEFENSIVE COMPLEXES

The integrity of the Ginalagan and Chudang Palii defensive complexes is threatened by natural disasters, such as typhoons and earthquakes, weathering from rain and microorganisms, and vegetation growth, which can break apart both the limestone cliffs and concrete and dry-stone structures (Moore and Hunter-Anderson 1988). The loose-stone features at Chudang Palii are susceptible to erosion, which is exacerbated by visitation to the site. Complex 4 at Ginalagan and the Japanese naval gun at Chudang Palii are in close proximity to roads and are therefore vulnerable to vandalism. Over the years exposed archeological artifacts have been moved from their original locations by visitors to the sites (Moore and Hunter-Anderson 1988, Mohlman et al. 2011). The establishment of a national park unit on Rota could increase visitation to the island overall, which would likely increase visitation to other resources

on Rota, including the World War II Japanese defensive complexes. Formal public access to the two defensive complexes is infeasible at this time.

HAZARDOUS MATERIALS

The presence of hazardous materials within a study area could make it infeasible to adequately protect the area's resources or accommodate public use in a reasonable way. The 2019 CNMI Comprehensive Public Land Use Plan included an analysis of sites on Rota where hazardous materials or unexploded ordnance (UXO) may be present. The analysis identified three potential Formerly Used Defense Sites (FUDS) on the island, which were used for military training and weaponry testing and storage.

FUDS are the responsibility of the Department of Defense, which is required to both investigate and environmentally restore the sites. The public land use plan reports that one of the sites (property number H09CN0401), located in the vicinity of Chudang Palii, was restored in 2011 (CNMI DPL 2019, Appendix B). The other two sites (numbers H09CN0009 and H09CN0090) have been identified by the Department of Defense as ineligible for FUDS restoration, because they were contaminated by the Japanese military through an act of war (CNMI DPL 2019, USGAO 2021). The U.S. Army Corps of Engineers is responsible for FUDS clean-up and maintains a GIS database of eligible and ineligible projects. The GIS database identifies the location of one of the ineligible sites, which appears to be located in or near the Ginalagan Defensive Complex (USACE 2022). The other site is not yet mapped; however it is reasonable to expect that it could be located in an area with a concentration of Japanese military structures.

In general, the presence of unexploded ordnance would be expected in lands occupied by military forces during World War II. The NPS has considerable experience managing visitor use within national park units where unexploded ordnance is present, including at War in the Pacific National Historical Park and American Memorial Park. In such situations, the NPS could

partner with local agencies and emergency services to reduce the public risk of UXOs and establish response protocols in the event military munitions are discovered. In addition, World War II hazards are likely concentrated within defensive structures in areas of the island that are inherently challenging for the public to access. Therefore, the presence of hazardous materials on Rota would not prevent reasonable public use or adequate resource protection.

Conclusion: Existing Resource Degradation and Threats to Resources

The study area contains resources of high integrity, sufficient for NPS designation, that are currently managed by local agencies on public land in a community that values their conservation. Due to the island location, Rota's limestone forests and Chamorro and

World War II archeological resources face ongoing risk from natural disasters and climate change. In the event that an NPS unit were established on Rota, the NPS and CNMI agencies could partner to leverage NPS fund sources to mitigate impacts and adaptively manage resources, though accessing such funding is highly competitive and uncertain.

Visitation to the sites is low at this time, and development pressure on the island is minimal. Designation of a NPS unit on Rota could increase visitation and need for resource protection. The presence of hazardous materials is not likely to impede public access or resource protection. The study area will therefore be able to retain its significant values.



Staff from the CNMI Historic Preservation Office and the NPS visit Māya Latte Site. Photo: NPS.

Level of Local and General Public Support

The National Park Service conducted public outreach for the Rota Special Resource Study in 2017 and 2020. More detailed information about public outreach efforts and comments received is included in Chapter 7: Consultation and Coordination.

Based on comments received on the NPS preliminary findings in 2020, public support for establishing a unit of the national park system on Rota is varied. Approximately half the comments received favored the establishment of a unit. There were also a substantial number of comments submitted in opposition to a unit (a little over a quarter of all comments received), and another quarter requested more information about what an NPS unit on Rota could entail before forming an opinion. Individuals requesting more information asked for additional detail about local use and access, the management approaches for a potential unit and the level of involvement of the CNMI government, and the potential economic impacts of a unit.

Many people voiced their strong desire that the residents of Rota and the CNMI have a say in whether a unit is established and the contents of any agreement between the NPS and CNMI. A few members of the public recommended specific elements that should be addressed in a land management agreement if one is created. These elements include provisions for traditional use and local access, the ability to hunt and to gather culturally important plants in lands outside conservation areas, an administrative structure that provides the Chamorro people with a priority voice in management decisions, and a hiring preference for Rota and CNMI residents.

Conclusion: Level of Local and General Public Support

There are varying opinions among the public and elected officials regarding the idea of including Rota's nationally significant resources in the national park system. The level of public support is dependent on the National Park Service's intent and ability

to preserve the local community's access to public lands for traditional uses. Public support for an NPS unit is also contingent on maintaining the local agencies' active role in land and resource management. This modest level of support diminishes the feasibility of an NPS unit on Rota.

Social and Economic Impact

ROTA AND CNMI SOCIOECONOMIC SETTING

Population

As reported in the 2020 Census, Rota has a population of 1,893, or about 4% of the total population of the CNMI. It is the third-most populated island in the archipelago, following Saipan, with a population of 43,385, and Tinian, with a population of 2,044 (USCB 2021). Between the 2010 and 2020 Census, the CNMI population as a whole declined 12.2%. Rota experienced a more marked decline in population over this ten-year period, at 25.1%. This represents the continuation of a downward trend in population in the islands, which began in the early 2000s with the departure of the garment production industry due to changes in international trade rules. In contrast, in the 1990s the CNMI and Rota experienced significant population increases, peaking in the year 2000 at 62,392 and 3,283 people, respectively. This represented a nearly 60% increase since 1990 (USDHHS 2021). Much of this increase was driven by the growth of garment production in this period, especially on Saipan, which was home to 34 factories before the industry left the CNMI (Erediano 2008).

Compared with Saipan and Tinian, Rota's population includes a higher percentage of people of Northern Marianas descent, or "NMD," which includes Chamorro and/or Carolinian people. In 2016, Rota's population of NMD residents was 1,395, or 51%, compared with 33% on Saipan and 37% on Tinian (CNMI DPL 2019, 3-10-3-15). Forecasts conducted for the 2019 Comprehensive Public Land Use Plan predict that Rota's total population could range from between 2,284 to 3,577 people by 2028. The variability in projected population reflects

different tourism growth scenarios for the CNMI (CNMI DPL, 37). When compared with other groups, population levels of NMD residents have tended to remain more stable on the islands despite changes in economic conditions (CNMI DPL, 3-39). Therefore, Rota's population is currently projected to be somewhat sheltered from large population shifts that may result from the islands' economic situation.

In 2016, 37.8% of Rota's residents spoke Chamorro at home, 32.6% spoke only English at home, and 26.3% spoke a Filipino language at home, reflecting an increasing proportion of CNMI residents who were born in the Philippines (CNMI DOC 2016).

Employment and Income

The CNMI Department of Commerce's Household Income and Expenditure Survey reported that the median income on Rota in 2016 was \$18,911, compared with \$19,201 in the CNMI as a whole. In 2016, 36.8% of Rota's residents were employed by the CNMI government, whereas 56.3% worked for private companies. On Rota, 28.1% of people worked in service occupations. Department of Commerce records state that 74.9% of Rota's population was in the labor force in 2016 (compared with 70.0% in the CNMI), a figure that does not include people who are practicing only subsistence activities. Only 2.0% of Rota's population is documented as unemployed but looking for work. Employment statistics for the Marianas have varied over time in response to economic factors, declining with the closure of the garment factories in the 2000s and beginning to rise again with the growth of tourism (CNMI DOC 2016).

According to the CNMI Department of Commerce, 47.5% of Rota's population was living in poverty in 2016, based on the U.S. Census Bureau official measure, compared with 55.7% in the CNMI. The Department of Commerce notes that these poverty rates are higher than they would be if residents' access to traditional lands and housing were monetized (CNMI DOC 2016). As reported by the community during public outreach, traditional subsistence uses are an extremely

important cultural practice for Rota's residents. Homesteading opportunities for people of Northern Marianas descent are also important to the local community. On Rota, there is strong demand for both agricultural and village homestead sites, currently exceeding available homesteading lands. To help meet this demand, the Department of Public Lands and the 2019 Comprehensive Public Land Use Plan have identified areas suitable for future homesteads (CNMI DPL 2019, 39-40).

Tourism

Tourism in the CNMI has fluctuated over the years, as a result of changing international economic and recreational trends, U.S. visa policies, typhoon damage, and most recently the global coronavirus pandemic. The Marianas Visitors Authority (MVA) reports that the islands hosted 424,838 visitors in fiscal year 2019 (October 2018-September 2019), which represented a 30% decrease in arrivals from the previous year (MVA 2019). Since then, COVID-19 travel restrictions have had a large and damaging impact on CNMI tourism, as reflected in MVA statistics from 2020 and 2021. In fiscal year 2020, the Marianas received 215,125 visitors, which plunged to 5,365 visitors in fiscal year 2021 (MVA 2021a). However, pre-pandemic tourism was comparatively strong. MVA records indicate that tourism in the islands significantly increased between the early 1980s and the late 2000s, with a peak visitation of more than 700,000 occurring in the mid- to late-1990s. Annual visitation neared these high levels again in 2017 and 2018, with 653,150 and 607,593 visitors respectively. Over the years, Japan, Korea, and China have been the islands' largest tourism markets, with Korea and China cited as leading visitation in 2019 (MVA 2019).

The majority of CNMI visitors stay on the island of Saipan, which is served by international airlines and offers additional tourism amenities. Although the MVA does not publish separate visitation statistics for Rota, visitation levels for Rota appear to be significantly smaller than for Saipan and vary according to commercial flight availability and tourism trends. The MVA's 2021-2031 Strategic Plan Toward Sustainable Tourism

highlights the need to promote Rota as a unique Marianas destination to attract additional visitation (MVA 2021b). Rota's natural beauty and cultural resources have inspired the local community's interest in promoting ecotourism (Sabuco 2004; CNMI DPL 2019, 11). Yet ecotourism has been slow to develop on Rota, where commercial uses are currently limited to several small hotels, restaurants, and convenience stores. Nature-based tourism is considered one of the most promising market opportunities for the CNMI, however, and is a focus of a 2017 feasibility and sustainability study for tourism commissioned by the MVA (CNMI OGM 2020, 45). The establishment of a potential national park unit on Rota could be compatible with and could support the local community's focus on ecotourism development.

POTENTIAL IMPACTS

Nationwide, visitors to NPS units purchase goods and services in local gateway communities, and these expenditures generate and support economic activity within those local economies. Sectors that are directly affected typically include lodging, restaurants, retail, recreation industries, and transportation. According to the 2020 *National Park Visitor Spending Effects* report, park visitors spent an estimated \$14.5 billion in local gateway regions while visiting NPS lands across the country in 2020. This was down 31% from 2019 numbers, largely due to the impact of temporary park closures and restrictions during the COVID-19 pandemic. Despite reductions, these expenditures supported an estimated 234,000 jobs, \$9.7 billion in labor income, and \$28.6 billion in economic output in the national economy (Cullinane Thomas and Koontz 2021, v, 1).

While data is available to describe the economic benefits of established national parks throughout the U.S., it is important to recognize that the economic impacts of a new unit are typically modest at first. This is even more likely to be true of parks in remote locations that may be challenging to access. Social and economic impacts of unit designation could vary widely, depending

on the size and scope of the new park, management approach, staffing levels, and especially visitation. Any impacts would be expected to accumulate over time as a new unit became better associated with the national park system.

Case Studies

Due to these variables, it is not possible to predict with certainty the specific economic impacts that a national park on Rota is likely to have. However, it is possible to analyze the impacts of existing parks in similar situations in order to have a better understanding of the potential effects a new unit might have on the island economy and community over the long term. The following analysis therefore evaluates three parks as case studies: War in the Pacific National Historical Park on Guam, the National Park of American Samoa, and Honouliuli National Historic Site on O'ahu. The first two parks are examples of established units in remote locations, and the third park is newly designated and illustrates the current conditions faced by a new unit in the system. It is important to note in reviewing these case studies that the geographic, economic, cultural, and political context of Rota is unique and is not directly comparable to other Pacific Islands where NPS units exist.

Economic impact is determined based on visitation levels, visitation patterns (i.e., day trips vs. overnight stays), and regional economic multipliers, which help understand the economic impact of visitation in a given area (Cullinane Thomas and Koontz 2021, 38). Therefore, economic benefit is directly connected to visitation levels and typically increases over time as visitation to a unit increases. Additionally, NPS staffing in a local area may have negligible to moderate impacts to the local economy, dependent on the number of staff and size of the local community.

War in the Pacific National Historical Park, Guam

War in the Pacific National Historical Park (NHP) was established in 1978, and the park received little funding during its earliest years. Staffing levels ranged from one to

four employees in the park's first five years of existence, increasing to six employees by 1993 (NPS 2004, 132, 160). By the year 2000, the park staff included 10 full-time equivalent employees; this rose to 13 full-time equivalent employees by 2020 (NPS 2002, NPS 2022). The enabling legislation for the park includes the provision that the residents of Guam and the Northern Mariana Islands should be employed "to the maximum extent feasible" to develop, maintain, and administer the park (P.L. 95-348 §6i).

Visitation levels have increased from 51,000 in 1986 to more than 432,000 in 2019 (NPS 2021b). Like many other national park units, visitation to War in the Pacific dropped in 2020 to 318,711, primarily due to the effects of the global coronavirus pandemic. According to the 2020 *National Park Visitor Spending Effects* report, visitor spending at War in the Pacific NHP totaled more than \$19 million in 2020, with 95.6% of spending by non-local visitors. These 2020 expenditures supported 214 jobs in the local area and provided a cumulative benefit to the local economy calculated at \$24.8 million (Cullinane Thomas and Koontz 2021, 38). In 2019 by contrast, park visitors spent a total of \$25.7 million (Cullinane Thomas and Koontz 2020, 33).

Although Guam is part of the Mariana archipelago, it differs from Rota in that it is larger, more developed, and more regularly serviced by commercial airlines. Visitation numbers for a potential national park unit on Rota would likely be significantly lower, especially in the early years of a park establishment.

National Park of American Samoa, American Samoa

The National Park of American Samoa is another NPS unit located in the Pacific Islands, within a U.S. territory. Due to its highly remote character, it provides another valuable case study for the impacts of NPS unit designation on a local economy. The park was authorized in 1988 but not established until 1993, upon the signing of a lease agreement between the Governor of American Samoa and the NPS to manage and use the lands

within the authorized boundary as a national park (NPS 1994).

Staffing levels for the National Park of American Samoa have increased slowly over time. The park's 1997 general management plan reported a total of four full-time employees (NPS 1997, 17). By the year 2000, there were seven full-time employees, rising to 14 by 2020 (NPS 2002, NPS 2022). The enabling legislation for the National Park of American Samoa also states a preference for hiring Native American Samoan staff "to the extent practicable," and it additionally calls for a program to train American Samoan staff to serve as NPS employees (P.L. 100-571 §3e).

Visitation to the park has ranged from nearly 2,000 visitors in 2002 to more than 60,000 in 2019 (NPS 2021b). In 2020 visitation dropped precipitously to 4,819, impacted by COVID-19 travel restrictions. These lower visitation rates contributed \$289,000 in visitor spending in 2020, compared with more than \$3.5 million in 2019 (Cullinane Thomas and Koontz 2021, 2020). Forty jobs in the local area were supported by visitor spending in 2019, with a cumulative benefit to the local economy of more than \$4.5 million (Cullinane Thomas and Koontz 2020, 28). National Park of American Samoa is a particularly relevant case study for Rota because of its isolation from mainland population centers and its cooperative management structure. Although the park's economic contribution to American Samoa has been beneficial, the scale of its beneficial economic impacts has fluctuated over the years due to varied visitation levels.

Honouliuli National Historic Site, O'ahu, Hawai'i

Honouliuli National Historic Site was first designated as a national monument in 2015 by presidential proclamation and was redesignated a national historic site in 2019 by Congress (P.L. 116-9). Staffing for Honouliuli has been minimal in the years immediately following its designation. In 2021 the unit's first superintendent was named, who is currently the only staff member at the historic site, although it receives administrative support from the nearby Pearl Harbor National

Memorial. The operating budget for the unit is \$354,000 in 2021 (NPS 2022). Funding and staffing are expected to rise slowly over time, as the unit prepares for public visitation.

Honouliuli is not yet open to the public, as the NPS works in partnership with technical experts and community stakeholders to prepare the site, including addressing logistical access challenges. Therefore, there are currently no visitation or economic figures to report for this unit. Honouliuli faces unique access challenges that are not directly comparable to those on Rota, where many of the nationally significant sites are already open to public visitation. However, it is a useful recent case study to understand that the process of establishing and staffing a new park can move slowly, with minimal economic contributions at first.

Conclusion—Social and Economic Impact

The social and economic impacts of a national park designation on Rota appear to be largely beneficial and would support the feasibility of NPS designation. Social and economic impacts would vary based on the size and purpose of the unit, management approach and allowable land uses, staffing levels, and visitation. Unlike national parks on the U.S. mainland, Rota's visitation patterns are likely to be heavily influenced by economic and tourism trends in Asia, as well as by the availability of commercial airline flights. Beneficial economic effects would likely be minimal to begin with and would increase gradually over time.

Establishing a national park unit on Rota would be consistent with the local government's goal to promote ecotourism and would complement efforts to increase tourism throughout the CNMI. Designation of a unit could raise awareness of Rota as a destination, which could spur increased visitation to the island, resulting in the long term in development of additional lodging and dining options, increased commercial tour opportunities, more regular airline service, tax revenues, and other visitor-related expenditures on the island. There are no

existing commercial activities that would be negatively impacted by park unit designation.

Costs Associated with Development and Operation

Costs associated with a potential national park unit on Rota could include development of facilities, resource management, and annual operations costs. The full costs to develop and sustain a unit of the national park system on Rota are not known at present and would be affected by the size and purpose of the unit, the management approach identified with the CNMI, the level of visitation, resource preservation needs, the desired level of facility development, and future congressional appropriations. Costs would also be impacted by location and the increased expense of shipping goods and materials to a remote Pacific island. Any costs associated with a land use agreement, long-term leases, or limited acquisition of lands from willing sellers (consistent with the Covenant), would need to be negotiated between the CNMI and the NPS and are unknown at this time.

DEVELOPMENT COSTS

Development costs of new national park units vary widely, depending on existing and desired conditions and facilities. New national park system units frequently require investment in both facility-related and non-facility-related costs to get the unit up and running. One-time facility costs include developing and improving facilities for visitors and park operations, including facilities that would meet legislative requirements for accessibility. These costs would vary with the specific facility and the size and purpose of the park (see "One-Time Facility Costs" section below).

Non-facility costs include projects related to natural and cultural resource management as well as visitor use. These would be costs associated with inventorying and documenting resources in the unit, developing management or treatment plans for those resources, developing educational and interpretative plans and materials, and preparing environmental compliance documents.

In the case of Rota, the CNMI Department of Lands and Natural Resources manages natural resources on the island and conducts some inventory and monitoring work, as does the U.S. Fish and Wildlife Service. Some documentation of Chamorro archeological sites also exists, however the CNMI HPO staff who are currently managing the archeological sites have limited capacity to expand resource documentation efforts. If a national park unit were established on Rota, it is assumed that local agencies would continue their management responsibilities for certain areas within the unit and NPS management responsibilities and costs would be supplemental.

One-Time Facility Costs

If a new unit of the national park system were established on Rota, facility improvements would be limited and would need to be carefully sited and designed with the goal of preserving natural and cultural resources. Wherever possible, the NPS would seek to use existing buildings and infrastructure. Buildings would be used for park operations including visitor services, administration, and maintenance. This approach could result in annual lease costs based on fair market value for existing structures.

Needs for new facilities would likely include trails, signage and interpretive waysides, roadway improvements in select locations, and parking areas. The existing restroom at I'Chenchon could be upgraded for additional visitor use. The cost of these developments would vary with the level of implementation and the size and purpose of the unit. As noted in the "Access and Public Enjoyment Potential" section, steep slopes throughout the island pose challenges to trail development, and trails would likely only be considered feasible in areas that are in proximity to existing roads, where public access can reasonably be provided to sites across public land, and where slope and other site conditions (including resources) allow. Vegetation removal in addition to ongoing vegetation management would likely be required for the development of new trails, trailheads, and parking areas.

OPERATIONAL COSTS

Operational costs of national park units vary widely, depending on the site management approach, partnership opportunities, the amount and type of resources managed, number of visitors, level of programs offered, and many other factors. Typically, a newly established park would be partially supported by staff from a nearby, existing park. For Rota, sharing of resources with other national park sites would be very challenging due to the island's remote location and access challenges. The closest National Park Service sites on Guam and Saipan have limited capacity, as well as staffing and operational challenges, and are not able to provide significant support. Consequently, a new unit on Rota would only be feasible with adequate operational funding. If the CNMI or other entities were to partner with the NPS and participate in a co-stewardship model, a new park unit would not be solely reliant on NPS operational funds.

The designation of a new unit in the national park system does not automatically guarantee that funding or staffing to administer that new unit would be appropriated by Congress. Any newly designated national park unit would have to compete with the more than 400 existing park units for limited funding and resources within a current fiscally constrained environment. Until a budget is provided, the site would receive limited support, and most services would be supplied remotely from the mainland and Hawai'i. Operating budgets would generally begin 2 to 5 years after establishment and initially remain small. Onsite NPS staffing would be added as funding became available.

Table 5-1 compares the expected budgetary needs of newly established units throughout the United States with those of fully established units on remote Pacific Islands. It is important to recognize that the initial operating budgets of new parks are more likely to begin in the range of approximately \$110,000 to \$180,000 a year, based on a review of recently designated units including Honouliuli, Mill Springs Battlefield National Monument, and Harriet Tubman National Historical Park (NPS 2017b, NPS 2021a, NPS

TABLE 5-1: OPERATING BUDGETS FOR RELEVANT NEW AND ESTABLISHED NPS UNITS – 2021*

PARK UNIT	FULL-TIME EQUIVALENT EMPLOYEES (FY20)	ACRES (FY20)	ANNUAL VISITATION (FY20**)	OPERATING BUDGET (FY21)	YEAR ESTABLISHED
RECENTLY ESTABLISHED UNITS					
Mill Springs Battlefield National Monument	0	1,459	N/A	\$472,000	2020
Harriet Tubman National Historical Park	1	512	N/A	\$628,000	2017
Honouliuli National Historic Site	0	155	N/A	\$354,000	2015
Waco Mammoth National Monument	3	107	55,110	\$395,000	2015
PACIFIC ISLAND PARKS					
National Park of American Samoa	14	8,257	21,419	\$1,452,000	1993
War in the Pacific National Historical Park	13	2,031	351,211	\$1,688,000	1978
American Memorial Park (Affiliated Area) ¹	9	133	39,191	\$1,651,000	1978

* Information from the Department of Interior National Park Service Fiscal Year 2022 Budget Justifications (NPS 2022).

** FY 2020 data reflects visitation from October 1, 2019 through September 30, 2020. The NPS also reports “Annual Visitation,” which reflects visitation from January 1, 2020 through December 31, 2020. Annual visitation figures are reported in the “Social and Economic Impact” section. Visitation counts will differ between these ranges.

¹ American Memorial Park on Saipan is an affiliated area of the national park system, however, unlike most affiliated areas, it is directly managed by the National Park Service and receives an annual operating budget from the NPS.

2022). Rota presents unique operational challenges related to staffing and maintaining a national park unit on a remote Pacific island. Existing units in Pacific Island territories are included to understand the operating costs that might be required for a unit in the long term. Operations would primarily include park administration, interpretation/education, trail maintenance, vegetation control, and potential costs associated with agreements the NPS might hold with the CNMI government.

Based on evaluation of comparable new park units, the annual NPS operating base budget on Rota ten years after designation could range from \$350,000 to \$650,000 in 2021 dollars. More specific operational costs would be identified through completion of a management plan for the site.

Conclusion—Costs

One-time development costs for a potential national park unit on Rota appear to be feasible if limited in scope. The level of facility development required for a potential national park unit on Rota would be minimal in comparison to larger, more developed units of the national park system. In identifying future facility developments, a management plan for the unit would need to consider the increased cost of construction in the Pacific Islands, as well as the need for typhoon-resilient design, both of which suggest a minimal facility footprint.

Operational costs would be dependent on the management agreement with the CNMI and the level of support provided by other NPS units or offices. A typical NPS operating budget for a new unit on its own may not be sufficient to meet the unique operational needs of a park in a remote location such as Rota. If the CNMI or other entities were to partner with the NPS and participate in a co-stewardship model, however, a new park unit would not be solely reliant on NPS operational funds. The operational costs of a national park unit on Rota could be conditionally feasible dependent on adequate funding.



Existing walking path at I'Chenchon Park Wildlife Conservation Area. Photo: NPS.

FEASIBILITY CONCLUSION

To be considered feasible for addition to the national park system, an area's natural systems or historic settings must be of sufficient size and configuration to ensure long-term protection of resources and accommodate public use. The area must also have potential for efficient administration at a reasonable cost.

To be feasible, a national park unit on Rota would need to be supported by the CNMI government, as the CNMI is the primary landowner of the sites evaluated in the study area. For a unit to be feasible, the NPS would need to have some level of management authority over lands within the potential unit: this could be achieved through a management agreement with the CNMI government. The agreement would need to include a partnership or co-stewardship arrangement for management, and/or long-term leases, and/or limited acquisition of lands from willing sellers, consistent with Section 806(a) the 1975 Covenant.

To be feasible, a national park unit would be dependent on support from residents on Rota and in the CNMI. At this time, public support for a potential national park unit on Rota is varied. Further description of an NPS unit proposal could address public questions and clarify the level of public support.

To be feasible, the budget for a national park unit on Rota would need to meet the operational requirements of a new park in a remote location. Rota presents unique logistical challenges related to staffing and maintaining a national park unit on a remote Pacific island. Typically, a newly established park would be partially supported by staff from a nearby, existing park. For Rota, sharing resources with other national park sites would be difficult due to the isolated location and access challenges of the Mariana Islands. If the CNMI or other entities were to partner with the NPS and participate in a co-stewardship model, however, a new park unit would not be solely reliant on NPS operational funds. The operational costs of a national park unit on Rota could therefore be conditionally feasible dependent on adequate funding.

One-time development costs for establishing a national park unit on Rota could be reasonable, provided the facility footprint is limited—such as for trails, small parking lot and trailhead improvements, and a small leased, administrative space. Additionally, the social and economic impacts of NPS designation appear to be largely beneficial and would support the conditional feasibility of NPS designation.

There are exceptional opportunities for public enjoyment of the sites on Rota if safe public access can be provided. However, the limestone forest areas along the Sabana cliffs and the World War II Japanese defensive complex at Chudang Palii are not feasible for public access due to safety concerns associated with their challenging locations and rugged terrain. The defensive complex at Ginalagan is not feasible for public access due to the need to cross private lands.

An appropriate boundary configuration for a potential national park unit on Rota would encompass the limestone forest and Chamorro archeological sites listed below and surrounding area sufficient for resource protection and visitor facilities.

The following sites include resources with integrity sufficient for national park unit designation, and no current threats would preclude their management as a unit of the national park system: limestone forest along the south and east coasts, including the I'Chenchon Park Wildlife Conservation Area; Mochong Latte Village Complex; As Nieves Quarry; Alaguan Latte Village Complex; Māya Latte Site; Dugi Archeological Site (portions not designated as homesteads); Gampapa Latte Village (portions not privately owned or designated as homesteads); and Chugai Cave.

Based on the feasibility analysis, select limestone forest and Chamorro archeological sites are conditionally feasible as an addition to the national park system, dependent upon support from the CNMI government and the development of a management agreement, support from Rota and CNMI residents, and sufficient funding for park operations.



Māya Latte Site. Photo: NPS.

NEED FOR NPS MANAGEMENT AND STUDY CONCLUSIONS

6





Detailed view of the sea turtle pictographs in Chugai Cave. Photo: NPS.

CHAPTER 6: NEED FOR NPS MANAGEMENT AND STUDY CONCLUSIONS

This chapter describes whether direct NPS management is optimal when compared with other management options. This chapter also includes the overall conclusions from the special resource study process.

DETERMINATION OF NEED FOR NPS MANAGEMENT

The need for direct NPS management is the final criterion for evaluating resources for potential designation as a new unit of the national park system. In this section, management by public and private entities is evaluated to determine if these entities can effectively and efficiently provide long-term resource protection and visitor services or if direct NPS management is the optimal approach. If other entities can provide an equivalent or superior level of resource protection and visitor services, the National Park Service will determine that establishment of a national park unit is not needed, and other organization(s) should manage the area.

Evaluation of the need for NPS management pertains to those resources that are determined to be nationally significant, suitable, and feasible for inclusion in the national park system. Based on these findings, the need for NPS management focuses on the following sites on Rota:

- **Rota’s Limestone Forest:** South and East Coasts, including the I’Chenchon Park Wildlife Conservation Area
- **Chamorro Archeological Sites**
 - Mochong Latte Village Complex
 - As Nieves Quarry
 - Alaguan Latte Village Complex
 - Complex of Coastal and Upland Latte Villages
 - Māya Latte Site
 - Dugi Archeological Site (portions not designated as homesteads)
 - Gampapa Latte Village (portions not privately owned or designated as homesteads)
 - Rock Art Sites
 - Chugai Cave

Summary of Existing Management

Rota’s nationally significant limestone forest resources and Chamorro archeological sites are managed by the CNMI Department of Lands and Natural Resources (DLNR) and the Historic Preservation Office (HPO), respectively. Rota’s residents have carefully protected the island’s resources for generations. In this way, Rota’s community provides an excellent example of the stewardship traditions described by Kelly G. Marsh and Tiara R. Na’puti in the NPS *Asian American Pacific Islander National Historic Landmarks Theme Study*:

For centuries, Pacific Islanders have developed, practiced, and refined forms of managing their environments, cultures, histories, and heritages. These forms were integrated into everyday living. From generation to generation, knowledge, skills, oral narratives, as well as approaches, practices, and traditions relating to care of the environs and cultural heritage were passed down and adapted. Over time, these forms have blended with modern cultural heritage management concepts and institutions (Marsh and Na’puti 2017).

EXISTING MANAGEMENT OF LIMESTONE FOREST

The south and east coast limestone forest areas are actively managed by the DLNR Division of Fish and Wildlife and the Forestry Section of the Division of Agriculture. Limestone forest located within existing conservation areas is protected by the provisions of Rota Local Laws [9-1](#), [9-3](#), and [15-8](#). Traditional subsistence uses, including hunting and gathering, are permitted on publicly owned lands outside conservation areas. Over the years, CNMI agencies have leveraged funds

from federal programs (for example, from the U.S. Forest Service) to support their resource management efforts in Rota's limestone forests. The CNMI and Rota governments regularly grant access to limestone forest areas for research by university programs focused on conservation and ecology.

In recent years the CNMI has focused resource management and restoration efforts in the Sabana and Talakhaya areas. These efforts have recognized the importance of the Sabana and Talakhaya for habitat and species conservation, water resources and watershed health, ongoing cultural significance and traditional practices, and the protection of marine areas and coral reefs. In 2018, the DLNR completed a Sabana Land Use Management Plan focused on increased reforestation efforts, control of invasive species, and restrictions on agricultural activities, along with strategies to enhance sustainable economic development (CNMI BECQ 2020).

In 2020, the CNMI Division of Coastal Resources Management released an updated plan for the Talakhaya area, the Talakhaya Integrated Watershed Management Plan. The Talakhaya plan provides an integrated approach to managing the terraced cliffs below and to the south of the Sabana. The area includes high-quality limestone forest with culturally significant plant species and ancient Chamorro settlement sites, and it protects Rota's primary source of freshwater as well as the health of the coral reefs below by reducing erosion and sedimentation. The Talakhaya area has been identified as an important watershed for ridge-to-reef management by both the CNMI and the National Oceanic and Atmospheric Administration (NOAA) Coral Reef Conservation Program. The CNMI Forestry Section of the Division of Agriculture and NOAA have supported active watershed restoration efforts in recent years, which have included community volunteers in revegetation efforts, notably through the Luta Livelihoods project (CNMI BECQ 2020, NOAA 2022). CNMI agencies have also been actively involved with many fire reduction efforts throughout Rota's limestone forest areas (Bubb, pers. comm., 2021).

The U.S. Fish and Wildlife Service (USFWS) also conducts resource management and monitoring activities on Rota in partnership with DLNR, with a specific focus on promoting the survival of threatened and endangered plant and animal species, such as the tree *Serianthes nelsonii* and the aga, or Mariana crow (*Corvus kubaryi*). In 2004, the USFWS designated approximately 6,033 acres (2,441 hectares) on Rota as a critical habitat unit for the Mariana crow, to protect areas that support existing crows and provide high-priority habitat components. The USFWS-designated Mariana Crow Critical Habitat Unit includes both the CNMI-designated I'Chenchon Park and the Mariana Crow Conservation Area and extends around the northeast coast of the island as well as around the cliffs below the Sabana. Although the critical habitat unit covers both CNMI- and privately owned land, the critical habitat designation only regulates activities that are sponsored by federal agencies. Critical habitat designation does not affect activities on CNMI or private lands unless a federal permit, license, or funding is involved (USFWS 2004).

Opportunities exist to increase visitor enjoyment and interpretation of the ecological and cultural importance of limestone forests. Many forest areas are currently not accessible to visitors and are not being interpreted. Although there are existing visitor facilities and interpretation provided within the I'Chenchon Park Wildlife Conservation Area, these visitor amenities serve only a small portion of the limestone forest resources on Rota.

EXISTING MANAGEMENT OF CHAMORRO ARCHEOLOGICAL SITES

CNMI Historic Preservation Office (HPO) staff maintain the Chamorro archeological sites on Rota, according to the regulations set forth in [CNMI Public Law 3-39](#), the Commonwealth Historic Preservation Act of 1982. HPO staff undertake activities such as mowing, vegetation removal, and monitoring of the resources. Limited documentation for the sites exists in the form of National Register nominations and archeological surveys conducted by university research teams.

The HPO augments their historic preservation efforts through federal grant funding: sites currently listed in the National Register of Historic Places, such as Mochong, As Nieves, Dugi, and Chugai Cave are eligible for technical assistance and grants for preservation. Recently the CNMI Department of Community and Cultural Affairs, within which the HPO is located, received a technical assistance grant from the Office of Insular Affairs to support maintenance and additional interpretation of several of Rota’s historic sites, including Chamorro archeological sites. The NPS is currently supporting a national historic landmark nomination for the As Nieves Quarry.

While some interpretation is provided at select sites (Mochong, Måya, and As Nieves) in the form of wayside exhibits, many more

opportunities exist to enhance interpretation of pre-latte-and latte-period resources and their ongoing cultural importance to Chamorro people. In addition, visitor access to sites could be increased by providing facilities such as trails and trailheads in locations that are currently inaccessible. Sites such as the Alaguan Latte Village Complex, Dugi Archeological Site, and Gampapa Latte Village are largely inaccessible to visitors, and Chugai Cave is accessible only by appointment with the HPO. Partnerships with interested organizations could provide the HPO with additional capacity for research, interpretation, education, and visitor service activities, and could expand the range of sites that are preserved and interpreted.

TABLE 6-1: EXISTING MANAGEMENT OF LIMESTONE FOREST AND CHAMORRO ARCHEOLOGICAL SITES

SITE	OWNERSHIP AND MANAGEMENT	CURRENT VISITOR OPPORTUNITIES OR INTERPRETATION
Limestone Forest	Public, CNMI DLNR; some privately owned	In general, not publicly accessible; lacking interpretation
I’Chenchon Park Wildlife Conservation Area	Public, CNMI DLNR	Trail and overlook open to the public with interpretive waysides
Mochong Latte Village Complex	Public, CNMI HPO	Open to the public with interpretive waysides
As Nieves Quarry	Public, CNMI HPO	Open to the public
Alaguan Latte Village Complex	Public, CNMI DLNR, CNMI HPO	Currently not accessible to the public
Måya Latte Site	Public, CNMI HPO	Currently open to the public with interpretive waysides
Dugi Archeological Site	Public, CNMI Department of Public Lands	Currently not accessible to the public
Gampapa Latte Village	Public, CNMI Department of Public Lands; some portions of the site are privately owned	Currently not accessible to the public
Chugai Cave	Public, CNMI DLNR, CNMI HPO	Accessible by appointment with HPO

**Rota Special Resource Study
Map 6: Existing Management**

National Park Service
U.S. Department of the Interior



Conservation Selected Cultural Resources

- Conservation Areas: Blue diagonal hatching
- Public Land: Solid green
- Homesteads: Existing and Proposed (Cross-hatched)
- Prehistoric Chamorro sites: Red dot
- WWII sites (1940s): Yellow star

Data Sources:
 CNMI: Conservation Areas
 NPS: Cultural Resources, Places, Basemap
 CNMI/DPL/NPS: Public Land, Homesteads
 U.S. Census Bureau: Roads

Produced by National Park Service, DOI Regions 8, 9, 10 and 12 GIS Group
 Date: March 2022

Scale: 0 1 2 Miles

The data on this map is derived from the CNMI government and other agencies. The National Park Service gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of the maps and is not liable for positioning inaccuracies, subsequent updates, errors, or unintentional omissions of data. These graphics are not legal documents and are not intended to be used as such.

Potential Management Frameworks

To make the determination of whether NPS management is needed for the Rota study area, the NPS has compared existing management of Rota's significant sites with several additional management frameworks.

CONTINUED MANAGEMENT WITH ADDITIONAL FEDERAL FUNDING

During public outreach for the study in 2020, several commenters suggested that the NPS consider directing additional U.S. government funds to CNMI agencies to support local management in the study area and provide additional visitor enjoyment opportunities. The NPS offers limited grant funding for the acquisition and development of local parks throughout the country, including in the CNMI, through the Land and Water Conservation Fund (LWCF). Local governments in the CNMI, including Rota, are able to apply for LWCF State Assistance Program grants every two years and compete against other local projects. The CNMI develops criteria and standards for LWCF grant selection based on its priority needs for outdoor recreation, as outlined in its Statewide Outdoor Comprehensive Recreation Plan (CNMI OGM 2020).

Other federal agencies have grant programs that may address some park and land management needs on Rota. For example, the Office of Insular Affairs (OIA) within the Department of the Interior provides Technical Assistance Program (TAP) grants for short-term, non-capital projects in the U.S. territories, provided such grants are not directed toward routine operating expenses. Other available grant programs through the OIA include the Maintenance Assistance Program, a matching grant designed to promote and develop infrastructure maintenance capabilities, as well as grants to protect natural resources. In addition, the CNMI HPO annually receives funding appropriated by Congress through its Historic Preservation Fund, which is given to historic preservation offices in all U.S. states and territories, as well as tribal historic

preservation offices. The Historic Preservation Fund also supports several competitive grants administered by the National Park Service that local governments and organizations may apply for.

Existing federal fund sources, including grants, provide valuable support for CNMI public lands and resources, and the CNMI currently makes use of many of these opportunities. However, the majority of these fund sources are designed to cover one-time costs related to planning, design, capital investments, and discrete management activities rather than ongoing resource management and park operations.

WORLD HERITAGE SITE DESIGNATION

World Heritage designation is a program of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) to recognize sites of outstanding universal value for their natural or cultural resources. Universal value is defined as cultural and/or natural significance that is so exceptional that it transcends national boundaries and is of importance to present and future generations of all humanity. Nominations to the World Heritage List are first added to a Tentative List by the country in which the property is located. The final decision on nominations is made by the UNESCO World Heritage Committee based on an evaluation of each site against selection criteria. Inclusion on the Tentative List does not guarantee future designation, however, and the process of inscription on the World Heritage List can take many years.

Designation does not come with funding, although some grant funds are available on a competitive basis for specific projects. Additionally, inscription on the World Heritage List does not place management restrictions or regulations on a site; authority over individual properties remains with the organization that owns and manages the land. Many designated world heritage sites in the U.S. are on publicly owned lands, and several are also national parks, such as Hawai'i Volcanoes National Park. World heritage site designation would likely raise international

awareness of Rota's resources and lead to increased visitation to the island.

NATIONAL HERITAGE AREA DESIGNATION

National heritage areas (NHAs) are designated by Congress as places where natural, cultural, and historic sites combine to form a cohesive, nationally important landscape. There are 55 existing NHAs, all of which are located on the U.S. mainland, although several areas in Hawai'i have explored heritage area options, and a bill proposing a suitability and feasibility study for a national heritage area on Guam was introduced in April 2021 (H.R. 2899, 117th Congress). NHAs operate through locally based public-private partnerships, with a limited amount of matching federal funds, to support historic preservation, natural resource conservation, recreation, heritage tourism, and educational projects.

The national heritage area is not a unit of the national park system, nor is any land owned or managed by the NPS. Individual sites are managed independently within a regional framework of related sites, but benefit from NPS brand recognition, as well as opportunities for technical support or financial aid from the National Park Service through the NHA program. Federal financial support is limited, however. For example, annual federal funding for newly designated NHAs along the west coast totaled \$154,000 per area in fiscal year 2020 and \$157,000 in fiscal year 2021, according to the National Heritage Areas Program for Interior Regions 8, 9, 10, and 12. Most NHAs also have matching funds requirements specified in their enabling legislation that require the non-federal coordinating entity to provide at least 50% of the total annual budget. In addition, the legislation establishing the NHA typically authorizes federal funding for a specific time period only, with the goal of encouraging long-term self-sufficiency of the heritage area. Although funding can be extended through subsequent legislation, Congress is not required to do so (CRS 2021, 8).

Suitability and feasibility studies for proposed national heritage areas may be conducted

by the NPS, when directed by Congress, or by a nonfederal entity. The studies evaluate the area's resources and whether they merit national recognition, conservation, and interpretation; whether they are connected to ongoing cultural traditions; and whether an organization exists that has the financial and organizational capacity to coordinate heritage area activities. Also key to the evaluation is whether there is a community of residents, businesses, nonprofit organizations, and local agencies who have the willingness and capacity to support a heritage area.

National heritage areas provide an opportunity to preserve local ownership and management of lands while fostering cultural tourism and economic development through a small investment of federal funds. The NHA model has historically been successful in situations where a robust local coordinating entity and public-private partnership already exist, along with capacity to raise matching funds.

NPS AFFILIATED AREA DESIGNATION

National Park Service affiliated areas are designated by Congress or by the Secretary of the Interior to preserve significant properties in affiliation with the national park system. Similar to NHAs, these sites are not federally owned or directly managed by the National Park Service but benefit from NPS brand recognition, as well as technical or financial aid from the National Park Service. American Memorial Park on Saipan,¹ the Aleutian World War II National Historic Area in Alaska, and the Wing Luke Museum of the Asian Pacific American Experience in Seattle, Washington are a few examples. To be eligible for affiliated area status, the area's resources must (1) meet the same standards for significance and suitability that apply to units

¹ Unlike other affiliated areas, American Memorial Park is directly managed by the National Park Service and receives an annual operating budget from the NPS. This unique arrangement is guided by the CNMI Constitution and the Covenant (P.L. 94-241), in addition to the park's enabling legislation (P.L. 95-348). American Memorial Park is therefore not a traditional or typical model of an NPS affiliated area.

of the national park system; (2) require some special recognition or technical assistance beyond what is available through existing NPS programs; (3) be managed in accordance with the policies and standards that apply to units of the national park system; and (4) be assured of sustained resource protection, as documented in a formal agreement between the park service and the nonfederal management entity.

Rota's cultural and natural resources are significant and suitable for inclusion in the national park system and thereby meet the first criterion. An affiliated area can benefit from NPS site branding and technical assistance available through NPS program staff. However, affiliated area status does not provide additional NPS site management assistance or ongoing operational funding. If Rota were designated an NPS affiliated area, the CNMI agencies that are currently managing the island's resources would be expected to adhere to federal mandates and standards specified in NPS management policies.

CNMI AND NPS CO-STEWARDSHIP OF A NATIONAL PARK UNIT

Under this model, the NPS and the CNMI could partner to preserve Rota's significant sites and limestone forest areas. The NPS and CNMI could also collaborate to provide interpretation and educational opportunities and operate the unit of the national park system. The intention behind a co-stewardship approach would be to enhance existing CNMI management efforts where NPS responsibilities and expertise would be complementary.

Operational funding for the unit would be provided both by the NPS and by the CNMI or other entities. The unit would need to be authorized by congressional legislation and could be implemented between the CNMI and the NPS through a management agreement that would identify lands to be included in a potential park, and outline management responsibilities and a management structure. For a more detailed description of this model, see Appendix B: National Park Unit Alternative.



View of protected limestone forest in the I'Chenchon Park Wildlife Conservation Area. Photo: NPS.

Need for NPS Management Conclusion

The people of Rota have protected their resources for generations through community stewardship, cultural practices, local laws, federal financial assistance, and the dedicated efforts of CNMI agencies. At likely NPS funding and staffing levels, the NPS contributions to existing management of Rota's significant resources would be limited.

Given the robust stewardship that is already in place for Rota's limestone forest, the study finds that the National Park Service would have limited support to offer for natural resource management for a potential park unit at this time. While opportunities exist to enhance visitor enjoyment and interpretation of limestone forests in partnership with the CNMI, NPS capacity to provide visitor services and facilities, interpretation, and educational programming would be limited given the expected budget and staffing levels of a new park unit.

For management of cultural resources, the study has identified the need for additional documentation and interpretation of

Chamorro cultural sites, to build on the long-term efforts of the CNMI HPO. However, this support could be effectively achieved through partnerships with interested organizations. NPS capacity to partner with the CNMI to enhance management of Rota's Chamorro archeological sites would be limited given expected NPS budget and staffing levels. Partnerships with interested organizations could provide additional capacity for research, interpretation, education, and visitor services for Rota's significant sites under both NPS and non-NPS management.

The incorporation of Rota's significant sites into the national park system would provide an opportunity to represent the histories and heritage of the Chamorro people within a rare limestone forest ecosystem, which are underrepresented in the national park system. However, when compared against current management and other potential management frameworks, in light of the limited NPS financial capacity and the modest level of interest in NPS designation among the people and elected officials of Rota and the CNMI, NPS management is not needed at this time.



Seedlings of native limestone forest plants raised for outplanting by the CNMI DLNR Division of Fish and Wildlife and the Forestry Section of the Division of Agriculture. Photo: NPS.



Visitors to Mochong Latte Village Complex. Photo: NPS.

SPECIAL RESOURCE STUDY CONCLUSIONS

Based on the analysis performed through this special resource study, the National Park Service finds that the Rota study area does not meet all four criteria for inclusion in the national park system at this time. Resources within the study area meet established criteria for national significance and suitability, and a portion of the area is conditionally feasible for inclusion in the national park system, dependent on support from the CNMI government and the development of a management agreement, support from

Rota and CNMI residents, and sufficient funding for park operations. However, analysis of existing management and several additional management frameworks does not demonstrate a clear need for direct NPS management at this time. The CNMI government is continuing a centuries-long tradition of resource stewardship while also providing visitor access and information about Rota's significant sites. Therefore, this special resource study concludes that Rota does not meet all criteria necessary to be considered eligible for designation as a new unit of the national park system.



Mochong Latte Village Complex. Photo: NPS.

CONSULTATION AND COORDINATION





Staff from the CNMI Department of Lands and Natural Resources and the NPS visiting limestone forest areas. Photo: NPS.

CHAPTER 7: CONSULTATION AND COORDINATION

This chapter provides an overview of public and stakeholder outreach conducted as part of the study process.

PUBLIC INVOLVEMENT

The National Park Service provided opportunities for elected officials, local government agencies, organizations, Rota residents, and the general public to learn about and contribute to the Rota Special Resource Study through public and stakeholder meetings, newsletters, and the study website. The NPS conducted two rounds of public engagement for the study: a 2017 public scoping effort and a 2020 public review of the study's preliminary findings and alternative concepts. These outreach opportunities allowed the NPS to inform members of the public about the special resource study process, collect additional information, and gather opinions and comments about a potential NPS unit on Rota. As part of the study process the NPS also consulted with CNMI agencies, local government entities, and other interested parties. The NPS reviewed and analyzed the comments received during each public engagement effort. The comments informed the development of this report and helped refine the study's findings.

Scoping

Public scoping for this study began in January 2017. The NPS produced and distributed a [newsletter](#) to the media, individuals, organizations, and government officials. The purpose of the newsletter was to introduce the study, explain the process to community members, and solicit comments on resources and issues the study should address. The newsletter was written in English and Chamorro and provided the schedule of public scoping meetings as well as a public comment form. Press releases announcing the beginning of the study process and the public meeting schedule were distributed to local media. Numerous articles about the study appeared in area newspapers. The National Park Service's Planning, Environment and Public Comment (PEPC) website, parkplanning.nps.gov/rotastudy, provided the public with information about the study and was used to accept public comments. The comment period extended to mid-April 2017, and comments received after the closing date were also accepted.



Public scoping meeting held on February 22, 2017 at the Rota Mayor's Office. Photo: NPS.

In February and March 2017, the NPS held five public scoping meetings on Rota, Saipan, and Guam, one meeting with the CNMI legislature on Saipan, and two online public meetings (see Table 7-1). The public scoping meetings on Rota coincided with a visit from members of the U.S. House of Representatives Committee on Natural Resources, including Congressman Gregorio Kilili Camacho Sablan. During this visit of the committee to Rota, the delegates toured many of the sites evaluated for the study.

The meetings included a presentation overview of the study purpose and process, identification of the resources evaluated in the study, and potential management outcomes. After the presentation, NPS staff facilitated group discussions to capture comments related to the study. Twenty-five written comments were received via letter, comment form, PEPC website, and e-mail.

The NPS met with the following entities or their representatives during scoping:

- Rota Mayor’s Office
- Rota Municipal Council
- CNMI Governor’s Office
- Members of the CNMI Legislature (House and Senate)
- Office of Congressman Gregorio Kilili Camacho Sablan
- CNMI Historic Preservation Office
- CNMI Department of Lands and Natural Resources, Divisions of Fish and Wildlife and Forestry
- CNMI Department of Commerce
- CNMI Bureau of Environmental and Coastal Quality
- CNMI Division of Coastal Resources Management
- U.S. Fish and Wildlife Service

TABLE 7-1: PUBLIC SCOPING MEETINGS, 2017

LOCATION	DATE	ATTENDANCE
Saipan, CNMI Legislature	February 21, 2017	17
Saipan, American Memorial Park Visitor Center	February 21, 2017	11
Rota Mayor’s Office	February 22, 2017	68
Rota Mayor’s Office	February 23, 2017	28
Sinapalo, Rota: Man Amko’ Center	February 23, 2017	25
Hagåtña, Guam: Guam Museum	February 27, 2017	50
Online public meeting 1	March 8, 2017	2
Online public meeting 2	March 9, 2017	2
Total		203

SUMMARY OF PUBLIC SCOPING COMMENTS

Public scoping comments predominantly expressed a desire to preserve Rota's important cultural and natural resources. Many people emphasized the need to respect and protect the special places on the island. Several of the comments highlighted the deep meaning and value that Rota's resources hold for community members. Comments also expressed concern about changes in access or other restrictions that might occur with a potential NPS unit on the island. While many participants had questions about what NPS management might entail, many also described their interest in enhancing educational and visitor opportunities at Rota's significant sites.

Cultural and Natural Resources

When asked which pre-contact sites and resources on Rota are considered the most important, respondents identified the Mochong Latte Village Complex, Mâya Latte Site, As Nieves Quarry, Dugi Archeological Site, and Chugai Cave. These sites were described as essential resources because they represent the ancestral Chamorro culture of the Mariana Islands and are still sacred or important to the community today. Commenters additionally identified the importance of the Japanese World War II fortifications and artifacts, remnants from past industrial activities on the island, and structures from the Spanish, German, and Japanese periods of colonization.

Concerns were expressed about increased visitation to sites and how to protect archeological features from theft and vandalism. Commenters on this topic suggested a variety of approaches to protect important sites, including establishing opening and closing times, increasing enforcement of resource protection laws, erecting barriers to safeguard sensitive resources, and embracing traditional cultural practices, such as requesting permission of the taotaomo'na (or ancestral spirits) to enter archeological and limestone forest areas. Several participants also highlighted the importance of sharing the sites more widely with visitors and the need to educate future generations. Commenters

additionally stressed the importance of culturally significant species and the need to protect traditional medicinal plants and subsistence activities in addition to archeological sites.

Rota's limestone forests were described as fragile and pristine and were considered by most commenters to be the most significant natural resources on the island. Participants highlighted certain locations and features within the limestone forest as being especially culturally significant for the Chamorro people: these included caves, waterfalls, and the Taipingot Peninsula (Wedding Cake). The important wildlife habitat provided by the I'Chenchon Park Wildlife Conservation Area and the publicly owned land on the Sabana and at Talakhaya were also described as highly valued resource areas for their role in supporting endangered species, medicinal plants, and water quality.

Some participants emphasized the overarching cultural importance of Rota's marine resources and offshore areas and strongly encouraged the NPS to evaluate them in addition to land-based sites. A few commenters also suggested that other islands in the Marianas would merit study by the NPS and additional resource protection, especially from military activities. The islands most frequently recommended for further study were Pagan and Tinian.

A few participants observed that weather damage, especially from typhoons, is a concern for cultural and natural resources. A small number of these commenters questioned how the NPS would respond to such natural disasters, were there to be a national park unit on Rota. Several people emphasized that Rota's residents have carefully protected their resources for generations through community stewardship, cultural practices, local laws, and the dedicated efforts of CNMI agencies. Many of these commenters questioned whether a national park unit would improve current resource management activities.

Management and Access

Many of the individuals who commented on the topics of management and access were concerned about potential restrictions that

might be imposed on Rota's lands as a result of NPS involvement. These commenters were opposed to regulations that could limit local access to lands for important cultural and subsistence practices such as hunting, medicinal plant gathering, and farming. Some of these individuals expressed support for a possible national park unit but only if hunting and gathering were permitted. A few participants were worried that a potential NPS unit could result in entrance fees being charged to community members for access to sites.

A few respondents cited past experiences with federal government agencies and initiatives, including the ongoing military buildup in the Marianas, the 2004 designation of Mariana cove critical habitat area by the U.S. Fish and Wildlife Service, and the 2009 establishment of the Marianas Trench Marine National Monument. Some commenters strongly asserted that such federal actions have negatively impacted CNMI residents' livelihoods, cultural practices, and other important activities on their lands. Many commenters in this group viewed a potential national park as a federal takeover of local lands. Other participants wished to ensure that ongoing conservation projects in partnership with universities would be allowed to continue on lands within a potential national park.

Many people expressed the desire for local management of Rota's resources with additional support from the federal government. Several commenters on this topic requested that the NPS analyze a variety of management models for Rota's natural and cultural resources.

Land Use, Landownership, and Boundaries

The majority of comments on the topics of land use, landownership, and boundaries focused on the size of a potential park unit and its impact on Rota's other land uses. Respondents sought to ensure that the NPS would evaluate only publicly owned lands and that agricultural lands, including homesteads, would not be considered for inclusion within a possible boundary. One commenter recommended that a potential national park

unit be created in phases over time, to avoid having too large an impact on existing land uses. The NPS was asked how a national park unit designation could be accomplished in the CNMI, given the landownership restrictions in the CNMI Covenant and Constitution.

Several commenters observed that Rota is a small island with important sites that are widely distributed. These individuals questioned whether a park boundary could be identified that did not cover a significant portion of the island. In general, commenters on this topic were concerned that a national park unit might cover too large an area given the island's size.

Economic Development and Tourism

The NPS received multiple comments about economic development, and whether a potential national park unit would be likely to have a beneficial impact on Rota's economy. Many of those who commented on this topic expressed an interest in an economic impact study for a possible NPS unit on Rota. A few respondents cautioned that the NPS and the community should be careful not to overestimate potential economic benefits, noting that they may materialize slowly if at all.

A few members of the public emphasized that economic activity on Rota has declined over the past few decades and relies primarily on tourism. A small number of respondents noted that it is important to keep options open for future economic development, including jobs that will allow residents to remain on the island. Some of these commenters noted that a national park unit might provide local jobs, while others expressed concern that a national park unit might limit other economic development opportunities.

Education, Interpretation, and Visitor Opportunities

A large majority of commenters supported the preservation of significant cultural and natural resources for educational purposes. Many people noted that the most valuable contribution a national park unit could make would be to provide additional education, interpretation, and visitor opportunities at Rota's important sites.

Commenters emphasized the importance of offering educational activities and outdoor recreation for youth.

Multiple comments were submitted describing possible recreational experiences that visitors could have on Rota. Suggestions for recreation included a children’s camp, a zipline, a water park, rental facilities for beach and water equipment, and rock-climbing opportunities, among others. Respondents highlighted the need for activities that would involve the entire community and create opportunities for future generations to enjoy.

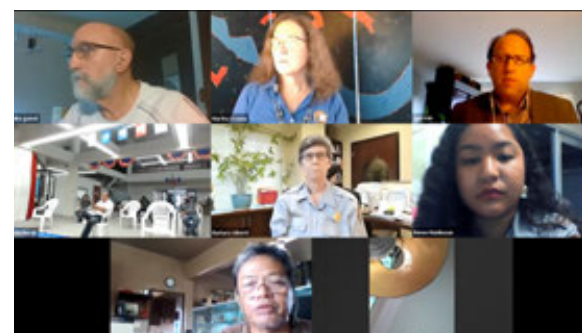
In general, commenters expressed support for facility improvements that might accompany a potential national park on Rota. Comments highlighted an interest in additional visitor access and circulation facilities, such as pathways or trails, as well as increased signage to provide information about sites and resources, and viewpoints to enjoy Rota’s scenery. One respondent noted that it would be important to preserve Rota’s natural character and requested that any potential development remain limited and be sensitively located.

Public Review of Preliminary Findings and Alternative Concepts

In August 2020, the NPS initiated a public review of the study’s preliminary findings and a set of initial alternative management concepts. While most study processes do not include a review of the preliminary findings and initial alternatives, for the Rota SRS this was determined necessary to fully evaluate the feasibility criterion, in particular the level of CNMI and public support for a potential national park unit, and the need for NPS management, given the engagement of the CNMI government that would be needed for a national park unit to be feasible. The findings and concepts were distributed through a [newsletter](#) and were posted on the National Park Service’s Planning, Environment and Public Comment (PEPC) website. The comment period extended until November 20, 2020.

The preliminary findings indicated that Rota’s cultural and natural resources are nationally significant, that areas of the island are suitable for inclusion in the national park system, and that NPS management could fill an important need. However, the preliminary feasibility finding was conditional upon the establishment of appropriate land and resource management agreements with the CNMI and Rota governments, support from the CNMI government, and further analysis of the costs. The alternative concepts presented to the public included a no-action alternative; a 1,300-acre (526-hectare) historical park managed collaboratively with the CNMI and focused on Chamorro archeological sites; and a 4,400-acre (1,781-hectare) national monument, also managed collaboratively with the CNMI and encompassing archeological sites, historic World War II fortifications, and limestone forests.

To solicit public input on the preliminary findings and alternative concepts, in September 2020 the NPS held two public meetings and one meeting each with Rota and CNMI elected officials and local agency staff (see Table 7-2). All of the meetings in



Virtual public meetings, September 2020. Photos: NPS.

TABLE 7-2: PUBLIC MEETINGS TO SHARE PRELIMINARY FINDINGS AND ALTERNATIVE CONCEPTS, 2020

LOCATION	DATE	ATTENDANCE
Online public meeting 1	September 17, 2020	58
Online public meeting 2	September 19, 2020	39
Total		97

2020 were conducted in a virtual format due to restrictions on travel and in-person gathering imposed by the COVID-19 pandemic. Close to 100 people attended the online public meetings.

The meetings held with elected officials and agencies included the following entities or their representatives:

- Rota Mayor’s Office
- Members of the CNMI Legislature (House and Senate)
- Office of Congressman Gregorio Kilili Camacho Sablan
- CNMI Indigenous Affairs Office
- CNMI Department of Lands and Natural Resources, Division of Fish and Wildlife
- CNMI Department of Public Lands
- CNMI Bureau of Environmental and Coastal Quality
- CNMI Division of Coastal Resources Management
- Mariana Visitors Authority
- U.S. Fish and Wildlife Service

The CNMI Indigenous Affairs Office hosted four village forums on Rota in October 2020 to solicit input from residents who were unable to participate in the virtual meetings or who preferred to share their thoughts in person. The hybrid in-person/virtual village forums were socially distanced and organized in accordance with public health guidelines to reduce the spread of COVID-19. The NPS appreciates the additional engagement opportunities provided by the Indigenous

Affairs Office, as well as the comments received from the village forums.

In addition to comments from the virtual meetings and village forums, the NPS also received about 50 written comments through the project website and email.

SUMMARY OF PUBLIC COMMENTS ON PRELIMINARY FINDINGS AND ALTERNATIVE CONCEPTS

The following summary represents the full range of comments received on the preliminary findings and alternative concepts.

Comments on a Potential NPS Presence

Among those who commented, support for a potential national park unit on Rota is mixed. Close to half of respondents favor the establishment of a unit, but the majority of these commenters would like to see access to lands preserved for the local community, in particular for cultural and subsistence uses such as hunting and gathering. A little over a quarter of respondents stated their opposition to a national park unit on Rota. The remaining group of commenters (a little over a quarter) requested more information about what an NPS unit on Rota would entail before forming an opinion.

Many people were concerned that a national park unit on Rota could fundamentally change the character of the island’s undeveloped, scenic landscape. Some commenters, however, expressed equally strong concerns that Rota’s landscapes and resources could be lost to development without the additional protection of a national park unit. Those worried about potential development were most concerned

about changes in land use that could damage the character of valued cultural and natural areas. A few people noted that they would like to see a park unit established in phases, where the gradual addition of new lands to the park would happen over time, allowing the community a chance to understand the impacts of a possible unit.

Some participants expressed interest in alternative management concepts that would not involve direct NPS management of Rota's lands, such as inclusion in a national heritage area or designation as an NPS affiliated area or world heritage site. Commenters on this topic also suggested that additional U.S. government funds could be directed to CNMI agencies to support resource protection efforts and visitor enjoyment opportunities. See the "Potential Management Frameworks" section of Chapter 6 for analysis of these concepts. A small number of people offered ideas to ensure that the local community would have a voice in management, were an NPS unit to be established on Rota. These ideas included the creation of a board or commission composed of local representatives, which could provide Rota's residents with a priority role in management decisions.

Several commenters indicated that the Rota and CNMI governments and people are best suited to care for their resources. Within this group of respondents, some observed that local agencies and organizations need additional support and funding for management activities. A few people expressed concern about the local government's capacity to manage resources and maintain facilities.

Support for Specific Alternative Concepts

While commenters expressed general support or opposition to a potential NPS unit, as described above, few people noted their support for a specific alternative concept. Among those in favor of an NPS presence, there was greater support for a smaller unit, as illustrated by the historical park concept, because it would allow more flexibility for current land uses and practices to continue. In contrast, a few respondents stated a preference for the larger alternative concept, the national

monument, citing the need to protect additional natural and cultural resources and include World War II sites.

Some participants were concerned that both alternative concepts would encompass too much of the island. A few respondents wished to see additional areas included in the alternative concepts, such as the Sabana Protected Area, the Liyo Conservation Area (Taipingot/Wedding Cake), and coastal and offshore resources.

Cultural and Natural Resources

Many of the comments submitted on Rota's cultural and natural resources echoed public input that was shared with the NPS during scoping. Rota's resources are cherished by the community and are an integral part of day-to-day life. People overwhelmingly agree that the Chamorro sites and their limestone forest settings are special, significant, and should be protected. A small number of commenters highlighted the importance of preserving and interpreting the island's World War II sites. In describing Rota's resources, many participants stressed the importance of traditional subsistence activities and expressed a strong desire to protect community access to resources for cultural uses, such as hunting and gathering medicinal plants.

Several respondents observed that the people of Rota and the CNMI are doing an excellent job managing the resources on the island without assistance from the National Park Service. A few people highlighted Rota Local Laws [9-1](#), [9-2](#), and [9-3](#), which already preserve significant conservation areas on the island (see the "Conservation Areas" section of Chapter 5 for additional detail). However, some commenters highlighted the need for additional resource management capacity, to help protect sensitive and rare limestone forest ecosystems and support endangered species in the face of climate change. One commenter also suggested that the NPS could assist with needed maintenance for the island's World War II fortifications.

Some participants described their concerns about invasive species and the likelihood that they could spread more easily to the

island with the increased visitation that might accompany a national park unit. These commenters were interested in measures that the NPS could take to protect against invasive species.

A few people requested that the NPS evaluate additional resources on Rota as part of the study process, including other important natural resource areas, such as the Sabana; inshore waters and reefs; submerged shipwrecks; and sites that reveal the history of colonization on the island.

Management and Access

Comments on the topics of management and access clearly stated the importance of community access to Rota's lands for traditional and subsistence practices. Many emphasized that this access is critically important for Chamorro residents to maintain their culture and their way of life. Several commenters remarked that hunting invasive ungulates such as deer, feral pigs, and goats is beneficial for island ecosystems in that it reduces impacts from herbivory. However, one participant cautioned that fencing would be needed around pristine areas of limestone forest to adequately protect threatened plants from ungulate browsing, which could preclude hunting within the area that was fenced.

Among those who supported a potential NPS unit on Rota, there was strong interest in having the NPS collaborate closely with the local community and CNMI agencies to manage resources. Many people asked how cooperative management might work between the CNMI and the NPS and wanted to know how the roles and responsibilities might be shared between each entity. Some individuals asked how much funding the NPS would be able to provide for a potential unit on Rota. A small number of commenters wished to see NPS management of a possible park based fully in the CNMI, rather than shared management with War in the Pacific National Historical Park on Guam and American Memorial Park on Saipan. One respondent noted that an NPS unit on Rota could attract worldwide attention, which could increase the success of current local conservation efforts by

attracting assistance from other agencies and nongovernmental organizations.

Land Use, Landownership, and Boundaries

Many people observed that Rota is a very small island and requested that the NPS take its size into account when considering a potential national park unit boundary. Some commenters also stressed that community access to agricultural and village homesteads is very important to residents' livelihoods. These individuals stated that homesteads on the island should be preserved and that an NPS unit should not result in removal of homesteading opportunities. A few respondents asked whether lands included in the USFWS-designated Mariana cove critical habitat could be removed in exchange for other lands protected by a potential national park unit.

Several participants requested that the NPS carefully review landownership information when identifying potential unit boundaries to ensure that proposed boundaries only include public lands that are publicly accessible. A few community members expressed concerns that the GIS data presented by the NPS did not reflect current landownership status. A small number of respondents noted that they were worried about impacts that a possible NPS unit could have on adjacent private lands.

Some of those commenting stressed that Rota's residents should be compensated for any lands included in a potential national park to adequately reflect the land's profound cultural, historical, and personal value to the community. Many of these individuals asked whether the NPS would create a lease agreement to provide this compensation directly to the Municipality of Rota.

Economic Development and Tourism

The NPS received numerous comments on the topics of economic development and tourism, and views on these subjects were mixed. Many people were interested in understanding the impacts of a national park designation on the local economy. Those supporting the establishment of a potential national park unit cited the benefits that a unit could confer in

terms of job creation, tourism, and general economic development in the community, including private sector opportunities. Several people highlighted Rota's potential as an ecotourism destination. Although access to Rota by air is currently limited, respondents suggested that travel options would increase with an increase in visitor demand. A few commenters noted that a national park unit could provide additional training and resources that would allow residents to lead stewardship and interpretation efforts.

In contrast, other comments cautioned that a national park on Rota may not result in very many jobs, given the size of the island and the smaller size of a potential unit. These respondents noted that a possible NPS unit might not be able to revitalize Rota's economy on its own, citing the impact of American Memorial Park on Saipan as an example. Some commenters in this group expressed concern that a potential unit might hinder the development of other economic opportunities on the island and stated that the community did not want to see a park established if it couldn't help the economy.

Some commenting on tourism felt that an NPS unit would be beneficial to resource protection, by attracting attention and assistance from other organizations worldwide and reducing costs to local agencies. Others were concerned that additional tourism could result in damage to resources. A small number of commenters were worried that NPS regulations might limit access to sites in such a way that could reduce their appeal for tourists.

Education, Interpretation, and Visitor Opportunities and Facilities

In general, there was interest in providing additional educational opportunities on Rota, in particular for today's youth as well as for future generations. Commenters emphasized the importance of raising awareness of and appreciation for Rota's special sites and resources and allowing immersive opportunities for visitors to access them via land (through trails and signage) or sea (through kayaking and diving).

A small number of commenters expressed strong concerns about the NPS representing Chamorro culture, were a national park unit to be established. These commenters emphasized that the Chamorro people should tell the story of their own sites and resources on Rota, rather than allowing the NPS to do so. These respondents worried that the NPS would be biased toward a U.S. mainland perspective and could not adequately convey the experiences of Rota's people, given the successive waves of colonization and war that have been imposed on the Marianas over the past 500 years.

Some participants stated their support for additional facilities or amenities that the NPS might provide on the island to serve a possible national park unit. One individual suggested that a cultural center be developed, which could be used to display Chamorro archeological artifacts. Others expressed a strong interest in having additional trails to explore Rota's limestone forest. A small number of commenters asked whether an NPS presence on the island could assist with improving roadway and utility infrastructure.

Study Process

The NPS received a large number of comments focused on the special resource study process. The majority of commenters on Rota and in the CNMI want to make sure they would have a voice in decision-making related to a potential national park unit designation of their lands and heritage. Some commenters expressed profound concern that an NPS unit might be established without adequate participation from the CNMI and from Rota's people. A few individuals suggested that the residents of Rota should have the opportunity to vote on whether or not a national park should be designated.

Several respondents wished to learn more about how a national park unit might be established on CNMI-owned land, and how a possible agreement might be developed between the CNMI and the NPS for management of a park. These individuals asked about the terms and conditions of such an agreement, whether it could include terms for a lease, and whether the CNMI would be able to withdraw from or revise

the agreement in the future if needed. Some commenters suggested elements to include in a potential agreement or legislation authorizing a park, such as a local hiring preference and access to lands for hunting, gathering, community events, and other cultural and subsistence practices.

Many of those who submitted comments on the study process requested additional opportunities for public engagement and additional information from the NPS. Several commenters expressed frustration and disappointment with the virtual public outreach conducted by the NPS in 2020, when the COVID-19 pandemic prevented in-person gatherings. Community members asked the NPS to consider delaying the study process to provide additional face-to-face opportunities for Rota’s residents to participate, given cultural protocols for gathering public input, barriers to internet access, and differing levels of comfort and familiarity with online meeting platforms. Several participants requested a copy of the draft study for review before transmittal to Congress.

AGENCY CONSULTATION

Section 106 of the National Historic Preservation Act

In January 2017, the NPS notified the CNMI Historic Preservation Office (HPO) by letter about the Rota Special Resource Study. This letter informed the CNMI HPO of the NPS determination that this study is an activity that does not have the potential to cause effects on historic properties, because the final product of the undertaking is a study transmitted to Congress. This study is therefore part of “nondestructive project planning” for prospective actions and as such does not “restrict the subsequent consideration of alternatives to avoid, minimize, or mitigate [a specific] undertaking’s adverse effects on historic properties” in accordance with 36 CFR 800.1(c). On February 28, 2017, the CNMI Historic Preservation Officer provided a letter concurring with the NPS finding of “No Potential to Cause Effects.” The CNMI HPO was invited to participate in public

scoping, the review of preliminary findings and alternative concepts, and the fall 2021 technical review (see “Contributions and Technical Review” section below).

Section 7 of the Endangered Species Act

In January 2017, the NPS submitted a letter to the Pacific Islands field office of the U.S. Fish and Wildlife Service (USFWS) announcing the beginning of the Rota Special Resource Study. The letter indicated that the study itself would have no effect on species listed or proposed for listing under the Endangered Species Act. This assessment of “no effect” is due to the nature of such a study, which may have implications for potential future NPS actions but will not itself result in any action or environmental impacts. During a meeting on Guam on February 27, 2017, USFWS staff determined that a letter of concurrence would not be necessary, because the study would not include any field work or agency action. The USFWS expressed interest in continuing their engagement with the study and participated in public scoping and the review of preliminary findings and alternative concepts.

CONTRIBUTIONS AND TECHNICAL REVIEW

To determine the significance of Rota’s natural resources, the NPS conducted numerous interviews and field visits with resource managers and researchers with knowledge of the island’s native limestone forests. Those who contributed their time and expertise include David Calvo, Lainie Berry, and James Manglona of the CNMI Department of Lands and Natural Resources (DLNR); Manny Pangelinan, Bethany Chagnon, Jill Liske-Clark, and Robert Uchoa of the CNMI DLNR Division of Fish and Wildlife; Frank Rabauliman of the CNMI Bureau of Environmental and Coastal Quality; Fred Amidon, Jackie Flores, Peter McBride, and Tyler Willsey of the U.S. Fish and Wildlife Service; Marjorie Falanruw of the U.S. Forest Service; and Haldre Rogers and Ann Marie Gawel of Iowa State University, among others.

The significance evaluation for Rota’s cultural resources was primarily conducted by Micronesia Archaeological Research Services (MARS) on behalf of the NPS in 2016 and 2017. The NPS additionally discussed Rota’s cultural resources through interviews and field visits with the CNMI Historic Preservation Office (HPO) staff, including Eloy Ayuyu, Antonelli Rosario, and Vincent Mesngon. Stephen Haller of Golden Gate National Recreation Area (NPS) contributed to the analysis of World War II resources.

Peer reviews were conducted for the resource description and preliminary significance evaluation for Rota’s natural and cultural resources. Peer reviewers contributing comments included biologists Fred Amidon and Haldre Rogers for the limestone forest resources, and archeologists Brian Butler and Rosalind Hunter-Anderson for the Chamorro archeological sites and World War II defensive complexes.

To ensure the accuracy of the study, in November 2021 the NPS initiated a technical review of key portions of the study with CNMI agencies. Invited agencies included the CNMI HPO, Indigenous Affairs Office, DLNR (including the Divisions of Fish and Wildlife and Forestry), Department of Public Lands, and Office of Planning and Development. Elected officials were notified of the technical review process and also invited to participate. Invited officials included the Rota Mayor’s Office and Rota Municipal Council; members of the CNMI Legislature; CNMI Governor Torres and Lieutenant Governor Palacios; and the office of U.S. Representative for the CNMI, Gregorio Kili Camacho Sablan.

The NPS would like to thank all those who contributed their time, comments, and valuable information to the study. A detailed list of contributors can be found in the “Preparers” section of this report.



Staff from the CNMI Historic Preservation Office and the NPS clear vegetation from latte at Gampapa Latte Village. Photo: NPS.



Staff from the CNMI Historic Preservation Office and the NPS clear vegetation from a lusong at Gampapa Latte Village. Photo: NPS.

APPENDICES





Strategic viewpoint from the Japanese World War II defensive complex at Ginalagan. Photo: NPS.

APPENDIX A: STUDY LEGISLATION

On December 19, 2014, President Barack Obama approved the Carl Levin and Howard P. “Buck” McKeon National Defense Authorization Act for Fiscal Year 2015 as Public Law 113-291. Division B, Title XXX, Subtitle D, Section 3051 authorized the National Park Service to conduct a special resource study of the “prehistoric, historic, and limestone forest sites on the island of Rota, Commonwealth of the Northern Mariana Islands” to evaluate the national significance of the sites and the feasibility of designating them as a unit of the national park system. The following is the text of the legislation that pertains to the Rota Special Resource Study.

**CARL LEVIN AND HOWARD P.
“BUCK” MCKEON NATIONAL
DEFENSE AUTHORIZATION ACT, 2015
(PUBLIC LAW 113-291)**

December 19, 2014

113th Congress

Section 3051: Special Resource Studies

- a. IN GENERAL.—The Secretary of the Interior (referred to in this section as the “Secretary”) shall conduct a special resource study regarding each area, site, and issue identified in subsection (b) to evaluate—
1. the national significance of the area, site, or issue; and
 2. the suitability and feasibility of designating such an area or site as a unit of the National Park System.
- b. STUDIES.—The areas, sites, and issues referred to in subsection (a) are the following:

...

3. ROTA, COMMONWEALTH OF NORTHERN MARIANA ISLANDS.—Prehistoric, historic, and limestone forest sites on the island of Rota, Commonwealth of the Northern Mariana Islands.

...

- c. CRITERIA.—In conducting a study under this section, the Secretary shall use the criteria for the study of areas for potential inclusion in the National Park System described in section 8(c) of Public Law 91-383 (commonly known as the “National Park System General Authorities Act”) (16 U.S.C. 1a-5(c)).
- d. CONTENTS.—Each study authorized by this section shall—
1. determine the suitability and feasibility of designating the applicable area or site as a unit of the National Park System;
 2. include cost estimates for any necessary acquisition, development, operation, and maintenance of the applicable area or site;
 3. include an analysis of the effect of the applicable area or site on—
 - A. existing commercial and recreational activities;
 - B. the authorization, construction, operation, maintenance, or improvement of energy production and transmission or other infrastructure in the area; and
 - C. the authority of State and local governments to manage those activities;

4. include an identification of any authorities, including condemnation, that will compel or permit the Secretary to influence or participate in local land use decisions (such as zoning) or place restrictions on non-Federal land if the applicable area or site is designated as a unit of the National Park System; and
 5. identify alternatives for the management, administration, and protection of the applicable area or site.
- f. REPORT.—Not later than 3 years after the date on which funds are made available to carry out a study authorized by this section, the Secretary shall submit to the Committee on Natural Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report that describes—
1. the findings and recommendations of the study; and
 2. any applicable recommendations of the Secretary.

Approved December 19, 2014

APPENDIX B: NATIONAL PARK UNIT ALTERNATIVE

The National Park Service considered several approaches to preservation and interpretation of Rota's nationally significant resources as required by the study's authorizing legislation (see Appendix A: Study Legislation §3051d). As part of this process, the NPS evaluated a range of possible management alternatives to help better understand the feasibility of administering the study area as a new unit of the national park system, and to determine whether NPS management of Rota's sites would be the optimal management approach.

In 2020, the NPS shared three preliminary alternative concepts with the public, including two different national park unit concepts that would involve some level of co-stewardship with the CNMI. The concepts were described and illustrated in a [newsletter](#) released to the public in August 2020. See Chapter 7: Consultation and Coordination for a description of public comments received on the preliminary alternative concepts. The national historical park alternative presented below is a refined and updated management concept that combines elements of the two concepts presented to the public in 2020.

While this study does not recommend establishing a new unit of the national park system at this time, describing this alternative helps illustrate how a national park unit on Rota might be established, how it could function, how the NPS and the CNMI could collaborate on stewardship and management, and what the implications might be of managing the study area as a unit of the national park system.

The national historical park alternative serves as a basis of comparison with the other possible management alternatives, including existing management, and allows for a more complete analysis of potential costs associated with administering the study area as a new unit of the national park system. The alternative described below was evaluated by the NPS as part of this study's feasibility and need for NPS management analysis. It was developed based

on information gathered from public and stakeholder input, internal NPS discussions, evaluation of special resource study criteria, and NPS management models.

NATIONAL HISTORICAL PARK ALTERNATIVE

Concept

Under this alternative, Congress could authorize the establishment of a national park unit, dependent on the execution of a management agreement between the CNMI government and the National Park Service. The national park unit is described here as a national historical park, but it could also be designated as another type of unit, such as a national preserve, a national monument, or another type of designation. Congressional legislation could describe an authorized boundary but delay formal establishment of a unit until a management agreement is adopted, satisfying requirements of both the NPS and the CNMI government and identifying specific lands, management responsibilities, and a management structure.

Under this alternative, the authorized boundary of the national historical park could include the Chamorro archeological sites of Mochong, Måya, As Nieves, Gampapa, Dugi, Chugai Cave, and Alaguan, and the I'Chenchon Park Wildlife Conservation Area. The archeological sites would need to be protected within their limestone forest settings with sufficient lands to allow for public access and visitor facilities. Areas of limestone forest would need to be included in expanses that are sufficiently continuous to protect habitat connectivity, ecosystem integrity, and the forest's dense and intact physical structure.

The National Park Service recognizes the local community's expertise in managing Rota's resources and interpreting their importance and could therefore seek to implement a co-stewardship arrangement with CNMI agencies

to enhance existing resource management efforts. The CNMI and the NPS could together preserve the sites, provide interpretation and educational opportunities, and operate the unit of the national park system.

Definition

A national historical park (NHP) extends beyond single properties or buildings, and typically protects an area of greater extent and complexity than a national historic site. Resources in an NHP include a mix of significant historic features and may include significant natural features that contribute to the historic setting and cultural importance of the area. National historical parks preserve places and commemorate persons, events, and activities important in the nation's history.

Examples include:

- War in the Pacific National Historical Park: Guam
- Kalaupapa National Historical Park: Moloka'i, Hawai'i
- Nez Perce National Historical Park: Montana, Idaho, Washington, Oregon
- Chaco Culture National Historical Park: New Mexico
- Salt River Bay National Historical Park and Ecological Preserve: St. Croix, Virgin Islands

Potential Area

The national historical park could be established on lands within an authorized boundary, all on publicly owned land. See Map 7 for an illustration of a potential unit boundary. The exact configuration of a park boundary could be determined by the CNMI and the NPS as part of the management agreement process. In this alternative, the authorized boundary encompasses about 2,380 acres (963 hectares) and is composed of the small site at As Nieves Quarry and a contiguous linear area along the eastern and southern coastline of Rota. A final boundary could include more or fewer acres and could be identified collaboratively with the CNMI based on shared goals for land use and

resource management. The lands identified through the management agreement would need to be of a sufficient size and configuration to constitute a manageable unit. In order to fully address landownership and access, the management agreement for a park unit on Rota would need to reflect co-stewardship goals and be developed in accordance with CNMI law and policy, including the 1975 Covenant and the CNMI Constitution.

Management

The national historical park alternative focuses on partnership between the CNMI and NPS to protect and interpret Chamorro archeological sites and their landscape settings. Management could occur through collaborative processes, and the specific roles and responsibilities of each managing entity could be identified through the agreement process with the NPS and CNMI. The agreement could also determine land uses for the unit and take into account whether and where traditional uses could occur.

The intention behind a shared management approach would be to enhance existing management efforts where NPS responsibilities and expertise would be complementary. If a park unit were established, the NPS could contribute to: 1) overall interpretation and education, including the development of interpretive media and programs; 2) technical assistance in preservation of park sites to supplement ongoing activities; and 3) site operation activities, including management of visitor and administrative facilities, such as trails, roads, and visitor contact facilities.

Resource Protection

Within the unit, the NPS could allocate park staff to work with the CNMI and other partners to conduct research and preserve Chamorro archeological sites and their limestone forest settings. Management plans would be needed to guide appropriate historic preservation documentation and treatment for cultural resources, as well as management activities for natural resources. A management

agreement between the CNMI and NPS would address how the park would meet federal law and policy requirements for resource management, research, and collections ownership and management.

Visitor Experience

Visitors could have enhanced opportunities to learn about Rota’s Chamorro culture—past and present—and experience the island’s remarkably intact latte village sites and other archeological resources, set within the unique landscapes and ecosystems that have sustained the Chamorro people for millennia. Visitors could also have the chance to be immersed within intact expanses of Rota’s limestone forest and experience and learn about the endemic flora and fauna of the island. A wide variety of interpretive and educational programs could be provided in formats that are accessible and relevant to diverse audiences and generations. Interpretation could be provided in multiple languages, including Chamorro, to reflect the composition of the local community as well as the different cultural backgrounds of many of the potential park’s visitors.

Programs could be provided by NPS rangers or CNMI staff, by other partners, and by volunteers. Virtual visitor experiences could be explored to share information more broadly about Rota and its ancient Chamorro sites. The NPS and CNMI could additionally partner with a cooperating association to expand capacity for interpretation and education efforts.

A management plan could suggest whether existing structures could be rehabilitated for visitor contact facilities and could identify locations for additional new visitor-serving facilities, including trails, trailheads, and signage.

Operations

Following establishment, a management plan could be developed to identify park priorities and provide guidance for resource management, development, visitor use and

experience, and park operations. Management planning would need to be undertaken collaboratively by the NPS and CNMI and could provide additional guidance for co-stewardship roles and responsibilities.

STAFFING

Until a budget is provided, the site would receive limited support, and most services would be supplied remotely from the mainland and Hawai‘i. National Park Service staff could partner with CNMI agency staff to conduct resource protection and interpretation activities as determined by the management agreement. On-site staffing could be supplemented over time as funding became available, and in a co-stewardship environment, both the NPS and the CNMI would provide staff to support the park unit. The authorizing legislation for the park could identify a preference for hiring local residents for park positions.

While no formal estimates of operating costs have been completed for this study, current parks of similar scale illustrate the potential range. Established park units of similar acreage have staff ranging from 8 to 14 full-time equivalent (FTE) positions, although more recently designated parks typically have fewer positions. As noted in the “Operational Costs” section of Chapter 5, the NPS contribution to the annual operating budget for a unit on Rota could reach \$350,000 to \$650,000 in ten years, in 2021 dollars, based on evaluation of comparable new park units. However, it is important to note that initial NPS operating budgets for new parks are more likely to begin in the range of approximately \$110,000 to \$180,000 a year.

CNMI agencies would be assumed to retain staff in existing resource protection roles, with types and numbers dependent on their specific functions. A management agreement between the NPS and CNMI would define the co-stewardship or shared management arrangement between the two entities and could indicate the number and type of NPS staff needed to operate the unit in addition to CNMI staff.

ONE-TIME FACILITY DEVELOPMENT COSTS

Were a national historical park to be established, planning would be undertaken to determine appropriate facility types and balance types and levels of development with resource protection and visitor experience. Most initial development at the park would be preceded by these planning efforts, but needs would likely include trails, signage and interpretive waysides, roadway improvements in select locations, parking areas, and restroom upgrades.

A list of these potential initial development projects is provided below. Were a park unit to be established on Rota, up-to-date estimates for one-time capital costs would need to be developed to understand the expected range. Escalation factors would also need to be considered to reflect the cost of construction in a remote location such as Rota. Facility development costs for a potential park could be funded by NPS construction or repair/rehabilitation funds, or by other sources.

Additional facility development needs could be anticipated for a park in the longer-term, but these would be identified through a future management planning process. Potential future projects might include facilities for visitor contact, administration, and maintenance; additional trail and trailhead construction; and additional signage and interpretive waysides. Limited improvements

to the existing unpaved roadway to Gampapa and Chugai Cave may be needed; however, roadway improvements along this alignment (and others in the region between Sinapalo and I'Chenchon Park) have been identified as long-range capital projects in the 2009 CNMI Comprehensive Highway Master Plan (CNMI DPW 2009, 176–180). Implementation planning could explore opportunities for persons of all abilities to access and experience Rota's nationally significant Chamorro archeological sites. The cost of new developments on Rota would vary according to the size of the park and the operational responsibilities identified through the management agreement between the CNMI and the NPS.

Long-term facility development needs on Rota are limited, however, as the NPS and CNMI could seek to use existing buildings and infrastructure wherever possible by leasing from willing owners. Buildings could be adaptively reused for park operations including visitor services, administration, and maintenance. This approach could result in annual lease costs based on fair market value for existing structures. Costs for facility rehabilitation would vary depending on the size, condition, and program identified for the building in question. The NPS could also share administrative and operational facilities with CNMI agencies or other partner organizations.

POTENTIAL INITIAL DEVELOPMENT PROJECTS, NATIONAL HISTORICAL PARK ALTERNATIVE

POTENTIAL INITIAL DEVELOPMENT PROJECT
New or formalized trails: approx. 2.5 miles (4 kilometers)
Unpaved parking areas or trailheads: for 5–6 sites, approx. 9,600 square feet (892 square meters)
Improvements to unpaved roadways for vehicle access: Mochong and Måya, approx. 0.3 miles (0.5 kilometers)
Restroom upgrades at I'Chenchon Park Wildlife Conservation Area
Signage, kiosks, and interpretive waysides: includes 4 entrance signs, 4 kiosks, and 4 waysides

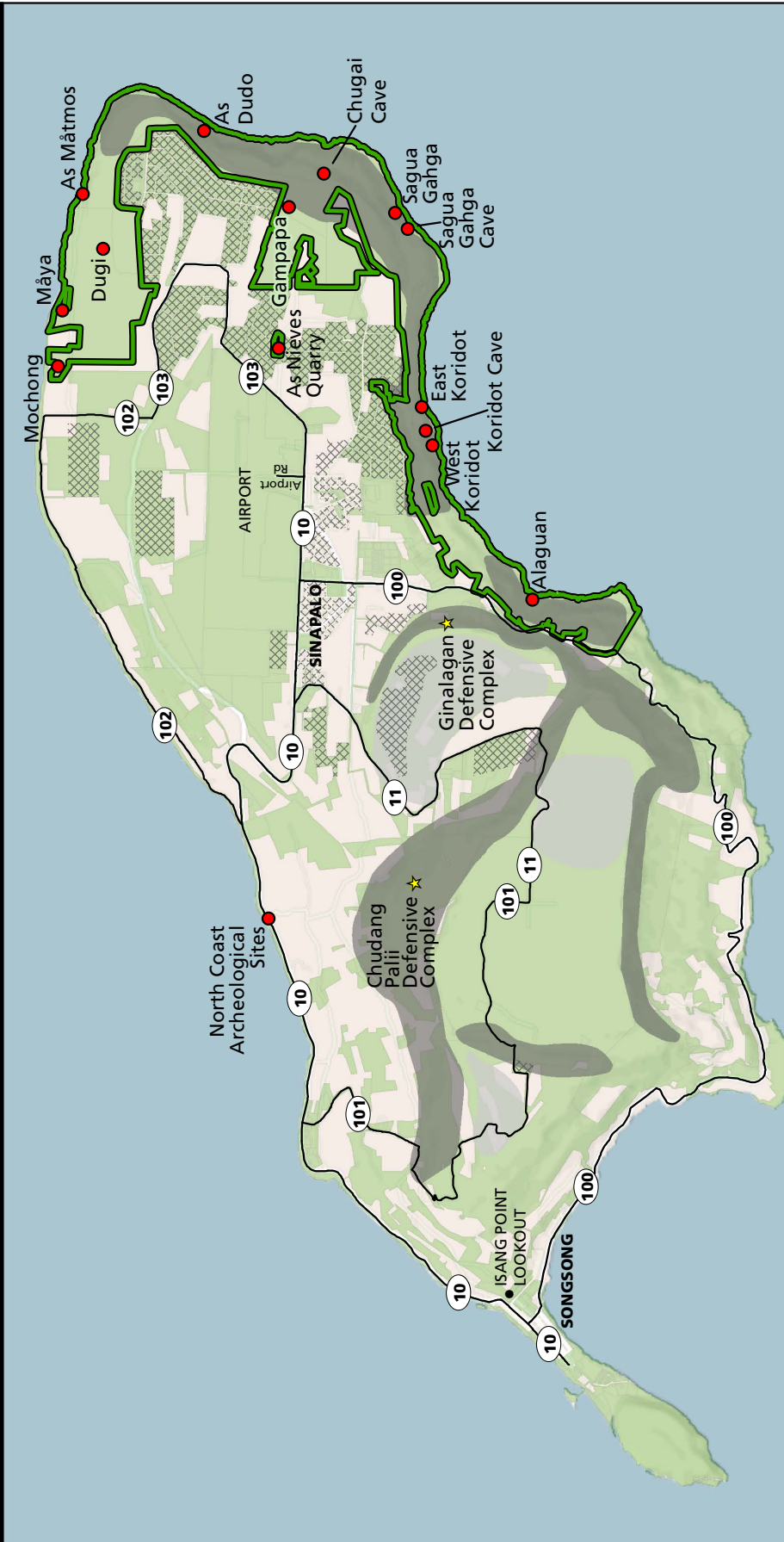
FACILITY OPERATIONS AND MAINTENANCE COSTS

Management of a national park unit on Rota could be funded both through CNMI appropriations and federal appropriations as part of the annual NPS budget. Management support could also be provided by potential partners and grants. Funding for capital improvements could be awarded through the CNMI and/or NPS competitive funding processes. A variety of other public and private funding sources could be sought by the CNMI and NPS to assist in implementation efforts. Other NPS units have successfully found partners to help with funding major projects, and some of the costs associated with actions in the alternative may prove to be less expensive if donated materials, labor, and other support can be secured.

If a park were authorized by Congress and established through agreement with the CNMI, it is likely that funding for the new unit would grow slowly over time. Many of the activities described in the alternative would have to be phased in as NPS and CNMI funding and staffing allow, and it would be many years before the park would be fully operational as described.

Rota Special Resource Study Map 7: National Historical Park Alternative

National Park Service
U.S. Department of the Interior



Potential Authorized Boundary: National Historical Park Alternative

- Potential Authorized Boundary, Cultural Resources, Places, Basemap
- Public Land
- Homesteads: Existing and Proposed
- Highest quality stands of limestone forest
- Possible high quality stands - need further investigation

Selected Cultural Resources

- Prehistoric Chamorro sites
- ★ WWII sites (1940s)

Data Sources:
 NPS: Potential Authorized Boundary, Cultural Resources, Places, Basemap
 CNMI/DPL/NPS: Public Land, Homesteads
 U.S. Census Bureau: Roads

Produced by National Park Service, DOI Regions 8, 9, 10 and 12 GIS Group
 Date: January 2023

0 0.5 1 Miles

The data on this map is derived from the CNMI government and other agencies. The National Park Service gives no warranty, expressed or implied, as to the accuracy, reliability, or completeness of the maps and is not liable for positioning inaccuracies, subsequent updates, errors, or unintentional omissions of data. These graphics are not legal documents and are not intended to be used as such.

APPENDIX C: SELECTED LIMESTONE FOREST PLANTS OF ROTA

The below chart includes limestone forest plants identified in the 2005 National Park Service reconnaissance survey of significant natural areas and cultural sites for the Island of Rota (NPS 2005). Other sources consulted include: vegetation surveys conducted by the U.S. Forest Service in 1989 and 2004 (Falanruw et al. 1989, Kauffman et al. 2011); a chart of plants of cultural

importance included in Appendix G, Chapter 4 (Cultural Resources) of the 2010 Guam and CNMI Military Relocation Environmental Impact Statement (Naval Facilities Engineering Command 2010); and published literature on medicinal plants in the Mariana Islands (Nandwani et al. 2008, Lizama 2014, McMakin 1978, Pobutsky-Workman et al. 1994).

CHAMORRO NAME (ENGLISH NAME)	SCIENTIFIC NAME	USES	LOCATION(S)	NOTES
mapunao, mapunyao	<i>Aglaia mariannensis</i>	timber		
kalaskas (siris tree)	<i>Albizia lebeck</i>		lower terraces	Introduced, naturalized. Carolinian name: schepil kalaskas
	<i>Allophylus</i> sp.		lower terraces	
nanagu	<i>Alyxia</i> sp.		upper terraces	
	<i>Angiopteris evecta</i>		upper terraces	
lemai (breadfruit)	<i>Artocarpus altilis</i>	food, medicinal, timber	middle, upper terraces	
dugdug (seeded breadfruit)	<i>Artocarpus mariannensis</i>	food, timber, cordage, thatch, weaving, medicinal	middle, upper terraces	
galak dangkulo, galak fedda' (bird's nest fern)	<i>Asplenium nidus</i>	medicinal, decorative	middle, upper terraces	
putting, puting, puteng (fish-kill tree)	<i>Barringtonia asiatica</i>	medicinal, timber, used for killing fish	lower terraces	
siboyas halumtanu, siboyan halom tano	<i>Bulbophyllum guamense</i>		upper terraces (Sabana)	Threatened (USFWS)
pakao, akankang	<i>Caesalpinia major</i>	medicinal	lower terraces	
sibukao	<i>Caesalpinia sappan</i>	medicinal		
panao	<i>Claoxylon marianum</i>		upper terraces	
	<i>Coelogyne guamense</i>		middle, upper terraces	
fadang (cycad)	<i>Cycas micronesia</i>	food, medicinal	lower terraces	Threatened (USFWS)
gulos	<i>Cynometra ramiflora</i>	food	lower terraces	Introduced, naturalized.
pugua' machena	<i>Davallia solida</i>	medicinal, decorative	middle, upper terraces	
	<i>Dendrobium guamense</i>			Threatened (USFWS)
otot	<i>Discocalyx megacarpa</i>		upper terraces	
yoga, joga	<i>Elaeocarpus joga</i>	timber	upper terraces	
agate lang, agatelang	<i>Eugenia palumbis</i>	medicinal	lower terraces	
a'abang	<i>Eugenia reinwardtiana</i>	timber	lower terraces	
toto	<i>Eugenia thompsonii</i>	food, timber	lower terraces	

CHAMORRO NAME (ENGLISH NAME)	SCIENTIFIC NAME	USES	LOCATION(S)	NOTES
	<i>Excoecaria agallocha</i>		coastal spray zone	
	<i>Fagraea berteriana</i>		upper terraces	
nunu (banyan)	<i>Ficus prolixa</i>	medicinal	upper terraces	
hodda (dyer's fig)	<i>Ficus tinctoria</i>		lower, upper terraces	
fianiti	<i>Freycinetia reineckeii</i>		middle, upper terraces	
paipai	<i>Guamia mariannae</i>		lower, upper terraces	
panao (zebrawood)	<i>Guettarda speciosa</i>	timber, medicinal	lower, upper terraces	
ufa halumtanu, ufa halom tano	<i>Heritiera longipetiolata</i>		lower, middle terrace (Sabana)	Endangered (USFWS), only one known individual on Rota.
	<i>Hernandia labyrinthica</i>		upper terraces	
nonak (lantern tree)	<i>Hernandia sonora</i>	medicinal, timber	lower terraces	
pago, pagu (beach or sea hibiscus)	<i>Hibiscus tiliaceus</i>	medicinal, timber, cordage, thatch, weaving	lower, middle, upper terraces	
	<i>Historiopteris incisa</i>		upper terraces	
Ifit	<i>Intsia bijuga</i>	timber	lower terraces	
palilolia	<i>Laportea interrupta</i>		lower, upper terraces	
kotdon di San Francisco (cat's tail, disciplina)	<i>Lycopodium phlegmaria</i> var. <i>longifolium</i>		upper terraces	Threatened/ endangered (CNMI)
pengua	<i>Macaranga thompsonii</i>	medicinal	lower, middle, upper terraces	
	<i>Maesa walkeri</i>		upper terraces (Sabana)	Threatened (USFWS)
chopak	<i>Mammea odorata</i>	medicinal, timber	lower terraces	
luluhot, luluhut, lulujut	<i>Maytenus thompsonii</i>	medicinal	lower terraces	
gafos	<i>Medinilla medinilliana</i>		upper terraces	
lada (noni)	<i>Morinda citrifolia</i>	food, medicinal	lower terraces	
	<i>Muntingia calabura</i>		lower terraces	Introduced, naturalized.
fago, fagot	<i>Neisosperma oppositifolium</i>	food, timber	lower terraces	
sensen hale' hanom	<i>Nervilia jacksoniae</i>	medicinal	upper terrace (Sabana) in <i>Pandanus</i> forest	Threatened (USFWS)
	<i>Nesogenes rotensis</i>		southeastern Sabana coastal spray zone	Endangered (USFWS)
	<i>Osmoxylon mariannese</i>		middle, upper terraces (Sabana)	Endangered (USFWS), endemic to Rota.
pahong (pandanus)	<i>Pandanus dubius</i>	food, cordage, thatch, weaving	lower, upper terraces	
kafu, akgak (pandanus, screwpine)	<i>Pandanus tectorius</i>	food, cordage, thatch, weaving, medicinal	lower, upper terraces	

CHAMORRO NAME (ENGLISH NAME)	SCIENTIFIC NAME	USES	LOCATION(S)	NOTES
nigas	<i>Pemphis acidula</i>	timber	coastal spray zone	
pupulon aniti	<i>Piper guahamense</i>	medicinal	lower, middle, upper terraces	
atmagayan, amahadyan (silvery pipturus)	<i>Pipturus argenteus</i>	fiber, medicinal	lower, middle, upper terraces	
umumu	<i>Pisonia grandis</i>	timber	lower terraces	
	<i>Pisonia umbellifera</i>		upper terraces	
kamachili (monkeypod)	<i>Pithecellobium dulce</i>	medicinal	lower terraces	Introduced, naturalized. Carolinian name: ghamasiligh
	<i>Polyscias grandifolia</i>		lower terraces	
ahgao (false elder)	<i>Premna obtusifolia</i>	medicinal, timber	lower terraces	
aplokateng, aploghating	<i>Psychotria mariana</i>	timber, medicinal	upper terraces	
nanaso (half-flower)	<i>Scaevola taccada</i>	timber, medicinal	coastal spray zone	
tronkon guafi (fire tree)	<i>Serianthes nelsonii</i>		lower, middle terrace (Sabana)	Endangered (USFWS), threatened/ endangered (CNMI)
	<i>Sophora tometosa</i>		coastal spray zone	
	<i>Tabernaemontana rotensis</i>			Threatened (USFWS)
talisai (tropical almond)	<i>Terminalia catappa</i>	timber, food	lower terraces	
banalo (rosewood)	<i>Thespesia populnea</i>	timber	lower terraces	
hunek, hunik (velvet leaf)	<i>Tournefortia argentea</i>	timber, medicinal	coastal spray zone	
lemonchina	<i>Triphasia trifolia</i>	food, timber	lower terraces	
	<i>Tuberolabium guamense</i>			Threatened (USFWS)

APPENDIX D: THREATENED AND ENDANGERED SPECIES DESCRIPTIONS

Animals

Acropora globiceps
Seriatopora aculeata

Coral, kuraling, yeal

Threatened

Both of these coral species are found in reef habitats in the Indo-Pacific, including the Northern Mariana Islands. Both species are considered threatened, with primary threats of ocean warming, disease, and ocean acidification (NOAA n.d. (a) and (b)).

Corvus kubaryi

Mariana crow, aga, mwii'lup

Endangered

The Mariana crow, or aga, is endemic to Rota and Guam. It is an omnivorous bird that nests in native limestone forest. There are no longer any crows on Guam, due to predation by the brown tree snake. The population on Rota has been steadily declining. The primary factors in this species' decline on Rota are uncertain, but it is likely a combination of habitat loss, poaching and harassment, and predation by feral cats. Six thousand thirty-three acres (2442 hectares) of critical habitat for the Mariana crow have been designated on Rota. (USFWS 2004 and 2012a).

Chelonia mydas

Green sea turtle, haggan, wong mool

Endangered

The green sea turtle is found in coastal waters worldwide, primarily in tropical and subtropical areas. They spend almost their entire lives in the ocean but use beaches for egg laying. There are 11 distinct population segments worldwide, which vary in species status and threats; the Marianas are part of the Central West Pacific distinct population segment, which is considered endangered. Threats to the Central West Pacific distinct population segment include habitat loss (including destruction, barriers to nesting habitat, and alterations due to both human activities and climate change), hunting and egg

gathering, predation, fisheries bycatch, and ingestion of trash (USFWS 2015a and 2016). Green sea turtles are frequently found in the waters off Rota (Kolinski et al. 2006, Wiles et al. 1990). Summers et al. (2018) note that 113 *Chelonia mydas* nests were found on Rota based upon 10-day and 64-night turtle nesting surveys from 2009 to 2016. Haggan have been identified as a species of cultural/ social importance in the CNMI (Liske-Clark 2015).

Eretmochelys imbricata

Hawksbill sea turtle, haggan karai, wong maaw

Endangered

The hawksbill turtle inhabits shallow coastal waters throughout the tropical and subtropical world, including the Mariana Islands. Populations in the Pacific are declining, and only five to ten females are estimated to nest in the Mariana Islands. The turtles may still be present in the waters off Rota but have not been observed nesting for many decades. Worldwide, threats to the species include habitat loss (including direct destruction and alterations due to climate change), hunting and egg gathering, fishery bycatch, ingestion of trash, and oil spills (USFWS 2013, Wiles et al. 1990).

Gallinula chloropus guami

Mariana common moorhen, puláttat, gherel bweel

Endangered

The Mariana common moorhen is a member of a species found worldwide; the Mariana subspecies is endemic to the Marianas. It is a nonmigratory freshwater wetland dweller. Moorhens occurred on Rota prehistorically but were extirpated due to loss of wetlands, hunting, or introduced predators. From 1995 to at least 2002 they were observed in a manmade wetland at the Rota golf course, indicating that they are capable of moving between islands. The primary threat to this species is habitat loss (USFWS 1991 and 2009a).

Ischnura luta

Rota blue damselfly, dulalas Luta

Endangered

The Rota blue damselfly is endemic to the streams of Rota. The species lives in an extremely limited range in the Talakhaya watershed area, where it has been observed in two nearby streams, one of which is the sole water supply for the island of Rota. The area is somewhat protected by its remote and inaccessible location, but if municipal demand for water increases the species may no longer be able to inhabit that stream. Introduction of nonnative fish and small population size are other potential threats to this species (USFWS 2015b).

Partula gibba

Humped tree snail, akaleha', denden

Endangered

The humped tree snail is endemic to the forests of the Mariana Islands. They live in the subcanopy in areas of dense forest and may be found on both native and nonnative plants. The largest of five known populations on Rota is presumed gone after its habitat was cleared for development. The primary threats to this species are habitat loss and predation by nonnative species, particularly flatworms and snails (USFWS 2015b).

Pteropus mariannus mariannus

Mariana fruit bat, fanihi, pai'scheei

Threatened

The Mariana fruit bat, or fanihi, is endemic to the Mariana Islands. It is a medium-sized bat that lives in large colonies, which roost in trees. It primarily forages and roosts in native limestone forest. Fanihi is an important traditional food in Chamorro culture. The primary threats to this species include habitat loss and overhunting (USFWS 2009b). From 2010 to 2012, the population of fanihi on Rota nearly doubled; this was credited to increased enforcement of hunting bans, particularly on maternity colonies (USFWS 2012b). Fanihi are identified as a species of cultural/social importance in CNMI (Liske-Clark 2015).

Samoana fragilis

Fragile tree snail, akaleha'

Endangered

The fragile tree snail is endemic to the forests of Rota and Guam. It occupies the same subcanopy habitat as the humped tree snail (above) and is currently known in a single population on Rota and two on Guam. The primary threat to this species is habitat loss (USFWS 2015b).

Sphyrna leweni

Scalloped hammerhead shark

Threatened

The scalloped hammerhead shark is found in coastal open water worldwide. There are four distinct population segments, which vary in species status; the Marianas are part of the Indo-West Pacific distinct population segment, which is considered threatened. Threats to this distinct population segment include bycatch and the shark fin trade (NOAA 2015).

Vagrans egistina

Mariana wandering butterfly,

ababbang, libweibwogh

Endangered

The Mariana wandering butterfly is endemic to the forests of Rota and Guam. The larvae of the species feed on the endemic plant *Maytenus thompsonii* (luluhut). The species is considered extirpated (locally extinct) on Guam. The last survey for the species on Rota, in 1995, identified it in one location. If the species persists, it is likely in very low numbers, and surveys are needed to determine its status. The primary threat to this species is habitat loss and destruction by rats and typhoons (USFWS 2015b).

Zosterops rotensis

Rota white-eye, nosa Luta

Endangered

The Rota bridled white-eye is a diminutive bird endemic to the island of Rota, where it lives in a small area of mature limestone forest above 490 feet (150 meters) on the Sabana. The white-eye prefers wetter, denser forests, and changes to the forest structure may be

altering the distribution and population of the species (Amidon 2000, Zarones et al. 2013). The population size has fluctuated over the past three decades, though further studies are needed to understand why. The primary threats to this species are habitat loss and a small, concentrated population that could be wiped out by a random event. Predation by introduced species is another potential threat. In 2006, the entire range of the white-eye was designated as critical habitat (USFWS 2007a and 2014b).

Plants

Bulbophyllum guamense

Siboyan halom tano

Threatened

Bulbophyllum guamense, a member of the orchid family, is endemic to Rota and Guam. It grows in large mats on the branches of trees in forested areas. On Rota, it is found primarily on the Sabana at elevations above 980 feet (300 meters). The primary threats to this species are habitat loss and predation by nonnative invertebrates (USFWS 2015b).

Cycas micronesica

Fadang, Federico palm

Threatened

Cycas micronesica, a member of the cycad family, is found on Rota, Guam, Palau, and Yap, where it grows in the forest ecosystem. Populations on Rota are found on the northeast, northwest, and south shores, along with the Taipingot (Wedding Cake) Peninsula. Since the introduction 10 years ago of the nonnative insect, cycad aulacaspis scale (*Aulacaspis yasumatui*), this species is experiencing mortality rates of over 90% across all life stages. This species may be extirpated from Rota and Guam in the near future, unless an effective control is found for the scale (USFWS 2015b).

Dendrobium guamense

No common name

Threatened

Dendrobium guamense, a member of the orchid family, is found in the forests of Guam, Rota, Tinian, and Aguiguan, and historically on Saipan. On Rota, it has primarily been

observed on the western third of the island. While it is rare on other islands, the species is abundant across its forest habitat on Rota, with a healthy population structure, and population numbers are likely in the thousands. The primary threats to this species are habitat loss and predation by nonnative insects (USFWS 2015b).

Heritiera longipetiolata

Ufa-halomtano

Endangered

Heritiera longipetiolata, a small tree in the hibiscus family, is endemic to the forests of the Mariana Islands. There is one known individual on Rota, out of a total of approximately 200 known individuals on Guam, Saipan, Rota, and Tinian. Herbivory by pigs and deer may be killing seedlings and seeds before they are able to mature, but this hypothesis is based only on observations from Guam. The primary threat to this species is habitat loss (USFWS 2015b).

Maesa walkeri

No common name

Threatened

Maesa walkeri, a small tree in the primrose family, is endemic to the forests of Rota and Guam. While only two individuals are known on Guam today, the species is abundant across the Sabana of Rota. The Sabana population includes a healthy mix of seedlings, juveniles, and adults. The primary threat to this species is the loss of its niche habitat on the Sabana, particularly due to degradation from fire and nonnative plants and animals (deer and rats) (USFWS 2015b).

Nervilia jacksoniae

No common name

Threatened

Nervilia jacksoniae, a member of the orchid family, is endemic to the forests of Rota and Guam. On Rota, it is found primarily on the Sabana, often in Pandanus forest. The primary threat to this species is the loss of its niche habitat on the Sabana, particularly due to degradation from fire, typhoons, and nonnative plants and animals (deer and rats) (USFWS 2015b).

Nesogenes rotensis

No common name

Endangered

Nesogenes rotensis, an herb in the verbena family, is endemic to Rota. It grows on exposed, unforested limestone flats adjacent to the coast, where it is hit by salt spray during severe storms. The primary threat to this species is habitat loss (USFWS 2007b).

Osmoxylon mariannense

No common name

Endangered

Osmoxylon mariannense, a tree in the ginseng family, is endemic to Rota. It grows in the limestone forest of the Sabana. Ongoing recovery efforts include outplanting nursery-raised seedlings. The primary threat to this species is habitat loss (USFWS 2007b).

Serianthes nelsonii

Hayun lågu (Guam), tronkon guafi (Rota)

Endangered

Serianthes nelsonii is a tree endemic to the forests of Rota and Guam. Only one adult tree is known on Guam, while 60 to 80 individuals are known on Rota, all in limestone forest. Nursery-raised seedlings have also been planted on both Guam and Rota. Seedling survival is very poor, and a substantial number of mature trees were damaged or destroyed by typhoons in 2003 and 2004. The primary threat to this species is lack of regeneration caused by deer herbivory of seedlings and insect predation on seeds. (USFWS 2012c).

Tabernaemontana rotensis

No common name

Threatened

Tabernaemontana rotensis, a small tree in the dogbane family, is endemic to the forests of Rota and Guam. Only nine naturally occurring individuals are known on Rota, along with 30 planted individuals. On Guam, the population of about 21,000 includes a healthy mix of seedlings, juveniles, and adults. The primary threat to this species is habitat loss (USFWS 2015b).

Tuberolabium guamense

No common name

Threatened

Tuberolabium guamense, a member of the orchid family, is endemic to the Mariana Islands. The species grows on the branches of native canopy trees, particularly *Hernandia labyrinthica*, *Premna obtusifolia*, and *Elaeocarpus joga*. While only one individual is known today on Guam, a few hundred individuals in a healthy population structure were recently identified on Rota. The primary threats to this species are habitat loss, particularly loss of the large native canopy trees on which the species grows, and predation by nonnative insects (USFWS 2015b).

APPENDIX E: MARINE AND SUBMERGED RESOURCES

Public Law 113-291 authorized the National Park Service to conduct a special resource study of the “prehistoric, historic, and limestone forest sites on the island of Rota, Commonwealth of the Northern Mariana Islands” to evaluate the national significance of the sites and the feasibility of designating them as a unit of the national park system (P.L. 113-291, Title XXX, §3051; see Appendix A). The authorizing legislation for this study therefore did not include an evaluation of marine resources. However, marine habitats and other submerged resources are undeniably a critical component of Rota’s ecosystems, cultural practices, and heritage. The information below provides context for Rota’s marine setting, however further study of inshore waters, coral reefs, and other submerged resources should be undertaken in the future.

Marine Resources

Rota is surrounded by a fringing coral reef, with approximately 9.5 square miles (24.6 square kilometers) of shallow reef habitat. Fringing reefs are typical around newly emergent land masses and are located adjacent to shore. As the land mass ages and subsides, the reef transitions to a barrier reef (separated from the shore by a lagoon) and finally an atoll reef (fully subsided land mass, leaving only a reef around a lagoon). A sea level platform fringing reef, the type of reef found at Rota, is typically described in five zones, each with different physical conditions and biological communities. Starting at the shore, the shoreline intertidal is the zone between low and high tide, where species are limited to those able to tolerate the fluctuations of being submerged and exposed. The reef flat platform is a shallow area, which may be exposed or only shallowly covered at low tide. Reef flat habitats include sandy bottoms, eelgrass, rubble, algal pavement, or coral, depending on the exact environmental conditions of the site. More corals tend to be found towards the seaward edge. At the edge of the reef flat platform is the reef margin, which is exposed

to breaking waves, and is home to a variety of corals, fish, and algae adapted to the high energy conditions of breaking waves. The reef front occupies the area between the reef margin and the base of the waves and is exposed to strong surging water. The reef front zone generally includes areas with the most vigorous growth of corals, coralline algae, and other reef-building organisms. Finally, the seaward reef slope extends down from the reef front. A number of different habitats and species assemblages are found within this zone, depending on the depth, slope, exposure, substrate, and other factors, giving this zone high biological diversity (Liske-Clark 2015).

The reef platform at Rota, including the shoreline intertidal, reef flat, and reef margin, is just over 1 square mile (2.5 square kilometers), and the reef slope, including the reef front and seaward reef slope, covers 8.5 square miles (22 square kilometers). There are no reef lagoons. This fringing reef is quite narrow in most places but extends up to 800 feet (244 meters) in the leeward area north of Songsong Village. The eastern shore has steep cliffs and high wave exposure, meaning that reef formation is limited in this area. Much of Rota’s shoreline is emergent fossilized reef exposed by geologic uplift and sea level drop in recent geologic history (mid-Holocene), resulting in a reef flat that is exposed at lower tides. This emergent reef geology also means that substantial groundwater makes its way into the reef. This combination of exposure and groundwater results in low biological production and coral cover compared to other islands in the Marianas. An exception is the Sasanhaya Bay Fish Reserve, or Coral Gardens Marine Protected Area, located on the eastern edge of Sasanhaya Bay south of Songsong Village, which has relatively high coral cover (Liske-Clark 2015).

Recent surveys on the status, resilience, and stressors of CNMI reefs found that marine recruitment and diversity are slightly less on Rota than other islands, but Rota also has the least exposure to anthropogenic stresses as compared to Tinian and Saipan (Maynard et al. 2015). Houk et al. (2014) found that Rota's reefs are more resilient to invasive Crown-of-Thorns starfish damage than other Mariana Islands.

Archeological surveys at coastal settlements on Rota reveal that precontact Chamorro relied on specialized fishing skills as early as 2,500 years ago. Excavations at coastal village sites such as Mochong and Alaguan have unearthed a variety of artifacts associated with fishing, as well as fish bone assemblages representing at least 27 fish families (Amesbury and Hunter-Anderson 2008, 43). Analysis of the assemblages indicates that parrotfish were most commonly consumed, followed by pelagic fish such as mahi-mahi, dolphinfish, marlin, sailfish, swordfish, wahoo, and yellowfin and skipjack tuna (Amesbury and Hunter-Anderson 2008, Leach et al. 1990). Fishing remains an important cultural practice for residents in the Marianas today, including on Rota, although present-day fishermen report that fish are not as plentiful as they once were. Current fishermen cite overfishing, pollution, climate change, and the invasive Crown-of-Thorns starfish as key reasons for the decline (Amesbury and Hunter-Anderson 2008, 141).

Selected Submerged Resources

Rota's cultural resources are identified in Chapter 2: Context and Resource Description, which includes a description of archeological resources and historic structures on the island from multiple historical periods. This analysis of cultural resources was conducted by Micronesian Archaeological Research Services (MARS) on behalf of the NPS and included a small number of shipwreck sites from both the Spanish period and World War II. These resources are not part of the study scope; however, they are included below for reference.

SANTA MARGARITA SHIPWRECK

The Spanish galleon *Santa Margarita* ran aground off Rota's north coast, near Teteto, in February 1601 (Driver 1993, Woodman 2009). The ship was heading east from Manila when it was demasted in a storm, floundering at sea for eight months before wrecking off Rota. Fewer than 50 of the original 300 sailors on board remained alive. Some of these survivors were killed by Chamorro on Rota in retaliation for threats and abuses the Spaniards had perpetrated once onshore. Others were taken to Guam and Tinian, and some were rescued by westbound galleons in 1601 and 1602 (Driver 1993; Russell 2002, 26; Brunal-Perry et al. 2009, 107).

From 1996 until 2006, IOTA Partners, a commercial treasure-salvor venture, conducted intermittent excavation of the *Santa Margarita*. Religious art, Ming dynasty porcelain, gemstones, a cache of ivory carvings, and other valuables were recovered (Trusted 2013). No reports were produced on the salvage operations.

The integrity of the shipwreck is in question as the decade of commercial treasure hunting by IOTA Partners may have stripped the galleon of its cargo while destroying many of the vessel's defining elements.

SHŌUN MARU SHIPWRECK AND OTHER WORLD WAR II SHIPWRECKS

The known Japanese shipwrecks lost in World War II around Rota include the *Shōun Maru*; two submarine chasers (CHA-54 and CHA-56) in Sasanhaya Bay sunk in air raids on June 15 and 17, 1944; and the cargo ship/gunboat *Shotoko Maru*, torpedoed by the submarine USS *Tunny* in deep water near the island on June 28, 1943 (Carrell 1991, 335–355; Mohlman et al. 2011).

The *Shōun Maru* was a Japanese merchant ship torpedoed by U.S. forces while anchored in Sasanhaya Bay (Carrell 1991, 337–345; Carrell 2009, 395–405). The 4,396-ton bulk cargo ship transported supplies, munitions, and equipment to Rota, where it was loaded with phosphate ore for delivery to Japan. In June of 1944, the *Shōun Maru* had just returned to Rota after transporting base personnel and materials for Japanese Air Group 265 from Yokohama to Saipan (Carrell 2009, 396). It was anchored offshore of the phosphate loading dock when the American invasion of Saipan began on June 11. In a precarious position and probably without armed escort, *Shōun Maru* was riding at anchor when it was attacked and sunk on June 21, 1944 by a torpedo launched by a TBF torpedo bomber based on the escort carrier USS *White Plains*.

Shortly after being sunk, personnel from the Japanese navy salvaged material from the ship (Denfeld 1997, 129). Sitting upright in 70 to 110 feet (21.3–33.5 meters) of water on the sandy bottom of the bay, the shipwreck is now a favored scuba diving spot. Limited archeological investigations have been conducted on the *Shōun Maru*. The site has been archeologically monitored by Toni L. Carrell, who reports that the forward holds were dynamited open as part of a commercial salvage effort for scrap metal in the late 1950s or early 1960s (Carrell 2009, 396). She observed that between 1987 and 2009, the ship, without a reef to protect it from ocean swells, has deteriorated and “is slowly collapsing and will soon be a part of the ocean floor, except for the engine and boilers” (Carrell 2009, 405).

PREPARERS

National Park Service

Barbara Alberti

Superintendent
War in the Pacific National Historical Park
and American Memorial Park

Betsy Anderson

Landscape Architect, Park Planning and
Environmental Compliance Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Jennifer Ascencio

Former Planning and Environmental
Compliance Fellow, Park Planning and
Environmental Compliance Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Jean Boscacci

Supervisory Realty Specialist, Land
Resources Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Martha Crusius

Manager, Park Planning and Environmental
Compliance Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Cherri Espersen

Former Program Analyst, Park Planning and
Special Studies Division
Washington Support Office

Mike Gawel

Former Integrated Cultural and Natural
Resources Manager
War in the Pacific National Historical Park
and American Memorial Park

Jonathan Gervais

Environmental Protection Specialist, Facility
Management Division
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Patrick Gregerson

Former Division Manager, Park Planning and
Special Studies Division
Washington Support Office

Stephen Haller

Former Historian
Golden Gate National Recreation Area

Scott Henrickson

Civil Engineer, Facility Management Division
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Jordan Hoaglund

Division Manager, Park Planning and Special
Studies Division
Washington Support Office

Elaine Jackson-Retondo, Ph.D.

Preservation Partnerships Program Manager
and Regional Historian, Cultural Resources
and Science Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Chris Johnson

Historian, Preservation Partnerships
Program, Cultural Resources and
Science Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Dave Lotz

Former Cultural Resources Program Manager
War in the Pacific National Historical Park
and American Memorial Park

Renee Manibusan

Ranger
American Memorial Park

Allen McCoy

GIS Specialist, Information
Technology Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Carrie Miller
Program Analyst, Park Planning and Special
Studies Division
Washington Support Office

Brooke Nevitt
Lead Ranger
American Memorial Park

Charles Notzon
Economist, Park Planning and Special
Studies Division
Washington Support Office

Hilary Retseck
Historian
Denver Service Center

Amber Reyes
Cartography/GIS Specialist Intern, Land
Resources Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Jim Richardson
Former Superintendent
War in the Pacific National Historical Park and
American Memorial Park

Thomas Sheffer
Management and Program Analyst, Park
Planning and Special Studies Division
Washington Support Office

Anna Tamura
Planning Portfolio Manager, Park Planning
and Environmental Compliance Program
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Katelyn Walker
Former Outdoor Recreation Planner, Park
Planning and Environmental Compliance
Pacific West Region (Interior
Regions 8, 9, 10, 12)

Erika Wudtke
Former Program Analyst, Park Planning and
Special Studies Division
Washington Support Office

Consultants

Jolie Liston, Ph.D.
Micronesian Heritage Consulting, LLC

**Micronesian Archaeological Research
Services (MARS)**
Mangilao, Guam

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Fred Amidon
U.S. Fish and Wildlife Service

Mayor Efraim Atalig
Rota Mayor's Office

Eloy Ayuyu
CNMI Historic Preservation Office

Lainie Berry, Ph.D.
CNMI Department of Lands and
Natural Resources

Ilan Bubb
CNMI Office of Planning and Development

Brian Butler
Southern Illinois University, Emeritus

David Calvo
CNMI Department of Lands and
Natural Resources

Manuel Camacho
CNMI Office of Planning and Development

Mike Carson, Ph.D.
Micronesian Area Research Center,
University of Guam

Bethany Chagnon
CNMI DLNR Division of Fish and Wildlife

Arthur Charfauros
Division of Coastal Resources Management,
CNMI Bureau of Environmental and
Coastal Quality

Sarah Faegre
University of Washington

Marjorie Falanruw, Ph.D.
U.S. Forest Service

Jacqueline (Jackie) Flores
U.S. Fish and Wildlife Service

Ann Marie Gawel
Iowa State University

James Ha, Ph.D.
University of Washington, Emeritus

Renee Robinette Ha, Ph.D.
University of Washington

Rosalind Hunter-Anderson, Ph.D.
Anthropologist and Archeologist

Jill Liske-Clark
CNMI DLNR Division of Fish and Wildlife

Glenn Manglona
Translator

James Manglona
CNMI Department of Lands and
Natural Resources

Peter McBride
U.S. Fish and Wildlife Service

Ivan Mereb
Rota Mayor's Office

Isaac Merson
Former Field Technician,
University of Washington

Vincent Mesngon
CNMI Historic Preservation Office

Crispin Ogo
CNMI Indigenous Affairs Office

Manny Pangelinan
Director, CNMI DLNR Division of
Fish and Wildlife

Bill Pendergrass
Division of Coastal Resources Management,
CNMI Bureau of Environmental and
Coastal Quality

Jim Pruitt
CNMI Historic Preservation Office

Nicholas Puzon
Pacific Historic Parks

Frank Rabauliman
Former Administrator, CNMI Bureau of
Environmental and Coastal Quality

Haldre Rogers, Ph.D.
Iowa State University

Antonelli Rosario
CNMI Historic Preservation Office

Westin Saito
Pacific Historic Parks

Robert Uchoa
CNMI DLNR Division of Fish and Wildlife

Dacia Wiitala
Former Research Coordinator,
University of Washington

Zachary Williams
Division of Coastal Resources Management,
CNMI Bureau of Environmental and
Coastal Quality

Tyler Willsey
U.S. Fish and Wildlife Service

GLOSSARY

Ach'ot: The middle class in Chamorro social structure, who lived with or close to the matua (upper class) and offered them support.

Agroforest: Forest that has been modified through human actions to produce forest crops.

Archipelago: An archipelago is a group of scattered islands. The CNMI makes up the 14 northern islands in the Mariana archipelago (excluding Guam in the south, which is a separate U.S. territory).

Biophysiographic province: also known as a natural region.

Bluff: A steep bank or cliff.

Brown tree snake (*Boiga irregularis*): A snake species native to parts of Indonesia, the Solomon Islands, New Guinea, and Australia. It has no natural predators on Guam and therefore has decimated its bird population, but has so far been prevented from establishing in the CNMI.

Bulwark: A defensive wall typically built from earth or other natural materials.

Cache: A collection of objects that has been hidden away or stored.

Chamorro: The indigenous people of the Mariana Islands (including Guam). On Rota, the earliest ancestral Chamorro voyagers arrived at least 3,500 years ago, establishing small coastal settlements and introducing new species such as coconut and taro. Later populations expanded horticultural practices into inland areas. This involved clearing, terracing, and other modifications of forest and forest understory. They also made use of native forest species for food, tools, building materials, clothing, crafts, and medicine.

Endemic: Endemic is a word used to describe animals and plants native to a single area and found nowhere else in the world.

Fanihi (*Pteropus mariannus mariannus*): Mariana fruit bats, or fanihi, are a threatened species endemic to the Marianas Island. Fanihi primarily forage and roost in native limestone forest and are identified as a species of cultural/social importance in the CNMI.

Grassland: A large open area of land that is predominantly composed of grasses and forbs.

Haligi: The stone hemispherical cap that sits on a tasa, i.e., the upper component of a latte.

Isthmus: A thin strip of land that connects two larger land formations, with water bodies on either side.

Karst: An irregular topography, or landscape, formed when soluble rocks such as limestone, dolomite, and gypsum dissolve due to water passing through them. The resulting karst landscape is characterized by sinkholes and caverns. Karst landforms on Rota are composed of limestone.

Latte period: The latte period extends from ca. AD 1000 to ca. 1700 when, after decades of warfare with Spanish colonizers, the surviving Chamorro were forced to abandon their traditional village sites for new villages on Guam and Rota.

Latte: Stone archeological remains found only in the Mariana Islands. Latte are composed of pillars (haligi) topped with stone caps (tasa) and can vary in size. Latte were typically arranged in parallel sets and used as foundation support for wooden structures. Latte are considered the quintessential symbol of Chamorro history and cultural identity.

Limestone cloud forest: A forest formation that is unique to Rota and some parts of Guam. It occurs on Rota where higher-elevation cliffs are exposed to a persistent accumulation of clouds and higher levels of rainfall, which creates a wetter “cloud forest” environment.

Limestone forest: A distinct forest type, occurring on areas of raised limestone. Limestone is formed through the deposition of calcium carbonate, which comes from the exoskeletons of coral colonies. Once it has been uplifted out of the ocean through tectonic activity, it is weathered by rainwater, which slowly dissolves the limestone, making it very porous.

Lommok: Typically carved from basalt or limestone, lommok are stone artifacts that were used as pestles with lusong (mortars).

Lusong: Typically carved from basalt or limestone, lusong are stone artifacts that were used as mortars with lommok (pestles).

Mampostería: A style of early Spanish vernacular architecture seen in building remains of the Marianas. The construction technique consists of using thick, rough masonry walls of coral cobbles with signs of plaster on the interior walls.

Manachang: The lower class in Chamorro social structure, manachang lived in upland areas and were primarily farmers.

Matua: The highest class in Chamorro social structure, matua were born into their status through matrilineal lines of descent.

Midden: A midden is a mound of shells, bones, and other discarded materials marking the place where humans once lived.

Mixed introduced forest: This forest type consists of a variety of native and introduced tree species. It typically occurs when areas which have been heavily disturbed or cleared begin to recover.

Pillbox: A small, partially underground fort or building made of concrete that is used as for military defense.

Plateau: A land formation composed of relatively level high ground.

Precontact: Of or relating to the period before contact of an indigenous people with an outside culture.

Pre-latte period: The pre-latte period extends from initial settlement of the islands ca. 1500 BC until ca. AD 1000, which marks the early appearance of latte architecture, distinguished by alignments of upright capped stone pillars (latte) used as house supports.

Proa: Double-hulled boats built by the Chamorro.

Quarry: A location that has been excavated, from which stone and other materials have been extracted.

Ravine forest: On Rota this forest type occurs on volcanic soils where weathering has created steep, deep ravines with heavy soils.

Ravine: A ravine is a deep valley with steep sides. It is smaller than a canyon and often narrower. It is formed when running water erodes (wears away) an area of land. Sometimes the running water may continue to flow through the ravine. Some ravines may only have seasonal streams.

Revetment: A retaining wall built to provide protection from blasts and explosions.

Rock art: On Rota, rock art is principally composed of pictographs (painted figures) with pigments made from limestone, charcoal, and iron-rich soils. In some locations petroglyphs (carvings) are found interspersed among the pictographs.

Rock shelter: A shelter formed from stone materials; an example would be a shallow cave-like opening at the base of a cliff or bluff.

Ruins: The remains of a structure that are in a state of decay, damage, or destruction.

Substrate: An underlying material or layer.

Tangantangan: A dense monocultural forest made up of the *Leucaena leucocephala* tree (called tangan-tangan in Chamorro).

Tasa: Made from stone, the tasa is the pillar component of a latte (the base).

Terrace: A series of flat land areas formed on a slope that resemble a series of steps and are used for cultivation.

Traditional Cultural Properties (TCP): NPS guidelines define a TCP as a property associated with “cultural practices and beliefs of a living community that are (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (Parker and King 1998, 1).

Tsunami: A tsunami, also known as a tidal wave, is a series of large waves caused by earthquakes or volcanic eruptions that take place underwater.

Typhoon: A mature tropical cyclone that develops in the Northwestern Pacific Basin region.

Ungulate: A mammal that has hooves.

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