

Cultural Resource Analysis Appendix E



Guam Watershed Plan



**US Army Corps
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1. Cultural Resources Existing Conditions

Cultural resources are a term used to describe the places, objects, sites, oral practices that connect individuals, communities, or even a nation to their past within watershed planning as a key component contributing to the resilience reinforcing a sense of place or reflecting the cultural identity of people. An watershed and resources would be largely incomplete without addressing resources present throughout the landscape and its surrounding waters.

Typical inventories for cultural resources focus on preserving tangible properties buildings, structures, objects, or districts under state, territorial, and federal protection. But it is also necessary for this watershed assessment to consider the intangible that play an important role in maintaining cultural identity across the territory below summarize the human history of Guam, organized according to historically defined temporal periods. These temporal periods will help contextualize resources and provide an indication of their cultural and historical significance.

Summary of Prehistoric Cultural Resources

Historic Context	Date
Early Pre-Latte Period	3500-2500 Before Present (B.P.)



1. Cultural Resources Existing Conditions

Cultural resources are a term used to describe the places, objects, sites, oral histories, and traditional practices that connect individuals, communities, or even a nation to their past. They can be viewed within watershed planning as a key component contributing to the resilience of a community by reinforcing a sense of place or reflecting the cultural identity of people. An assessment of Guam’s watersheds and resources would be largely incomplete without addressing the myriad of cultural resources present throughout the landscape and its surrounding waters.

Typical inventories for cultural resources focus on preserving tangible properties such as a sites, buildings, structures, objects, or districts under state, territorial, and federal historic preservation law. But it is also necessary for this watershed assessment to consider the intangible cultural resources that play an important role in maintaining cultural identity across the territory today. The sections below summarize the human history of Guam, organized according to archaeologically and historically defined temporal periods. These temporal periods will help contextualize certain cultural resources and provide an indication of their cultural and historical significance.

Summary of Prehistoric Cultural Resources

The “prehistoric” period of Guam is understood by studying the physical evidence of human activity left behind by the ancient Chamorro people. The Chamorro cultural group did not leave behind any written records, requiring most of what we know about Guam’s prehistoric past to be reconstructed through archaeological evidence, settlement patterns, artifact typologies, changes in subsistence, ethnographic information such as traditional oral histories, and architectural features at sites. The Guam Historic Resources Division has divided the islands historic contexts into 5 distinct periods of prehistory.

Historic Context	Date
Early Pre-Latte Period	3500-2500 Before Present (B.P.)
Intermediate Pre-Latte Period	2500-1600 B.P
Latte Period	800-1000 Anno Domini (A.D.)
Mid-Latte Period	c. 1300 A.D.
Late Latte/Early Historic Period	1521-1700 A.D.



Figure 1. A scatter of broken pottery known as "sherds". Photograph from Guampedia and taken by Kerri Ann Borja.

The initial settlement of the Mariana Islands began around 4,000 years ago, and possibly earlier, according to archaeological research. Ancient seafarers believed to be the ancestors of the modern-day Chamorro people arrived on the Mariana Islands from Southeast Asia. The Pre-Latte Period, ranging from circa 3500 to 1600 years before present, is subdivided into four subperiods based on pottery styles. The subperiods include: 1. Early Unai (1500-900 Before Common Era (BCE)) containing highly decorated dentate-stamped pottery known as Lapita ceramics, 2. Middle Unai (900-400 BCE) characterized by bolder lines imprinted onto ceramics, 3. Late Unai



(400 BCE- 400 CE) with large thick-walled ceramic vessels, and 4. Huyong (400-1000 CE) with pottery defined by flat-bottomed pans, rounder bases, and incurved rims. Archaeological sites from this early period are uncommon discoveries on Guam. However, the few Pre-Latte sites which have been recorded by archaeologists were located in coastal environments, buried in rocky and sandy deposits. Early settlement sites were believed to be inhabited by small groups who took advantage of the sandy embayments and their easy access to coastal lagoons and marine resources for subsistence (Graves and Moore 1985). Early settlement sites are also found in coastal rock shelters and inland caves throughout Guam, Rota, Tinian, and Saipan.

The material culture associated with the Pre-Latte Period includes redware pottery, surface and subsurface scatters of ceramic sherds (shattered remains of pottery), midden deposits, and ecofacts such as faunal remains or marine shell. Pre-Latte Period sites are often found to be in poor condition due to impacts from natural transformational processes near the shoreline, as well as human activity and development which persisted into the historic era (Carson 2008).



Figure 2. Latte sets at Senator Angel Leon Guerreros Santos Latte Stone Memorial Park in Hagåtña, Guam. Photograph from Wikipedia.

By around 1000 CE, the population of the Marianas Islands had increased and settlement had expanded outside of the usual coastal environments. This shift in settlement patterns marks the beginning of the Latte Period, named for the eonymous megalithic *latte*, consisting of upright limestone pillars supporting a capstone. The Latte Period is defined by parallel sets of latte which served as foundations for village residential and community houses. Family members were commonly buried underneath or adjacent to latte sets, and early Spanish records note ancestral skulls resting above the latte structures (Coomans 1997).



A shift in pottery technology was also noted by archaeologists, wherein small bowls (possibly used for baking) were replaced by the Latte Period’s larger thick-walled jars, presumably used for boiling (Moore and Hunter-Anderson 1997). The cultivation of rice also occurred during this period, as evidence by rice impressions left in Latte Period ceramic pottery. The material culture of the Latte Period is also characterized by *lusong* (basalt or limestone grinding mortars), *lummok* (stones used like a pestle), latte quarries, hearths, cooking debris, food storage features, lithic debitage from tool making activities, pictographs, and remnants of abandoned village sites. There are many more Latte Period sites recorded, in comparison to Pre-Latte sites, across the Mariana Islands.

Summary of Historic Period Resources

The historic era for the Mariana Islands starts at around 1668, however written records from the Spanish Magellan expedition documented the island much earlier in 1521, with the Spanish crown making formal claims for the islands in 1565. Spanish contact in the mid-16th century had little impact on the Chamorro people and their traditional lifeways. It wasn’t until the establishment of a Jesuit mission on Guam in 1668 that European influence intensified. This period, marking the transition from “prehistoric” to “historic”, is commonly referred to as the Spanish Missionization

Historic Context	Date
Spanish Missionization/Chamorro Spanish Wars	1668-1699
Spanish Colonial Period	1700-1898
First American Colonial Period	1898-1941
World War II/Japanese Military Occupation	1941-1944
Post World War II/Second American Colonial Period	1944-1950
Political and Economic Development	1950-Present

Period and is known for its series of Chamorro-Spanish conflicts. Spain’s attempts to colonize the island were met with resistance by the Chamorro people. Violent conflict broke out between the parties on numerous occasions, with the Chamorros attempting to drive the Spanish colonizers off the archipelago and the Spanish attempting to take control of the islands and install a supply station for the Manila-Acapulco sailing route.

The Society of Jesus, led by Father Diego Luis de San Vitores, would eventually convert the inhabitants of the archipelago to the practice and beliefs of Roman Catholicism (Guam HPO 2007). Past inventories have documented 17th century

latte sites, historic sites, remnants of Spanish structures, war sites, and two known shipwrecks off the coast of Malessos and Pago Bay, all of which are associated with this early period of Spanish colonization. Historic archives for this period are plentiful. Spanish journals and chronicles document the locations of sites where battles occurred between the Spanish and Chamorro, including the location of mission chapels at certain villages (Guam HPO 2007).

By 1700, the Chamorro population had decreased dramatically, and many of their traditional cultural practices and beliefs were lost with the shift to Christianity. Prehistoric technologies related to pottery, lithic tools, and seafaring appear to have been lost under Spanish rule (Guam HPO 2007). The new social and political organization created by the Spanish during this era of colonization was centered on the small Spanish colony in Hagåtña, managed by the Society of Jesus and Augustinian Recollects. The construction and use of latte stones stopped completely during this period. The Pre-Latte Period’s village spaces would traditionally include a chief’s house as well as a central plaza. The Spanish introduced churches, public buildings, and wealthy



residential houses into the village settlements of Hagåtña, Umatac, and Agat, which traditionally would have contained community structures built atop latte (Guam HPO 2007). In addition to societal and cultural change introduced by the Spanish, migrants from the Caroline Islands arrived in the 1880's. The surviving remnants associated with the Spanish Colonial Period are generally in good condition, however there is very little remaining associated with the early Chamorro-Spanish conflicts. Archaeological sites, Spanish colonial buildings, stone bridges, and defensive forts are the extant components of the Spanish Colonial Period.

The First American Colonial Period, beginning in 1898, is an outgrowth of the various attempts by the United States, Germany, and Japan to take control of the Mariana Islands. In June of 1898, during the Spanish-American War, the *USS Charleston* anchored at Apra Harbor in an attempt to seize control of Guam from Spain. By August 12, 1898 the Spanish-American War was brought to a close with the signing of the Treaty of Paris. Guam, the Philippines, and Puerto Rico were ceded to the



Figure 3. Guam Naval Militia in Agaña c. 1920's or 1930's.
Photograph from NPS.gov.

United States on December 10, 1898 (Guam HPO 2007). The U.S. Navy took control of Guam's administration around this time (Guam HPO 2007). Guam's position in the Pacific Ocean made it an important stop for fuel and rest between Asia and the United States, eventually becoming of strategic importance as a Naval radio station and landing area for airforce planes.

World War II in Micronesia began with the Japanese invasion and occupation of Guam. A significant plane bombardment occurred on December 8, 1941, just a few hours after the Pearl Harbor attack at O'ahu Island, Hawai'i. Despite Guam being under control of the U.S. Navy, Guam's military force was unprepared for warfare or potential invasion by the Japanese. Two days after the bombardment, Japanese forces invaded Guam and the U.S. Naval commander surrendered after a brief resistance. For the next two and a half years, the Japanese occupied Guam and attempted to make it an economic contributor to the Greater East Asian Co-Prosperity Sphere. During this period, control of the island was handed over to the Kohatsu Company. The Kohatsu development group brought in its own police, doctors, and clergy. Women were forced to work in rice fields during this period and men labored on airfields and other military construction projects. As U.S. forces advanced across the Pacific, the Japanese Army assumed control of Guam and began building defensive fortifications on areas most likely to be invaded during the war, such as potential landing beaches. Guam's native communities were forced to labor for the Japanese and when U.S. invasion became imminent, were put in internment camps in the southern part of the island.

Within a few years of Japanese control, military construction had greatly transformed the landscape of Guam. Bunkers, bomb shelters, tunnels, and gun stations were built all over the island. In June of 1944, the United States returned to the Mariana Islands and attempted to wrest



control from the Japanese, beginning with Saipan. The liberation of Guam by the United States occurred on July 21, 1944. Guam, Saipan, and Tinian would eventually serve as important staging areas for B-29 bombers in support of missions to the Japanese mainland, including the delivery of atomic bombs to Hiroshima and Nagasaki. Guam's historic sites associated with World War II include pillboxes, man-made tunnels and enhanced natural caves, defensive gun emplacements, military airfields, anti-aircraft positions, trenches, sunken ships, straggler caves, and mass grave sites. Isolated artifacts from World War II are also prevalent across the island. The Guam Historic Preservation Office has documented over 150 World War II features and sites on Guam (Guam HPO 2007). Examples of Guam's war-era historic resources are on display at the National Park Service's War in the Pacific National Historical Park, and at other interpretive parks and museums.

After the war, the Mariana Islands fell under the control and administration of the United States. Guam would be established as a U.S. flag territory and governed once again by the U.S. Navy. The people of Guam gained more agency and self-determination for their own politics following the 1949 Guam Congress walk-out and the passage of the United States Congressional 1950 Organic Act of Guam. The Organic Act granted Guamanians United States citizenship. The 1950's is associated with Guam's Political and Economic Development period, which provides significance for historic properties associated with the establishment of Guam's government, politics, and economy today.

Congress passed the Guam Elective Governor Act, P.L. 90-497 on September 1, 1968, which amended the 1950 Organic Act and allowed the people of Guam to elect their own governor and lieutenant governor (Guam HPO 2007). Executive Order 11045 was executed by President John F. Kennedy on August 21, 1962. This order effectively removed Navy security clearance for Guam. Certain restrictions and obstacles that prevented Guam from pursuing its own economic development were lifted, helping the island to establish a better free enterprise system for its people as well as more control over economic development (Guam HPO 2007). Historic properties commonly associated with this period include military structures, Quonset huts, churches, government buildings such as the Guam Congress Building (Guam HPO 2007).



Summary of Intangible Cultural Resources

Identifying and preserving intangible cultural resources can be challenging, yet also presents an opportunity to consider a unique class of historic properties during this watershed assessment. Due to the difficulty of defining the boundaries of such resources, close consultation with



Figure 4. Children from the Chamorro organization Hurao Cultural Camp performing a burial ceremony. Photo from the Smithsonian.

Chamorro cultural groups is necessary. The National Register Bulletin 38 has addressed this issue by defining a category of protected cultural resources known as Traditional Cultural Properties (TCP).—This guidance defines a TCP as a historic property eligible for inclusion in the National Register of Historic Places because of significance associated with cultural practices or beliefs for a living community’s history and maintaining their cultural identity (Parker and King 1990).

Intangible cultural resources have become an important part of Chamorro and Pacific Islander communities, connecting them to their language, oral history, community values, ceremonial practices, maritime

activities, folklife, folklore, and traditions (Guam HPO 2007). Administrative management and occupation by Spain, Japan, and the United States, has resulted in the loss of land and traditional customs for the Chamorro people. Although Guam has taken on a more westernized lifestyle, everyday customs surrounding their past traditions, such as maritime activities related to fishing, seafaring, or the management of marine habitats and natural resources, helps to maintain their traditional connection to the land and sea (Allen 2008). By maintaining and enhancing their intangible cultural heritage, the Chamorro community can revive their sense of cultural identity and connection to their traditional lands and resources.

Although not yet thoroughly documented, intangible cultural resources should be considered during any project or study. The Guam Historic Preservation Plan notes that the preservation of non-tangible cultural resources is a goal of various government and non-government entities (Guam HPO 2007). Meaningful outreach to Chamorro communities and villages will result in the working partnerships necessary to address intangible cultural heritage. This will help an agency or developer to better understand the significance of intangible cultural resources and how traditional practices, beliefs, and values can be included within the management of Guam’s water resources.

2. Cultural Resources Investigations Overview

To establish a baseline inventory for cultural resources within the study area, site records, cultural resource inventories, academic archaeological reports, and resource management plans were consulted. USACE also reached out to relevant agencies and organizations to collect information on Guam’s cultural resources, including most notably the Guam Preservation Trust and the Guam State Historic Preservation Officer (SHPO). The SHPO serves as the



territory’s leading expert on documenting cultural resources and administering a territory-wide historic preservation program.

The Guam Historic Preservation Plan (GHPP), first published in 2007 and republished in 2016, was used for this watershed assessment’s cultural resource analysis. The GHPP lays out the historic preservation objectives and goals of the territorial government, including such topical areas as public participation, education, outreach, cultural resource surveys and inventories, economic development, land use, and heritage tourism.

134 listed historic properties, spanning Guam’s 19 villages, were identified on the National Register of Historic Places (NRHP) database. (The database was last updated on January 7th, 2022). Historic properties are a codified term defined under 54 U.S. Code § 30030836 and defined as any significant prehistoric or historic district, site, building, structure, or object that is listed or eligible for the National Register of Historic Places. This can include places of traditional religious and cultural importance to Chamorro communities. Guam’s listed historic properties include prehistoric and historic buildings, structures, sites, districts, and objects.

Historic Property	Property Type	Village
Achugao Bay Site	Site	Umatac
Aga Tongan Archaeological Site	Site	Inarajan
Agaga	Site	Umatac
Agana Historic District	District	Hagåtña
Agana Spanish Bridge	Structure	Hagåtña
Agana-Hagatna Pillbox	Structure	Hagåtña
Aagana/Hagatna Cliffline Fortifications	Structure	Hagåtña
Agat World War II Amtrac	Site	Agat
Agat Invasion Beach	Site	Agat
Aratama Maru	Site	Talofofu
As Sombreru Pillbox I	Site	Tamuning
As Sombreru Pillbox II	Structure	Tamuning
As Sombreru Pillbox III	Structure	Tamuning
Asan Invasion Beach	Site	Asan-Maina
Asan Ridge Battle Area	Site	Asan-Maina
Asmaile Point	Site	Merizo
Asquiroga Cave	Site	Talofofu
Atantano Shrine	Structure	Piti
Ayulang Pillbox	Site	Hagåtña Hagåtña
Baza Outdoor Oven	Structure	Yona
Cable Station Ruins	Building	Agat
Canada Water Wells	Structure	Barrigada
Cetti Bay	Site	Umatac
Chaqui’an Massacre Site	Site	Yigo



Historic Property	Property Type	Village
Merlyn G. Cook School	Building	Merizo
Creto Site	Site	Umatac
Cruz Water Catchment	Structure	Yigo
Dãdi Beach Japanese Bunker	Structure	Santa Rita
Dobo Spring Latte Set Complex	Site	Santa Rita
Dungcas Beach Defense Guns	District	Tamuning
Fafai Beach Site	Site	Tamuning
Faha Massacre Site	Site	Merizo
Fonte River Dam	Structure	Asan-Maina
Fort Nuestra Señora de la Soledad	Site	Umatac
Fort San Jose	Site	Umatac
Fort Santa Agueda	Structure	Hagåtña
Fort Santo Angel	Structure	Umatac
Fouha Bay	Site	Umatac
Gadao's Cave	Site	Inarajan
Garapan Mount Pillbox	Site	Talofofu
Gilan	Site	Tamuning
Gongna Beach Gun Emplacement	Structure	Tamuning
Gongna Beach Gun Mount	Site	Tamuning
Gongna Beach Mount Pillbox	Site	Tamuning
Guam Congress Building	Building	Hagåtña
Guam Institute	Building	Hagåtña
Guzman Water Catchment	Structure	Barrigada
Ha. 62-76 Japanese Midget Attack Submarine	Structure	Santa Rita
Hanum Site	Site	Yigo
Haputo Beach Site	Site	Dededo
Hill 40	Site	Agat
Ilik River Fortification I	Site	Yona
Ilik River Fortification II	Structure	Yona
Inarajan Pillbox	Site	Inarajan
Inarajan Ridge	Site	Inarajan
Inarajan Village	District	Inarajan
Ipao Pillbox I	Structure	Tamuning
Ipao Pillbox II	Site	Tamuning
Ipao Pillbox III	Site	Tamuning
Jinapsan Site	Site	Yigo
Light Model Tank No. 95	Object	Yona



Historic Property	Property Type	Village
Machagden Point	Site	Umatac
Mahlac Pictograph Cave	Site	Talofofu
Malessu Japanese Rice Mill	Building	Merizo
Malessu' Pillbox	Structure	Merizo
Malolos Site	Site	Inarajan
Mana Pillbox	Structure	Talofofu
Manenggon Concentration Camp	Site	Yona
Mataguac Hill Command Post	Structure	Yigo
Matalala' Pillbox	Site	Talofofu
Matgue River Valley Battle Area	Site	Asan-Maina
Memorial Beach Park	Site	Asan-Maina
Merizo Bell Tower	Building	Merizo
Merizo Conbento	Building	Merizo
Mesa House	Building	Hagåtña
Mochom	Site	Mangilao
Mount Tenjo Fortifications	Site	Santa Rita
Naton Headland Fortification I	Site	Tamuning
Naton Headland Fortification II	Site	Tamuning
Nomna Bay Site	Site	Inarajan
North Inarajan Site	Site	Inarajan
Oka Fortification	Site	Tamuning
Orote Field	Structure	Santa Rita
Orote Historical Complex	Site	Santa Rita
Pagat Site	Site	Yigo
Pagu' Pillbox I	Structure	Chalan Pago-Ordot
Pagu' Pillbox II	Structure	Chalan Pago-Ordot
Paulino Outdoor Oven	Structure	Inarajan
Piti Coastal Defense Guns	Object	Piti
Plaza de Espana	Site	Hagåtña
Quan Outdoor Oven	Structure	Piti
San Dionisio Church Ruins	Site	Umatac
San Vitores Beach Japanese Fortification	Site	Tamuning
San Vitores Martyrdom Site	Building	Tamuning
Francisco Q. Sanchez Elementary School	Site	Umatac
Sella Bay Site	Site	Umatac
SMS Cormoran	Site	Piti



Historic Property	Property Type	Village
South Finegayan Latte Stone Park	Site	Dededo
South Pulantant Site	Site	Yona
South Talofo Site	Site	Talofofo
Spanish Dikes	Structure	Hagåtña
Sumay Cemetery	Site	Agat and Santa Rita
Taelayang Spanish Bridge	Structure	Agat
Talagi Pictograph Cave	Site	Dededo and Yigo
Taleyfac Spanish Bridge	Structure	Agat
Talisay Site-Latte' Saddok Talisai	Site	Santa Rita
Talofofo River Valley Site	Site	Inarajan
Talofofo-Talu'fofo' Pillbox	Structure	Talofofo
Taogam Archeological Settlement	Site	Mangilao
Tinta Massacre Site	Site	Merizo
Tokai Maru	Site	Piti
Tokcha' Pillbox	Structure	Talofofo
Tomhum Cliffline Fortification I	Site	Tamuning
Tomhum Cliffline Fortification II	Site	Tamuning
Tomhum Cliffline Fortification III	Site	Tamuning
Tomhum Pillbox I	Structure	Tamuning
Tomhum Pillbox II	Structure	Tamuning
Tomhum Pillbox III	Structure	Tamuning
Tonhum Fortification I	Site	Tamuning
Torre Water Catchment	Structure	Yigo
Toves House	Building	Hagåtña
Tumon-Maui Well	Structure	Dededo
Umang Dam	Structure	Agat
Umatac Outdoor Library	Structure	Umatac
Umatac-Umatac Pillbox	Site	Umatac
U.S. Naval Cemetery	Site	Hagåtña
Uruno Beach Site	Site	Dededo
Uruno Site	Site	Dededo
War in the Pacific National Historical Park	District	Hagåtña
West Atate	Site	Inarajan
West Bona Site	Site	Santa Rita
Won Pat Outdoor Oven	Structure	Sinajana
Yokoi's Cave	Site	Talofofo



Historic Property	Property Type	Village
Ypao Beach Archaeological Site	Site	Tamuning

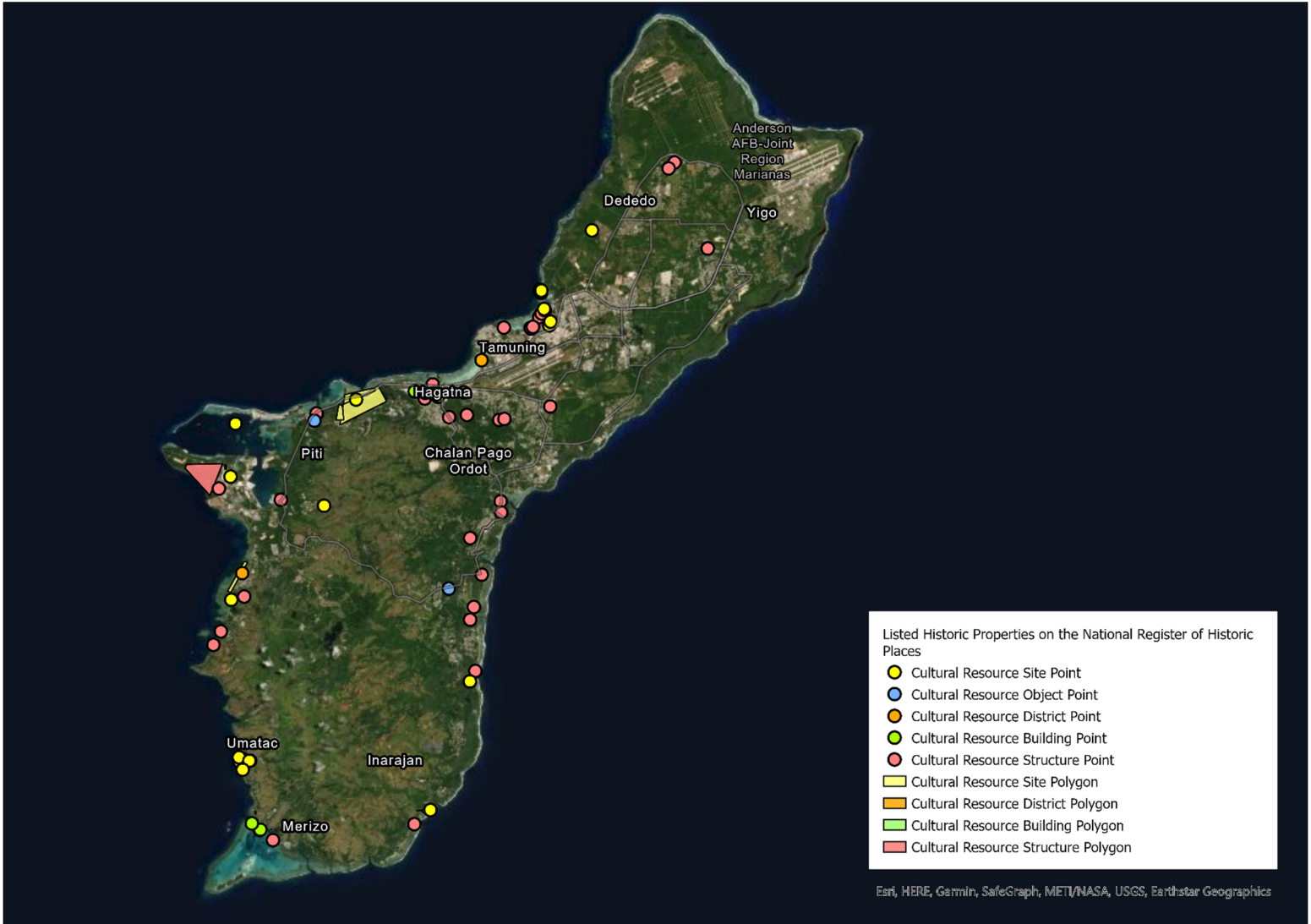


Figure 5. Public location of Guam’s listed historic properties on the National Register of Historic Places.

3. Land Ownership

The Mariana Islands have been the ancestral homeland of the Chamorro people for thousands of years. The Chamorro people refer to themselves as “taotao tano” meaning “people of the land”. As taotao tano, Guam’s Chamorro people maintain a strong belief in stewardship of their ancestral lands, as well as preservation of its natural features and resources. Their cultural identity is supported by, and based on, a strong relationship to the island and to the sea.

Historic impacts extending from the early Spanish Period to incorporation into the American political system, have altered, but not eradicated, Chamorro traditions and customs. During the



American Colonial Period under the administration of the U.S. Navy, military policies and projects heavily altered the landscape and resulted in land condemnations from Chamorro landowners. This resulted in more than half of Guam's historic and cultural resources being under the management of the Department of the Defense (Guam HPO 2007). Land ownership claims by Chamorro families are often impossible to compensate due to the lack of land records (Corona 2004). Guam legislatures have attempted to ease tensions associated with land claims by creating the Chamorro Land Trust Commission, which is responsible for returning parcels to those with Chamorro ancestry.

Lands in Guam today are split between private owners (approximately 45%), the U.S. federal government's military installations, National Parks, and the Guam National Wildlife Refuge (approximately 30%), and the Guam government (approximately 25%) (Corona 2004). Land ownership in Guam is distinct from that found in the neighboring Commonwealth of the Northern Mariana Islands, which restricts land ownership to those of Northern Marianas Chamorro or Carolinian blood. U.S. residents, Americans naturalized or born in the U.S., and foreign investors can all purchase and acquire land in Guam. Programs through the Chamorro Land Trust Commission exist to help with real estate and development, grants, land leases, and the disposition of public lands for the Chamorro community.

Guam's SHPO is responsible for reviewing all federal undertakings related to building permits, private construction, or development projects, in order to ensure that potential impacts to historic properties are considered. Stimulated by Guam's ongoing economic growth and development, the SHPO works with contractors, developers, local governments, and federal agencies to thoroughly review proposed projects, with the goal of preventing or mitigating damage to Guam's significant cultural resources.

4. Problems Identified for Cultural Resources

Background research for cultural resources identified a variety of potential impacts to cultural resources associated with the domains and problems studied by the watershed assessment. Guam's Historic Preservation Plan, in particular, has documented past damage to tangible cultural resources from natural disaster events. Destructive winds, storm surge flooding, river and stormwater flooding, high surf, coastal erosion, salt spray, and typhoon events have all worked to diminish or destroy the integrity of archaeological sites and the historic built environment. Damage to museums and archival spaces holding important records and artifacts is another issue associated with typhoon-induced flooding (Guam HPO 2007).

Sea level rise, coral reef degradation, and loss of fish habitat have also been shown to have potentially adverse effects on cultural resources, traditional practices, and traditional cultural properties. Community recreational use, access, and/or cultural practices can potentially be limited as a result of these processes. Fish habitat loss and coral reef degradation are documented examples. These are important, since the Chamorros of Guam continue to depend on fishing and locally caught seafood as part of their traditional lifeway.

The fact that Prehistoric and World War II cultural heritage sites are usually located along the coastline is also important, as they are likely to face inundation from sea level rise. Coral reefs, considered a significant part of the Guam's natural and cultural heritage, also may be impacted. Coral reef degradation and loss of fish habitat would most likely impact intangible cultural resources, including the traditional practice of harvesting and sharing fish during weddings, funerals, village fiestas, and religious events. According to one survey, more than half of



Guam's local fishermen responded that fish is used not only for sustenance and economic benefit, but also for upkeep of cultural values and practices (Guampedia).

Guam's subsistence fishing has already been identified as a significant issue for the Chamorro people, who wish to teach local fishing methods to Chamorro youth. Chamorro elders stated that their traditional fishing and maritime practices should be passed on to the younger generations. This is one of their principal ways to preserve their Chamorro cultural identity and practices (Beukering 2007).

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