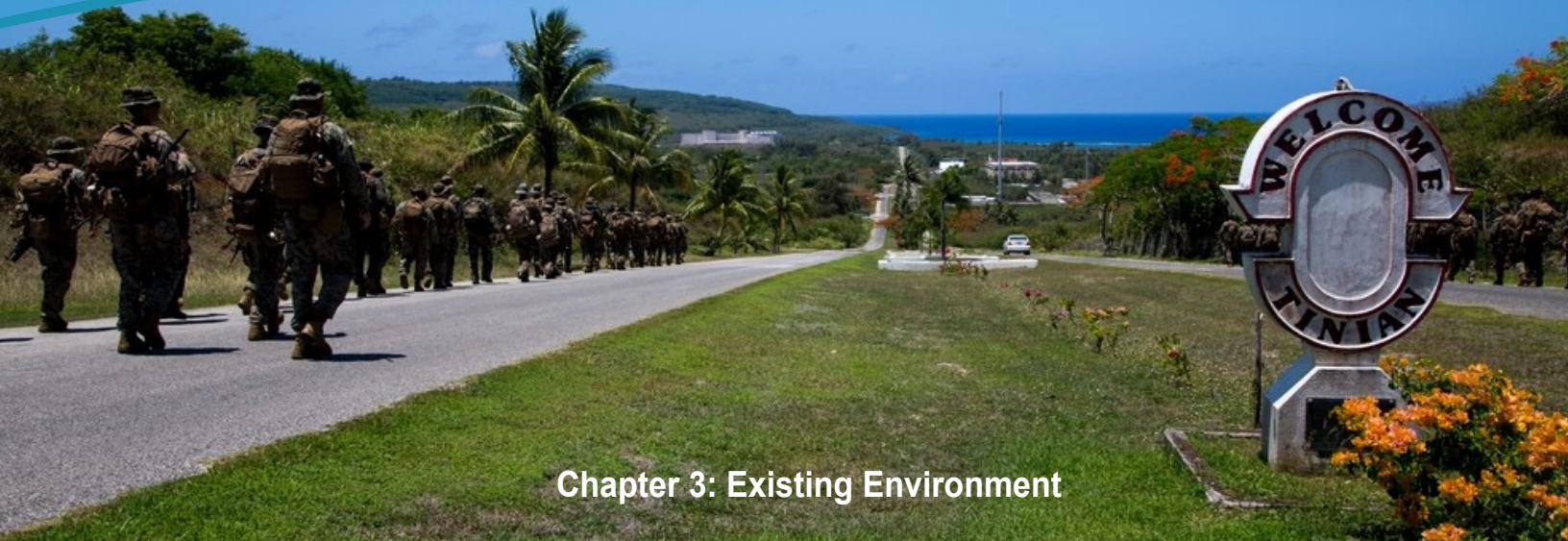




Revised Draft Environmental Impact Statement Commonwealth of the Northern Mariana Islands Joint Military Training



Chapter 3: Existing Environment



June 2025
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**Revised Draft Environmental Impact
Statement
in Support of the
Commonwealth of the Northern
Mariana Islands
Joint Military Training Environmental
Impact Statement**

CHAPTER 3 EXISTING ENVIRONMENT

June 2025

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3 EXISTING ENVIRONMENT

This chapter describes the existing environment or future baseline that may be affected by the Proposed Action. The future baseline includes the continuation of approved onshore training events in the CNMI as described in prior NEPA documents (DON 2010a, 2015c). The baseline also includes construction and operations associated with the U.S. Air Force's Divert project (U.S. Air Force 2016, 2020). Additionally, projects under the U.S. Air Force's Agile Combat Employment program would also continue, which would include the clearance of vegetation and restoration of the runway and other engineered surfaces at North Field. This chapter is organized in 14 sections: Public Access, Land Use and Recreation; Socioeconomics; Biological Resources; Cultural Resources; Visual Resources; Transportation; Noise; Air Quality; Public Health and Safety; Utilities; Topography, Geology, and Soils; Groundwater and Hydrology; and Surface Waters and Wetlands.

3.1 Public Access

The Military Lease Area (northern two-thirds of Tinian and shoreline areas immediately adjacent to Tinian) is currently available to residents of Tinian and tourists during festivals and holidays and for fishing and boating, commercial ranching, cultural activities, recreation, tourism, and subsistence activities like hunting and gathering of both plants and animals. Access to the Military Lease Area is restricted only when needed to comply with safety and security requirements during military training activities, consistent with the terms of the 1983 Lease Agreement.

Current military training on Tinian includes large training events like Valiant Shield (June 2024), which is held a few times per year for approximately four weeks. During these training events, access has been restricted around North Field, with closure of the taxiway between runways Able and Baker and the two ends of runway Baker for the duration of training activities. No access has been permitted on runway Baker during aviation operations and airdrops. Small and medium training events, typically lasting a few weeks, are also conducted throughout the year on Tinian in conjunction with at-sea training. The portion of the Cope North exercises that have previously occurred in the CNMI (February 2024) is an example of a medium training event. In addition, Seabee units conduct training at Camp Tinian and the Military Lease Area throughout the year.

The USAGM, formerly the International Broadcasting Bureau, operated two broadcast facilities in the Mariana Islands—one on Tinian and one on Saipan. The Tinian site is located within the Military Lease Area. The Saipan site is situated in the southwest area of the island adjacent to the Commonwealth Utilities Corporation Agingan wastewater treatment plant. Both USAGM sites supported international shortwave radio transmissions and are collectively referred to as the Robert E. Kamosa Transmitting Station. Public access to both sites is restricted due to the presence of sensitive communications infrastructure and federal security requirements.

3.2 Land Use and Recreation

The island of Tinian encompasses approximately 25,000 acres. Land use on Tinian includes residential and commercial uses on privately owned land, with the population primarily located in the village of San Jose. Commercial uses include grocery and dry goods stores, restaurants, agriculture, hotels, TNI, and the Port of Tinian. Public land uses include civic and government functions, homesteads, conservation areas, and recreation. Recreation on Tinian is outdoor-focused and includes land uses such as beaches and parks, and recreational activities such as

visiting cultural resources, swimming, fishing, snorkeling, diving, boating, wild plant collection, and bicycling.

Since the 1983 Lease Agreement, several land use agreements have defined DoD management of the Military Lease Area (see Appendix E for a description of these agreements). The Lease Back Area was leased back to the CNMI by the U.S. Government for agricultural and other uses. Roads within the Lease Back Area and a 10-acre youth camp parcel within the area were returned to the CNMI, but DoD retains use rights and easements over these areas. The Lease Back Area is no longer managed as a separate section within the Military Lease Area and will only be referenced in a limited capacity regarding past actions and/or agreements. The youth camp area within the Military Lease Area is not currently being used as a youth camp. A 936-acre Natural Resources Conservation Area has also been dedicated within the Military Lease Area. The DoD also negotiated with the Commonwealth Ports Authority to lease an area south of the Military Lease Area on the northern end of TNI under the U.S. Air Force's Divert Activities and Exercises program.

The Department of Public Works manages all public lands within the CNMI in accordance with the 2019 updated Public Land Use Plan. The plan provides guidance and planning for capital improvements over a 5-year planning horizon (CNMI Department of Public Lands 2019) and identifies five categories of public land uses as shown in Table 3.2-1. Approximately 90 percent of land on Tinian is considered public land with 67 percent of that public land in the northern half of the island leased to the military and the other 33 percent located on the southern half of the island. Figure 3.2-1 shows the land uses on Tinian and land-based recreational sites.

Table 3.2-1 Tinian Land

<i>Tinian</i>	<i>Acres¹</i>	<i>% of Total Land</i>	<i>Public Land Acres</i>	<i>% of Public Land</i>
Total Land Area	25,115	—	—	—
Private Land	2,434	10	—	—
Public Land	22,681	90	—	—
-Grant of Public Domain Land	—	—	1,604	7
-Designated/In Use Public Land	—	—	1,278	6
-Undesignated/Not in Public Use Public Land	—	—	2,874	13
-Leased Public Land	—	—	1,572	7
-Covenant/Military Leased Public Land	—	—	15,353	67

Legend: % = percent.

Note: ¹ Acreages are from CNMI Department of Public Lands 2019.

Source: CNMI Department of Public Lands 2019.



Figure 3.2-1 Existing Land Uses and Land-Based Recreation Sites on Tinian

3.2.1 Land Uses and Recreation Outside of the Military Lease Area

Existing land uses south of the Military Lease Area include the Port of Tinian, TNI, agricultural, residential, commercial businesses (restaurants, hotels, grocery stores, offices), a power plant, civic buildings, open space, mining, a waste disposal site (Puntan Diablo disposal site), homestead designated areas, parks, and conservation land (3,358 acres along the cliff line on the southeast side of island). Most of Tinian's population and commercial activities are in San Jose near the Port of Tinian. The Tinian Dynasty Hotel and Casino, a large resort, operated on the island until its permanent closure in 2016. A new 40-unit hotel and casino, the Tinian Diamond Hotel and Casino, opened in 2023, but the casino closed in 2024. The CNMI government leased a parcel on the southeast end of the port to Bridge Investment Group for potential commercial development, although the project has not been approved or constructed.

The CNMI Department of Public Lands Homesteads Division is responsible for reviewing and accepting applications for homesteads on public lands, which are available to eligible residents (CNMI Department of Public Lands 2023a). The homestead program includes village lots up to 1,000 square meters and agricultural lots up to 10,000 square meters, or 0.2 and 2.4 acres, respectively. As of January 2019, there were 528 deeded village homesteads and 384 deeded agricultural homesteads where the owners are currently farming and raising livestock in the lands south of the Military Lease Area (CNMI Department of Public Lands 2019). The Department of Public Lands has planned for future development of both village and agricultural homesteads on Tinian, in an area of approximately 1,549 acres in the southeastern portion of the island (CNMI Department of Public Lands 2019). A new public highway (Route 205) is planned to provide vehicular access to the future Kastiyu homestead area and provide multiple connections to the existing roadways on Tinian (CNMI Department of Public Lands 2019).

Recreation sites frequented by both Tinian residents and visitors are located on the west side of the island and include Unai Leprosarium/Unai Tinian, Unai Kammer, Unai Taga, and Unai Tachogna (Figure 3.2-1). Annual festivals hosted at these beaches include the Pika Festival in February and the San Jose Fiesta in May (Marianas Visitors Authority 2019). These festivals are managed by the Tinian Mayor's Office, which also maintains the cultural sites outside the Military Lease Area including the House of Taga ruins and Suicide Cliff. Other recreational features include parks, the Tinian Community Gym and Sports Field Complex, and the Tinian Community Park and Outdoor Amphitheater. Ocean-based activities on Tinian include fishing, snorkeling, diving, and boating. Known popular dive sites surrounding the island are shown in Figure 3.2-2.

3.2.2 Land Uses and Recreation within the Military Lease Area

Current training within the Military Lease Area consists of units engaging in maneuvers on roads and in offroad areas, simulated live-fire training, aircraft operations and live-fire small arms training using bullet traps (in existing structures only) (DON 2013). Large-scale training events can take place on Tinian up to four weeks per event and can occur any time of the year. Public uses include tourism, public recreation, subsistence agriculture, and wildlife conservation.



Figure 3.2-2 Tinian Popular Dive Sites

For cultural sites, the most popular destinations include the Tinian Landing Beaches, Ushi Point Field, and the North Field National Historic Landmark. Several annual ceremonies are held to commemorate Iwo Jima in March, Battles of Saipan and Tinian in June and July, end of the War in the Pacific in August, and Memorial Day and Veterans Day in May and November (DON 2020). Other recreational uses within the Military Lease Area include hiking, shoreline fishing, wild plant collection, hunting, gathering, bicycling, and other outdoor activities. All recreational activities occur year-round (Marianas Visitors Authority 2023).

Cattle grazing occurs on the east side of Broadway and along 8th Avenue. Grazing and agricultural uses continue even though permits issued by the Department of Public Lands have expired. Other agricultural uses in the Military Lease Area include subsistence growing and harvesting of fruits and vegetables.

Wildlife conservation is another land use within the Military Lease Area. In 1999, the DON, in cooperation with U.S. Fish and Wildlife Service, CNMI Division of Fish and Wildlife, and the FAA, dedicated 936 acres in as a conservation area for the Tinian monarch (*Monarcha takatsukasae*). This existing Tinian Military Retention Land for Wildlife Conservation (also known as the FAA Mitigation Area but hereinafter referred to as the Natural Resources Conservation Area) allows low-impact military training that does not adversely modify habitat. Though the Tinian monarch was removed from the endangered species list in 2004 due to recovery of the species, the conservation area remains an existing land use within the Military Lease Area. In addition, the U. S. Fish and Wildlife Service recovery plan for the Mariana common moorhen identifies Lake Hagoi within the northern portion of the Military Lease Area as primary habitat for the moorhen (U.S. Fish and Wildlife Service 1991). Lake Hagoi is currently restricted from training activities.

The Military Lease Area also includes approximately 300 acres formerly used by USAGM on the northwest side of the Military Use Area. The USAGM operated 13 curtain antennae, each of which consists of two vertical steel towers between 150 and 400 feet tall with a curtain of horizontal and vertical cables hung between the towers of the same height (DON 2010b). The site also contains administration buildings and equipment. During operation at the USAGM communications site, shore fishing from Puntan Lamanibot Sanhilo (Sanhilo) was restricted due to hazards from electromagnetic radiation and all access to the shoreline along Lamanibot Bay (Dump Coke) from Puntan Lamanibot Sanhilo to Puntal Lamanibot Papa was also restricted.

On August 13, 2024, the USAGM announced the closure of the Robert E. Kamosa Transmitting Station facilities located on both Tinian and Saipan. The Saipan site contains a few buildings and five towers on public land adjacent to a water treatment plant and a golf course. The Saipan site itself is fenced and does not contain public recreation uses.

3.3 Socioeconomics

Socioeconomic considerations include population, demographics, economic activity, and public services. The island of Tinian is small, approximately 12 miles long and 6 miles wide. Residents live in the village of San Jose, located on the southern one-third of the island. The livelihood of the Tinian community is dependent on both commercial markets and subsistence practices and relies on social cohesion to adapt to external factors such as pandemics (e.g., SARS and COVID-19) or natural disasters that adversely affect the economy of the island. Residents rely on many of the natural resources found in the Military Lease Area. Information on local resources and

producers (e.g., ranching, fishing, and cultivation or gathering of other traditional food sources or goods) is presented below to highlight their importance to the island’s economy. The Proposed Action includes establishing a new lease for the USAGM property on Saipan and the reuse of the existing facilities and communications towers. Under the new lease, the use of the property and terms of the lease would be similar to the past lease but operate under a different federal agency, the DoD. Thus, there would be no impact to socioeconomics related to the Saipan site and the existing environment is not described further in this section.

3.3.1 Population and Demographic Composition

Table 3.3-1 shows population trends on Tinian, Saipan, and the CNMI for the past six decades based on U.S. Census data. Non-resident workers are included in these numbers.

Table 3.3-1 Population of CNMI and Tinian, 1970-2020

<i>Location</i>	<i>1970</i>	<i>1980</i>	<i>1990</i>	<i>2000</i>	<i>2010</i>	<i>2020¹</i>
CNMI Overall	9,640	16,780	43,345	69,221	53,883	47,329
Saipan	7,976	14,549	38,896	62,392	48,220	43,385
Tinian	710	866	2,118	3,540	3,136	2,044

Notes: Population numbers include non-resident workers. Data from the 2020 decennial census is the most recent census data. Population data for the island of Tinian was released in October 2021 (U.S. Census Bureau 2021), and census-tract level data on the island was released in July 2023 (U.S. Census Bureau 2023). The U.S. Census Bureau’s American Community Survey that updates census data on an annual basis is not conducted in the CNMI (U.S. Census Bureau 2022a).

¹ According to the U.S. Census Bureau, the COVID-19 pandemic had a minimal impact on data collection for the 2020 Census of the CNMI (U.S. Census Bureau 2022b).

Sources: Pacific Web 2025; U.S. Census Bureau 1970, 2000, 2010, 2020.

Tinian has experienced periods of substantial population growth and decline since 1970, mirroring the population trend in the CNMI. On Tinian, economic growth was primarily related to the casino industry, which, along with the garment industry in the CNMI, generally brought an influx of migrant non-resident workers. Notably, Tinian’s population increased by 48 percent corresponding with the opening of the Tinian Dynasty Hotel and Casino. The permanent closure of the resort in March 2016 (Saipan Tribune 2019) resulted in a subsequent population decline on Tinian. Typhoon Soudelor in 2015 was another contributing factor to Tinian’s population decline and falling populations in the CNMI (CNMI Report to the President on 902 Consultations 2017). The U.S. Census estimates that 2,044 residents were living on Tinian in 2020, concentrated in the developed southern end of the island in the village of San Jose.

According to the 2020 U.S. Census, the ethnicity on Tinian primarily falls into two categories: “Native Hawaiian and Other Pacific Islander” and “Asian.” An estimated 51 percent of the population is Native Hawaiian and Other Pacific Islander while 38 percent are Asian. The 2020 U.S. Census provided the following subcategories under the “Native Hawaiian and Other Pacific Islander” category: Carolinian, Chamorro, Chuukese, Kosraen, Marshallese, Palauan, Pohnpeian, Yapese, and Other. Subcategories under the “Asian” category include Bangladeshi, Chinese (except Taiwanese), Filipino, Japanese, Korean, Nepalese, Thai, and Other (U.S. Census Bureau 2020). Of the 1,033 Native Hawaiian and Other Pacific Islanders on Tinian, 937 are Chamorro (91 percent) (U.S. Census Bureau 2020).

In both the CNMI and in Tinian, an estimated 74 percent of the population speaks a language other than English at home. Prominent languages are Chamorro and Filipino. Carolinian and various

Asian languages are also spoken within the CNMI but not as frequently on Tinian. The average age in the CNMI and on Tinian is about 35 and 36, respectively. About 40 percent of the CNMI and nearly 46 percent of Tinian's population have a high school diploma. There are 14,282 households in the CNMI and 609 in Tinian, and the average household size in both the CNMI and on Tinian is three people. In addition, more than 30 percent of Tinian's residents have incomes below the annual statistical poverty thresholds.

No military personnel are permanently stationed on Tinian but in 2020, the U.S. Navy Seabees constructed a temporary Base Camp on the island, referred to as Camp Tinian. Typically, one Naval Mobile Construction Battalion is assigned to the island for a 6-month period at a time. Training events currently approved under the *Mariana Islands Training and Testing EIS/OEIS* occur periodically, some lasting up to four weeks at a time, and bringing approximately 1,000 service members temporarily to Tinian. Major training events include Valiant Shield and Cope North.

3.3.2 Economic Activity

As of 2016, the most recently published available data, reported the largest employment sectors on Tinian were public administration (371 with an average annual pay of \$31,678) and construction (120 with an average annual pay of \$31,283). In 2019, the average per capita income was \$21,657, based on the 980 workers employed on Tinian (U.S. Census Bureau 2020). The U.S. Air Force Divert project has been constructing new facilities north of TNI. Some employees are working on the project under the H1B Visa program. The U.S. Air Force construction contractor, Black Micro Corporation, identified an average annual salary of \$29,056 in 2023 under its H1B visa program (H1BGrader.com 2024, MyVisaJobs.com 2024).

Revenue generated by the CNMI government supports local public administration jobs on Tinian and the other islands within the CNMI. Various revenue sources fund local appropriations including direct taxation and fees charged for specific government services. In total, there are 11 categories of local taxation that generate revenue, with the primary sources of tax revenue being the Business Gross Revenue Tax on commercial operations and the Wage and Salary Tax paid by employees based on their annual total income and salary. As of 2020, CNMI government revenue was \$223.0 million, largely consisting of gross business receipts taxes (\$82.7 million), income taxes (\$57.5 million), and charges for services (\$25.6 million) (CNMI Office of the Public Auditor 2020). Trends in CNMI government revenue track with the population trends described in the previous section, with revenues declining since 2017 with the loss of garment manufacturing and declines in the casino industry. Natural disasters such as Super Typhoon Yutu in 2018 and the wide-spread impacts of the COVID-19 pandemic further constrained revenues.

Federal grants constitute a substantial share of overall expenditures, accounting for approximately 34 percent of the CNMI's gross domestic product in 2020. The decline in economic activity during the COVID-19 pandemic and the long-term economic impacts resulting from natural disasters highlight the importance of federal aid in the CNMI and its impact on the health of the island economy (CNMI Governor's Council of Economic Advisers 2021).

3.3.2.1 Local Economic Factors

Tinian's local economy is primarily driven by tourism and commercial agriculture, supported by the aircraft and vessels that transport people and goods to and from the island. The CNMI as a

region relies heavily on imported food resources and the local ranchers and fishers on Tinian have worked to develop sustainable sources of locally grown and sourced meat and fish, which has played a key role in reducing the CNMI's dependence on imported goods (Saipan Tribune 2024). Additionally, the community's subsistence practices offer additional security in the face of fluctuations in the global markets that affect both the availability and price of goods on the local economy.

Tourist arrivals to Tinian occur via air taxi operations at TNI, with passengers traveling from other island locations through Saipan. Star Marianas Air offers direct passenger and air cargo service between Tinian, Saipan, and Rota. The other available mode of goods transport to Tinian is by cargo vessels. Large cargo vessels arrive at the Port of Tinian's North Wharf to unload, and smaller non-commercial cargo service is provided at the small boat dock at the Port of Tinian's marina. In fiscal year 2021, a total of 427,348 revenue tons of cargo were delivered through CNMI seaports (Commonwealth Ports Authority 2021). This has been a 5 percent decrease in the movement of goods since 2020, which could be attributed to the decrease in shipping activity due to the global pandemic. The largest imports to CNMI are construction materials such as raw cement and petroleum products. The vast majority (approximately 80 percent) of exports from CNMI are the return of containers with wastepaper and packaging. Tinian has historically accounted for roughly 4 percent of CNMI's total trade volume (Commonwealth Ports Authority 2018).

Tourism

Tourism is the primary economic industry for CNMI and Tinian by not only increasing the exchange of goods but also increasing tax revenue through both local purchases and income tax. In 2022, Tinian had an estimated 26,058 visitors, which represents a recovery from a recent downturn in the tourism industry. Tourism peaked on Tinian in 2013, with approximately 58,000 annual visitors, but by 2015 that number had declined to 24,346 visitor arrivals, a more than 50 percent decrease (Marianas Visitors Authority 2015). Reasons for the decline include the exit of Japan and Korean Airlines from the CNMI market, the world-wide recession, and visa complications for Russian and Chinese visitors (Marianas Visitors Authority 2015). Tourism continued to decline as a result of Typhoon Soudelor in 2015, the closure of the Tinian Dynasty Hotel and Casino in 2016, Typhoon Yutu in late 2018, and the global pandemic in 2020.

In 2021, the most recent year island-specific data is available, Tinian reported 20,333 visitor arrivals, down over 16 percent from 2015 (Commonwealth Ports Authority 2023). In 2022, the Tourism Resumption Investment Plan was established by the Mariana Visitors Authority to provide subsidies to airlines, hotels, travel agencies, and related businesses to help restart the tourism industry. The recent gains in tourist arrivals are due in part to this effort, along with Marianas Visitors Authority promotions and infrastructure improvements. Visitor arrivals in Fiscal Year 2024 increased 22 percent compared to the previous year, but the total number of visitors is still 44 percent lower than Fiscal Year 2019, which is the last year direct flights from China were available (Marianas Visitors Authority 2024).

Tourism on Tinian includes activities such as visiting historic and cultural sites, exploring unique environmental features, shopping, eating at local restaurants, SCUBA diving, and relaxing on its many beaches. Although tourism occurs on the whole island, specific tourism resources found in the Military Lease Area include the 107th U.S. Naval Construction Monument, Japanese Village Ruins, the Old Japanese Communications Center, Mount Lasso, Shinto Shrine, Blowhole, runway

Able, the Atomic Bomb Loading Pits, Ushi Point, three dive locations, and six distinct beaches (Mariana Visitors Authority 2024).

Commercial Agriculture

Ranching

Thirty-two cattle ranching operations occupy approximately 2,442 acres of leased land on Tinian (Northern Marianas College Cooperative Research, Extension and Education Services 2023). There are no recent cattle population surveys. However, the Tinian Cattleman's Association provided an unofficial count of 1,500 total cattle after a wildfire occurred in 2018 (Tinian Cattleman's Association 2023). Cattle ranches are family-owned and operated. An estimated 75 percent of ranchers on the island utilize military land (Tinian Cattlemen's Association 2023). Although the land use permits between the CNMI government and the ranchers expired in 2016, the ranchers continue to graze cattle primarily on grassland in the Military Lease Area on a holdover basis. According to the Tinian Cattlemen's Association chairman, ranchers need a long-term lease agreement to qualify for U.S. Department of Agriculture Natural Resources Conservation Service grant funding. Without such funding, many ranchers will struggle to continue operations (Tinian Cattlemen's Association 2023).

Historically cattle ranching has been a subsistence activity on Tinian, but in April 2023, the Tinian Cattlemen's Association initiated the development of commercial beef production with the construction of a new slaughterhouse, the Tinian Kualidat Meat Processing Center. The facility, which was certified by the U.S. Department of Agriculture in the summer of 2023, can now process up to four cattle per week and is able to sell Tinian beef (Tinian Cattlemen's Association, Personal Communication, 2023).

Farming

There are two farms on Tinian that grow vegetables and leafy greens for two local markets, with no farm larger than 2 acres. Such small farms do not require commercial farm permits (Tinian Mayor's Office, Personal Communication, 2023).

Fishing and Aquaculture

As with other islands in the Pacific, fishing is an important practice for the people of Tinian and the CNMI as a whole. Beyond its importance as a commercial industry, fishing provides the community with food security and serves to strengthen social connections and propagate cultural traditions, which are discussed further below in this section. Fisheries in the CNMI have been small and fluid, with businesses that are highly sensitive to changes in the economy, regulations, population and other factors.

The majority of small-scale commercial fishing in the CNMI is located on Saipan, occurring within 20 miles of the island using 16-to-20-foot boats, typically on 1- to 2-day trips and that may conduct multiple fishing activities during a single trip (e.g., troll fishing, bottom fishing, spearfishing) to target various species like pelagic fish, bottomfish, and coral reef fish (Western Pacific Regional Fisheries Management Council 2023; Department of Fish and Wildlife 2024). However, the waters around the CNMI are extensive and contain abundant fishery resources, with substantial development potential for underutilized bottom fish and pelagic species (Western Pacific Regional Fishery Management Council 2024). The Western Pacific Regional Fishery Management Council and the National Marine Fisheries Service established an annual catch limit of 84,000 pounds and

an annual catch target of 78,000 pounds for each year between 2020–2023 for the 13 bottom fish management unit species, which include snappers, groupers, and jacks. The bottom fish fisheries are managed as a single multi-species stock complex that is assessed as one unit whether the fish are in territorial or federal waters (from the shoreline out to 3 nautical miles and from generally 3 to 200 nautical miles from shore, respectively) (86 FR 10526). The CNMI's catch in 2022 was 47,567 pounds and the three-year average catch was 55,916 pounds, both of which are well below the regulatory limits (Western Pacific Regional Fishery Management Council 2023).

Challenges for the commercial fishing industry in the CNMI include the conditions of the seaport and the relatively fixed or flat average commercial fish prices in the region against the increasing costs for fishing gear, tackle, boats and maintenance, and fuel. The seaport has limited space for the expansion of commercial fishing businesses and the pressures of fixed pricing create tight profit margins that leave the commercial fishing industry in the CNMI, including locally-owned fish markets and vendors, largely reliant on less expensive foreign labor. Natural disasters such as typhoons have also affected the industry by disrupting fishing activities due to sediments in nearshore waters after the event, gasoline rationing, and lack of available running water and electricity to prepare and store catch. Additionally, on Tinian, the lack of lighted channel markers to the Port of Tinian entrance constrains fishers from leaving early or returning to port when it is dark due to safety concerns (National Oceanic and Atmospheric Administration 2018).

According to a survey of 112 boat-based fishers across the CNMI, even operations with higher catch and profits were only able to derive around half of their personal income from selling their catch (Hospital and Beavers, 2014, as cited in National Oceanic and Atmospheric Administration 2018). Data on commercial fish sales is not collected for Tinian but, according to interviews, there are approximately 25 active fisherman who operate from Tinian and 20 who engage in cliff fishing, crabbing, and diving regularly. Commonly caught fishes include rudderfishes, unicornfishes, and drumfishes, along with harvesting shellfish and coconut crabs from the cliffs and nearshore rocky areas. While individuals may sell directly to local vendors, the catch is more commonly consumed or shared with family and friends and thus fishing has more cultural and subsistence value. Use of boats for pelagic, reef, and bottom fishing is less popular, due to the higher costs (e.g., fuel, insurance, maintenance) and seasonality considerations (e.g., sea state and safety considerations) and boats tend to stay closer to shore (within around 800 feet for bottom fishing and 300 feet for trolling). On Tinian, fishing is becoming more common on the weekends compared to the weekday, with most fishers going out approximately once a week (R. DeLa Cruz, Personal Communication, 2025; R. Sablan, Joint Region Marianas, Personal Communication, 2025). Fishing for reef fish using small boats beyond the reef is seasonal and dependent on weather conditions. Fishing on the windward side of Tinian usually occurs between the months of April and October (Trianni et. al. 2018; CNMI Division of Fish and Wildlife 2024).

Tinian also cultivates aquaculture, including fish nurseries and shrimp raceways (Northern Marianas College Cooperative Research, Extension and Education Services 2023). An Aquaculture Feasibility Study is underway to expand aquaculture in both CNMI and on Tinian. Preliminary plans include three offices, two laboratories, six raceways, a mesocosm tank field for fish nurseries, and a seawater well reservoir on Tinian (Northern Marianas College Cooperative Research, Extension and Education Services 2023).

Subsistence Activities

Recent impacts to Tinian's economy from disasters such as Super Typhoon Yutu and social and economic crises like the COVID-19 pandemic highlight the importance of subsistence activities practiced on the island. This type of activity serves to both supplement income and provide stability if imports become expensive or scarce due to global supply chain disruptions.

Subsistence activities practiced on Tinian include agriculture, gathering, hunting, fishing, and ranching when conducted for a family's own use or for income substitution (U.S. Census Bureau 2010a). Subsistence activity was not evaluated in the 2020 Census, but the 2010 Census identified 103 Tinian residents over the age of 16 who participated in subsistence activities (4.5 percent of the over-16 population) (U.S. Census Bureau 2010). Interviews conducted by the DON in 2016 for the *Tinian Food Survey Report and Socioeconomic Assessment* suggest that more people may be engaged in subsistence activities than indicated in the 2010 census data (DON 2018). Given the closure of the Tinian Dynasty Hotel and Casino and associated loss of jobs, the estimates provided in the structured interviews could more accurately reflect current levels of subsistence activities that occur on Tinian. These interview estimates suggest that as much as 53 percent of the average Tinian citizen's diet is locally sourced.

Agricultural products grown for subsistence on Tinian include taro, sweet potatoes, and melons. Other agricultural products harvested on Tinian include hot peppers (Donni Sali or Pika), yams, and breadfruit (DON 2018). While the slaughterhouse on Tinian was recently certified by the U.S. Department of Agriculture for commercial sale of beef, the 2016 Food Survey found that 82 percent of the interviewees indicated beef from local cattle was an important part of the community's diet, and they consumed more local than imported beef products. Individuals also raise pigs for their personal use and sell them to other local households as a subsistence practice (Tinian Cattlemen's Association 2023).

In addition to agriculture and ranching, throw net, spearfishing, rod and reel, and bottom fishing are important subsistence activities on Tinian throughout most of the year. (Tinian Department of Lands and Natural Resources 2023). In 1999, the National Marine Fisheries Service officially identified the CNMI, including Tinian, as a "fishing community," which is "a community...substantially dependent on, or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs" (National Oceanic and Atmospheric Administration 2012). According to the Tinian Department of Lands and Natural Resources and the Western Pacific Fishery Management Council, Tinian fishermen typically fish to obtain food for themselves and their family. The 2016 Food Survey found locally sourced fish and shellfish were a common and important part of the diet on Tinian, with interviewees estimating about 60 percent of the fish consumed on Tinian was locally caught. Other data indicates that 90 percent of the fish harvested on Tinian were consumed by the fishermen, family, and friends, with less than 10 percent sold commercially (DON 2018).

Locally hunted wildlife including turtledoves, coconut crabs, sea crabs, and goats and chickens, also supplement Tinian diets (Department of Land and Natural Resources, Personal Communication, 2023). While the entire island could be considered a hunting ground, most hunting occurs in the Military Lease Area. Medicinal plants are also gathered on Tinian and used for traditional healing. These plants are often gathered in the areas around North Field and along rocky coastlines and cliff lines (DON 2015).

According to the Northern Marianas College's Cooperative Research, Extension, and Education Services, access to subsistence agriculture, gathering, fishing, and hunting sites was substantially reduced due to Typhoon Yutu. Although cattle fencing, water catchment facilities, shade trees, and cattle corrals were damaged in the storm, no cattle were lost (Tinian Cattlemen's Association 2023). Many of the fruit trees, plants, and game were killed by the storm and by the ensuing drought and wildfires (DON 2018). The COVID-19 pandemic also impacted subsistence activities by restricting movement and travel and limiting the number of people who could gather (Northern Marianas College's Cooperative Research, Extension, and Education Services 2023). All these events had impacts on the availability of resources and the ability of residents to engage in subsistence activities.

3.3.2.2 Social Cohesion

Socioeconomics also considers social cohesion, which is the level of "relationship between individuals, groups, and organizations within a community" (Holdsworth and Hartman 2009). The Chamorro population and its historical reliance on agriculture, fishing, hunting, and gathering defines the Tinian community today and contributes to the community character and social cohesion of Tinian. In a community with strong social cohesion, several factors, such as high levels of social ties, interdependence, trust, and reciprocity, exist that bind people together within that community. The Chamorro concept of *inafa'maolek* is closely linked with the concept of community cohesion. *Inafa'maolek* is a core Chamorro value that continues to be passed down to each new generation and refers to the "interdependence within the kinship group," literally translated as "making it good for each other" or "getting along" (Cunningham 1992). In other words, society is based on good relationships and mutual respect. *Inafa'maolek* is grounded in familial relationships and reciprocal obligations between people in these relationships. Relationships tend to be guided by the age of the parties, with the older person owing the younger person responsibility and the younger owing the older deference.

The Carolinian (Rafaluwasch) population holds the concept of *tipiyeew* as the sentiment of social cohesion and a sense of belonging within the community. *Tipiyeew*, which translates to "to be decided, of one mind, to agree," represents a deeper connection and shared identity among community members. It fosters unity, cooperation, and a collective vision, serving as a guiding principle for decision-making and community engagement. Through *tipiyeew*, the Carolinian community nurtures a strong sense of unity, cultural preservation, and inclusive community dynamics (Kuehling 2012).

3.3.3 Public Services

3.3.3.1 Public Safety

As of 2021, the Tinian Department of Public Safety was staffed by 25 police officers (a ratio of 12 officers for every 1,000 residents) and 21 firefighters (a ratio of 10 firefighters per 1,000 residents) (CNMI Department of Public Safety 2022; CNMI Department of Fire Emergency Medical Services 2022). The Commonwealth Ports Authority also maintains firefighting capability at TNI as a requirement for airport operations. This capability is available to the Tinian Department of Public Safety in the event of an emergency. TNI has one firefighting vehicle and nine personnel. The personnel have dual roles as Aircraft Rescue Firefighters and Ports Police officers (Commonwealth Ports Authority 2023).

3.3.3.2 Public Health

There are two medical facilities on Tinian including the Tinian Healthcare Center and the Isla Community Health Clinic. The Tinian Healthcare Center, part of the Commonwealth Healthcare Corporation, is the island's primary health care facility and is located in San Jose Village. The facility was built in 1987 and has five holding beds and provides emergency services, an outpatient clinic, laboratory, x-ray, radiology, pharmacy, dentistry, and public health operations (Commonwealth Healthcare Corporation 2022).

In 2023 alone, the Tinian Healthcare Center and the Isla Community Health Clinic encountered 4,419 and 1,777 patients, respectively (Commonwealth Healthcare Corporation, 2023). Information provided by the Tinian Mayor's Office indicates that as of September 2023, there was one Physician's Assistant at the Tinian Healthcare Center and one Nurse Practitioner at the Isla Community Health Clinic (Tinian Mayor's Office, Personal Communication, 2023).

3.4 Biological Resources

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are referred to generally as vegetation, and animal species are referred to generally as wildlife, both of which include terrestrial and marine species. Habitat can be defined as the conditions present in an area that support plants and wildlife.

Biological resources are divided into five categories: (1) terrestrial vegetation, (2) terrestrial wildlife, (3) terrestrial special-status species¹, (4) marine communities, and (5) marine special-status species (including marine protected areas).

3.4.1 Terrestrial Vegetation

Terrestrial vegetation is defined as plant species or groups of plants (plant communities) that occur and interact with each other, animal populations, and the physical environment. Plants that are of cultural or societal importance on Tinian are also described in this section. The vegetation present in an area provides habitat that supports different wildlife species. The plant communities on Tinian and within the Military Lease Area are described according to plant associations and the dominant species.

The 12 plant communities that occur on Tinian are listed in Table 3.4-1 and are shown on Figure 3.4-1 and Figure 3.4-2. The six most prevalent plant communities on Tinian are described below. Definitions of all plant communities in Table 3.4-1 are provided in Appendix G.

Table 3.4-1 Plant Communities on Tinian and Within the Military Lease Area

<i>Plant Community</i>	<i>Acres</i>	<i>% of Total Land Cover on Tinian</i>	<i>Acres within the Military Lease Area</i>	<i>% of Total Land Cover within the Military Lease Area</i>
<i>Leucaena</i> Forest	8,283.20	33.1	5,750.40	37.6
Secondary Limestone Forest	6,206.86	24.8	4,098.10	26.7
Other Scrub/Grassland ¹	5,176.60	20.7	3,229.50	21.1
Developed	1,683.00	6.7	407.90	2.7
Limestone Native Forest	1,032.59	4.1	268.30	1.8

¹ When species are mentioned for the first time, they are listed using their common name followed by their scientific name in parentheses; only the common name is used afterwards. If there is no common name, only the scientific name is used. Appendix G identifies the Chamorro names for species, where applicable.

<i>Plant Community</i>	<i>Acres</i>	<i>% of Total Land Cover on Tinian</i>	<i>Acres within the Military Lease Area</i>	<i>% of Total Land Cover within the Military Lease Area</i>
<i>Casuarina</i> Forest	779.08	3.1	528.20	3.5
Scrub/Shrub ²	718.33	2.9	451.10	3.0
Limestone Coastal Scrub	614.22	2.5	339.20	2.2
Barren	353.31	1.4	123.00	0.8
Coconut Forest	106.84	0.4	50.80	0.3
Wetland ³	30.62	0.1	34.00	0.2
<i>Bambusa</i> Forest ⁴	15.56	0.1	11.80	0.1
Total	25,000.21	100.0	15,292.40	100.0

Legend: % = percent.

Notes: ¹ Common non-native species include several considered invasive (that is, species that cause significant ecological harm when introduced to a new environment) such as: lantana (*Lantana camara*), paper rose (*Operculina campanulata*), climbing hempweed (*Mikania scandens*), mission grass (*Pennisetum polystachion*), giant sensitive plant (*Mimosa diplotricha*), and the African tulip tree (*Spathodea campanulata*).

² Characterized by the predominance of low-stature woody vegetation that can occur as a mixture of native and non-native species.

³ The term “wetland” refers to the plant community and is not meant to infer a jurisdictional determination as defined under the Clean Water Act.

⁴ Non-native bamboo (*Bambusa vulgaris*).

Source: NAVFAC Pacific 2019.

Coconut Forest. This plant community is almost exclusively dominated by coconut palm (*Cocos nucifera*). Stands of this forest type can support a relatively diverse understory of mixed native and non-native shrubs, herbs, and/or ferns, or have minimal understory. Some of these stands may be remnants of previous coconut plantations while others may be the result of natural dispersion. Approximately one-third of the island’s coconut forests are located in five stands within the Military Lease Area.

Leucaena Forest. This plant community is dominated by tanger-tanger (*Leucaena leucocephala*) and typically occurs on limestone substrate where it can occur in pure stands (Amidon et al. 2017). In areas adjacent to native forests, tanger-tanger can be invasive, mixing with native woody species. *Leucaena* forests dominate much of the level and moderately sloping lowland habitat areas on Tinian, especially in the northern portions of the island within the Military Lease Area. While not considered a native plant community on Tinian, *Leucaena* forest does provide habitat for some native bird species, including species protected under the Migratory Bird Treaty Act.

Limestone Coastal Scrub. This plant community, also simply referred to as coastal scrub, is found primarily on limestone terraces and cliff edges (Amidon et al. 2017). Species include *Ficus* spp., bantigue (*Pemphis acidula*), and great woolly Malayan lilac (*Callicarpa candicans*).

Secondary Limestone Forest. This plant community consists of limestone forest habitat that has been significantly disturbed by clearing, invasive plants, and non-native animals (Amidon et al. 2017). Secondary limestone forest is often referred to as degraded forest and exhibits a mixture of non-native trees, shrubs, and dense herbaceous plants. This community provides habitat for federally listed and CNMI-listed plant species and native birds, including those protected under the Migratory Bird Treaty Act.



Figure 3.4-1 Plant Communities on Tinian (North)



Figure 3.4-2 Plant Communities on Tinian (South)

Limestone Native Forest. This plant community consists of relatively undisturbed forest that occurs on shallow limestone soils dominated by native tree and shrub species (Amidon et al. 2017). Forest clearings from ungulates (i.e., mammals with hooves) and other disturbances are absent or very limited. The term “limestone native forest” also describes areas that may have been cleared and have regrown with native tree and shrub species.

The total area of limestone native forest has been significantly reduced on Tinian due to past human activities and land uses, including widespread cultivation of non-native species (e.g., sugar cane), ground disturbance during World War II, introduction of non-native plants and animals, and grazing by non-native ungulates. Limestone native forest is important because it retains the functional ecological components that provide habitat for most of Tinian’s native species, including federally listed and CNMI-listed species, and migratory birds. The few areas of limestone native forest remaining on Tinian within the Military Lease Area occur along cliff lines near Mount Lasso, along cliff lines to the west and south of Unai Chiget, along the coast of Lamanibot Bay (known locally as Dump Coke), and above and to the south-southeast of Unai Masalok (Figure 3.4-1).

Wetland. These plant communities are areas of grasses, sedges, herbs, or woody species typically found in standing water or soils that are saturated for most of the year. Wetlands include marshes, swamps, bogs, and similar areas. See Section 3.14 Surface Waters and Wetlands for discussion of the jurisdictional status of these wetlands. There are two main types of wetland communities on Tinian:

- *Wetland Herbaceous*, dominated by herbaceous plants and, in most cases, dominated by only a few plant species. The most common herbaceous species found in this community is tall reed (*Phragmites karka*), which often forms a dense monoculture.
- *Wetland Shrub/Herb*, found in areas subject to permanent or periodic inundation or prolonged soil saturation. Wetland shrub/herb communities tend to be dominated by shrubs or a mixture of shrubs and herbs. They are located in low areas along coasts and streams, in depressions or in poorly drained volcanic soils, and in areas of fresh or brackish water.

Wetlands on Tinian provide habitat for the federally endangered Mariana common moorhen (*Gallinula chloropus guami*) and migratory birds. Wetland habitat occurs in three areas within the Military Lease Area: Lake Hagoi, Mahalang Complex, and Bateha. See Section 3.14 Surface Waters and Wetlands for discussion of the jurisdictional status of these wetlands. Lake Hagoi (Figure 3.4-1) is the only permanent wetland vegetative community within the Military Lease Area (NAVFAC Pacific 2013). The wetland consists of a band of tall reed and large patches of bulrush (*Schoenoplectus litoralis*) around the perimeter, and patches of giant swamp fern (*Acrostichum aureum*) and knotgrass (*Paspalum distichum*), all of which are native to Tinian (Raulerson 2006).

The Mahalang ephemeral wetland complex consists of at least 24 individual sites located on a plateau within the northern portion of the Military Lease Area, south of Lake Hagoi. These sites are located within a matrix of grasslands (herbaceous-scrub), *Leucaena*, and mixed secondary forest. A few sites contain water during the wet season, but all are dry during the dry season. The two largest sites are approximately 1.2 acres each (AECOS, Inc. and Wil Chee Planning, Inc. 2009). The majority of the sites are likely bomb craters from World War II. Invasive species including mission grass and various species of non-native weedy vines dominate the interior of the

craters. Other sites in the complex consist of shallow depressions with various weedy vines and herbs.

The Bateha ephemeral wetland site consists of two shallow depressions that contain water during the wet season. Each area is approximately 1 to 2 acres. The larger western site at Bateha is dominated by the non-native giant sensitive plant and contains the non-native shrub candle bush (*Senna alata*) along with other weedy species. Mission grass occurs along the perimeter. The eastern site is a deeper depression surrounded by ridges dominated by an overstory of non-native Formosan koa (*Acacia confusa*) and mission grass. Candle bush is dispersed throughout the northern and southern portions of the site.

Culturally Important Plants. Multiple plant species occurring throughout Tinian have served as important sources of food or medicine to the people of Tinian, both historically and currently. These culturally important plants on Tinian include wild yams (*Dioscorea villosa*), breadfruit (*Artocarpus altilis*), Donni Sali (*Capsicum chinense*), and medicinal plants including puntan talisai (*Terminalia catappa*), galak (*Asplenium nidus*), niyok (*Cocos nucifera*), and ahgao (*Premna obtusifolia*) and are fairly evenly distributed throughout the Military Lease Area.

3.4.2 Terrestrial Wildlife

The term wildlife is used to describe animals that are not assigned special status protection by law, and include birds, mammals, reptiles, amphibians, and invertebrates. Non-protected, native wildlife species on Tinian include five birds, seven reptiles, and an undefined number of invertebrates (DON 2023; Joint Region Marianas 2023). Special status species are described in Section 3.4.3.

Birds. The non-protected native bird species on Tinian include: the Micronesian myzomela (*Myzomela rubratra*), rufous fantail (*Rhipidura rufifrons uraniae*), bridled white-eye (*Zosterops conspicillatus saypani*), Micronesian starling (*Aplonis opaca guami*), and Tinian monarch (*Monarcha takatsukasae*) (U.S. Fish and Wildlife Service 2013).

The most abundant native bird species on Tinian are bridled white-eye, rufous fantail, and the Tinian monarch (Camp et al. 2009b, Camp et al. 2012; NAVFAC Pacific 2014; Spaulding et al. 2022). Analyses of population trends from 1982 to 2013 indicate increases in population densities for the Micronesian starling and rufous fantail and decreases in population densities for the Micronesian myzomela. Population densities have remained stable for the bridled white-eye and Tinian monarch (NAVFAC Pacific 2014; Spaulding et al. 2022). The five naturalized, non-native birds occurring on Tinian include red jungle fowl (*Gallus gallus*), rock dove (*Columba livia*), island collared dove (*Streptopelia bitorquata*), Eurasian tree sparrow (*Passer montanus*), and orange-cheeked waxbill (*Estrilda melpoda*). All five of these species are common and widespread on Tinian (DON 2023).

The Tinian monarch was previously listed as an endangered species in 1970 (35 FR 8491). In 1999, the U.S. and the CNMI dedicated approximately 970 acres of land for wildlife conservation for the Tinian monarch. In accordance with the conservation agreement, and as stated in the U.S. Fish and Wildlife Service Biological Opinion 1-2-98-F-07 issued to Federal Aviation Administration and Commonwealth Ports Authority for the expansion of West Tinian Airport. The military retained the right to use the Natural Resources Conservation Area for low impact, non-habitat-destructive military training. However, in 2004, the U.S. Fish and Wildlife Service

removed the Tinian monarch from the Federal List of Endangered and Threatened Wildlife (69 FR 56367). At the time, the U.S. Fish and Wildlife Service found that the Tinian monarch has continued to thrive despite historical and ongoing impacts to its habitat on Tinian (83 FR 65133).

Mammals. Non-native mammals include the black rat (*Rattus rattus diardii*), Polynesian rat (*Rattus exulans*), Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*), Asian house shrew (*Suncus murinus*), domestic cat (*Felis catus*), domestic dog (*Canis lupus familiaris*), goat (*Capra hircus*), cattle, pigs (*Sus scrofa*) and Philippine deer (*Rusa marianna*). Non-native rodents (rats, mice, and shrews) can have a profoundly negative effect on island populations of native birds, reptiles, and invertebrates (Doherty et al. 2016; Spatz et al. 2017). The dietary intake of rats also includes native plants, seeds, and fruit, leading high rodent densities to be correlated with negative changes in forest composition (Weiwei et al. 2009). High densities of black rats on Tinian, which are present in all plant communities in the Military Lease Area, pose a threat to flora and fauna, including Tinian's bird species (Wiewel et al. 2009; DON 2023, Leo and Wiewel 2013).

Feral domestic cats and dogs are common on Tinian and have been observed hunting in native forests at night (DON 2013a). Goats have been transported from Aguiguan to Tinian, and a coastal survey in October 2008 confirmed at least 20 goats at Puntan Kastiyu, south of the Military Lease Area (Kessler 2009). No goats have been observed in the Military Lease Area. Cattle and pigs occur on Tinian as domesticated livestock found penned or pastured on leased lands.

Reptiles and Amphibians. During surveys on Tinian in 2008, the U.S. Fish and Wildlife Service observed eight native terrestrial reptile species, including the mangrove monitor lizard (*Varanus indicus*), mourning gecko (*Lepidodactylus lugubris*), Micronesian gecko (*Perochirus ateles*), Indo-Pacific house gecko (*Hemidactylus granitic*), oceanic snake-eyed skink (*Cryptoblepharus poecilopleurus*), littoral skink (*Emoia atrocostata*), Pacific blue-tailed skink (*Emoia caeruleocauda*), and Brahminy blind snake (*Ramphotyphlops braminus*) (Rodda et al. 2009, Weijola et al. 2020). The mourning gecko was the most abundant lizard species in secondary limestone and limestone native forest habitats (Rodda et al. 2009).

Non-native reptiles include the oceanic gecko (*Gehyra oceanic*), mutilating gecko (*Gehyra mutilata*), curious skink (*Carlia fusca*), emerald skink (*Lamprolepis smaragdina*), and green anole (*Anolis carolinensis*). The marine toad (*Bufo marinus*) is the only amphibian that occurs on Tinian (Wiles et al. 1989; DON 2023).

Invertebrates. The coconut crab (*Birgus latro*), blue land crab (*Discoplax hirtipes*) and the brown land crab (*Cardisoma carnifex*) are regulated as native game species by the CNMI Department of Fish and Wildlife; a license is required for harvesting them during regulated hunting seasons (land crabs from April 1 to June 30; coconut crab from September 15 to November 15). Although the coconut crab occurs in limestone native forests, females regularly migrate to the ocean to spawn. Coconut crab densities on Tinian have been estimated at 2 crabs per acre in limestone native forest and 0.7 crab per acre in *Leucaena* forest (Vogt 2009). Land crabs are a common terrestrial burrowing crab found throughout the Indo-Pacific and are generally associated with wetland or coastal habitats on Tinian (DON 2023).

The mangrove crab (*Scylla serrata*), introduced as a potential food source, is the only non-native terrestrial crustacean on Tinian (Commander, U.S. Naval Forces Marianas 2004; NAVFAC Pacific and NAVFAC Marianas 2010; DON 2023).

Butterfly surveys were conducted on Tinian from June through October 2008 (Hawley and Castro 2009). Known host plants for several species were extensively monitored at four sites on the island, two of which are in the Military Lease Area. During these surveys, Hawley and Castro (2009) observed adults, caterpillars, and chrysalis of three non-protected species at a site in the Military Lease Area referred to as the Japanese Caves: blue moon butterfly (*Hypolimnys bolina*), guardian butterfly (*Hypolimnys anomala*), and the common evening brown (*Melanitis leda*).

The predatory New Guinea flatworm (*Platydemus manokwari*) was introduced to Tinian to help control the non-native giant African snail (*Achatina fulica*). The flatworm poses a serious threat to native tree snails, including the humped tree snail (Hopper and Smith 1992; NAVFAC Pacific 2014; U.S. Fish and Wildlife Service 2015).

Although the coconut rhinoceros beetle (*Oryctes rhinoceros*) is established on Guam and was discovered on Rota in October 2017, it has not yet been reported on Tinian (CNMI Department of Land and Natural Resources 2017). This invasive pest is a highly detrimental threat to coconut palms in the Marianas, and a monitoring program has been established on Tinian (CNMI Department of Land and Natural Resources 2017). Under this program, panel traps for the beetles were deployed on the North Field during training events between February 2020 and February 2023. Since then, panel traps have been deployed to approximately 40 locations throughout the Military Lease Area and are maintained as early detection tools.

3.4.3 Terrestrial Special Status Species

Special status species are those species listed as threatened or endangered under the Endangered Species Act (referred to as federally listed species), those designated by the CNMI Department of Lands and Natural Resources as threatened or endangered, and bird species protected under the Migratory Bird Treaty Act (referred to as migratory birds) that occur or have the potential to occur on Tinian.

3.4.3.1 Terrestrial Federally Listed and CNMI-listed Species

Table 3.4-2 describes the federally listed and CNMI-listed species known or having the potential to occur on Tinian. Figure 3.4-3 shows the locations of known occurrences of these species.

Birds. Two federally endangered bird species, the Mariana common moorhen and Micronesian megapode (*Megapodius laperouse*), occur within the Military Lease Area. The Mariana common moorhen relies on emergent vegetation of freshwater marshes, ponds, and placid rivers for breeding, foraging, and sheltering (U.S. Fish and Wildlife Service 1992; NAVFAC Pacific and NAVFAC Marianas 2010). Its preferred habitat includes freshwater lakes, marshes, and swamps. The U.S. Fish and Wildlife Service (1992) recovery plan for the Mariana common moorhen identifies Lake Hagoi within the northern portion of the Military Lease Area as primary habitat for the moorhen. Analysis of survey data collected between 1998 and 2014 suggest the moorhen population on Tinian has been stable to slightly increasing (Camp et al. 2014). The population estimate at Lake Hagoi in 2017 was less than 20 individuals (NAVFAC Marianas 2017). From 2018 to September 2024, up to 54 moorhens potentially occurred throughout the year at Lake Hagoi and at the seasonal Bateha and Mahalang ephemeral wetlands when water was present, based on point-count survey data (DON 2023, NAVFAC Pacific 2024). However, these data were based only on acoustic counts and reflect at least some degree of replication.

Surveys in the Military Lease Area have shown the Micronesian megapode occurs only occasionally at very low numbers. In the years that megapodes were detected (seen in 2001, 2004, 2005 and 2013; and one identified by sound in 2009), they were recorded in the Mount Lasso area, south of Lake Hagoi, and a small area of native forest adjacent to Cross Island Road in the southern portion of the Natural Resources Conservation Area (Figure 3.4-3) (Krueger and O’Daniel 1999; Witteman 2001; Vogt 2006; NAVFAC Pacific and NAVFAC Marianas 2010; DON 2012, 2014b, 2023). The infrequent sightings of the species on Tinian is likely the result of movement of these transient birds from Aguiguan or Saipan as no resident breeding population has been identified on Tinian (DON 2013a).

Table 3.4-2 Occurrence of Terrestrial Federally Listed and CNMI-listed Species on Tinian

<i>Common Name/ Scientific Name</i>	<i>Federal Status</i>	<i>CNMI Status</i>	<i>Habitat</i>	<i>Occurrence</i>
Birds				
Mariana common moorhen/ <i>Gallinula chloropus guami</i>	E	E/T	Freshwater wetlands.	Monthly counts of moorhen at Lake Hagoi between 2002 and 2012 resulted in annual means of between 7 and 17 birds. Moorhen population estimates at Lake Hagoi between 2015 and 2017 averaged less than 20 birds. Similar numbers were estimated between 2018 through September 2024.
Micronesian megapode/ <i>Megapodius laperouse</i> ⁴	E	E/T	Limestone forest and coconut forest.	Multiple reports of individual birds seen since the 1980s, but none detected by sight or sound since 2014.
Mammals				
Mariana fruit bat/ <i>Pteropus mariannus mariannus</i>	T	E/T	Limestone forest, coastal forest, and coconut forest.	Occasional sightings by residents; four surveys were conducted between 2000 and 2008, with five fruit bats observed in 2005. A colony consisting of up to approximately 100 individuals was discovered in the limestone native forest region north of Mount Lasso in 2023.
Reptiles				
Green turtle/ <i>Chelonia mydas</i> ^{1,3}	E	E/T	Suitable beaches for basking and nesting.	Suitable nesting beaches occur at Unai Chulu, Unai Babui, Unai Lam Lam, Unai Chiget, Unai Dankulo, and Unai Masalok. Twenty-three nests were observed in the Military Lease Area in 2023 (at Unai Dankulo and Unai Masalok).
Hawksbill turtle/ <i>Eretmochelys imbricata</i> ^{3,4}	E	E/T	Suitable beaches for basking and nesting.	During monthly nesting surveys from 1999–present, one nest observed at Unai Dankulo in 2010.
Micronesian gecko/ <i>Perochirus ateles</i>	-	E/T	Forested areas.	Reported at Mount Lasso and Carolinas Plateau in 2008.
Invertebrates				

<i>Common Name/ Scientific Name</i>	<i>Federal Status</i>	<i>CNMI Status</i>	<i>Habitat</i>	<i>Occurrence</i>
Humped tree snail/ <i>Partula gibba</i> ⁴	E	-	Intact limestone forest.	Humped tree snail surveys have documented two discrete populations within limestone native forest along Lamanibot Bay (Dump Coke).
Plants				
Fadang/ <i>Cycas micronesica</i> ²	T ²	-	Forest and savanna ecosystems.	<i>C. micronesica</i> is not known to historically occur on Tinian. In 2008, the DON planted 1,000 cycad seedlings in native forest near Mount Lasso. Cycads have also been planted at memorials, shrines, and World War II landmarks and individual cycads are found within the village of San Jose.
Ufa-halomtano/ <i>Heritiera longipetiolata</i>	E	-	Moist forest on limestone cliffs and in coastal sites with windy conditions.	Observed during 2018 and 2023 surveys within the Military Lease Area at Unai Masalok on the east coast and south of the Military Lease Area along the eastern/southeastern coast.
No common name/ <i>Dendrobium guamense</i>	T	-	Grows on tree trunks and branches in native forest.	Observed during 2016, 2017, 2018 and 2023 surveys on and near Mount Lasso.

Legend: - = not listed; E = endangered; ESA = Endangered Species Act; T = threatened; E/T = the CNMI Administrative Code does not specify whether a species is threatened or endangered: all species are considered threatened *and* endangered.

Notes: ¹ Central West Pacific Distinct Population Segment.

² Threatened, but no federal status on Tinian. Individuals established on Tinian by the DON via outplanting and residents via seeds from Rota are not included in the species' range in U.S. Fish and Wildlife Service determinations (2014, 2015). The species will not be consulted on under the Endangered Species Act.

³ Land occurrence and nesting is under jurisdiction of U.S. Fish and Wildlife Service and aquatic occurrence is under jurisdiction of National Marine Fisheries Service. Marine occurrence of these Endangered Species Act-listed turtle species are described under Marine Special Status Species.

⁴ Due to a lack of presence within the Proposed Action areas, this species will not be analyzed in the U.S. Fish and Wildlife Service Section 7 consultation under the Endangered Species Act.

Sources: Berger et al. 2005; Vogt 2008a, 2008b; Brooke 2009; Kessler and Amidon 2009; Marshall et al. 2009; DON 2011, 2012, 2013a, 2020, 2023; NAVFAC Pacific and NAVFAC Marianas 2010; Summers et al. 2018; U.S. Fish and Wildlife Service 2012a, 2014, 2015; Holland and Sischo 2013; Liske-Clark 2015; NAVFAC Pacific 2014, 2014, 2017, 2018, 2019; NAVFAC Marianas 2019, Joint Region Marianas 2023, Cardno Government Services – AECOM Pacific Joint Venture 2023.

Mammals. Tinian once readily supported colonies of Mariana fruit bats (*Pteropus mariannus mariannus*) but following native forest clearing during Spanish colonial times, sugarcane production under the Japanese administration and World War II, only 5 percent of their native forest habitat remained on the island, resulting in the virtual absence of Mariana fruit bats on Tinian. Today, there are approximately 8,140.9 acres of suitable foraging and roosting habitat (i.e., limestone native forest, secondary limestone forest, *Casuarina* Forest, and coconut forest) remaining for fruit bats on the island, 61 percent (4,957.2 acres) of which occurs in the Military Lease Area. Habitat loss and poaching are the primary reasons for the decline of Mariana fruit bats on Tinian.

During surveys for the then-proposed USAGM site in 1995, locals reported that fruit bats were known to roost in the southern portion of what would become the proposed Base Camp footprint (Voice of America 1995). A fruit bat colony consisting of up to approximately 100 individuals was discovered in the limestone native forest region north of Mount Lasso in 2023 (CNMI Department of Lands and Natural Resources 2024, Mildenstein 2024). Prior to this, no fruit bat colony was known to occur on Tinian. Habitat loss and poaching are the primary reasons for the near absence of Mariana fruit bats on Tinian (Wiles and Johnson 2004). Fruit bats may fly between islands in the southern Mariana Islands, including Aguiguan and Tinian (Mildenstein and Mills 2013; DON 2023).

Reptiles. Both the Central West Pacific distinct population segment of green turtle (*Chelonia mydas*) and the hawksbill turtle (*Eretmochelys imbricata*) have been documented nesting on Tinian beaches (Joint Region Marianas 2023).

Abundance and density of green turtle nesting is highest along Tinian's relatively uninhabited east coast (Kolinski 2001), as nesting green turtles require deep sand beaches with open ocean exposure and minimal disturbance (NAVFAC Pacific and NAVFAC Marianas 2010; DON 2012). Of the 13 distinct beaches or beach complexes on Tinian that could support nesting, 10 are within the Military Lease Area, 6 of which have continually been surveyed once a month since 1998: Unai Chulu, Unai Lam Lam, Unai Chiget, Unai Dankulo, Unai Masalok, and Unai Babui. After 21 years (1999 to 2019) of monthly beach surveys, approximately 55 percent of all green turtle activity on the six regularly surveyed Military Lease Area beaches was observed on the Unai Dankulo pocket beaches (DON 2020). In 2023, 17 nests occurred on Unai Dankulo and another 5 nests were documented on Unai Masalok (NAVFAC Marianas 2024). On July 19, 2023, the U.S. Fish and Wildlife Service issued a proposed rule for the designation of 6 acres of terrestrial critical habitat for the green turtle along the southwest coast of Tinian (88 FR 46376), none of which occurs within the Military Lease Area (Figure 3.4-3). Furthermore, section 4(a)(3)(B)(i) of the Endangered Species Act designates that areas owned or controlled by the DoD are exempt from critical habitat designation if an Integrated Natural Resources Management Plan is in place that provides a benefit to the species. Joint Region Marianas completed an Integrated Natural Resources Management Plan in 2019. Therefore, proposed critical habitat for the green turtle is not discussed further in this Revised Draft EIS.

Hawksbill turtles will nest on small pocket beaches and, because of their small body size and greater agility, hawksbill turtles can traverse fringing reefs that limit access to other sea turtle species (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1998). During monthly surveys from 1998 to 2017, only a single hawksbill turtle nest was documented at Unai Dankulo in 2010 (DON 2020). These monthly surveys are ongoing.

The Micronesian gecko (*Perochirus ateles*) is native to Micronesia and is the only CNMI-listed threatened/endangered terrestrial reptile in the Mariana archipelago. The species has never been abundant on Tinian and was believed extirpated on the island after 1946 (Rodda et al. 2009) until it was collected in southern Tinian in August 2003, was sighted in 2007 near Mount Lasso, and was collected again in limestone native forest on Mount Lasso in 2008, suggesting it may occur at very low densities (Rodda et al. 2009; NAVFAC Pacific and NAVFAC Marianas 2010). No further surveys have been conducted for the species on Tinian.

Invertebrates. The humped tree snail was historically present on Tinian but was thought to be extirpated from the island until a June 2013 DON survey documented two discrete populations of the species within limestone native forest along Lamanibot Bay (known locally as Dump Coke). A total of 92 individuals were counted between the two sites, including adults, subadults, and juveniles (NAVFAC Pacific and NAVFAC Marianas 2010; NAVFAC Pacific 2014). Bleached humped tree snail shells were also observed on the ground in limestone native forests in the vicinity of Unai Chiget, south of Lake Hagoi, the Mount Lasso area, and Unai Masalok.

A 2019 survey conducted in the southern portion of Lamanibot Bay to locate these two humped tree snail populations post-Typhoon Yutu (NAVFAC Pacific 2019) found only old shells of humped tree snails at both locations. No living tree snails were observed (NAVFAC Pacific 2019); nor were any living humped tree snails observed during 2023 surveys for federally listed species, with only bleached, weathered shells discovered in the Mount Lasso region (Figure 3.4-3).

Plants. *Cycas micronesica* is not known to historically occur on Tinian. The cycads on Tinian are the result of a 2007 Joint Region Marianas project to collect cycad germplasm from geographically and genetically diverse plants on Guam and plant saplings on Tinian to ensure a broad genetic representation of Guam's cycads in a living seed bank (DON 2023). The collection has been and continues to be actively managed. In addition, approximately 50 cycads were planted by the Tinian Mayor's office in the early 2000s, at numerous memorials, shrines, and World War II landmarks (e.g., North Field historic landmark, Chulu roundabout) within the Military Lease Area, and at other locations in the south of Tinian (DON 2016). Tinian residents have also brought seeds from Rota and individual cycads are found within the village of San Jose. Because the individuals on Tinian were artificially planted outside of their natural range, they do not maintain a federal protection status in Tinian. No training events or construction would occur where these individuals have been planted on Tinian. Therefore, this species is not discussed further in this Revised EIS.

Heritiera longipetiolata is an endangered tree species reported from Guam, Saipan, and Tinian and is known outside the Marianas only in Pohnpei (U.S. Fish and Wildlife Service 2015, Raulerson 2006, Costion and Lorence 2012). Within the Military Lease Area, *H. longipetiolata* has been found in coastal forests near Unai Masalok on the east coast (NAVFAC Pacific 2017a), along the Lamanibot Bay (Dump Coke) escarpment (Hawaiian Agronomics International, Inc. 1985; DON 2016), and in limestone native forest between Puntan Barangka and Puntan Kastiyu (NAVFAC Pacific 2014; U.S. Fish and Wildlife Service 2015). During the 2023 surveys, known *H. longipetiolata* groves were revisited and mapped in the Unai Masalok region. One new grove was also discovered south of Unai Chiget. In total, 290 individuals (250 mature and 40 seedling/sapling) were mapped within 12 distinct groves in 2023 (Figure 3.4-3), all of which appeared to be vigorous and healthy.

Dendrobium guamense is a threatened orchid that grows on tree trunks and branches in forest habitats. During the 2023 survey efforts, 23 occurrences of *D. guamense* were recorded, totaling 208 individuals. These ranged from individual plants to localized populations of up to 34 individuals. The majority of these were found growing on dead and/ or downed trees and branches, all within the Mount Lasso region (Figure 3.4-3). Dead or downed trees were most likely the result of Typhoon Yutu in 2018.



Figure 3.4-3 Occurrences of Federally Listed and CNMI-listed Species on Tinian

3.4.3.2 Migratory Birds

Of 64 species of birds documented on Tinian, 55 are currently protected under the Migratory Bird Treaty Act (DON 2023). The 13 Migratory Bird Treaty Act-protected birds that are most likely to be exposed to project activities are listed in Table 3.4-3. A list of all 64 Migratory Bird Treaty Act-protected bird species is provided in Appendix G.

Table 3.4-3 Migratory Bird Treaty Act Bird Species Documented on Tinian Potentially Affected by the Proposed Action

<i>Common Name</i>	<i>Scientific Name</i>
black noddy	<i>Anous minutus</i>
brown booby	<i>Sula leucogaster</i>
brown noddy	<i>Anous stolidus</i>
Eastern cattle egret	<i>Bubulcus coromandus</i>
Mariana fruit dove	<i>Ptilinopus roseicapilla</i>
Mariana kingfisher	<i>Todiramphus albicilla</i>
Pacific golden plover	<i>Pluvialis fulva</i>
Pacific reef heron	<i>Egretta sacra</i>
Ruddy turnstone	<i>Arenaria interpres</i>
White tern	<i>Gygis alba</i>
White-tailed tropicbird	<i>Phaethon lepturus</i>
white-throated ground-dove	<i>Gallicolumba xanthonura</i>
yellow bittern	<i>Ixobrychus sinensis</i>

Sources: Reichel and Glass 1991; Stinson 1994; U.S. Fish and Wildlife Service 1992, 1998, 2013; Vogt and Williams 2004; Kessler 2009; DON 2013a, 2023; NAVFAC Marianas 2017a; NAVFAC Pacific 2017b; recent records retrieved from eBird (Sullivan et al. 2009); Taxonomy follows Gill and Donsker 2018.

The gray-tailed tattler (*Tringa brevipes*), wandering tattler (*Tringa incana*), Pacific reef heron (*Egretta sacra*), black noddy (*Anous minutus*), brown noddy (*Anous stolidus*), brown booby (*Sula leucogaster*), yellow bittern (*Ixobrychus sinensis*) and white tern (*Gygis alba*) commonly occur in and utilize the shoreline areas of the Military Lease Area (Kessler 2009; NAVFAC Pacific 2017b).

Three native species of Migratory Bird Treaty Act-protected land birds are known to occur on Tinian: Mariana kingfisher (*Todiramphus albicilla*), Mariana fruit dove (*Ptilinopus roseicapilla*), and white-throated ground-dove (*Gallicolumba xanthonura*) (Kessler 2009; NAVFAC Pacific 2017b).

The population of Mariana kingfishers has varied considerably since surveys began in 1982. In terms of abundance by habitat type, there were decreases from 2008 to 2013 in limestone native forest, secondary forest, and *Leucaena* forest habitats, with the greatest decrease in the latter at 83 percent (NAVFAC Pacific 2014). However, the trend for Mariana kingfisher abundance and density since 1982 is increasing (NAVFAC Pacific 2014; Spaulding et al. 2022).

The population of Mariana fruit doves has varied considerably since surveys began in 1982. There was a notable decrease from 2008 to 2013 in both herbaceous-scrub and *Leucaena* forest habitats and a slight increase in limestone native forest populations (NAVFAC Pacific 2014). The trend for Mariana fruit dove abundance since 1982 is increasing (NAVFAC Pacific 2014; Spaulding et

al. 2022). This conclusion is further supported by 1999 to 2015 breeding bird survey data from the CNMI Department of Fish and Wildlife (2015), which showed an increasing or stable fruit dove population on Tinian.

Abundance estimates for white-throated ground-doves have varied greatly, but the trend for both abundance and density of the species has increased since 1982 (NAVFAC Pacific 2014; Spaulding et al. 2022).

3.4.4 Marine Communities

Marine biological resources include those marine species and habitats that could be affected by training and construction. Marine communities that may occur in the marine environment surrounding Tinian include aquatic vegetation and marine invertebrates, fish, sea turtles, and marine mammals. Marine mammals, sea turtles, and some fish species are discussed under Marine Special Status Species (see Section 3.4.5). This section describes existing environmental conditions for marine communities potentially affected by the Proposed Action described in Sections 2.2 and 2.3.

3.4.4.1 Aquatic Vegetation and Marine Invertebrates

Vegetation communities along the Tinian shoreline include seagrass beds, coastal strand, and algae. There are no mangroves present on the island; instead, a vegetation type referred to as coastal strand is prevalent and is made up of flowering plants, vines, and salt tolerant grasses and can be present along the coasts and beaches (Plentovich 2020). Common plant species found in coastal strand are love vine (*Cassytha filiformis*), velvet leaf (*Heliotropium foertherianum*), sea-hibiscus (*Hibiscus tiliaceus*), bunchgrass (*Lepturus repens*), beach pea (*Vigna marina*), rosewood (*Thespesia populnea*), and seashore rush grass (*Sporobolus virginicus*), among other species.

Algae is an important vegetation type present in the nearshore waters of Tinian. Algal areas tend to be near or on reef habitats and support a high diversity of fish and invertebrates (DON 2015). Macroalgae, microalgae, coralline/red algae and turf algae are all present in the nearshore waters. There are 109 species of red algae, 31 species of brown algae and 71 species of green algae present in the waters of CNMI. Although there are no known surveys of algae species for Tinian, they are assumed to be ubiquitous in the CNMI and therefore present in the study area (NAVFAC 2022).

Tinian is surrounded by a shore-attached fringing reef covering approximately 9 square miles. Tinian has some of the oldest and most developed reefs of CNMI (National Oceanic and Atmospheric Administration 2018). There are seven defined reef flats of Tinian: Unai Chulu, Unai Babui, Unai Dankulo, Unai Masalok, Unai Barcinas, Unai Leprosarium, and Taga Beach (DON 2015).

Though macroinvertebrates are ecologically important species within CNMI ecosystems, much of the reef structure surrounding Tinian is poor habitat for other species of invertebrates (National Oceanic and Atmospheric Administration 2018). Recent studies by Couch et al. in 2023 show an overall decline in the population of invertebrates around Tinian and the rest of the Mariana Islands. By analyzing factors such as heat stress, human density, and habitat loss, clear correlations can be seen between an increase in these factors and a decrease in benthic populations over time. Abundance of giant clams, sea cucumbers, and sea urchins from surveys conducted around Tinian during the three Mariana Archipelago Reef Assessment and Monitoring Program survey years was

also low relative to the rest of the Mariana Archipelago (Waddell and Clarke 2008; Couch et al. 2023).

3.4.4.2 Fish

In 2011, a rudimentary survey of the fish population in the Tinian Marine Reserve recorded nine common families consisting of *Acanthurids*, *Chaetodontids*, *Scarids*, *Serranids*, *Pomacentrids*, *Laridae*, *Ballistae*, *Lethrinids*, and *Lutjanids* (Plass-Johnson 2011).

The most recent site-specific surveys of the fish population in the study areas were conducted for the Mariana Archipelago Reef Assessment and Monitoring Program in 2023. Overall, this project combined different data streams, covered a wide spatiotemporal scale, and employed a spatial downscaling approach to unveil patterns of resilience at management-relevant scales which were otherwise masked or undetected when investigating trends at island or regional scale (Gajdzik et al. 2023). Species richness, with a range of 24 to 37 species per 100 square meters, was broadly similar to data recorded in 2003. Damselfishes, most of them juveniles, comprised the most abundant family with three species that were particularly common: princess damsel (*Pomacentrus vaiuli*), jewel damsel (*Plectroglyphidodon lacrymatus*), and midget chromis (*Chromis acares*). Wrasses and surgeonfishes were also common. Total fish biomass was moderately low at the Rapid Ecological Assessment sites surveyed at Tinian with a mean of 3.85 kilograms per 100 square meters across the three survey years for Mariana Archipelago Reef Assessment and Monitoring Program, and according to Gajdzik's research, fish biomass on Tinian was the lowest of all the previous years of data. Across all years combined, the lowest fish biomass was observed at Tinian (NAVFAC 2022; Gajdzik et al. 2023).

3.4.5 Marine Special Status Species

Marine special status species include marine mammals protected under the Marine Mammal Protection Act, Endangered Species Act-listed and CNMI-listed special status species, marine protected areas, and essential fish habitat, as regulated under the Magnuson-Stevens Fishery Conservation and Management Act.

3.4.5.1 Marine Mammals

Several species of marine mammals are known to occur or potentially occur in the waters around Tinian. Examples would be the photo-documentation sightings of short-finned pilot whales (*Globicephala macrorhynchus*) and false killer whales (*Pseudorca crassidens*) offshore of Tinian and humpback whales (*Megaptera novaeangliae*) offshore of Saipan.

All species of marine mammal are protected by the Marine Mammal Protection Act, and some are also listed and protected under the Endangered Species Act. Non-Endangered Species include common minke whale (*Balaenoptera acutorostrata*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), melon-headed whale (*Peponocephala electra*), bottlenose dolphin (*Tursiops aduncus*), pantropical spotted dolphin (*Stenella attenuata*), spinner dolphin (*Stenella longirostris*), Blainville's beaked whale (*Mesoplodon densirostris*), and Cuvier's beaked whale (*Ziphius cavirostris*) (NAVFAC 2022).

"Species of Greatest Conservation Need" are those animal species or groups of particular importance to the people of the CNMI for biological, cultural, or economic reasons. All species first have to meet the following preliminary criteria before further consideration as a Species of Greatest Conservation Need:

- Animal species or groups only (any species that is Kingdom Animalia)
- Native species only
- “Manageable” species only (potential actions that could reasonably be expected to produce measurable population-level benefits for the species can be identified)
- Breeding species only

Table 3.4-4 provides a list of marine special status species that have been known to occur around Tinian. The species listed in this table include all federally listed and CNMI-listed species that could occur in the marine environment surrounding Tinian. This table represents the full range of possible occurrences based on habitat suitability and available documentation; however, it does not indicate confirmed or likely presence for all species. Inclusion of a species in this table should not be interpreted as evidence of regular or expected presence within the project area.

Table 3.4-4 Occurrence of Federally Listed and CNMI-listed Marine Species on and Around Tinian

<i>Common Name</i>	<i>Habitat</i>	<i>Presence around Tinian</i>	<i>ESA Status</i>	<i>CNMI Status</i>
Invertebrates				
Smooth Giant Clam/ <i>Tridacna derasa</i>	Reefs or other coastal areas (ocean surface to less than 20 m)	Occasionally present near Puntan Diablo area	Proposed Endangered	Species of Greatest Conservation Need
Fluted Giant Clam/ <i>Tridacna squamosa</i>	Reefs or other coastal areas (ocean surface to less than 20 m)	Occasionally present near Puntan Diablo area	Proposed Threatened	Species of Greatest Conservation Need
True Giant Clam/ <i>Tridacna gigas</i>	Reefs or other coastal areas (ocean surface to less than 20 m)	Occasionally present near Puntan Diablo area	Proposed Endangered	Species of Greatest Conservation Need
Small Giant Clam/ <i>Tridacna maxima</i>	Shallow waters of coral reefs and atoll lagoons	Occasionally present near Puntan Diablo area	Proposed Threatened	Species of Greatest Conservation Need
Giant Horse's Hoof Clam/ <i>Hippopus hippopus</i>	Reefs or other coastal areas from ocean surface to depths of less than 20 m	Could be present along Tinian's shoreline or in areas where coral reefs are abundant	Proposed Threatened	Species of Greatest Conservation Need
Triton's trumpet shell/ <i>Charonia tritonis</i>	Temperate and tropical waters worldwide in coral rich habitats	Could be present where coral reefs are abundant, in waters of about 75 m deep	None	Species of Greatest Conservation Need
Horned helmet/ <i>Cassis cornuta</i>	Found on sand and coral rubble, often around reefs	Could occur near Unai Chulu	None	Species of Greatest Conservation Need
Common spider conch/ <i>Lambis lambis</i>	Indo-West Pacific; reef flats and shallow water coral-rubble bottoms	Rare	None	Species of Greatest Conservation Need
Silver-mouthed turban snail/ <i>Turbo argyrostomus</i>	Tropical Indo-Pacific on hard substrate and coral reefs	Could occur in suitable reef habitats or along Tinian's eastern coast	None	Species of Greatest Conservation Need
Tapestry turban/ <i>Turbo spp.</i>	Tropical Indo-Pacific; intertidal and subtidal zones	Could occur along the west side of Tinian and southern tip, commonly observed in exposed areas of coral reefs	None	Species of Greatest Conservation Need
Rough turban/ <i>Turbo spp.</i>	Tropical Indo-Pacific; exposed areas on coral reefs	Could occur along the west side of Tinian and southern tip, commonly observed in exposed areas of coral reefs	None	Species of Greatest Conservation Need
Branched murex/ <i>Chicoreus ramosus</i>	Sandy and rubble bottoms near coral reefs; Indo-West Pacific	Could occur near Unai Chulu	None	Species of Greatest Conservation Need

<i>Common Name</i>	<i>Habitat</i>	<i>Presence around Tinian</i>	<i>ESA Status</i>	<i>CNMI Status</i>
Collector urchin/ <i>Tripneustes gratilla</i>	Coral reefs and seagrass beds; warm shallow waters of the Indo-Pacific	Could occur near Unai Chiget and Unai Masalok	None	Species of Greatest Conservation Need
Longlegged spiny lobster/ <i>Panulirus spp.</i>	Rocky and coral reefs, usually depths less than 18 m	Could occur where coral reefs are prevalent and along Tinian's eastern coast	None	Species of Greatest Conservation Need
Pronghorn spiny lobster/ <i>Panulirus spp.</i>	Rocky and coral reefs, usually depths less than 18 m; tropical Indo-Pacific	Could occur where coral reefs are prevalent and along the west and southern tip of Tinian and Unai Dankulo	None	Species of Greatest Conservation Need
Painted spiny lobster/ <i>Panulirus spp.</i>	Rocky and coral reefs, usually depths less than 18 m; tropical Indo-Pacific	Could occur where coral reefs are prevalent and along the west and southern tip of Tinian and Unai Dankulo	None	Species of Greatest Conservation Need
Pectinate venus/ <i>Gafrarium pectinatum</i>	Sand, mud, and seagrass beds; warm tropical and subtropical water	Could occur near Unai	None	Species of Greatest Conservation Need
Day octopus/ <i>Octopus cyanea</i>	Coral reefs, rocky substrates, seagrass beds; Indo-Pacific	Has been observed at Unai Babui, Unai Chulu, Lamanibot Bay, and Puntan Diablo	None	Species of Greatest Conservation Need
Corals				
Staghorn corals/ <i>Acropora globiceps</i>	Near reefs within depths of 20 m from ocean surface in clear, non-turbid environments	Present along west shoreline near Lamanibot Bay, south end, east shoreline until Masalok Beach Rd, and Unai Dankulo	Threatened	Species of Greatest Conservation Need
Staghorn corals/ <i>Acropora retusa</i>	Near reefs within depths of 20 m from ocean surface in clear, non-turbid environments	Present along west shoreline near Lamanibot Bay, south end, east shoreline until Masalok Beach Rd, and Unai Dankulo	Threatened	Species of Greatest Conservation Need
Staghorn corals/ <i>Acropora speciosa</i>	Near reefs within depths of 20 m from ocean surface in clear, non-turbid environments	Present along west shoreline near Lamanibot Bay, south end, east shoreline until Masalok Beach Rd, and Unai Dankulo	Threatened	Species of Greatest Conservation Need

<i>Common Name</i>	<i>Habitat</i>	<i>Presence around Tinian</i>	<i>ESA Status</i>	<i>CNMI Status</i>
Stony corals/ <i>Fimbriaphyllia paradivisa</i>	Found in low light environments protected from wave action	Present along west shoreline near Lamanibot Bay, south end, east shoreline until Masalok Beach Rd, and Unai Dankulo	Threatened	Species of Greatest Conservation Need
<i>Isopora crateriformis</i>	On shallow forereefs or backreef areas with strong wave action	Present along west shoreline near Lamanibot Bay, south end, east shoreline until Masalok Beach Rd, and Unai Dankulo	Threatened	Species of Greatest Conservation Need
<i>Pocillopora meandrina</i>	Shallow reefs exposed to strong wave action	Present along west shoreline near Lamanibot Bay, south end, east shoreline until Masalok Beach Rd, and Unai Dankulo	None	Species of Greatest Conservation Need
Fishes				
Bump head or Napoleon wrasse/ <i>Cheilinus undulatus</i>	Steep outer reef slopes; warm waters of Pacific and Indian oceans	Puntan Diablo and Port of Tinian	None	Species of Greatest Conservation Need
Steephead parrotfish/ <i>Chlorurus microrhinos</i>	Inshore reefs, ocean reef fronts between 2 to 50 m depth; Indo-Pacific region	Present at Puntan Diablo and Port of Tinian; also present in the southeast near Marpo Point	None	Species of Greatest Conservation Need
Marbled parrotfish/ <i>Leptoscarus vaigiensis</i>	Coral reefs, seaweed and seagrass beds; Indo-Pacific region	Present at Puntan Diablo and Port of Tinian; also present in the southeast near Marpo Point	None	Species of Greatest Conservation Need
Gray reef shark/ <i>Carcharhinus amblyrhynchos</i>	Offshore banks and reefs, 30-100 m depth	Present around southeast Tinian near Marpo Point	None	Species of Greatest Conservation Need
Oceanic white tip shark/ <i>Carcharhinus longimanus</i>	Open ocean; tropical and sub-tropical waters worldwide	Present around southeast Tinian near Marpo Point	Threatened	None
Scalloped hammerhead shark/ <i>Sphyrna lewini</i>	Warm temperate and tropical waters worldwide	Present around southeast Tinian near Marpo Point	Threatened	None
Giant manta ray/ <i>Manta birostris</i>	Offshore; tropical, subtropical, and temperate waters	Present around Northeast and Northwest Tinian	Threatened	None
Turtles				

<i>Common Name</i>	<i>Habitat</i>	<i>Presence around Tinian</i>	<i>ESA Status</i>	<i>CNMI Status</i>
Leatherback sea turtle/ <i>Dermochelys oriacea</i>	Temperate and tropical waters worldwide	When observed, commonly found around Tinian Harbor and Kammer Beach	Endangered	None
Green sea turtle/ <i>Chelonia mydas</i>	Subtropical and tropical waters of the Atlantic and Pacific oceans	When observed, commonly found around Tinian Harbor and Kammer Beach	Central West Pacific DPS – Endangered East Indian-West Pacific DPS – Threatened	CNMI Endangered
Hawksbill turtle/ <i>Eretmochelys imbricata</i>	Tropical coral reefs of the Pacific, Indian, and Atlantic oceans	Sightings have occurred near Puntan Diablo area	Endangered	CNMI Endangered
Loggerhead turtle/ <i>Caretta caretta</i>	Worldwide in subtropical and temperate regions of Atlantic, Pacific, and Indian oceans	Could occur in pelagic waters far from shore or near Tinian Harbor, as they often seek ship channels, bays, and lagoons	North Pacific Distinct Population Segment – Endangered	None
Olive ridley turtle/ <i>Lepidochelys olivacea</i>	Open ocean; tropical regions of Atlantic, Pacific, and Indian oceans	Could occur on the west side of Tinian in the soft-bottom habitats; likely to be in pelagic waters rather than near coast	Threatened	None
Mammals				
Blue whale/ <i>Balaenoptera musculus</i>	All oceans except Arctic; polar feeding grounds in summer and migration towards Equator during winter	Migrate along the west side of the island to travel away from strong winds and currents on the east side	Endangered	None
Fin whale/ <i>Balaenoptera physalus</i>	Found in many of the world's oceans, except extreme polar regions; deep, open ocean	Migrate along the west side of the island to travel away from strong winds and currents on the east side	Endangered	None
Humpback whale/ <i>Megaptera novaeangliae</i>	Live along the coasts of all oceans	Migrate along the west side of the island to travel away from strong winds and currents on the east side	Endangered	None

<i>Common Name</i>	<i>Habitat</i>	<i>Presence around Tinian</i>	<i>ESA Status</i>	<i>CNMI Status</i>
Sei whale/ <i>Balaenoptera borealis</i>	Subtropical, temperate, subpolar waters of Atlantic, Pacific, and Indian oceans	Migrate along the west side of the island to travel away from strong winds and currents on the east side	Endangered	None
Sperm whale/ <i>Physeter macrocephalus</i>	All world's oceans; distribution dependent on food sources and conditions	Migrate along the west side of the island to travel away from strong winds and currents on the east side	Endangered	None
Dugong/ <i>Dugong dugon</i>	Warm coastal waters of Indian and Pacific oceans	Unlikely to be present, but would be near coastal areas if present	Endangered	None
Spinner dolphin/ <i>Stenella longirostris longirostris</i>	Nearshore waters around oceanic islands in tropical Atlantic, Indian, and Pacific oceans	Present around Tinian Harbor and Kammer Beach; present around Marpo Point	None	Species of Greatest Conservation Need

Legend: ESA = Endangered Species Act; CNMI = Commonwealth of the Northern Mariana Islands.

Source: Lisle-Clarke 2015.

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3.4.5.2 Sea Turtles

Green and hawksbill sea turtles, with respect to nesting and their terrestrial occurrence in general are discussed in Section 3.4.3. This section focuses on their occurrence in the marine environment. An estimated 351 individual green turtles were observed in 27 surveys from March 12-21, 2001. The study area covered roughly 59 percent of the total shore and outer reef perimeter of Tinian. The numerical results in this study also examined 95 percent of Aguijan's outer reef and shoreline perimeter (Kolinski et al. 2001).

A vast majority of the green sea turtles (92.8 percent) showed high foraging site fidelity and limited movements. Only 8 out of 107 tagged turtles whose tags transmitted data moved out of the home range and traveled between distinct areas on the same island, moved from one island to another, or departed the Mariana Islands. Both green and hawksbill turtles have been observed spending the majority of their time at depths of 25 meters or less. Despite this similarity, hawksbill turtles spent more time in deeper waters than green turtles and they also have longer dive durations (Kolinski et al. 2004).

3.4.5.3 Marine Protected Areas

Marine Protected Areas are specific regions of the ocean designated for the conservation and protection of marine ecosystems and biodiversity. "Protected lands and waters" are those legally designated by the federal or CNMI government primarily for conservation of natural resources. Conservation Areas, Marine Protected Areas, and National Monuments are examples of protected lands or waters. Generally, the natural habitats in protected lands and waters are prevented from being converted to developed areas and have associated regulations regarding hunting, fishing, and other uses of the area. These regulations vary among protected areas, as each has a distinct history and purpose for protection. This Marine Protected Area along the southeast coast of Tinian is distant from the Military Lease Area; the southern boundary of the Military Lease Area is 2 miles from the northern boundary of the Marine Protected Area.

3.4.5.4 Essential Fish Habitat

The primary federal law that makes up the regulatory framework for essential fish habitat is the Magnuson Stevens Fishery Conservation and Management Act or Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297). Essential Fish Habitat is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Western Pacific Regional Fisheries Management Council 2005). Essential Fish Habitat for managed fishery resources is designated in the Fishery Management Plans prepared by the local regional fisheries management council, the Western Pacific Regional Fisheries Management Council, which manages the fisheries resources for Tinian and CNMI. Habitat Areas of Particular Concern are subsets of essential fish habitat that exhibit one or more of the following traits: (1) rare, (2) stressed by development, (3) provide important ecological functions for federally managed species, or (4) are especially vulnerable to anthropogenic (human impact) degradation. Habitat areas of particular concern can cover a specific location such as a certain bank, ledge, or spawning ground, or they can cover habitat that is found in many locations (coral, nearshore nursery areas, or pupping grounds) (National Oceanic and Atmospheric Administration Fisheries 2025). See Table 3.4-5 for Essential Fish Habitat and Habitat Area around Tinian.

Table 3.4-5 Tinian Essential Fish Habitat and Habitat Area

<i>Fishery Ecosystem Plan Management Units Species Group</i>	<i>Essential Fish Habitat: Juveniles and Adults</i>	<i>Essential Fish Habitat: Eggs and Larvae</i>
Coral Reef Ecosystems	Water column and benthic substrate to a depth of 328 ft (100 m)	Water column and benthic substrate to a depth of 328 ft (100 m)
Bottomfish	Water column and bottom habitat down to 1,312 ft (400 m)	Water column and bottom habitat down to 1,312 ft (400 m)
Crustaceans	Bottom habitat from shoreline to a depth of 328 ft (100 m)	Water column down to 492 ft (150 m)
Pelagics	Water column down to 3,281 ft (400 m)	Water column down to 656 ft (200 m)

Legend: ft = feet; m = meters.

Note: All areas are bounded by the shoreline and the outer boundary of the exclusive economic zone, unless otherwise noted.

Source: Western Pacific Region Fisheries Management Council 2009a.

3.5 Cultural Resources

Cultural resources are the physical evidence of or places of past human activity. Several federal laws and regulations govern the identification and management of cultural resources. The term “cultural resource” applies broadly to a variety of resources subject to consideration under the National Historic Preservation Act and other similar laws. Included are historic properties, which are defined under the National Historic Preservation Act as a district, site, building, structure, or object that is eligible for or listed on the National Register of Historic Places. These also include National Historic Landmarks and traditional cultural places. Under NEPA, the consideration of cultural resources also includes other resources that are not eligible for the National Register of Historic Places, but are important to the community, such as shrines and memorials. In order to qualify for the National Register of Historic Places, a property must exhibit a quality of significance in American history, architecture, archaeology, engineering, and culture in addition to retaining integrity of location, design, setting, materials, workmanship, feeling, and association. Significance is based on the following associations:

1. Criterion A: Properties that are associated with events that have made a significant contribution to the broad pattern of our history; or
2. Criterion B: Properties that are associated with the lives of persons significant in the past; or
3. Criterion C: Properties that embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value or represent a significant and distinguishable entity whose components may lack individual distinction; or
4. Criterion D: Properties that have yielded, or may be likely to yield, information important in prehistory or history.

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their actions on historic properties before undertaking a project, and to afford the Advisory Council on Historic Preservation with a reasonable opportunity to comment. Federal regulation 36 C.F.R. Part 800, “Protection of Historic Properties,” defines specific procedures for federal agencies to follow in complying with Section 106. Additionally, Section 110(f) of the

National Historic Preservation Act gives special consideration to National Historic Landmarks by requiring federal agencies, to the maximum extent possible, to undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking. The Advisory Council on Historic Preservation may, as part of the Section 106 process specific to National Historic Landmarks, request a report from the Secretary of the Interior pursuant to National Historic Preservation Act Section 213 detailing the significance of the affected National Historic Landmark, effects of the proposed undertaking, and recommendations to avoid, minimize, or mitigate adverse effects.

The NEPA analysis for the Proposed Action covers the National Historic Preservation Act's Section 106 area of potential effects, defined for this undertaking as the Military Lease Area, improvement areas north of TNI, the Port of Tinian, roads from the Port of Tinian to the Military Lease Area, and the former USAGM property on Saipan (Figure 3.5-1). Section 106 regulations define the area of potential effects as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 C.F.R. section 800.16(d)). An indirect area of potential effect encompasses the surface danger zone in the waters northwest of Tinian. The former USAGM property on Saipan has been included in the area of potential effect, but as no new uses or construction is planned for this area, there are no activities that have the potential to cause effects on cultural resources and therefore no further impacts analysis is warranted for this portion of the area of potential effects.

A total of 56 surveys have been conducted within and near the Military Lease Area, accounting for approximately 98 percent survey coverage within the area of potential effects (Figure 3.5-2). These include archaeological assessments, Phase I surveys, Phase II testing, Phase III data recovery excavations, architectural surveys, underwater surveys, traditional cultural places studies, and a cultural landscape study. Nine investigations included testing and/or intensive excavation, and research of archives in the U.S., Japan, and Micronesia, including collections of historical maps and photographs and oral histories. Areas not surveyed in the Military Lease Area primarily are limited to small swaths of lands around the former USAGM property. In addition to the Military Lease Area, all of the area north of the TNI runways to the Military Lease Area boundary has been surveyed, and there have been 17 studies at the Port of Tinian and adjacent areas. The latter includes a 2008 architectural survey and archival study for all structures along the port's wharf and quay (Thursby 2010 pp. 3-10). A list of cultural resources studies is presented in Appendix H.

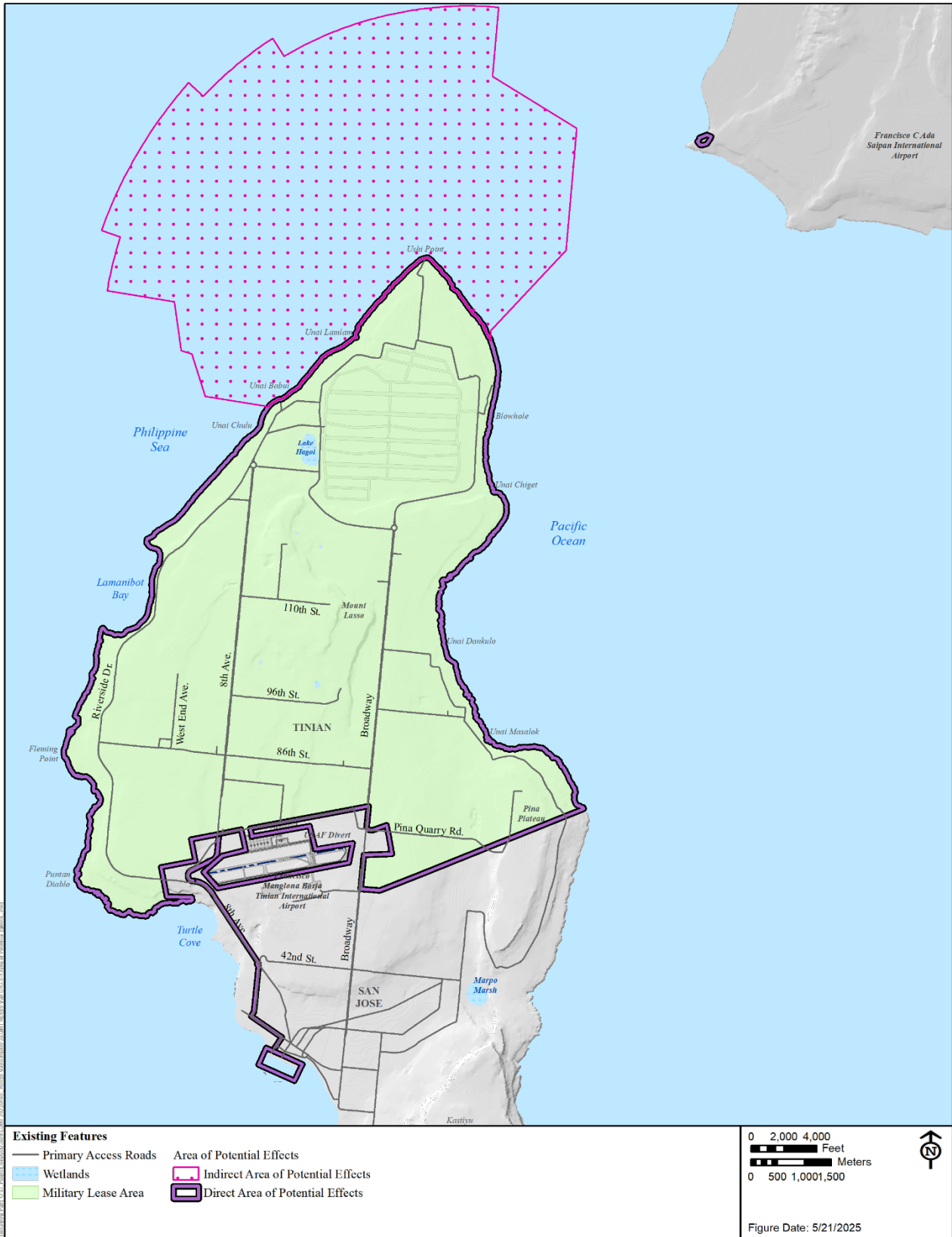


Figure 3.5-1 Area of Potential Effect

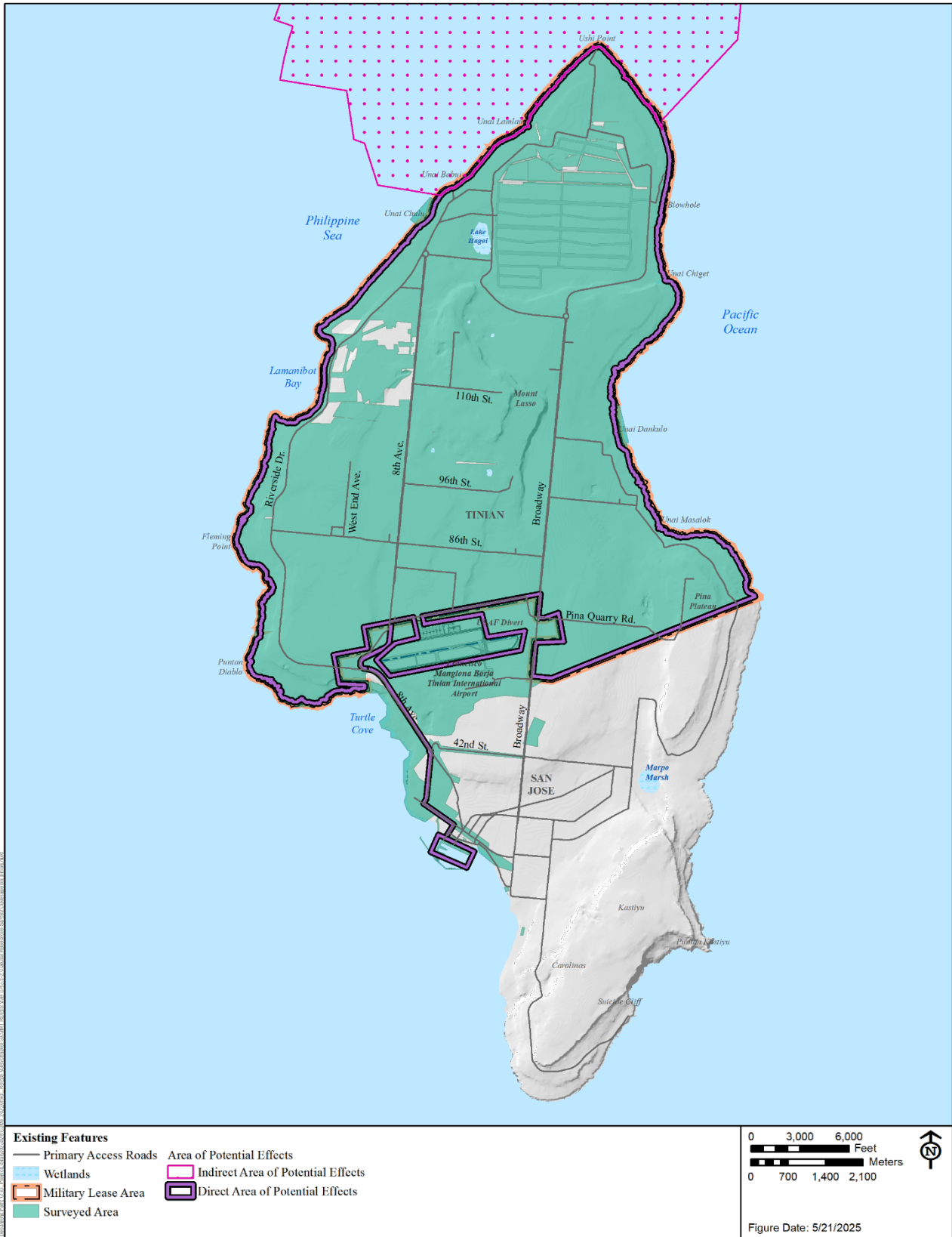


Figure 3.5-2 Cultural Resources Survey Coverage on Tinian

Surveys within the area of potential effect identified Pre-contact sites with *latte* stones and petroglyphs; Japanese Administration sites such as shrines, defensive caves, farmsteads, and internment camps; and other World War II-era sites. Cultural resources on Tinian consist of four types of resources: archaeological resources, architectural resources, traditional cultural places, and resources of cultural importance.

- **Archaeological Resources:** Those areas or locations (sites) where human activity measurably altered the earth or left deposits of physical remains, such as *latte* sites or pottery that are eligible for or listed in the National Register of Historic Places because of their association with an important historic context while retaining the integrity of features necessary to convey their significance.
- **Architectural or Built Properties:** Those standing buildings, dams, canals, bridges, and other structures which have historic, engineering, or aesthetic significance that are eligible for or listed on the National Register of Historic Places because of their association with an important historic context while retaining the integrity of features necessary to convey their significance.
- **Traditional Cultural Places:** A building, structure, object, site, or district that may be listed in (or determined eligible for listing in) the National Register of Historic Places for its significance to a living community rooted in the community's history and that are important in maintaining the community's cultural identity (National Park Service 2024).
- **Resources of Cultural Importance:** Include other resources that are important to the community such as shrines and memorials, even if they are not eligible for inclusion in the National Register of Historic Places.

3.5.1 Historical Overview

The island of Tinian shows evidence of overlapping layers of historical periods. Appendix H and the *Tinian Integrated Cultural Resources Management Plan* (Joint Region Marianas 2015) provide an in-depth historical description of the island.

3.5.2 Previously Recorded Resources

3.5.2.1 Historic Properties

The area of potential effects contains 344 historic properties, of which 343 have been recommended or determined to be National Register of Historic Places-eligible and one remains unevaluated but managed as National Register of Historic Places eligible. A table listing these properties is located in Appendix H, Table H-2. The majority of these properties are associated with pre-World War II Japanese farmsteads and World War II military activity. A lesser number of Pre-contact traditional Chamorro sites are also present.

Historic properties on Tinian span five historic contexts periods: Pre-contact, Spanish Administration, German Administration, Japanese Administration, and the American Administration. Pre-contact period historic properties include *latte* structures and ceramic scatters; Spanish Administration period sites contain evidence from this time-period while co-located with Pre-contact period sites; Pre-World War II Japanese Administrative period sites include farmsteads, shrines, cisterns, and other resources used by occupants of the island that predate the war; and World War II American Administrative period historic properties consist predominately of the remains of Japanese and later U.S. military development related to combat and post-invasion

development of the island. There are no German Administration sites within the area of potential effects.

Previous surveys have assigned an archaeological site number to all historic properties regardless of type. The result has been that historic structures are listed generally as “archaeological” sites instead of differentiated as archeological or architectural property types. In addition, the archaeological methods used to identify sites have resulted in large site boundaries that vastly exceed the location of individually identified contributing features in the survey record.

The area of potential effects also contains the North Field National Historic Landmark, which is significant for its association with the American military capture of Tinian and use of the island as a crucial airbase that contributed to the end of World War II during the period 1944-1945. North Field was designated a National Historic Landmark in 1985 and includes the following contributing features (Figure 3.5-3):

- Landing Beaches Unai Babui and Unai Chulu
- Japanese Pillbox at Unai Chulu
- Japanese Ushi Point Field: service apron, air administration building, air operations building, and two air raid shelters
- American North Field: four B-29 runways, taxiways, and two service aprons

In 2016, the National Park Service issued a Section 213 report on the previous iteration of the CJMT Proposed Action in which the agency recommended additional features as character-defining within the North Field National Historic Landmark, to include spatial organization and circulation patterns, construction materials, small scale features, landscape features and vegetation, topographic modifications, and viewsheds.

Three National Register of Historic Places-eligible traditional cultural places have been identified within the area of potential effect. These are Chamorro fishing areas within the Military Lease Area and include Unai Chulu, Unai Dankulo, and Puntan Masalok (also called Unai Masalok). These sites are considered significant for their association and contribution to the broad patterns of Chamorro history (Criterion A) – namely the historic and continued practices of *chenchulu* (Chamorro net fishing), *lulay* (hook-and-line pole fishing), and other traditional fishing techniques that are important to local subsistence, culturally important fiestas, and Chamorro cultural identity. Fishing in these areas is often a communal event involving all ages and is used to teach younger community members about traditions and values such as *respetu* (respect for elders and significant individuals and the environment and society where they live), and *inafa'maolek* (community cohesion).

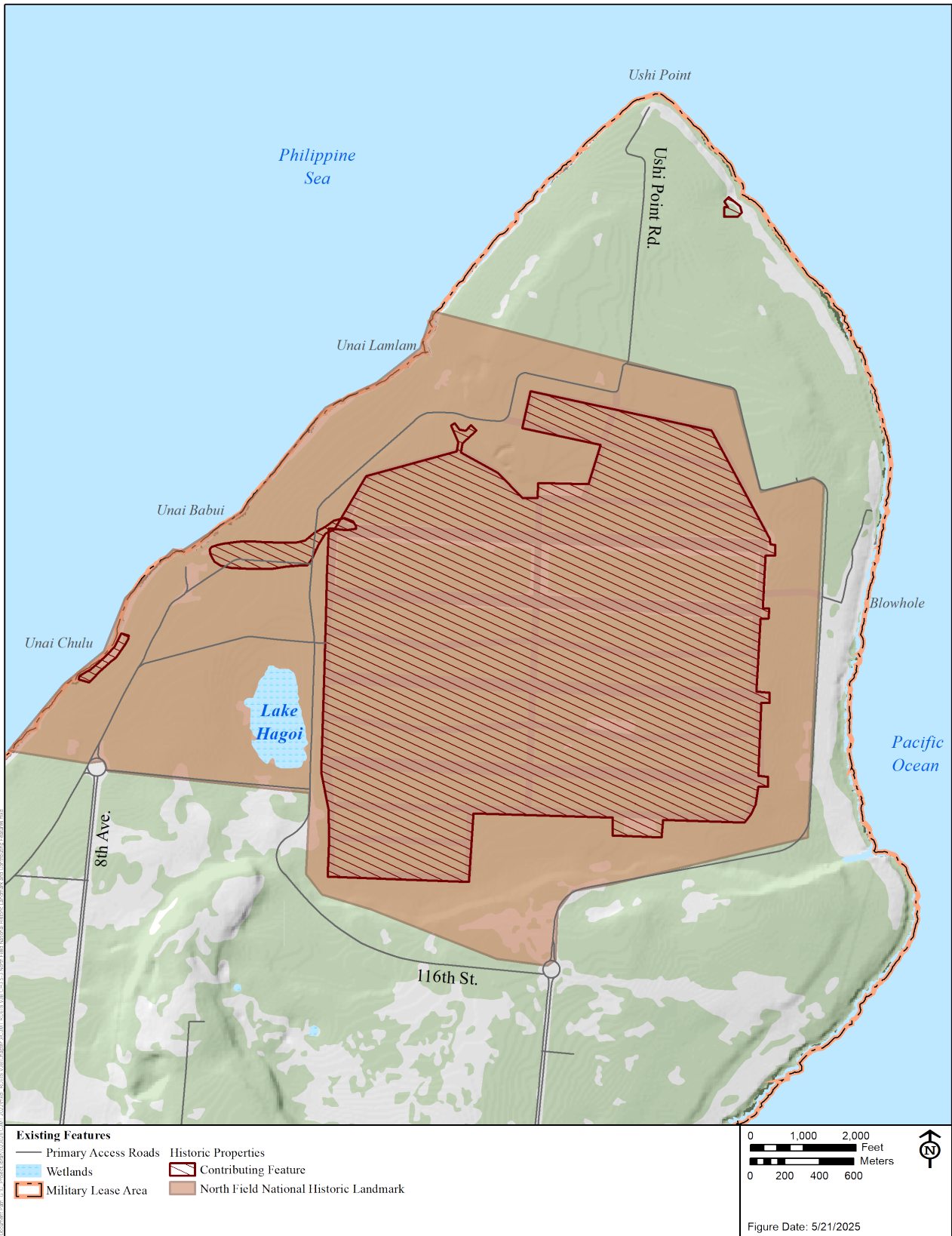


Figure 3.5-3 North Field National Historic Landmark and Contributing Features

Unai Chulu. Unai Chulu beach consists of a fringing reef accessible at low tide. This beach is an ideal location for the use of traditional fishing techniques because it is sheltered from prevailing trade winds, allowing for safe fishing of shallow lagoon fish and shellfish, and for communal gathering practices, such as the capture of seasonal rabbitfish prized for community fiestas. The back dune coconut grove provides shaded areas to clean and distribute the catch. The beach was specifically identified in oral history interviews as a location where traditional fishing has occurred since Chamorro people settled Tinian, and the beach is named for the Chamorro net fishing technique *chenchulu*. Archaeological evidence, such as nearby *latte* sets and the suitability of the beach for traditional fishing techniques, suggests that Chamorro have used the beach since before European contact.

Unai Dankulo. Unai Dankulo is an easily accessed beach with a well-developed fringing reef, relatively protected lagoon, and a back dune coconut grove. The setting is exposed to prevailing trade winds that make *lulay* fishing the preferred method of catching reef species such as parrotfish.

Puntan Masalok. Puntan Masalok is a small, sandy beach located along the east coast of the island. This beach is a favored location to carry out *lulay* fishing. Oral histories recorded use of the beach by the Chamorro community that resettled on Tinian in 1946 (DON 2015) but that the beach has been used by the Chamorro community since before European contact. This is supported by archaeological evidence, such as nearby *latte* sets and the suitability of the beach to traditional fishing techniques.

3.5.2.2 Other Resources of Cultural Importance

Other resources of cultural importance are available and accessible to the community on Tinian, both within and outside of the Military Lease Area. Some are tied to specific locations, such as the shrine on Mount Lasso and the cross and memorial located at Ushi Point on the northern tip of the island, while others are more dispersed. Other cultural resources may also include resources of cultural importance such as cemeteries, memorials, places for growing and/or gathering of medicinal plants, and similar resources that hold special traditional, religious, or cultural significance. These resources may be related to cultural traditions based on procurement of a product from different parts of the island and association with traditional activities and practices.

Important traditional activities and practices discussed during oral history interviews (DON 2015 pp. 5-1 to 5-7) include hunting, gathering, farming, medicinal, and fishing practices. These activities vary in the degree to which they are still practiced and the extent to which they are tied to specific locations on Tinian. Each of the activities can be considered a cultural tradition because they result in the procurement of a product that can be used for *chenchule*, a Chamorro word that once referred to many acts of reciprocation but is now often used to refer to the gift or act itself and is most commonly experienced as gifts of food, labor, or other contribution during the celebration of life's milestones. *Chenchule* is still strongly rooted within the Chamorro culture and is a mechanism that preserves and strengthens networks within the community, leading to stronger community cohesion. A detailed description of subsistence food and food culture is discussed in Section 3.3, Socioeconomics. The gathering of wild plants such as *Donni Sali*, also known as Pika or boonie peppers, breadfruit, and yams are also important to Chamorro traditions. A detailed description of medicinal plants is discussed in Section 3.4, Biological Resources. Beaches are also resources of cultural importance. For instance, *firowrow*, a traditional cultural practice for the

Carolinian community, requires the use of beaches when a family member passes away (CNMI Bureau of Environmental and Coastal Quality 2015 pp. 87).

Separately, 67 archaeological sites have been determined not eligible for the National Register of Historic Places and, therefore, are not considered historic properties under Section 106, as defined in the National Historic Preservation Act [54 U.S.C. section 300308]. Though these archeological sites have been determined not individually eligible for the National Register of Historic Places, they are still protected under other federal statutes including the Archeological Resources Protection Act, (16 U.S.C. section 470aa(b)), Antiquities Act (54 U.S.C. sections 320301et seq), Embezzlement and Theft (18 U.S.C. 641), Destruction of Government Property (18 U.S.C. 1361) and Trespassing (18 U.S.C. 1382).

3.6 Visual Resources

Visual resources on Tinian include natural features typical to the Pacific Islands region and human-built elements that, when viewed together as a landscape, result in a sense of place characterized by scenic views of tropical beaches and jungle areas. Natural views from coastal areas on Tinian include shorelines, seascapes, and cliffs. Inland, dominant natural features include vegetation, from dense jungle to sparser areas of shorter grasses, shrubs, and trees. Notable human-built and maintained features that contribute to the visual environment include cultural features, agricultural areas, parks and landscaping, and suburban-to-rural development. In the southern part of the island, south of the Military Lease Area, views are dominated by residential and commercial development, such as single-family homes and low-profile commercial and civic buildings.

The USAGM site on Saipan is composed of disturbed lands with five existing antenna towers and low buildings. Immediately west of the site is the Commonwealth Utilities Corporation Agingan wastewater treatment plant and Agingan Point. The area is relatively flat and slopes away to the ocean.

The selection of viewpoints for analyzing impacts to visual resources was based upon the consideration of activities while viewing the landscape, the importance of the scenic quality to these activities, the potential number of viewers, and the frequency and duration of views. Based on these considerations, 17 viewpoints on Tinian were selected for initial review. Because no new training or construction is proposed on Saipan, no viewpoints on Saipan were considered. The selected viewpoints on Tinian represent views and scenic overlooks and well-known places and thoroughfares that people are accustomed to seeing as part of the Military Lease Area landscape. Field observations were then performed to document and describe the existing visual environment (Figure 3.6-1).

The north portion of the Military Lease Area on Tinian is primarily composed of previously developed and disturbed lands with a historic World War II-era airfield (North Field). The area is a relatively flat plateau that slopes down to the ocean on the north, east, and west sides of the island, with some variation in topography across the plateau. The southern side of the plateau is defined by a steep upward slope that connects to the Mount Lasso ridge line. Lake Hagoi is the lowest point within the North Lowland plateau, with a minimum elevation of approximately 10 feet above mean sea level.



Figure 3.6-1 Tinian Viewpoints and View Orientation


The north and northeast coastlines are covered with low, windblown vegetation and generally provide open and expansive views of the island of Saipan, the Pacific Ocean, Philippine Sea, and horizon. The northwest coastline is better protected from wind, with denser vegetation than that of the windward side. The dominant features are the beaches in the North Field National Historic Landmark. With the exception of the cleared airfield and connecting roads, vegetation is generally overgrown and covers large swaths of land. Views are generally closed in and somewhat constrained due to the surrounding dense vegetation.




The west side topography of the Military Lease Area is broad and gently sloping, with noticeable vertical elevation changes occurring primarily along the western shoreline in the southern portion as it extends north from the Marpo Valley.



The central highlands are dominated by Mount Lasso, with a maximum elevation of 545 feet above mean sea level. The steep topography along the eastern edge of Mount Lasso consists of native limestone forest vegetation. The steep, rugged terrain is not conducive to farming, and the area was not cleared by the Japanese to support sugarcane production in the 1920s. The western coast consists of steep cliffs, starting south of Unai Chulu and accessed via Riverside Drive. A visually dominant feature is an antenna array at the USAGM site consisting of tall towers and curtain antennae in an area located west of 8th Avenue.



The east side of the Military Lease Area is characterized by a central layered limestone plateau, mostly blanketed by dense vegetation with some areas of fenced, semi-cleared agricultural lands. The shoreline areas consist of gently sloping topography to the sea and beach areas. Most of these areas are rocky and windier compared to their counterparts on the west side of Tinian. Table 3.6-1 includes descriptions of the 17 Tinian viewpoints, including the primary element within its viewshed, the quality and character of the surrounding landscape, and an associated photo. Additional information on the visual environment can be found in Appendix I.



Table 3.6-1 Description of Existing Tinian Views





<i>Viewpoint</i>	<i>Description of Existing View</i>
1: North Field National Historic Landmark, Looking South	<p>Viewpoint 1 looks south and includes pavement in the foreground and dense vegetation in the middle-ground and background. Degraded tarmac, Japanese air raid shelters, and other World War II structures and monuments are observed from this viewpoint. The entire area was once open and clear to accommodate World War II air combat operations. However, the visual connections and relationships between airfield buildings and structures are presently much harder to recognize amidst the overgrown vegetation. Two historic bomb loading pits are preserved at the North Field National Historic Landmark. The pits are slightly visible toward the middle and right of the photograph. The aprons surrounding these bomb pits are preserved in a mostly paved and unvegetated state, so the views around and between the bomb pits remain unobstructed. The bomb pits themselves are covered by protective enclosures of metal and glass with historical photos and text within.</p> 




<i>Viewpoint</i>	<i>Description of Existing View</i>
2: North Field National Historic Landmark, Looking North-northeast from Boston Post Road	<p>Viewpoint 2 looks north-northeast from Boston Post Road toward the proposed Multi-Purpose Maneuver Range (panorama photo). The foreground includes the degraded paved road, and the middle-ground and background are dominated by low-growing, dense shrubs, and trees.</p> 
3: North Field National Historic Landmark, Looking North-northwest	<p>Viewpoint 3 looks north/northwest from Broadway toward the proposed Multi-Purpose Maneuver Range and associated Landing Zone and ammunition holding areas. The foreground includes the degraded paved road, and the middle-ground and background are dominated by low-growing dense shrubs and trees.</p> 
4: North Field National Historic Landmark, Looking North-northeast	<p>Viewpoint 4 looks north-northeast from Taxiway 7/8 toward the western edge of the proposed Multi-Purpose Maneuver Range. The foreground is dominated by the degraded tarmac. The middle-ground includes landscaped grass and coconut trees and a wall of dense vegetation. The background includes dense vegetation interspersed with taller trees.</p> 


<i>Viewpoint</i>	<i>Description of Existing View</i>
<p>5: Unai Babui Looking Southwest</p>	<p>Viewpoint 5 looks southwest at Unai Babui—a beach located on the northwest coast that is part of the North Field National Historic Landmark. Unai Babui is smaller than Unai Chulu and is located about 0.65 miles north of Unai Chulu. It has rugged coral outcroppings along the shoreline edge and thick vegetation extending close to and upward from the shoreline’s edge. The shallow reef flat is easily seen from the coastline.</p> 
<p>6: Unai Chulu, Looking North- northeast</p>	<p>Viewpoint 6 looks north-northeast at Unai Chulu. Unai Chulu is one of only a few sandy beaches on this part of Tinian. It is a long, wide beach with open vegetated areas located between the beach and the densely vegetated area further inland to Riverside Drive. These nearshore areas are commonly used for picnics and social gatherings because they provide shade and views of the beach and the ocean.</p> 

<i>Viewpoint</i>	<i>Description of Existing View</i>
7: Ushi Point at the Road, Looking North	<p>Viewpoint 7 looks north toward Ushi Point from the roadway. This view mostly consists of an unpaved road with low-cut vegetation at its shoulders, dense vegetation farther from each shoulder, and open views of the ocean and horizon straight ahead. A maritime navigational aid beacon and some coconut trees are in the middle-ground. A gently sloping open area and road can also be seen in the middle-ground. An unimpeded view of the ocean and horizon are in the background due to the flat terrain and maintained vegetation in the immediate vicinity of the roadway.</p> 
8: Ushi Point at the Coast, Looking South	<p>Viewpoint 8 looks south and facing away from the ocean. This view mostly consists of green, low-growing vegetated ground cover. A maritime navigational aid beacon and some coconut trees are in the foreground. A gently sloping open area and road can be seen in the middle-ground. A stand of coconut trees and thick forest is in the background.</p> 

<i>Viewpoint</i>	<i>Description of Existing View</i>
9 and 10: Runway Able, Looking South- southeast and West, respectively	<p>Runway Able is one of four World War II-era airstrips situated in the boundary of the North Field National Historic Landmark over the former Japanese Ushi Point Airfield. Viewpoints 9 and 10 show the length of Runway Able. Viewpoint 9 looks south-southeast from the west end of the runway and Viewpoint 10 looks west from the east end. The aesthetic value of the North Field National Historic Landmark runways lies in both the existing visual landscape and their value as a part of Ushi Field–North Field Trail. The visual landscape of the airstrip consists of long linear runway of eroded tarmac infiltrated by vegetation and bordering the runway.</p> <p>Viewpoint 9 photo:</p>  <p>Viewpoint 10 photo:</p> 

<i>Viewpoint</i>	<i>Description of Existing View</i>
11, 12, and 13: Runway Baker, Looking West, South, and North, respectively	<p>Runway Baker is one of four World War II-era airstrips constructed at North Field National Historic Landmark over the former Japanese Ushi Point Airfield. Viewpoint 11a looks west from the west end of the runway Baker toward the proposed surface radar site, Viewpoint 11b looks west from the center of runway Baker, Viewpoint 12 looks north from the south side of the runway Baker, and Viewpoint 13 looks south from the north side of runway Baker. The visual landscape consists of long linear runway, bordered by varying amounts of vegetation, depending on when vegetation clearing takes place.</p> <p>Viewpoint 11a photo:</p>  <p>Viewpoint 11b photo:</p>  <p>Viewpoint 12 photo:</p>  <p>Viewpoint 13 photo:</p> 

<i>Viewpoint</i>	<i>Description of Existing View</i>
14: Mount Lasso Scenic Overlook, Looking East-northeast	<p>Viewpoint 14 looks east-northeast from the Mount Lasso overlook, providing a panoramic view over the eastern portion of Tinian, with Saipan in the background to the north. Located south of the North Field National Historic Landmark, Mount Lasso is a scenic lookout point frequently visited by tourists. As Tinian's second highest point, and due in part to its central location on the island, Mount Lasso was an important communications and visual reconnaissance center during World War II. Both Japanese and American radar systems were located on top of Mount Lasso, and concrete mountings for the facilities remain.</p> 
15: TNI Terminal, Looking North-northwest	<p>Viewpoint 15 looks north-northwest from the terminal at TNI. The airport is located south of the Military Lease Area and west of Broadway and is surrounded by dense vegetation. From the primary public viewpoint at the airport terminal, foreground views include the paved runway and taxiway, inclusive of the airplanes, vehicles, and other equipment in support of airport operations. Middle-ground and background views are dominated by the expanse of dense vegetation surrounding the airport.</p> 
16: Unai Masalok, Looking North-northwest	<p>Viewpoint 16 looks north-northwest from Unai Masalok, a beach approximately 154 feet in length located on the east coast of Tinian. It is protected by an offshore reef and has rugged coral outcroppings along the shoreline edge and thick vegetation extending close to and upward from the shoreline's edge. The shallow reef flat is easily seen from the coastline.</p> 

<i>Viewpoint</i>	<i>Description of Existing View</i>
17: Unai Dankulo, Looking Southwest	<p>Unai Dankulo is accessible through the forested Unai Dankulo Trail that opens to an expansive beach extending north. Viewpoint 17 looks southwest from the end of Unai Dankulo Trail, facing away from the beach toward Landing Zone 5. The beach and flat nearshore environment allow direct vehicle access to picnic spots that are located within somewhat shaded coconut groves adjacent to the beach. Thick grasses, shrub vegetation, and trees dominate the viewshed along Unai Dankulo Trail that leads to Unai Dankulo. While more windswept than the leeward beaches, the wind is buffered by inland vegetation.</p> 

Legend: TNI = Francisco Manglona Borja / Tinian International Airport.

3.7 Transportation

This section discusses the existing ground, water, and air transportation systems on the island of Tinian. The existing transportation system on Tinian consists of paved and unpaved roads, the Port of Tinian, and TNI. The roadway transportation network providing access to the USAGM site on Saipan is also described.

3.7.1 Ground Transportation

Tinian has approximately 68 miles of roads, most of which were constructed in 1944 to accommodate heavy truck traffic when the military population on Tinian was approximately 150,000. The CNMI is responsible for basic maintenance and repair of roads within the Military Lease Area, however, DoD may exercise United States reserved rights to maintain, repair, or construct roads within the Military Lease Area. The Seabees repaired roads and constructed Marpo Heights Road on Tinian in 2022. Routine road maintenance within the former Lease Back Area is conducted by the CNMI Department of Public Works. The CNMI Department of Public Works owns and maintains all other roads on Tinian south of the Military Lease Area. Several roads are part of the CNMI Territorial Highway System and eligible for federal aid administered by the U.S. Department of Transportation Federal Highway Administration. There is no existing public transportation service on Tinian. Figure 3.7-1 shows the existing road network on Tinian.

Table 3.7-1 provides a description of key transportation routes in and near the Military Lease Area and provides traffic volumes documented in the *CNMI 20-Year Highway Master Plan* (CNMI Department of Public Works 2023). Broadway and Grand Avenue have the highest traffic volumes, with about 1,560 and 2,130 vehicles per day, respectively. Other roads not listed in the table typically have the following characteristics:

- Within the Military Lease Area: roads are generally unpaved and moderately to severely overgrown by vegetation with traffic volumes of less than 100 vehicles per day.
- Outside of the Military Lease Area: roads are generally two lanes wide (one for each direction of travel), paved and undivided with no median, and carry between 25 and 300 vehicles per day.

Table 3.7-1 Primary Roads on Tinian Within and Outside the Military Lease Area

<i>Road Name</i>	<i>Description and Volumes</i>
Broadway (Route 21)	<p>Within the Military Lease Area, Broadway is a two-lane, divided, paved road with 20-foot-wide lanes and a 32-foot-wide median between 72nd Street and 116th Street. Lack of maintenance has resulted in the southbound lane being moderately to severely overgrown by vegetation and unsuitable for use, resulting in motorists using the northbound side for travel in both directions. This segment carries about 130 vehicles per day.</p> <p>Outside of the Military Lease Area, Broadway is a two-lane, divided, paved road with 20-foot-wide lanes and a 32-foot-wide median. On the segment outside the Military Lease Area, Broadway carries about 1,560 vehicles per day south of 42nd Street and 300 vehicles per day north of 42nd Street.</p>
8th Avenue (Route 23)	<p>Within the Military Lease Area, 8th Avenue is a two-lane, divided, paved road with 18-foot-wide lanes and a 36-foot-wide median. Lack of maintenance has resulted in the southbound lane being moderately to severely overgrown by vegetation and unsuitable for use, resulting in motorists using the northbound side for travel in both directions. This segment carries up to 70 vehicles per day.</p> <p>Outside of the Military Lease Area, this road has two distinct segments:</p> <ul style="list-style-type: none"> • From 42nd Street to TNI, 8th Avenue is a 24-foot-wide, two-lane, undivided, unpaved road in poor condition. This segment is located within a parcel formerly leased by the CNMI to the Alter City Group and had been marked as private property, with entry allowed only with the permission and consent of the Alter City Group. This segment carries about 140 vehicles per day. However, the CNMI Department of Public Lands terminated the public land lease for the Alter City project in August 2023 (De La Torre 2023), and thus public use of this road may resume in the future. • Near the Riverside Drive intersection, 8th Avenue is approximately 18- to 22-feet-wide, two-lane, undivided, paved/gravel road in poor condition. It carries approximately 180 vehicles per day on this segment.
86th Street (Route 204)	86th Street is a two-lane, undivided, paved road within the Military Lease Area that runs from 8th Avenue to Broadway (north of TNI). This road is in poor condition. It carries approximately 75 vehicles per day.
Canal Street (Route 202)	Canal Street is a two-lane, undivided road outside of the Military Lease Area that has no median and connects the village of San Jose to Broadway and residential and recreational areas to the northeast. It carries approximately 1,150 vehicles per day.
Grand Avenue (Route 201)	Grand Avenue is a two-lane, undivided road outside of the Military Lease Area that has no median and connects the village of San Jose to Broadway and residential and recreational areas to the east. It carries approximately 2,130 vehicles per day.
42nd Street (Route 24)	42nd Street is a two-lane, undivided road with no median that runs outside of the Military Lease Area from 8th Avenue to Broadway, north of the village of San Jose. It carries approximately 115 vehicles per day.

Legend: TNI = Francisco Manglona Borja / Tinian International Airport.

Source: CNMI Department of Public Works 2023.



Figure 3.7-1 Existing Roads in and Near the Military Lease Area on Tinian

The U.S. Air Force is removing and replacing the existing deteriorated asphalt cap on approximately 2.5 miles of roadway from the Port of Tinian north to 8th Avenue, to its intersection with 42nd Street, and east along 42nd Street to its intersection with Broadway (U.S. Air Force 2020). Improvements related to the U.S. Air Force Divert project, including these roadway improvements, began in early 2022 and are anticipated to be completed in 2026 (U.S. Air Force 2020; NAVFAC Pacific 2022).

The level of service categorization (A through F, best to worst) provides a qualitative grade of roadway functionality, with an acceptable level of service at C or better. All roads on Tinian are operating below capacity, at a level of service A, as evidenced by free-flowing traffic and no traffic delays (CNMI Department of Public Works 2023).

The USAGM site on Saipan is located at the southwest area of Saipan and accessed from Lililok Lane, also known as Agingan Lane. Traffic along this lane is limited to workers accessing the wastewater treatment plant and visitors to Agingan Point.

3.7.2 Water Transportation

3.7.2.1 The Honorable Jose P. San Nicolas Commercial Port of Tinian

The Honorable Jose P. San Nicolas Commercial Port of Tinian (Port of Tinian), near San Jose, is owned by the Commonwealth Ports Authority. The North Wharf serves as the commercial Port for the island, which includes a usable length of 1,400 feet in three contiguous berths (Berths 1-3). Berth 4 is under a long-term lease and not available for commercial use. The connecting pier adjacent Berth 1 includes a roll-on roll-off ramp used for landing and loading of construction equipment (Commonwealth Ports Authority 2018). The small boat dock, located just north of the North Wharf at the Tinian Harbor, has a marina with 18 small craft mooring slips and a concrete boat ramp for launching and recovering small craft.

The harbor's 525-foot-wide channel provides access between the ocean and the Port of Tinian for commercial barges, recreational boats, the U.S. Coast Guard, and military ships. There were an estimated 53 vessel calls for cargo delivery to the Port during 2015, and historical trends show an average of 3 to 5 vessel calls per month at the North Wharf. Smaller, non-commercial cargo and other vessels may use the marina and launch ramp, but these are not counted by the harbor master in the vessel call data. The largest vessels that call at the harbor include a fuel tanker and commercial and military cargo vessels. The Tinian Harbor capacity is adequate to handle current cargo handling needs and may even operate under capacity at times. However, larger vessels can experience capacity constraints. For example, a fuel tanker would take precedence over other cargo ships or Marine Corps landing vessels, even if that vessel is unloading supplies. In that situation, the cargo ship or Marine Corps landing vessel would need to stop offloading and move to an anchorage to complete its discharge later (U.S. Army Corps of Engineers 2018). A 2020 Tinian Construction Capacity Study indicated that Tinian Harbor would be able to continue to support its existing shipping by tugboat for the island's day-to-day commodities without near-term repairs. However, without repairs, it has limited capacity to support any increased use (AS MD LLC 2020).

Approximately 90 percent of all goods and materials imported to Tinian arrive through the harbor. Findings from a 2018 Interim Feasibility Report Tinian Harbor Modification Study indicate the protective breakwater at Tinian Harbor is in a state of disrepair, likely resulting in future disruptions to Port operations and risks to harbor navigation and infrastructure (U.S. Army Corps of Engineers 2018). In July 2023, the Commonwealth Ports Authority Board adopted a joint area

development concept with the DoD for construction, repair, and maintenance activities at the Port of Tinian, including dredging the harbor to a depth of 28 feet (Commonwealth Ports Authority 2023).

Existing DoD usage of the Port consists of larger chartered cargo vessels and roll-on, roll-off integrated tug-barges, which use the North Wharf to unload materials and equipment due to their size; and military training events using smaller landing craft or boats for transporting people or equipment. Amphibious Assault and Amphibious Raid training events approved under the *2015 Mariana Islands Training and Testing EIS/OEIS* can use the concrete boat ramp and approved procedures for beach landings in the Military Lease Area (DON 2015; 2020).

3.7.3 Air Transportation

3.7.3.1 Francisco Manglona Borja/Tinian International Airport

Francisco Manglona Borja/Tinian International Airport (TNI) is owned, managed, and operated by the Commonwealth Ports Authority. It is a commercial airport used primarily for inter-island travel between Tinian, Saipan, Rota, and Guam. The airport runway supports departures and arrivals in two directions: east (Runway 08) and west (Runway 26), based on weather conditions and wind direction. The paved runway is marked for precision approaches and equipped with a navigational light system. There are no additional navigational aids, Air Traffic Control facilities, or Air Traffic Control services provided below 3,500 feet mean sea level for pilots arriving at or departing from TNI. Use of the airport occurs on a first-come, first-served basis, with pilots notifying each other of their intentions via the common traffic advisory frequency. The airport closes overnight from 10 p.m. to 6 a.m., unless prior arrangements are made with the Commonwealth Ports Authority.

Because TNI improvements that are part of the U.S. Air Force Divert project will be completed prior to the Proposed Action, the existing environment includes the U.S. Air Force Divert project improvements. These improvements include a maintenance facility; a fire pump building, tanks, and wells; fuel tanks; a cargo pad; a parking apron; taxiways; an access road from Broadway; and the relocation of 8th Avenue near the western end of the runway. A fuel pipeline will also extend from the Port of Tinian to the TNI to provide fuel to the future bulk fuel storage tanks at the airport. Three heliports are located on Tinian, all within 2.5 miles south of the airport, but they are not in use as no charter helicopter services have been provided since October 2016, following the permanent closure of the Tinian Dynasty Hotel and Casino.

Table 3.7-2 provides a summary of operations at TNI from 2013 to 2022, excluding the COVID years of 2019-2021. The existing airfield capacity of TNI is 164,000 annual operations (an operation is counted as each time an aircraft lands or departs a runway).

Table 3.7-2 Existing Operations at TNI

<i>Period¹</i>	<i>Based Aircraft Total</i>	<i>Annual Operations</i>					
		<i>Air Carrier</i>	<i>Air Taxi²</i>	<i>General Aviation: Local</i>	<i>General Aviation: Itinerant³</i>	<i>U.S. Military: Itinerant³</i>	<i>Total Operations</i>
2013	13	58	46,206	1,922	454	476	49,116
2014	15	50	41,944	5,900	998	274	49,166
2015	17	0	35,282	3,146	2,731	229	41,388

<i>Period¹</i>	<i>Based Aircraft Total</i>	<i>Annual Operations</i>					
		<i>Air Carrier</i>	<i>Air Taxi²</i>	<i>General Aviation: Local</i>	<i>General Aviation: Itinerant³</i>	<i>U.S. Military: Itinerant³</i>	<i>Total Operations</i>
2016 ⁴	19	0	21,610	2,365	5,154	78	29,207
2017	19	0	21,610	2,365	5,154	78	29,207
2018	19	0	21,610	2,365	5,154	78	29,207
2022	19	0	21,610	2,365	5,154	78	29,207

Legend: Air Carrier = commercial airline; Air Taxi & Commuter = commercial flights that originate within the CNMI; General Aviation = private aircraft; U.S. Military = military aircraft; U.S. = United States.

Notes: ¹ FAA Airport Master Records are not available for the period between 2019 to 2021.

² Air taxi flights are used as commuter flights between TNI and the Saipan International Airport.

³ Itinerant operations are those aircraft not based at the airfield.

⁴ A 29 percent decrease occurred between 2015 and 2016, which coincides with the closure of the Tinian Dynasty Hotel and Casino.

Sources: FAA 2013a, 2014a, 2015, 2016a, 2018, 2023.

In 2022, there were a total of 29,207 operations at TNI. Since 2016, the number of operations has remained stable (FAA 2013a, 2014a, 2016a, 2017, 2018, 2022). Based on this information, TNI is currently operating under capacity. Air taxi and commuter flights account for most aircraft operations, with Star Marianas Air providing daily scheduled passenger flights between Saipan and Tinian.

There are no regularly scheduled international flights into TNI. International travelers to Tinian are routed through Saipan International Airport for customs services and then use local air transport such as Star Marianas. Any flight of international origin intending to use TNI requires advance arrangements with the Chief of Immigration on Saipan.

The FAA publishes Area Notices that contain preferred Visual Flight Rule routings between Saipan and Tinian based on trade wind conditions (FAA 2023). No other published flight routes between Tinian and Saipan are available. Pilots transiting between Tinian and Saipan airports fly using the preferred Visual Flight Rule on flight routes similar to the notional ones depicted in Figure 3.7-2, although flight paths are often modified based on conditions. These flights use two primary visual reference points, the 8th Avenue Traffic Circle and the Broadway Traffic Circle, which route the flights directly over the Military Lease Area. There are two published flight routes within proximity to Tinian (A221 and W21).

The military uses TNI in accordance with the 1999 Lease Agreement and FAA grant assurances. These existing agreements and protocols require the military to coordinate and obtain approval by the Commonwealth Ports Authority and the FAA (DON 2013a). During military training events, helicopter operations within the Military Lease Area are required to maintain a minimum altitude of 1,000 feet above ground level when operating over Lake Hagoi and are prohibited from flying over the Mahalang and Bateha sites (DON 2013a). As a part of current training events on Tinian, temporary time slots for the exclusive use of the TNI by the military are prearranged.

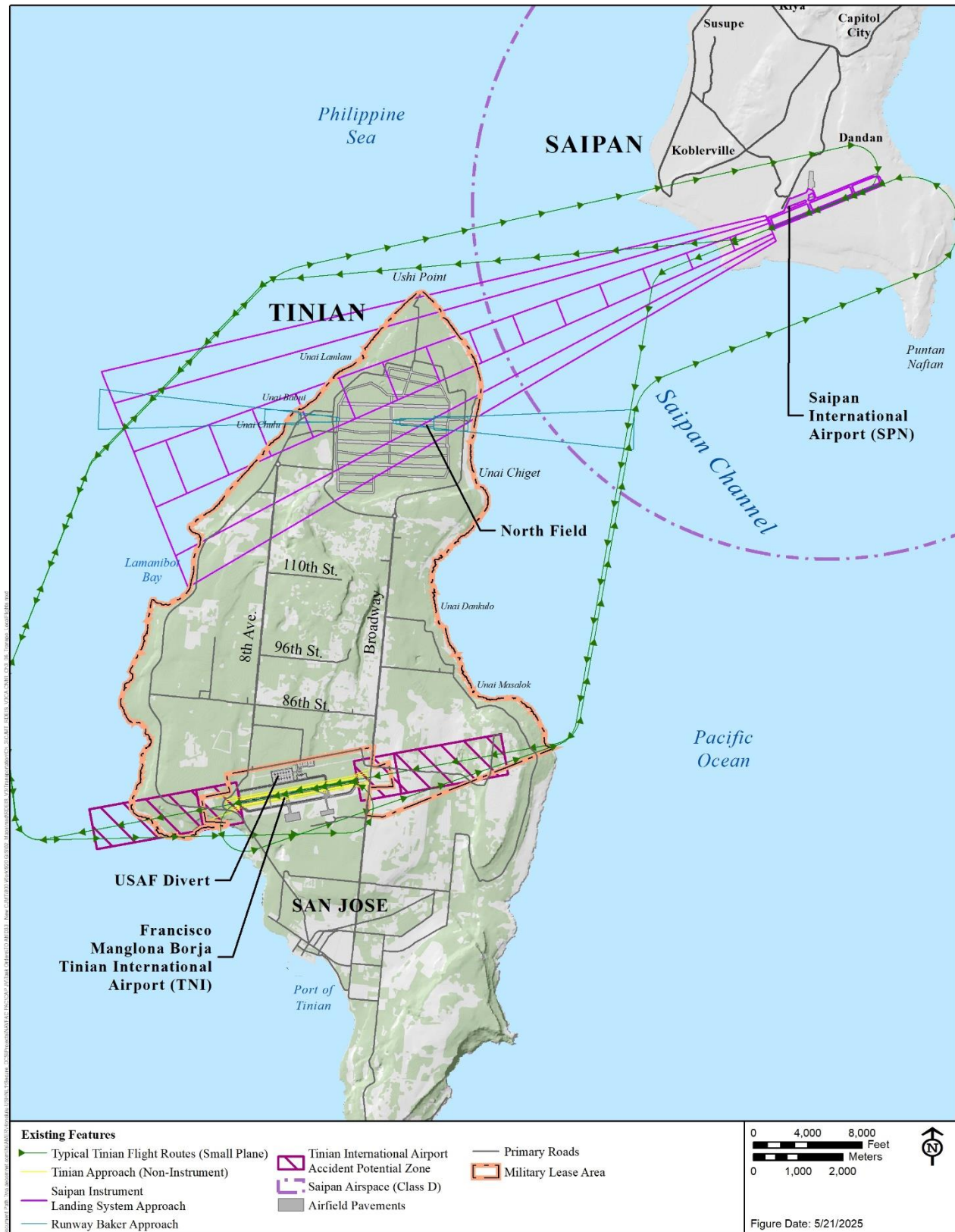


Figure 3.7-2 Local Flight Routes

3.7.3.2 North Field

North Field is a former World War II-era airfield. This airfield is the core of the North Field National Historic Landmark and is located in the northern portion of the Military Lease Area. There are no published approaches. This airfield is presently used for expeditionary airfield training events. The roads around North Field have been improved recently as part of an effort from the U.S. Air Force to clear and re-establish the runways, taxiways and surrounding roads.

3.7.3.3 Airspace

All airspace surrounding Tinian is within the FAA's Guam Combined Center/Radar Approach Control Flight Information Region. For Tinian and Saipan airports, Guam Combined Center/Radar Approach Control provides Air Traffic Control services at altitudes above 3,500 feet mean sea level. Saipan Air Traffic Control manages the local airspace between 2,000 and 3,500 feet mean sea level and international aircraft enroute to and from Saipan International Airport that is below 3,500 feet. Air Traffic Control services are not available below 2,000 feet mean sea level for aircraft flying in the local area or arriving at and departing from TNI.

Approaches, departures, and training events at North Field are all within Saipan International Airport's airspace, and military aircraft operating at North Field are required to maintain radio communication with Saipan Air Traffic Control and follow Air Traffic Control direction as needed to deconflict air traffic. The instrument landing systems approach for Saipan International Airport overlies North Field and the Multi-Purpose Maneuver Range.

3.8 Noise

An area's existing sound environment, referred to as an "ambient soundscape," includes everything that is normally audible, both natural (e.g., bird song, waves, wind in the trees) and human-made (e.g., vehicles on roads, aircraft, farm equipment). Tinian's ambient soundscape is typical to a small island in the Pacific, but with the addition of aircraft noise from TNI, and periodic military training events that use ground equipment and land aircraft at North Field. Thus, the ambient noise levels on Tinian vary by location, from very quiet, undeveloped natural areas with limited intrusions from human activity to moderately noisy or occasionally loud industrial noise environments where aircraft or heavy machinery operate regularly. The soundscape of the uninhabited inland area is dominated by natural sounds, such as wind rustling through the vegetation and trees, birds and wildlife, and livestock grazing. Areas near the island's coast are characterized by natural sounds of the waves, coastal winds, birds, and wildlife. Human-made noise in coastal areas is produced by people utilizing the beaches for gatherings and picnics. Recreational and commercial boating activity occurs at the Port of Tinian, located south of San Jose. Road noise is primarily generated by vehicles on Broadway and 8th Avenue that connect the residential areas of San Jose, Marpo Heights, and Carolinas Heights to the Military Lease Area north of TNI. Each roadway averages less than 2,220 trips per day (CNMI Department of Public Works 2022). Traffic volumes this low contribute very little to the noise environment.

Humans perceive sound based on its physical characteristics. The intensity of the sound is perceived as sound volume and is measured in decibels (written as the unit "dB"). Sound intensity varies widely, from a barely perceptible soft whisper to uncomfortable or painfully loud sounds. Human hearing ranges up to 120 decibels, at which point sound causes physical discomfort. For

context, Table 3.8-1 lists a range of typical outdoor ambient noise levels in decibels for different environments.

Table 3.8-1 Typical Outdoor Ambient Noise Levels

<i>Day-Night Average Sound Level (dB)</i>	<i>Location</i>
44	Field in a rural area
50	Residential area in a small town or quiet suburban area
55	Suburban residential area
60	Urban residential area
65	Noisy urban residential area
70	Very noisy urban residential area
80	3 rd floor apartment in a major city next to a freeway

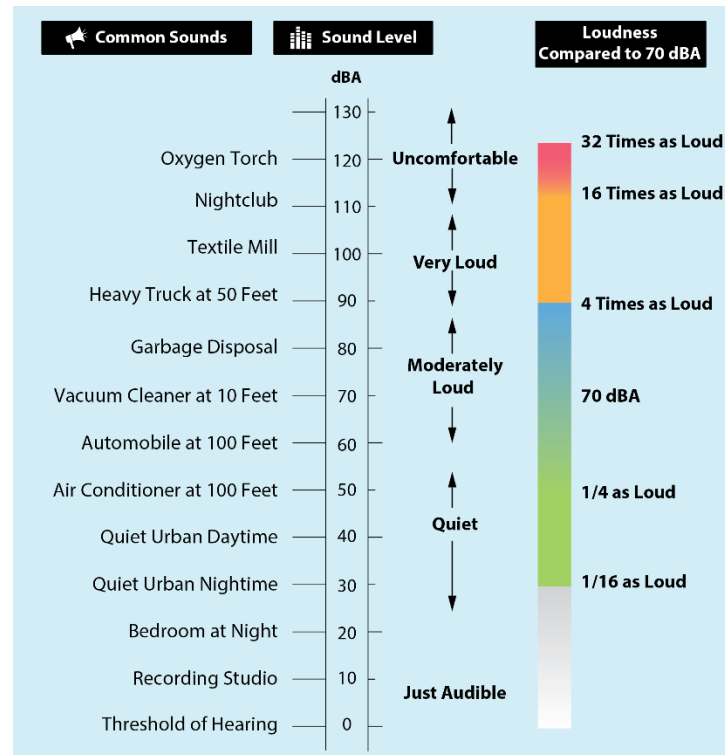
Legend: dB = decibel.

Source: U.S. EPA 1974.

The frequency of sound is perceived as a sound pitch. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. The duration or length of time the sound is produced also affects our perception of the sound—it may be intermittent or impulsive, starting and stopping at regular or irregular intervals, or continuous and steady. A relatively long, steady noise, like a passing train “feels” different from a rapid, loud striking noise.

Figure 3.8-1 provides a chart of sound levels from common noise sources. Some noise sources like an air conditioner or vacuum cleaner, generate continuous sounds that maintain a constant sound level for some period of time. Other sources represent a maximum sound that occurs during an event that varies over time, such as a vehicle passing by. Sounds are also present in the background or ambient environment (urban daytime or nighttime) and represent averages taken over extended periods of time.

On Tinian, outdoor ambient noise levels in most parts of the island vary from below 40 to 55 decibels in the residential areas. Major sources of human-made noise on Tinian include aircraft operations at TNI and intermittent military training events that occur within the Military Lease Area. Noise levels at a particular location on the island may vary based on a number of factors including climate, topography, proximity to the coast, vegetation or housing density, and proximity to noise producing activities such as roadways or TNI.



Source: Derived from Harris (1979) and Federal Interagency Committee on Aviation Noise (1997).

Figure 3.8-1 Sound Levels from Typical Sources

The locations of sensitive noise receptors on Tinian are shown on Figure 3.8-2. The receptors were selected based on the potential impacts that noise could have on those who frequent or inhabit such locations, their wellbeing, and their natural, cultural, or historical value. The ambient noise environments in the vicinity of TNI and the Military Lease Area are described in more detail in the following sections. Baseline noise levels from aircraft operating at TNI were estimated using the models and metrics described in Appendix J. A “noise metric” is a method for measuring sounds so they can be compared with each other.

The primary noise metric utilized in this analysis for noise impacts is the “day-night average sound level” (sometimes written as “DNL”), which is A-weighted applicable for subsonic aircraft operations. The day-night average sound level is a cumulative metric that includes all noise events occurring in a 24-hour period with a nighttime noise weighting applied to events occurring after 10 p.m. and before 7 a.m. The daytime period is defined as 7 a.m. to 10 p.m. An adjustment (weighting) of 10 decibels is added to events occurring during the nighttime period to account for the added intrusiveness while people are most likely to be relaxing at home or sleeping. Note that “daytime” and “nighttime” in calculation of day-night average sound level are sometimes referred to as “acoustic day” and “acoustic night” and always correspond to the times given above. This is often different than the “day” and “night” used commonly in military aviation, which are directly related to the times of sunrise and sunset applicable for military training in dark conditions which may vary by location and change throughout the year based on the season. DoD Noise Program Policy (DoD Instruction 4715.13, 28 January 2020) requires the use of the day-night average sound level noise metric to describe aircraft noise exposure levels at airfields based on an annual average day averaged over 365 days for purpose of long-term compatible land use planning.

While a cumulative metric, such as day-night average sound level is appropriate to predict the overall noise environment at airfields, additional description of noise impacts to noise sensitive locations requires additional metrics. DoD expands upon day-night average sound level with the “sound exposure level” (sometimes written as “SEL”) as described in the DoD Noise Working Group guidelines (DoD Noise Working Group 2009a). The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level (sometimes written as “ L_{max} ”), which occurs over one-eighth of a second and denoted as “fast” response on a sound level meter (American National Standards Institute 1988). Although useful in determining when a noise event may interfere with conversation, TV or radio listening, or other common activities, the maximum A-weighted sound level does not fully describe the noise because it does not account for how long the sound is heard.

3.8.1 Francisco Manglona Borja / Tinian International Airport

The only commercial passenger aircraft at TNI are air taxi flights, which primarily operate during the daytime and evening hours. Aircraft activity at the airport rarely occurs during night hours of 10 p.m. to 7 a.m. (U.S. Air Force 2016). The TNI Airport Master Record lists a total of 27,670 civilian flight operations for the 12-month reporting period ending in March 2022. The majority of civilian operations were air taxi flights (21,610), followed by General Aviation: Itinerant (5,154), and General Aviation: Local (2,365). Currently military aircraft utilize TNI for conventional operations resulting in arrivals and departures to the TNI runways and primarily comprised of C-130 and KC-135, but also include such aircraft as C-5, C-12, C-17, C-35, C-40, F-18E/F, and F-35A/B/C. Counts of annual operations at civil airfields often under report the numbers of military aircraft because military aircraft may fly as a group with multiple aircraft landing or departing in quick succession and only one of the aircraft utilize their transponder, which provides one of the primary sources for annual airfield counts. Also, in some cases, military aircraft may be captured in operations data as their civilian counterparts. The FAA data source for TNI airfield operations reported the identical 78 military operations for each of the past five years. This indicates it may be an outdated source for military operations that does not capture all activity. Therefore, this EIS collected baseline military operations data from operators and prior analyses. Table 3.8-2 summarizes current estimated annual military operations and civilian operations at TNI.

Approximately 95 percent of operations at TNI are composed of civilian aircraft and 27 percent of civilian operations occur at night. Civilian air taxi operations account for 78 percent of civilian operations. The majority of military operations (47 percent) are associated with KC-135 aircraft and 67 percent of military nighttime operations are associated with this aircraft. Fighter aircraft operating at TNI account for 10 percent of military aircraft operations.



Figure 3.8-2 Sensitive Noise Receptors on Tinian and Saipan

Table 3.8-2 Baseline/No Action Alternative Flight Operations at TNI

<i>Category</i>	<i>Aircraft¹</i>	<i>Departures</i>			<i>Arrivals</i>			<i>Totals</i>		
		<i>Day</i>	<i>Night</i>	<i>Total</i>	<i>Day</i>	<i>Night</i>	<i>Total</i>	<i>Day</i>	<i>Night</i>	<i>Total</i>
Civil	GA/AT	10,133	3,702	13,835	10,133	3,702	13,835	20,266	7,404	27,670
Military	C-130	98	12	110	98	12	110	196	24	220
	KC-135	240	120	360	240	120	360	480	240	720
	C-5	33	15	48	31	17	48	66	30	96
	C-12	73	7	80	73	7	80	146	14	160
	C-17	32	16	48	32	16	48	64	32	96
	C-35	24	-	24	24	-	24	48	-	48
	C-40	24	-	24	24	-	24	48	-	48
	F-18	34	3	37	34	3	37	68	6	74
	F-35	30	7	37	30	7	37	60	14	74
<i>Military Total</i>		<i>588</i>	<i>180</i>	<i>768</i>	<i>586</i>	<i>182</i>	<i>768</i>	<i>1,176</i>	<i>360</i>	<i>1,536</i>
Totals		10,721	3,882	14,603	10,719	3,884	14,603	21,442	7,764	29,207

Legend: % = percent; GA/AT = General Aviation and Air Taxi.

Note: ¹ GA/AT modeled as Single Engine Fixed Pitch aircraft; aircraft variants include the F-18E/F and F-35A/B/C.

Figure 3.8-3 presents the modeled noise contours for the baseline/No Action Alternative for TNI. Calculated with noise modeling software, existing civil and military aircraft operations at TNI results in baseline noise levels at noise sensitive points of interest that range from less than 35 decibels day-night average sound level at S2: San Antonio Residential Area on Saipan up to 57 decibels day-night average sound level at T18: Old West Field. Because the baseline average day-night sound level calculations do not include other sources of noise (i.e., street traffic, wind, and recreational or domestic activities) the actual baseline level may be substantially greater once these non-aircraft sources are included. According to the U.S. EPA, the typical outdoor ambient noise level at a field in a rural area is 44 decibels and a suburban residential area is 55 decibels day-night average sound level (U.S. EPA 1974). Additional baseline noise results provided in Chapter J.2 of Appendix J.



Figure 3.8-3 Baseline/No Action Alternative Modeled Noise Contours at TNI

3.8.2 Military Training in the Military Lease Area

The Military Lease Area on Tinian currently supports varied levels of training, from small unit-level training up to large field exercises and expeditionary warfare training. North Field is an unimproved expeditionary World War II-era airfield with four refurbished runways, where only one, Baker, is currently used for vertical and short-field landings and helicopters as part of existing military training. Other training activities at North Field and the surrounding area include force-on-force airfield defense and offensive training, helicopter insertion and extraction, paratroops training, C-130 cargo drops, night vision goggle training, airfield seizure/defense, forward area refueling, camping, command and control, air traffic control, logistics, armament, rapid runway repair, and other airfield-related requirements. The activities at North Field create noise, but they are sporadic and occur only a few times each year over a short period (e.g., two to four weeks at a time). Additionally North Field is located far north on Tinian and away from the sensitive noise receptors concentrated in the southern portion of the island and approximately 5-miles away from the island of Saipan. Sensitive receptors in closer proximity to North Field are composed of cultural, historic, and natural resources that are visited on a sporadic and infrequent basis. Consequently, there has not previously been a need to assess potential noise impacts by developing airfield noise maps showing noise level boundaries as contour lines (DON 2010, 2015, 2020). No supersonic operations are conducted over Tinian or in overwater airspace adjacent to the island (DON 2020).

Low-level military training flights passing over the Military Lease Area result in periodically elevated noise levels throughout the day. In addition to average day-night sound level, different metrics can be used to describe noise sources in motion, where the sound level changes over time (i.e., sound increases as the source moves closer and decreases as it moves further away). In these cases, the maximum sound level (sometimes written as “ L_{max} ”) of a particular noise event, like an aircraft flying overhead, is the loudest sound level experienced for a moment during that event. However, the maximum sound level does not account for the duration of a noise event. Sound exposure level (sometimes written as “SEL”) is a metric that represents both the intensity of a sound and its duration providing a measure of the net exposure of the entire acoustic event. During an aircraft flyover, the sound exposure level combines both the maximum sound level and the quieter sound levels produced during beginning and end of the overflight but does not directly represent the sound heard at any given time.

Several TNI aircraft departure and arrival routes are proximate to the northern section of Tinian and contribute to noise levels over the northern portion of the island. There are nine single-engine and three multi-engine civilian aircraft based out of Saipan International Airport that contribute to the noise levels on the northern end of Tinian and, as with TNI, the majority of annual operations are inter-island air taxi flights (FAA 2024b). Under existing military training in the Military Lease Area, helicopters and tilt-rotor aircraft (MV-22, CH-53E, and AH-1/UH-1) operate at a variety of altitudes but generally below 2,000 feet and fixed-wing jet aircraft (F-35A/B/C variants, F-18E/F variants, and KC-130J) typically operate above 10,000 feet in the airspace around Tinian. However, to account for situations where lower flight activity by jet aircraft may occur, the sound exposure level and maximum sound level in decibels is provided at 5,000 and 2,000 feet. Table 3.8-3 presents single event noise levels experienced on the ground when different types of aircraft fly overhead at a certain speed and various altitudes to represent what the public would experience

in the vicinity of North Field or elsewhere on Tinian while training is occurring under existing conditions. People would not be directly underneath an aircraft overflight for much of the time, so typical single event noise levels experienced are often substantially less than presented in the table. Sounds above 65 decibels to approximately 90 decibels would typically be considered moderately loud, very loud between 90 to 120 decibels, and begin to become uncomfortable above 120 decibels (refer to Figure 3.8-1).

Table 3.8-3 Single Event Noise Levels (Sound Exposure Level and Maximum Noise Level) at Ground Level Underneath Common Military Aircraft Operations

Altitude (ft AGL)	MV-22 at 80 kts		CH-53 at 80 kts		AH-1/UH-1 at 80 kts		F-35A/B/C at 220 kts		F-18E/F at 220 kts		KC-130 at 220 kts	
	SEL (dB)	L _{max} (dB)	SEL (dB)	L _{max} (dB)	SEL (dB)	L _{max} (dB)	SEL (dB)	L _{max} (dB)	SEL (dB)	L _{max} (dB)	SEL (dB)	L _{max} (dB)
300	98	91	97	91	96	88						
500	95	86	95	87	93	84						
2,000	89	75	87	73	87	73	110	102	111	104	85	77
5,000							100	90	101	93	76	66
10,000							90	80	91	82	67	56

Legend: ft AGL = feet above ground level; kts = knots; dB = decibels; L_{max} = maximum sound level; SEL = sound exposure level.

Note: Modeled at a constant speed and altitude.

As shown in Table 3.8-3, the MV-22 and CH-53E produce approximately the same maximum sound level of 91 decibels. This sound level would be experienced on the ground directly underneath the aircraft operating at 300 feet above. The AH-1/UH-1, which is smaller and lighter, produces a maximum sound level of 88 decibels under the same conditions. The sound exposure level would range from 96 to 98 decibels for all three aircraft. Both the F-35 and F-18 produce similar noise levels, with a maximum sound level of 80 to 82 decibels when operating at 10,000 feet. When operating at 2,000 feet, which would occur during operations that use North Field, they produce a maximum sound level ranging from 102 to 104 decibels. For these aircraft the sound exposure level would range from 90 to 111 decibels under these conditions. The KC-130J generates a maximum sound level ranging from 56 to 77 decibels and a sound exposure level from 67 to 85 decibels.

Ground-based military training events in the Military Lease Area consist of urban terrain-type training, vehicle land navigation, convoy training, camping and other field activities. A limited amount of small arms training occurs within the Military Lease Area using either simulated munitions or sniper firing of ammunition into steel bullet traps within existing structures in the North Field area (DON 2010, 2015). In general, the sound level is quieter the farther away from the source, but environmental and weather conditions (e.g., terrain, vegetation cover, wind, humidity, temperature) affect how far sound travels. Under changing weather conditions, it is possible that a sound source can be barely detectable one day, but very loud and annoying the next (DoD Defense Noise Working Group 2018). As with aviation training, ground training occurs sporadically and for short durations throughout the year. Given the dense vegetation and varied terrain in the Military Lease Area along with the prevailing easterly trade winds, sounds from ground training events in the Military Lease Area are predominately imperceptible to populations south of the Military Lease Area.

3.9 Air Quality

In general, air quality is influenced by many factors, including the type and amounts of pollutants emitted into the atmosphere and local meteorological conditions. Most air pollutants originate from human-made sources, including mobile sources (e.g., vehicles), stationary sources (e.g., concrete batch plants, quarries, and power plants), indoor sources (e.g., certain building materials and cleaning solvents), and area sources (e.g., ground disturbance from construction and agricultural activities). Air pollutants are also released from natural sources such as volcanic eruptions and wildfires.

The Clean Air Act designates six pollutants as “criteria pollutants,” for which the U.S. EPA has established National Ambient Air Quality Standards (Appendix E). These criteria pollutants are carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone, suspended particulate matter with a diameter less than or equal to 10 micrometers (PM₁₀), fine particulate matter less than or equal to 2.5 micrometers (PM_{2.5}), and lead (42 U.S.C. 7401, et seq.). The Northern Mariana Islands are classified as being in attainment of the National Ambient Air Quality Standards (40 C.F.R. 81.354), meaning the air quality complies with the standard for each criteria pollutant.

In addition to the “criteria pollutants,” national emission standards exist for hazardous air pollutants (40 C.F.R. 61). Hazardous air pollutants include substances known or suspected to cause cancer or other adverse health effects at or above certain exposure levels. Unlike criteria pollutants, ambient air quality standards have not been established for hazardous air pollutants.

Greenhouse gases primarily consist of carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), and other fluorine-containing compounds. Greenhouse gas emissions resulting from human activities trap heat in the atmosphere, which can have global effects. Scientific evidence indicates a trend of increasing global temperature over the past century due to increased greenhouse gas emissions.

Tinian meets all federal air quality standards under the Clean Air Act. With a population of approximately 2,000 people, several factors contribute to this compliance, including its isolated location in the Pacific Ocean, prevailing east-to-west winds (Figure 3.9-1), a rural development pattern, and the absence of heavy industry. In accordance with the General Conformity regulations (40 C.F.R. 93.153(c)(2)(xxii)), the air quality analysis in this Revised Draft EIS analyzes criteria and hazardous air pollutant emissions in the air above the island and the nearshore environment from the ground surface up to 3,000 feet above ground level. These emissions generated at elevations above 3,000 feet have a minimal effect on ground level pollutant concentrations (U.S. EPA 1992).

3.9.1 Sources of Air Emissions

The CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality (the Division going forward), does not monitor ambient air quality data for Tinian. The Division’s Clean Air Program protects public health and the environment by enforcing local and federal environmental regulations that limit the release of air emissions. This includes issuing permits for sources of air pollution, conducting compliance inspections, responding to citizen complaints, and issuing notices of violations or administrative orders when necessary. Additionally, the Division conducts vehicle emission tests for diesel-powered motor vehicles (Bureau of Environmental and Coastal Quality 2023).

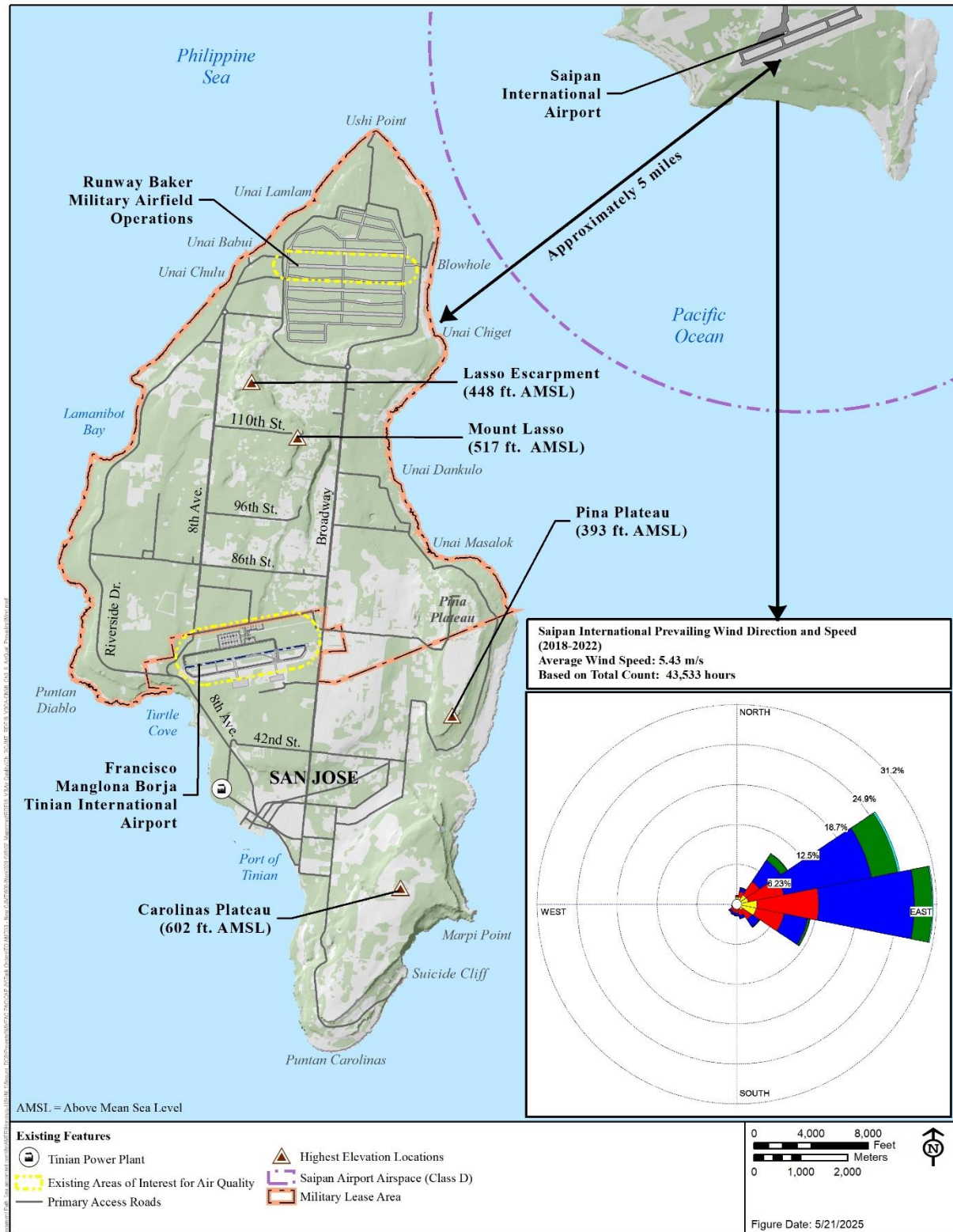


Figure 3.9-1 Prevailing Wind Patterns for Tinian, based on the Wind Rose for Saipan International Airport

Air emissions can come from stationary sources (e.g., power plants) or mobile sources (e.g., vehicles, aircraft). Stationary sources of air pollutants on Tinian include power generation units and distribution facilities that comprise the power system owned by the Commonwealth Utilities Corporation. This system consists of four 2.5-megawatt and two 5-megawatt diesel generators for a total of 20 megawatts of power generation (U.S. Energy Information Administration 2018). This facility is in San Jose about 1,000 feet west of the nearest residences. In addition to these stationary sources, various facilities including the Maui Well Number 2 and the U.S. Air Force Divert airfield facility use of fuel-burning backup generators that run intermittently.

The construction related to the U.S. Air Forces Divert facility at the TNI began in early 2022, and this activity represents a short-term, temporary source of air emissions on Tinian. Emissions from fuel-burning construction equipment and on-road vehicles are considered mobile sources of emissions.

The primary long-term source of mobile emissions on Tinian comes from vehicular traffic along major travel routes, such as Broadway, 8th Avenue, Grand Avenue, and Canal Street, which connect the village of San Jose to the Military Lease Area. Operations of aircraft at TNI and marine vessels at Tinian Harbor, including those used during current military training events on Tinian, also generate mobile source emissions.

Particulate matter emitted from non-point sources, such as unpaved or poorly paved surfaces, undeveloped land, or material storage piles – referred to as fugitive dust – comes from civilian and military vehicle travel and other activities that disturb the ground surface within the Military Lease Area. Existing agricultural activities that occur within the Military Lease Area and on public and private lands in the community south of the Military Lease Area also produce fugitive dust emissions through earth disturbance. Volcanic eruptions can also be a source of fugitive dust but the six Northern Mariana Islands that contain active volcanoes (Anatahan, Guguan, Pagan, Agrihan, Asuncion, and Uracus) are far enough away from Tinian that they are not a source of dust emissions in the project area.

3.9.2 Greenhouse Gas Emissions

Natural climate cycles and other factors, including human activities, influence temperatures and weather patterns at regional scales with major indicators of climate conditions include air temperature, sea level rise, and annual precipitation. Data observed at the Saipan International Airport show a trend of increasing air temperature during the day (90° Fahrenheit or warmer) and a decline in the annual number of cool nights (below 74° Fahrenheit) since 2006. Annual total rainfall data collected at the Saipan International Airport from 1989 to 2020 show little average change over the past 30 years. The sea level around the CNMI is rising, with Saipan's tide gauge recording a long-term sea level rise of 0.07 inches per year since 1978 (Pacific Islands Regional Climate Assessment 2021).

The CNMI released a 2024 Priority Climate Action Plan, which outlines five priority measures, each targeting a specific aspect of emissions reduction: electricity generation, transportation, solid waste management, wastewater treatment, and carbon removal. This plan also includes a priority greenhouse gas inventory for the CNMI for the base year of 2023, as shown in Table 3.9-1.

Table 3.9-1 CNMI 2023 Greenhouse Gas Emissions Inventory

<i>Priority Sector for the CNMI Priority Climate Action Plan</i>	<i>Annual CO₂e Emissions (Metric Tons)</i>
Electricity Generation (stationary combustion)	224,574
Transportation (mobile combustion from road vehicles, marine vessels, and aviation)	212,788
Wastewater Treatment	5,428
Solid Waste	377
Subtotal of Gross Emissions of Priority Sectors for the Priority Climate Action Plan	443,167
<i>Forestry Carbon Sequestration</i>	<i>-199,228</i>
Net Emissions of Priority Sectors for Priority Climate Action Plan	243,939

Legend: CNMI = Commonwealth of the Northern Mariana Islands; CO₂e = carbon dioxide equivalent.

Source: CNMI Climate Policy and Planning Program 2024.

Energy generation accounts for approximately 51 percent of the CNMI's priority greenhouse gas emissions, as the CNMI relies almost entirely on diesel fuel to generate electricity. Less than 1 percent of the CNMI's power supply comes from solar net-metered systems (CNMI Climate Policy and Planning Program 2024).

On April 15, 2024, Governor Palacios signed the Blue Planet Climate Agreement, committing the CNMI to achieving 100 percent renewable energy by 2045.

3.10 Public Health and Safety

This section describes current public health and safety conditions on the island of Tinian for the following categories: ground training, aviation training and civilian aviation, radio frequency and microwave emission, unexploded ordnance and discarded military munitions, hazardous materials and waste, natural hazards, wildfire, flood hazards, and protection of children from environmental health and safety risks.

The Proposed Action includes establishing a new lease for the USAGM property on Saipan and the repurpose of the existing facilities and communications towers. The use of the property would remain similar to the current use under this new lease to the DoD. The public is restricted from accessing the property by a perimeter fence. No military training occurs at this location. Due to the nature of the Proposed Action at the USAGM Saipan site, the existing environment is not described further in this section.

3.10.1 Ground Training

Training activities currently occur on Tinian within the Military Lease Area as described in previous NEPA documents (DON 2010, 2015), and in recent years have included large and medium events (e.g., Valiant Shield and Cope North), as well as smaller events. Ground-based activities include surveillance and reconnaissance, military operations in urban terrain, evacuation operations, command and control, logistics, camping, land navigation, convoy training, non-

combatant evacuation operations, operations at the Port of Tinian and other non-live-fire activities, and limited live-fire training (i.e., small arms into bullet traps within existing structures).

Military services employ a proactive and comprehensive program to ensure the safety and health of personnel and the general public. Service members training on Tinian are required to comply with all federal and local environmental laws and regulations, in addition to established range, aviation, and munitions safety directives and standard operating procedures. These include the *Marianas Training Manual*, *Joint Region Marianas Fire Management Plan* (Commander, U.S. Naval Forces Marianas Instructions 3500.4E and 3500.4C, respectively), and *Commonwealth of the Northern Mariana Islands Field Guide for United States and Visiting Forces Mariana Islands Range Complex*, among others as required to perform specific training objectives. Prior to a training activity occurring, an exercise or activity plan is coordinated with the CNMI Government and the Tinian Mayor's Office and any required regulatory agencies (e.g., CNMI Department of Public Works for road closure requests). Exercise planning includes coordination on biosecurity inspections, temporary public access restrictions, environmental compliance, and natural resources consultations. The planning considers other factors such as the ability to control access to an area; schedule (time of day, day of week); duration and intensity of activities; how required range safety procedures or other operational controls would be applied; and safety history. Potential users of an area are notified prior to the event, including where temporary access restrictions may occur. A qualified Range Safety Officer is always on duty during training events to ensure training areas are clear of non-participants during training events.

There are no residences within the Military Lease Area. The nearest residential area is Marpo Heights, located approximately 1 mile south of the Military Lease Area, east of Broadway. However, public access to the Military Lease Area by locals and visitors occurs on a daily basis for recreation, tourism, subsistence gathering purposes, and visiting cultural sites. The Military Lease Area is unfenced except for a formerly used unexploded ordnance area known as the Tinian Mortar Range, private cattle ranching operations, and the former USAGM facility.

3.10.2 Aviation Training and Civilian Aviation

The military currently uses North Field with expeditionary air traffic control. Other military activities at North Field include humanitarian assistance/disaster relief practice, off-loading of cargo, and helicopter night vision landings. Rotary-wing aircraft activities include takeoffs and landing, and troop insertion and extraction. All aircraft are required to maintain an altitude greater than 1,000 feet above ground level over wetlands (Lake Hagoi, Mahalang, Bateha) and limestone forest associated with Mount Lasso.

Military aircraft use of TNI accounts for less than 1 percent of the airport's operations (FAA 2023). Fixed-wing aircraft activities include arrested landings and expeditionary refueling at TNI. Both TNI and North Field allow aircraft loading and unloading in support of military training.

Civilian air taxi/commuter flights account for most aircraft operations at TNI. Two fatal civilian aircraft incidents have occurred in the last 20 years involving flights enroute either to or from TNI (National Transportation Safety Board 2014, 2015). The FAA also recorded three non-fatal safety-related incidents between 2010 and 2019 during taxi or take-off on Tinian (National Transportation Safety Board 2017, 2018, 2019). All resulted in aircraft damage, and two resulted in personal injury but no fatalities.

3.10.3 Radio Frequency and Microwave Emissions

Electromagnetic radiation: Radars, cell phones, radio transmitters, and other navigation, communications and electronic devices used by the military and available in the home produce electromagnetic radiation. These devices can also cause electrical interference with each other, including home entertainment equipment (e.g., television and radio) as well as civilian and military frequency-dependent systems such as aircraft control towers and cell phone towers. Exposure to the radio frequency electromagnetic spectrum (between 3 kilohertz and 300 gigahertz) can adversely affect people, munitions, and fuel (DON 2011).

In 2014, the Defense Information Systems Agency Joint Spectrum Center conducted an analysis identifying potential electrical interference between USMC communication systems and existing civilian and military systems on Tinian. Based on this analysis, it was recommended that the USMC avoid using frequencies close to those assigned to current systems and maintain minimum separation distances from these systems.

To assess the potential for exposure of military personnel and the public to electromagnetic radiation, the Naval Surface Warfare Center conducted two evaluations in 2013 and 2014. The only source of electromagnetic radiation above 3 kilohertz identified was the USAGM's Robert E. Kamosa Transmitting Station. Fencing around the facility protected military personnel and the public from exposure to this electromagnetic radiation. USAGM ceased operations at the transmitting station in August 2024.

3.10.4 Unexploded Ordnance and Discarded Military Munitions

Unexploded ordnance and discarded military munitions from World War II are present on Tinian. These include tank munitions, mortars, and bazookas used during ground assaults. After the initial battle, the U.S. military constructed airfield facilities on the northern part of the island, which involved grading and the use of fill material from other parts of the island. The 2010 *Final Historical Ordnance Assessment, Guam and CNMI Area, P-50*, identified shallow soil and this extensive construction of U.S. military facilities at North Field as mitigating factors that reduced the potential presence of unexploded ordnance (DON 2010). In addition, unexploded ordnance was removed during the subsequent rebuilding of San Jose and the Port of Tinian. Unexploded ordnance may still be present on Tinian in undeveloped areas or at depths below previously disturbed areas (DON 2010). A 2015 Environmental Report for Tinian confirmed the presence of unexploded ordnance near caves along the cliffs below the east side of Mount Lasso (DON 2015). The northern third of Tinian is classified as a high probability area for the presence of unexploded ordnance, and the middle third of Tinian is classified as a medium probability area.

The single known source of unexploded ordnance after World War II is the Tinian Mortar Range (also known as the Chiget Mortar Range), located on the island's northeastern coast, which was used for military live-fire training events from 1945 through 1994 (GMP 1997). This former mortar range is now fenced and is being addressed under the Navy's Munitions Response Program (DON 2015). The U.S. military, the U.S. EPA, and the CNMI routinely advise the public not to handle or step on any suspicious items, and to report the presence of such items immediately. Qualified military explosive ordnance disposal technicians investigate reports of suspicious items and if unexploded ordnance were to be identified, they would handle and remove it for offsite disposal or destroy it in place if deemed unsafe to move. All actions to address munitions of explosive concern would be in accordance with local and federal regulations or instructions.

3.10.5 Hazardous Materials and Waste

In 1997, an Environmental Baseline Survey was conducted for lands leased by the U.S. on Tinian that identified sites of environmental concern caused by the historical use of hazardous materials during World War II and from more recent agricultural and commercial activities (GMP Associates, Inc. 1997). The 2015 Environmental Report for Tinian updated the 1997 Environmental Baseline Survey, re-evaluating 41 sites for existing conditions and identifying several new sites containing old building structures, scrap metal, container drums, and other conditions requiring further investigation and possible cleanup (DON 2015).

Military training events are conducted in compliance with standard operating procedures and federal and CNMI laws. Training is coordinated with Joint Region Marianas environmental staff who coordinate with federal and CNMI agencies regarding the handling of hazardous materials. As part of current military training exercises, portable aboveground bulk diesel storage containers have been temporarily staged and used at North Field (DON 2014a). The military ensures proper storage and handling of hazardous materials inside an impervious barrier and away from catch basins, storm drains, and waterways. The military also complies with the Tinian Spill Control Plan and has trained spill response teams available during training events (M. Cruz, Joint Region Marianas, Personal Communication, 2014). Outside of limited use during training events, the military does not routinely use any pesticides, herbicides, industrial or household cleaning products, paints, or solvents within the Military Lease Area.

The USAGM Tinian site uses minimal amounts of hazardous materials such as pesticides, herbicides, industrial or household cleaning products, paints, or solvents for interim maintenance since the closure of the facility began in August 2024. Additionally, the site has a standby power plant consisting of three diesel-fired generators, two free-standing aboveground storage tanks, and a fuel pump house. The aboveground storage tanks are surrounded by an earthen containment berm connected to an oil/water separator. No releases related to the fuel storage activities at the USAGM have been reported (DON 2013).

3.10.6 Natural Hazards

Potential natural hazards on Tinian that could affect public health and safety include wildfire and floods.

3.10.6.1 Wildfire

Wildfires can occur on Tinian, and there is greater danger of grass and other vegetation-based fires during the dry season, which runs from January through April (Pacific Fire Exchange 2019). Tinian's Department of Fire and Emergency Medical Services and Department of Public Works have constructed fire breaks around residences vulnerable to wildfire (Pacific Fire Exchange 2019). As of 2014, there were no records of wildfires on Tinian resulting from military training events (NAVFAC Pacific 2014).

3.10.6.2 Flood Hazard (Flood Zones)

The Federal Emergency Management Agency provides Flood Insurance Rate Maps that define flood zones and show the geographic areas with varying levels of flood risk: V, X, and A. On the Flood Insurance Rate Map of Tinian, the seaward coastline areas are designated as Flood Zone V, or "Special Flood Hazard Area subject to coastal high hazard flooding" (Figure 3.10-1) (FEMA 1998, 2006). Zone V areas may be designated with known wave-induced elevations. However, on

Tinian, this area is designated as “without base flood elevation.” Most landward areas on Tinian, including those within the Military Lease Area, such as the former USAGM Tinian site, are designated as Zone X, areas of minimal flood hazard, and are for the most part outside of the 500-year floodplain areas. Nineteen distinct areas on Tinian are designated as Flood Zone A, a Special Flood Hazard Area that usually indicates a base flood elevation and may also indicate the type of flooding (e.g., sheet flow, ponding, shallow). These distinct areas are in locations that include Lake Hagoi, portions of North Field, TNI, and Marpo Marsh.

3.10.7 Protection of Children

Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (April 21, 1997), requires federal agencies to identify and assess environmental risks and safety risks that may disproportionately affect children. On Tinian, most families with children reside south of the Military Lease Area in the villages of San Jose and Marpo Heights. The island’s schools, parks, and playgrounds are located within San Jose. No children reside, attend school, or otherwise congregate for long periods in the Military Lease Area.



Figure 3.10-1 Special Flood Hazard Area Subject to Coastal High Hazard Flooding

3.11 Utilities

Utilities on Tinian include water supply (potable water, non-potable water, and groundwater), wastewater treatment, management of solid and hazardous waste, green waste, stormwater, electrical power systems, and communications systems.

3.11.1 Potable, Non-Potable, and Groundwater Water Supply

3.11.1.1 Commonwealth Utilities Corporation

The Commonwealth Utilities Corporation owns, operates, and maintains the public water system on Tinian, including sources, treatment, storage, testing, and distribution of potable water to approximately 800 metered connections outside the Military Lease Area (Commonwealth Utilities Corporation 2015). The distribution system does not extend into the Military Lease Area.

A single groundwater well, Maui Well Number 2, provides a total operational capacity of approximately 1.5 million gallons per day and is the sole source of potable water for the island (Commonwealth Utilities Corporation 2015; DON 2019). Maui Well Number 2 meets U.S. EPA Primary and Secondary Drinking Water Standards (Commonwealth Utilities Corporation 2024a). Figure 3.11-1 provides an overview of the Commonwealth Utilities Corporation public water system and its components. The system disinfects water using gaseous chlorine and no other water treatment is necessary.

Table 3.11-1 summarizes water production (i.e., extraction) quantities from Maui Well Number 2 as recorded by the Commonwealth Utilities Corporation at the well site for the last five years. Production includes water delivered into the distribution system, which is inclusive of water billed to customers, unmetered uses, leaks, losses, and overflows.



Figure 3.11-1 Public Water System

**Table 3.11-1 Commonwealth Utilities Corporation
Water Production from Maui Well Number 2**

<i>Year</i>	<i>Total Annual (MG)</i>	<i>Average Daily (MGD)</i>
2019	313	0.86
2020	312	0.85
2021	307	0.84
2022	321	0.88
2023	306	0.84
Average		0.85

Legend: MG = million gallons; MGD = million gallons per day.

Source: Commonwealth Utilities Corporation 2024b.

Table 3.11-2 summarizes billing records for all the Commonwealth Utilities Corporation customers based on meter readings. All registered connections served by the Commonwealth Utilities Corporation are metered and read monthly.

**Table 3.11-2 Commonwealth Utilities Corporation Billed
Water Demand**

<i>Year</i>	<i>Total Annual (MG)</i>	<i>Average Daily (MGD)</i>
2019	88	0.24
2020	77	0.21
2021	81	0.22
2022	84	0.23
2023	87	0.24
Average		0.23

Legend: MG = million gallons; MGD = million gallons per day.

Source: Commonwealth Utilities Corporation 2024c.

The average daily production from Maui Well Number 2 between 2019 and 2023 was 0.85 million gallons per day and the average billed water demand was 0.23 million gallons per day.

The U.S. EPA has stated that the sustainable yield at Maui Well Number 2 in drought conditions is 1.0 million gallons per day (Appendix M, *Utility Studies–Potable Water Study*). This applies only to the Maui Well Number 2 location and does not indicate Tinian’s overall sustainable yield.

The Commonwealth Utilities Corporation water system includes a total of 1.25 million gallons of storage between three existing aboveground welded steel reservoirs.

- Marpo Tank has a capacity of 0.25 million gallons and is currently out of service.
- Carolinas Tank 1 has a capacity of 0.50 million gallons.
- Carolinas Tank 2 has a capacity of 0.50 million gallons and is in operation.

3.11.1.2 Francisco Manglona Borja / Tinian International Airport

TNI is owned and operated by the Commonwealth Ports Authority. As a customer of the Commonwealth Utilities Corporation, it receives all potable water from Maui Well Number 2. Downstream of the Commonwealth Utilities Corporation water meter, the Commonwealth Ports Authority operates its own water system within the airport property.

3.11.1.3 United States Agency for Global Media

The USAGM, formerly the International Broadcasting Bureau, operated a radio transmitting facility on Tinian. This facility is not connected to the Commonwealth Utilities Corporation system. Rainwater is captured from a portion of the roof and stored in two aboveground tanks with a total capacity of 8,500 gallons. All water used at the facility is non-potable, except for a point-of-use-reverse osmosis system which treats water for potable use in the kitchen. Most water comes from harvesting rainwater, except in dry months. Approximately 5,000 gallons per year are purchased from Commonwealth Utilities Corporation and trucked in bulk.

3.11.1.4 Tinian Mayor's Office

Groundwater is owned by the Tinian Mayor's Office and a fee is charged for the quantity of water extracted. The Tinian Mayor's Office owns and operates two non-potable water wells: M-21 and M-26. Neither well is connected to a pipeline network.

- Well M-21 is primarily used by the contractor for the U.S. Air Force's Tinian Divert Infrastructure Improvements project at TNI. It has a water meter and a 40,000-gallon tank. In 2024, it was permitted to extract up to 1.8 million gallons per month (J. Aldieri, NAVFAC Marianas, Personal Communication, September 10, 2024).
- Well M-26 is primarily used by cattle ranchers and is not metered.

3.11.2 Wastewater Treatment

Tinian has no centralized municipal wastewater collection and treatment system. Public and private buildings rely on individual septic tanks and leach fields, or seepage pits for wastewater treatment and disposal. The Bureau of Environmental and Coastal Quality Wastewater, Earthmoving, and Erosion Control Program oversees residential septic systems design and permitting. It also conducts village-by-village household surveys to identify septic systems that require upgrades or need a pump-out to properly collect and treat wastewater (CNMI Bureau of Environmental and Coastal Quality 2020). The Commonwealth Utilities Corporation has initiated a feasibility study for a new wastewater treatment system with collection mains for Tinian (CNMI Bureau of Environmental and Coastal Quality, Personal Communication, September 12, 2024). Until such a system is funded and constructed, residents and visitors will continue to rely on private septic systems.

The DoD owns and operates an existing septic tank and leach field at Camp Tinian, which is located inside the Military Lease Area. The septic tank measures 25 x 20 x 5 feet and the leach field is 75 x 40 feet. The system is permitted for an average daily sewage flow of 6,640 gallons per day (DEQ 1999). This Individual Wastewater Disposal System is not currently in use (Senior Chief Petty Officer, U.S. Navy, Personal Communication, September 10, 2024).

3.11.3 Solid Waste and Hazardous Waste

The CNMI Department of Public Works operates an unlined, open dump for municipal solid waste at Tinian Puntan Diablo disposal facility located adjacent to 8th Avenue near San Jose and the southwest coast. In 2010, the Bureau of Environmental and Coastal Quality issued an administrative order to the CNMI Department of Public Works documenting violations of the CNMI Solid Waste Management Regulations and imposing operational requirements. In response to the administrative order, the CNMI Department of Public Works planned to close the dump by

February 2017 but has not done so, leaving the open dump as the only solid waste disposal option on Tinian (USMC Utilities Working Group Meeting April 2023). Because the existing Puntan Diablo disposal facility has limited remaining capacity, the CNMI is initiating permitting efforts for a new landfill at Atgidon site, located north of 86th Street and between Riverside Drive and 10th Avenue. The CNMI anticipates permitting of this new landfill would take 5 years to complete.

In 2020, the CNMI Department of Public Works completed construction of the Tinian Transfer Station and Recycling Center, and operations began in 2022 (CNMI Department of Public Works 2020, 2022). The facility currently collects source-separated recyclable materials such as cardboard/paper, plastic bottles, and aluminum cans. Recyclable materials are shipped off the island for processing and sale, and the costs of handling and transportation exceed the revenue generated by the sale of the recyclables.

Tinian has no public facilities for hazardous waste transport, storage, or disposal. Commercial hazardous waste generators use contractors to dispose of hazardous waste off the island (CNMI Office of the Governor 2023). Household hazardous waste in the municipal solid waste stream includes used batteries, electronics, appliances, cleaning agents, fertilizers, and pesticides. These items are currently disposed of in the same landfill as all other solid waste on Tinian.

Due to the lack of a permitted landfill or hazardous waste disposal facility on Tinian, the military currently removes all solid and hazardous waste generated during training exercises for off-island disposal in accordance with applicable laws and regulations. This includes expended brass deposited during training events (DON 2023).

The USAGM facility contains two 30,000-gallon diesel fuel storage tanks (International Broadcasting Bureau 2009). The facility generates universal wastes, such as fluorescent light bulbs and batteries, which are temporarily stored in the facility's hazardous waste storage area before transporting them off-island for proper disposal/recycling (DON 2013). Solid waste from the facility is managed within the local solid waste infrastructure. Residual waste, after recycling, is disposed of at the Puntan Diablo facility.

3.11.4 Green Waste

Green waste generated by residents on Tinian is managed at the Tinian Organics Processing Site operated by the Department of Public Works. It was permitted in June 2022 for green waste disaster debris and does not accept green waste from commercial generators. The site is equipped with a wheel loader and a chipper for processing and storing green waste. It receives approximately 660 cubic yards per year (CNMI Office of the Governor 2023).

3.11.5 Stormwater Management

Stormwater is managed within the public road infrastructure, at TNI, and the Port of Tinian. The CNMI Department of Public Works maintains the roadway stormwater infrastructure, primarily consisting of concrete gutters, curbs, and vegetated swales. The Commonwealth Ports Authority maintains the airport and port stormwater infrastructure. At the Port of Tinian, inlets and pipes direct runoff from paved areas into shallow retention basins. At TNI, paved surface areas are graded to direct runoff into large, shallow retention basins. Stormwater captured in swales, retention basins, and depressions infiltrates rapidly due to the high soil porosity throughout the island. During heavy rainfall, excess stormwater flows into the ocean.

The CNMI Division of Environmental Quality, Bureau of Environmental and Coastal Quality, and the U.S. EPA regulate stormwater under the National Pollutant Discharge Elimination System. The program regulates three pollutant sources: municipal separate storm sewer systems, construction activities, and industrial activities. Tinian is not regulated as a municipal separate storm sewer system because no municipal stormwater outfalls exist on Tinian. Construction and industrial activities must implement best management practices to minimize stormwater runoff from transporting pollutants to surface waters, nearshore waters, and groundwater.

In the Military Lease Area, stormwater flows mainly over unmaintained swales and shallow depressions constructed during World War II. Tinian's highly porous soils and karst geology enable rapid stormwater infiltration.

3.11.6 Electrical Power System

The Commonwealth Utilities Corporation operates a diesel-fueled power plant on Tinian consisting of six engines totaling 20 megawatts of rated capacity. There are 18.5 megawatts of this capacity held for reserves to support the island wide distribution covered in this study (Commonwealth Utilities Corporation 2021). The operating capacity of the power plant is currently 18.2 megawatts. In 2021, the Commonwealth Utilities Corporation reported an average peak load of 1.9 megawatts per day, lower than the pre-2019 average of 2.5 megawatts per day (Commonwealth Utilities Corporation 2021). Four feeder circuits consisting of overhead electrical lines convey power from the plant to the customers. Feeders 1, 2, and 3 supply power outside the Military Lease Area. Feeder 4 supplies power within the Military Lease Area to the former USAGM facility. Feeder 4 has a 5-megawatt capacity with the USAGM using 1.4 megawatts, leaving 3.6 megawatts available in the Military Lease Area. See Appendix M, Electrical System Analysis for detailed information on the existing electrical power system.

The Commonwealth Utilities Corporation also has several small solar photovoltaic projects installed at public facilities and schools and is planning a 3-megawatt solar photovoltaic plant (Energy Information Administration 2020). To meet the Comprehensive Sustainable Development Plan's clean affordable energy goal of meeting 20 percent of the peak electricity demand on each of the inhabited CNMI islands, the Commonwealth Utilities Corporation is developing a Comprehensive Energy Plan and planning installation of an integrated utility-scale photovoltaic system (CNMI Office of Planning and Development 2021). The corporation is collaborating with the U.S. Department of the Interior, Office of Insular Affairs and the U.S. Department of Energy to update a new Energy Master Plan (Commonwealth Utilities Corporation 2021).

In 2020, the Commonwealth Utilities Corporation received a \$36 million CNMI federal grant to repair and reinforce infrastructure damaged by recent typhoons. The funds will support powerplant upgrades, concrete power pole installation, and undergrounding of transmission lines to protect them from future storm damage (Energy Information Administration 2020). As of October 2021, CNMI had installed approximately 1,000 new concrete power poles on Tinian (Commonwealth Utilities Corporation 2021). Figure 3.11-2 provides an overview of power distribution on Tinian.



Figure 3.11-2 Tinian Power Distribution

3.11.7 Communications

Tinian's information technology and communications infrastructure includes telephone, internet, cable television, and satellite service. IT&E and Docomo Pacific provide commercial information technology and communications services. Both companies provide phone, internet, and cellular phone service through overhead distribution lines and towers in the southern part of Tinian. Marianas Cable Vision Broadband and Docomo Pacific provide cable television service through overhead distribution lines in the southern part of Tinian. The Military Lease Area has no commercial or military information technology and communications infrastructure.

Two undersea fiber optic cable links, one owned by IT&E and one owned by Docomo Pacific, connect Tinian and Saipan to the Trans-Pacific Cable hub on Guam, enabling phone, internet, cellular phone, and high-definition television services. A microwave system provides alternative connectivity if the cables fail. The USAGM Tinian site has thirteen towers, and the USAGM site on Saipan has four.

3.12 Topography, Geology, and Soils

Topography, geology, and soils describe surface and subsurface features of land. Topography is typically described with respect to the elevation, slope, and surface features found within a given area. Geology is characterized by the physical features of the earth and includes rock type, geologic structure (e.g., faults, folds, and tilting of rocks) and mineral deposits. Soil is the unconsolidated mineral or organic material on the top layer of the earth that serves as a natural medium for the growth of plants.

The USAGM Saipan site is not discussed further under the existing environment section for topography, geology, and soils. USMC would repurpose existing communication towers at the USAGM Saipan site, and no clearing or new construction would be required.

3.12.1 Topography

Tinian is approximately 12 miles long and 6 miles wide. The island is composed of a series of limestone plateaus separated by steep slopes and cliffs (U.S. Department of Agriculture 1989). The northern portion of the Military Lease Area is generally level with elevations that range between 30 and 100 feet above mean sea level, except for Lake Hagoi, where the elevation is approximately at sea level. The southern portion of the Military Lease Area and TNI is a broad and gently sloping plateau. Within the northern part of this plateau is a highland with a maximum elevation of 545 feet above mean sea level at Mount Lasso. From Unai Dankulo and Unai Masalok in the southeastern portion of the Military Lease Area, a low, broad depression extends southward past Marpo Marsh and includes San Jose Village and the area around the Port of Tinian. This area has a maximum elevation of 150 feet above mean sea level. To the east of this broad depression are the Pina Plateau and Carolinas ridges that extend to the southern tip of Tinian and includes Kastiyo, the highest part of the island at 614 feet above mean sea level. It has steep slopes and cliffs as high as 500 feet above mean sea level. Wetland topographic features including Lake Hagoi and Marpo Marsh are discussed in Section 3.14.1 (Surface Water). Topographic contours are shown in Figure 3.12-1.



Figure 3.12-1 Tinian Topographic Map

3.12.2 Geology

Tinian is a volcanic arc island formed by the Pacific Plate subduction under the Philippine Plate, approximately 100 miles west of the Mariana Trench. The foundation of the island, predominantly below sea level, is composed of low-permeability volcanic rock. However, the dominant lithology above sea level overlying the volcanic material is high-permeability, coralline limestone from Plio-Pleistocene carbonate facies and raised Holocene beach and reef deposits. Tectonic uplift and high-angle, normal faulting impacted these sequences, as evidenced by fault transects observed throughout the island, creating complex dynamics in the permeability and structure of Tinian's rock units (USGS 2000 and Stafford, et al. 2005).

Four major geologic units make up the island; the Tinian Pyroclastic Rocks, the Tagpochau Limestone, the Mariana Limestone, and unconsolidated sediments consisting of beach deposits, alluvium, and colluvium. The porous nature of coral reefs, and the high susceptibility of limestone to solution weathering favor high hydraulic conductivities in the limestone units. In contrast, hydraulic conductivities of the pyroclastic rocks tend to be low due to poor sorting and the high susceptibility of some volcanic minerals to chemical weathering and alteration to clays. (Gingerich, 2002). Beach deposits are mostly medium-to-coarse grain calcareous sands, gravels, and rubble interspersed over exposed limestone.

Karst geology is present on Tinian in the Mariana and Tagpochau Limestone formations. Karst is a distinctive geologic formation created when surface or groundwater dissolves soluble rocks such as limestone. Karst features include large voids, such as sinkholes and caves. Sinkholes can act as catchments for surface water. Caves (i.e., banana holes, flank margin caves, and fracture caves) (Stafford et al. 2002) can form in limestone deposits in the zone of mixing of salt and freshwater. Epikarstis, defined as the upper layer of eroded rock, is characterized by rough surfaces, little soil, and small cavities.

On Tinian, sinkholes and collapsed surface features suggest the presence of channeled internal drainage and cavernous subgrade conditions (Doan et al. 1960). Subgrade conditions have not been mapped to assess the actual conditions including any potential effects to the stability of the limestone. Epikarst is present in all limestone rock formations on Tinian, and its characteristics vary based on proximity to the coast, appearing more jagged toward the coast as a result of physical and chemical interactions with the saltwater ocean and sea spray (Stafford et al. 2004). Caves, notches, cuts, and slumped materials (i.e., materials that have collapsed or fallen) are present along the Tinian coast. Figure 3.12-2 provides the locations of known karst features on Tinian. Although this figure depicts a specific recharge feature (i.e., Lasu recharge cave, as described in Stafford et al. 2002) south of Mount Lasso, groundwater recharge occurs throughout Tinian in areas of limestone formations.

3.12.3 Soils

Soil classes across Tinian are depicted in Figure 3.12-3. Soil descriptions and properties characterizing shrink/swell potential and erosion potential are provided in Table 3.12-1.



Figure 3.12-2 Tinian Karst Features

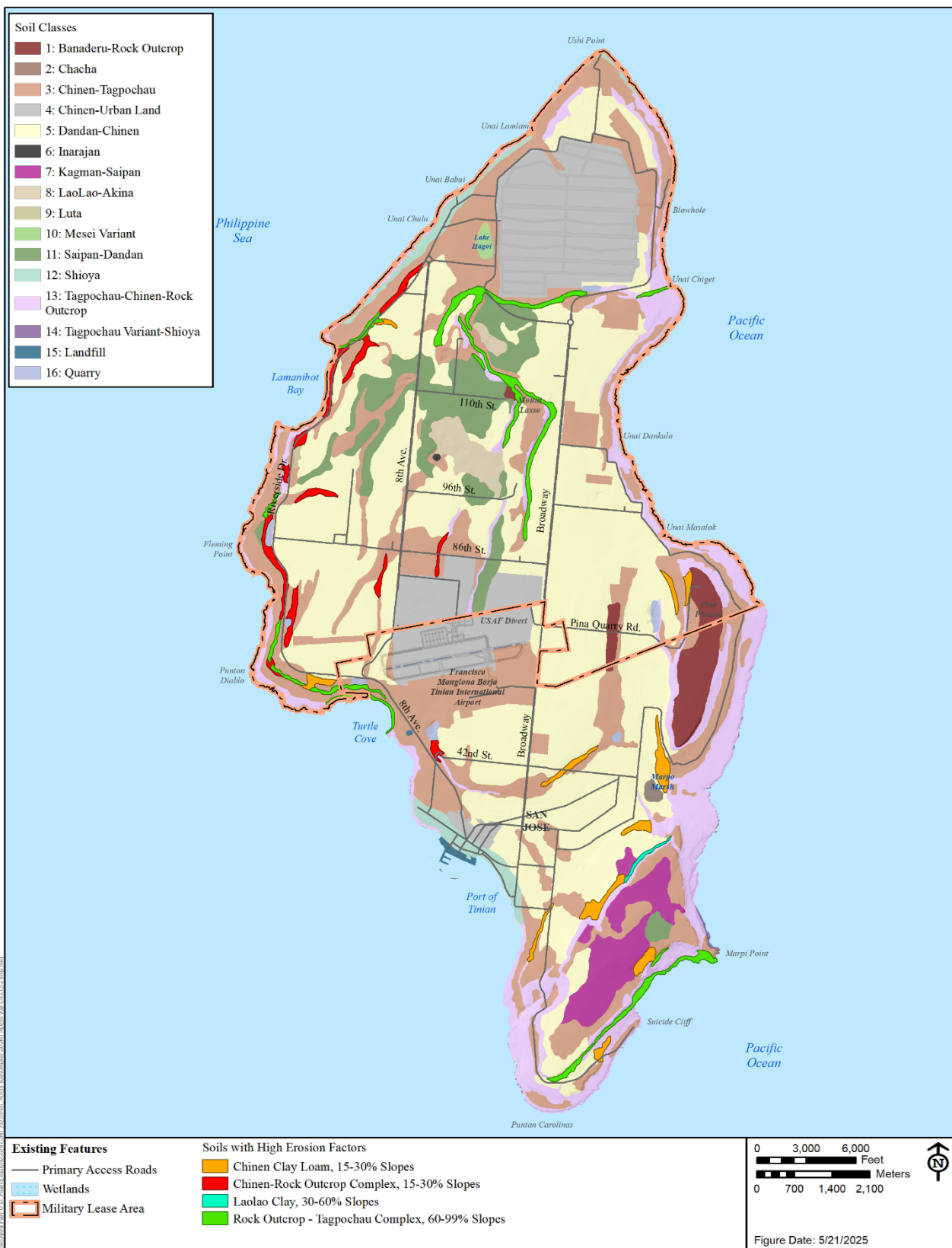


Figure 3.12-3 Tinian Soils

Table 3.12-1 Tinian Soil Classifications and Properties

<i>Soil Class</i>	<i>Soil Description</i>	<i>Shrink/ Swell Potential</i>	<i>Erodibility Factor (K)</i>	<i>Location</i>
Banaderu-Rock Outcrop	Shallow, well drained, nearly level to moderately steep soils and rock outcrop.	Moderate	0.20	Limestone Plateaus
Chacha	Shallow and deep, poorly drained, and found on steep slopes, plateaus, and hills.	High	0.15	Limestone Uplands
Chinen-Tagpochau	Very shallow and shallow, well drained, nearly level to strongly sloping soils, and found on plateaus and side slopes.	Moderate	0.10	Limestone Plateaus
Chinen-Urban Land	Shallow, well drained, nearly level soils and urban areas.	Moderate	0.15	Limestone Plateaus
Dandan-Chinen	Shallow and moderately deep, well drained, nearly level to strongly sloping soils.	Moderate	0.15	Limestone Plateaus
Inarajan	Very deep, poorly drained soils.	High	0.24	Valley Bottoms and Coastal Plains
Kagman-Saipan	Deep and very deep, well drained, nearly level to strongly sloping soils.	Moderate	0.15	Limestone Plateaus
Laolao-Akina	Moderately deep, well drained, strongly sloping to steep soils found on volcanic uplands.	Moderate	0.15	Uplands
Luta	Very shallow, well drained, nearly level to strongly sloping soils.	Low	0.10	Limestone Plateaus
Mesei Variant	Moderately deep, very poorly drained, level soils.	Low	0.05	Depressional Areas
Saipan-Dandan	Moderately deep and very deep, well drained, nearly level to gently sloping soils.	Moderate	0.15	Limestone Plateaus
Shioya	Very deep, excessively drained, level to nearly level soils, found on coastal strands.	Low	0.15	Coastal Limestone Sands
Tagpochau-Chinen-Rock Outcrop	Shallow, well drained, strongly sloping to extremely steep soils and rock outcrop, found on limestone escarpments and plateaus.	Moderate	0.10	Uplands
Tagpochau Variant-Shioya	Very shallow to very deep excessively drained, levels to gently sloping soils, found on coastal stands and plateaus.	Low	0.15	Lowlands

Source: U.S. Department of Agriculture 1989.

Soil erosion occurs naturally on the islands due to the effects of wind and water but can be accelerated by human and wildlife activities (U.S. Department of Agriculture 2004). Banaderu and Inarajan soil units in the Military Lease Area are characterized as having the greatest susceptibility for soil erosion. The higher the “K” value in the table, the more susceptible the soil is to erosion (U.S. Department of Agriculture 1989). In addition, soil units located in areas with slopes greater than 15 percent have higher susceptibility to erosion. Within the Military Lease Area, these steep areas tend to be in the vicinity of Mount Lasso and along the western edge of the island (Figure 3.12-3).

Soils that are best suited to producing sustained high yields of crops are identified as prime farmland (U.S. Department of Agriculture 1989). Prime farmland soils do not have to currently be used for cropland. Areas with these soils can be forest land, pastureland, cropland, or other land (Natural Resources Conservation Service 2012). Prime farmland soils on Tinian are shown in Figure 3.12-4. Within the Military Lease Area, prime farmland soils include Saipan-Dandan clays (0 to 5 percent slope) and Saipan clays (0 to 5 percent slope) and comprise approximately 71 percent (1,054 acres) of prime farmland soils on Tinian.

3.13 Groundwater and Hydrology

This section describes Tinian groundwater and hydrology conditions, which is the occurrence, movement, and quality of water beneath the surface.

3.13.1 Groundwater Availability

Rainfall is the primary source of fresh groundwater on Tinian. This rainwater percolates downward into porous limestone rock (Doan et al. 1960) and recharges Tinian's freshwater aquifer. Fresh groundwater on Tinian is primarily classified as basal (a body of fresh groundwater that floats on saline groundwater). The portion of the basal freshwater lens that is usable for potable water (groundwater with chloride concentrations less than 250 parts per million) is thickest south and southwest of Mount Lasso and thins approaching the coastline (Figure 3.13-1). Tinian relies on groundwater for all of its water supply. The basal freshwater lens underlying Tinian meets the definition of an aquifer found in CNMI Title 65, Chapter 65-90-010 and is the principal source of drinking water for the island's residents.

The groundwater table on Tinian (the underground area where water fills the spaces between sediment layers), ranges from sea level around the perimeter of the island to over 3 feet above mean sea level in the central portions of the island. The U.S. Geological Survey estimates the average annual groundwater recharge for Tinian to be approximately 30 inches per year (Gingerich 2002). This translates into approximately 20 billion gallons per year of recharge. Groundwater flows outward from the North Central Highland and the Southeastern Ridge and generally seaward around the island (Appendix M). Figure 3.13-1 depicts groundwater table elevation contours and the general direction of groundwater flow. Most of the fresh groundwater slowly discharges naturally from springs around the perimeter of the island and submarine coastal springs.

Numerous wells have been installed on Tinian, beginning with potentially more than 100 wells installed by the Japanese from 1914 to 1944. Most of these wells were reportedly filled. Between 1944 and 1945, the U.S. installed approximately 40 wells, including Maui Well Number 1. The majority of these wells have been inactive since shortly after World War II, except Maui Well Number 1. Between 1993 and 1997, the U.S. Geological Survey installed 17 wells and rehabilitated 16 World War II-era wells for groundwater monitoring; all of which remain open.



Figure 3.12-4 Tinian Prime Farmland Soils

The Commonwealth Utilities Corporation operates the Tinian public potable water system. Until it was disconnected and abandoned, Maui Well Number 1 supplied potable water to Tinian. This Maui-style well, featuring a horizontal infiltration system, was constructed at Makpo Marsh by the U.S. military during World War II. It served as Tinian's primary potable water source until it was replaced by Maui Well Number 2 (Commonwealth Utilities Corporation 2022). Maui Well Number 2 is also located in the Makpo Marsh within the Makpo sub-watershed. Ranchers and farmers pump fresh water from agricultural wells M-21 and M-26 (Figure 3.13-1), which are not regulated for potable water use. Currently, the U.S. Air Force Divert Activities project is using well M-21 to supply construction water (DON 2023).

3.13.2 Groundwater Quality

The Commonwealth Utilities Corporation routinely tests Maui Well Number 2 for chemical constituents regulated under the Safe Drinking Water Act. All analyzed water samples were reported to be within primary and secondary drinking water standards (Appendix M).

Tinian's groundwater quality is potentially vulnerable to increased nitrates and microbial contaminants, which can be associated with on-site wastewater systems and agricultural practices. Most residences, commercial buildings, and government facilities rely on septic systems. Annual monitoring reports for Maui Well Number 2 indicate water quality complies with total nitrogen limits, which includes nitrate and nitrite concentrations. Tinian has the potential for high chloride levels in groundwater due to saltwater intrusion into the freshwater lens. Chloride concentration is an important secondary standard for Maui Well Number 2 because it has the potential to indicate the quantity of freshwater available at that location. Annual monitoring reports for Maui Well Number 2 indicate water quality complies with total chloride limits. The Commonwealth Utilities Corporation conducts monthly water tests for signs of microbial contamination. The latest published results reported no microbial detection (Commonwealth Utilities Corporation 2024a). As an agricultural well, M-26 is not legally mandated to be monitored. However, it was sampled in 2015 as part of the *CNMI Aquifer Study*. The results showed that the water met primary and secondary drinking water standards (Appendix M).



Figure 3.13-1 Tinian Groundwater Wells, Elevation, and Flow Direction

3.14 Surface Waters and Wetlands

Surface waters on Tinian include lakes, ponds, and nearshore waters. Wetlands are defined “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” (33 C.F.R. Part 328.3). Figure 3.14-1 shows the five surface water features and wetlands on Tinian, four of which are in the Military Lease Area. Section 3.10 Public Health and Safety includes an analysis of flood zones. The flood zones are areas of the landscape that may be flooded following heavy rain events but are not considered surface waters or wetlands.

3.14.1 Surface Waters

Surface waters are uncommon on Tinian and no permanent streams exist on the island because the porous limestone rock plateaus allow high amounts of rainfall to percolate from the surface to subsurface soils and groundwater. Surface waters typically occur in small (less than 3 acres) natural landscape depressions and craters in areas of impermeable clay that prevent infiltration of surface water or at perched water tables (temporary pockets of groundwater located above unsaturated soil or rock, not connected to the permanent groundwater table). The exception is Lake Hagoi (37 acres), which is a complex of intermittent surface water and wetlands and contains the largest area of surface water and wetlands in the Military Lease Area. The wetlands and surface waters on Tinian are all isolated, meaning they do not have a surface water connection to other wetlands or surface waters. As such, Tinian’s surface waters are entirely dependent on rainfall as a water source for sustaining productivity and habitat quality. On average, Tinian receives about 70 to 80 inches of rainfall per year with a distinct wet season from July through October consisting of high rainfall driven by tropical storms and typhoons. Tinian’s dry season from January through April has little rainfall, with transition periods in between wet and dry seasons (JRM 2020).

3.14.2 Wetlands

Like surface water, wetlands on Tinian are uncommon due to the high permeability of soils and underlying rock. Wetlands in the Military Lease Area include Lake Hagoi, Mahalang, and Bateha. A full U.S. Army Corps of Engineers jurisdictional determination of wetlands has not been conducted on Tinian, and the status of wetlands are undetermined at this time. Typically, a request for a jurisdictional determination would not be made unless wetlands were proposed to be impacted and a permit application were being submitted to place fill in a wetland.

- **Lake Hagoi.** Located within the northwest portion of the Military Lease Area, Lake Hagoi is a 37-acre wetland situated on a limestone terrace over either an impervious layer or a perched water table. It is dependent on rainfall as a water source, and the water level drops in periods of drought (DON 2010), but may also be hydraulically connected to groundwater (Gingerich 2002). Since 2010, a steady reduction of open surface water has been observed at Lake Hagoi (DON 2015), and, with sediment inflow and the expansion of shore club-rush (*Shoenoplectus subulatus*), the open water area has been slowly decreasing in extent.

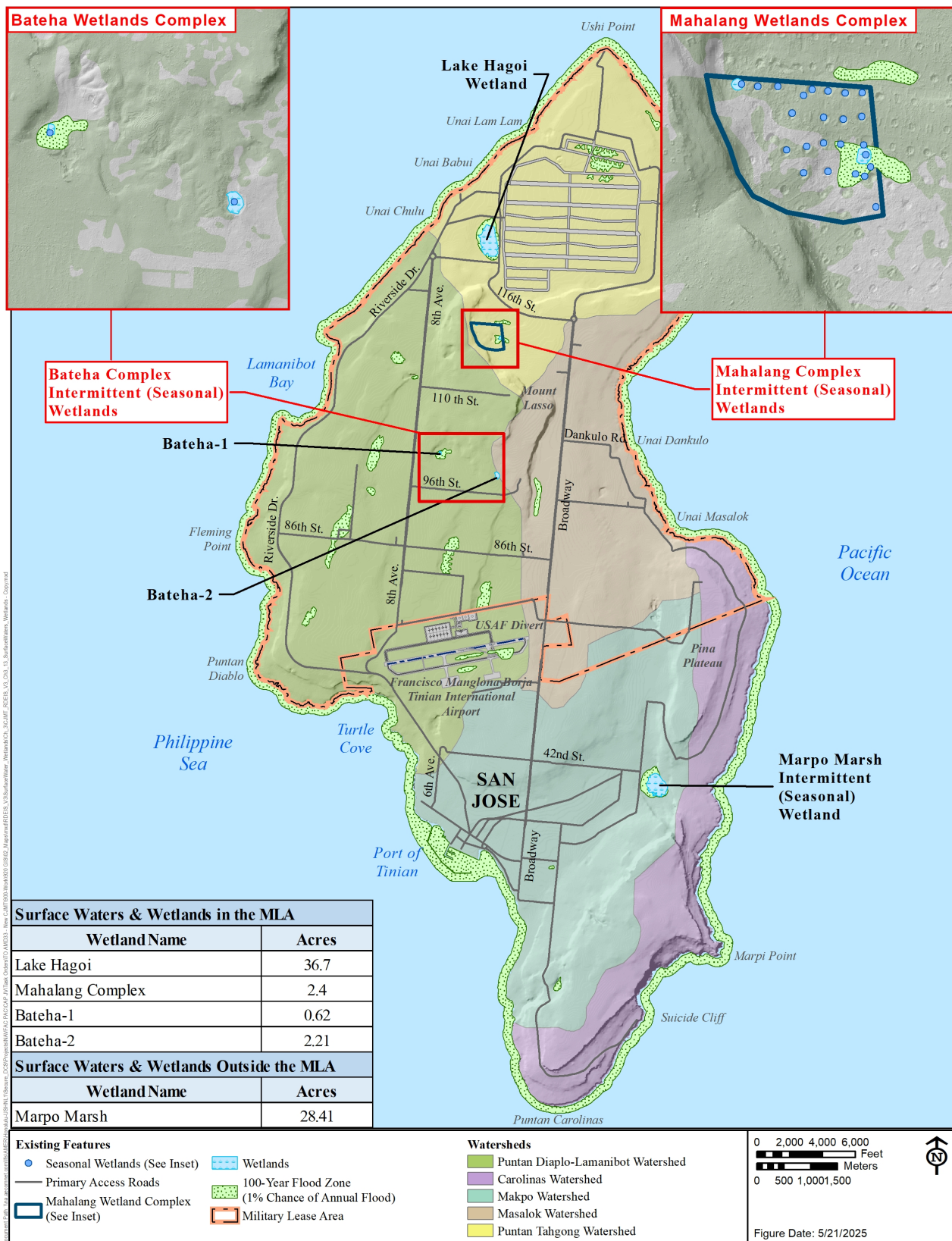


Figure 3.14-1 Tinian Surface Water and Wetland Features, Flood Zones, and Watersheds

- **Mahalang.** Located within the north central portion of the Military Lease Area, Mahalang wetland consists of 24 individual craters and depressions totaling approximately 2.4 acres, a subset of which retain water during the wet season. The two largest features combined are 0.9 acres. The complex is located on a plateau in an area of grasslands, tanga-tanga, and mixed secondary forest. Dominant vegetation within the craters consists of upland plant species, including introduced grass mixed with various weedy vines and herbaceous plants. Based on the 2014 wetland surveys of six ephemeral wetlands at the Mahalang Complex, one of the depressions (MD3) contained wetland vegetation, suitable hydrology, and hydric soils but had no connection and was not adjacent to navigable waters of the U.S. or tributaries to navigable waters of the U.S. Although four of the sites surveyed at Mahalang (MC1, MC2, M7, and M10) did have hydric soils and suitable hydrology, they did not support wetland vegetation and are considered ephemeral surface waters and not wetlands. Site M11 had suitable hydrology but lacked hydrophytic vegetation and hydric soils and is therefore not considered a wetland (DON 2015).
- **Bateha.** The Bateha site consists of two shallow depressions or “moats” of approximately 0.6 and 2.2 acres that contain water during wet periods (U.S. Fish and Wildlife Service 1996; NAVFAC Pacific 2013). They have evolved as eroded clay- and silt-filled depressions in limestone bedrock (DON 1997). Vegetation within and surrounding these features is dominated by introduced species. The 2014 wetland survey of the two Bateha sites documented suitable hydrology, hydrophytic vegetation, hydric soils, and lack of connection to surface drainage features or waters of the U.S. Both Bateha sites may be considered isolated wetlands (DON 2015).

3.14.3 Water Quality

CNMI water quality standards establish criteria designed to protect the designated uses for each classification of surface waters (i.e., coastal waters, fresh waters, and wetlands). Designated uses of fresh surface waters include aquatic life, fish consumption, recreation, aesthetic enjoyment, and potable water supply. The CNMI Bureau of Environmental and Coastal Quality maintains a monitoring program for water quality, which on Tinian is limited to coastal waters. Inland surface water quality has not yet been assessed, but the Division of Coastal Resources Management intends to establish a collaborative Bureau of Environmental and Coastal Quality Wetlands Program, which would involve an assessment of Tinian’s wetlands using the 2016 CNMI Wetland Rapid Assessment Method (Arriola et al., 2016).

Beginning in 2004, the quality of CNMI coastal waters has been assessed every 2 years (CNMI Bureau of Environmental and Coastal Quality 2022). As presented in Appendix I of CNMI Bureau of Environmental and Coastal Quality 2022 *Water Quality Assessment Report*, the coastal waters of the Masalok, Makpo, Makpo Harbor, Puntan Diaplo-Lamanibot, and Puntan Tahgong sub-watersheds, were listed as impaired by one or more pollutants during the reporting cycles from 2004 to 2022 (Table 3.14-1).

Table 3.14-1 Impaired Coastal Waters on Tinian

<i>Sub-watershed</i>	<i>Pollutant(s)</i>	<i>Source</i>	<i>Years Listed</i>
Masalok	Enterococci, Nitrate, Orthophosphate	Unknown	2022 2020 2018 2016 2014 2004
Makpo	Biocriteria, Dissolved oxygen, Enterococci, Low pH, Orthophosphate, Nitrate	Unknown, on-site treatment systems, urban runoff	2022 2020 2018 2016 2014 2012 2010 2006 2004
Makpo Harbor	Enterococci, Dissolved oxygen, Orthophosphate	Unknown	2022 2020 2018 2016
Puntan Diaplo-Lamanibot	Dissolved oxygen, Enterococci, Nitrate, Orthophosphate	Unknown	2022 2020 2018 2016 2014 2012 2004
Puntan Tahgong	Biocriteria, Dissolved oxygen, Enterococci, Nitrate, Orthophosphate	Unknown	2022 2020 2018 2016 2014 2006 2004

Sources: Yuknavage et al. 2022; Appendix VI: CNMI Coastal Water Bodies Reported by Assigned CALM Categories; Table VI-b Category 2: 2022 Coastal Waters Attaining Some Designated Uses, Insufficient Information about Remaining Designated Uses.

The Makpo sub-watershed has the greatest number of pollutants and includes both Tinian's commercial harbor and its population center (San Jose). Existing concerns and sources of pollution for the Makpo sub-watershed include the absence of centralized wastewater collection and treatment systems, cesspools and septic systems, marina boat maintenance, animal holding management areas, livestock grazing in riparian/shoreline areas, waste from pets, illegal dumps and disposals, and undefined sources (Yuknavage et al. 2022).