

Guam

Guam is the southernmost island in the Mariana Islands Archipelago. Of all the islands in Micronesia, Guam is the largest in terms of both land area (543 sq km) and population (over 176,000 in 2008) (26, 49). Politically, Guam is considered a U.S. territory and county and is divided into 19 districts (or U.S. Census Bureau county subdivision equivalents). Tamuning, the third most populated district, is located on the island's western shore. It contains approximately 11% of Guam's population (49) and is home to Guam's primary economic activities, including the tourism industry, Harmon Industrial Park, Antonio B. Won Pat International Airport, and Fort Juan Muna—headquarters of Guam's Army National Guard.

Key Facts	
176,075	Population (2008)
324	Population Density (2008) (persons per sq km)
867	Number of residents per square kilometer of potential coral reef habitat within the 180 meter depth curve. (2008)
38,769	Households (2000)
26,728	Housing Units (2000)

The coral habitats surrounding Guam consist of fringing reefs, patch reefs, submerged reefs, offshore banks, barrier reefs, and lagoonal habitats. Over 5,000 species of marine organisms have been documented. Coral reef habitat has traditionally been an important part of the economic and cultural life of those on the island (26). The extent of coral reef habitat is summarized in Table 8 and displayed in Figure 6.

Habitat Type	Area
<i>Depth Curves (sq km)</i>	
18 Meter Line	91
180 Meter Line	203
<i>Mapped Coral Habitat¹ (sq km)</i>	
Coral Reef Hardbottom	72
Submerged Vegetation	0
Unconsolidated Sediment	33
Other Delineations	<1

Table 8. Approximate area (in square kilometers) of coral reef habitat surrounding Guam.

Source: Rohmann et al., 2005.

Population

In 2000, the population of Guam reached 154,805 people; in 2008, it is estimated to be 176,075 (35, 49). Guam's population is concentrated on the northern portion of the island, with the Dededo, Yigo, and Tamuning Districts containing 30%, 13%, and 11%, respectively. From 1970 to 2008, the population of Guam increased by just over 90,000 people. A large portion of this increase occurred in the Tamuning District, which grew by more than 42,000 people. (49).

By 2015, the population is expected to increase by almost 23,000 people, with most of this growth occurring in the Dededo District (estimated at 11,000). Figure 7 presents this expected change by district. The highest percentages of growth, however, are expected to occur in the Yigo (22%) and Talofofo Districts (23%) (49).

In 2008, the population density averaged 324 persons per square kilometer. The most densely populated districts are Agana Heights, Sinajana, Tamuning, and Mongmong-Toto-Maite, all located along the central and western side of the island. Figure 6 illustrates the concentrations of population and adjacent coral reef habitats.



High density commercial development along the Tumon Bay Marine Preserve.
Credit: John Jocson

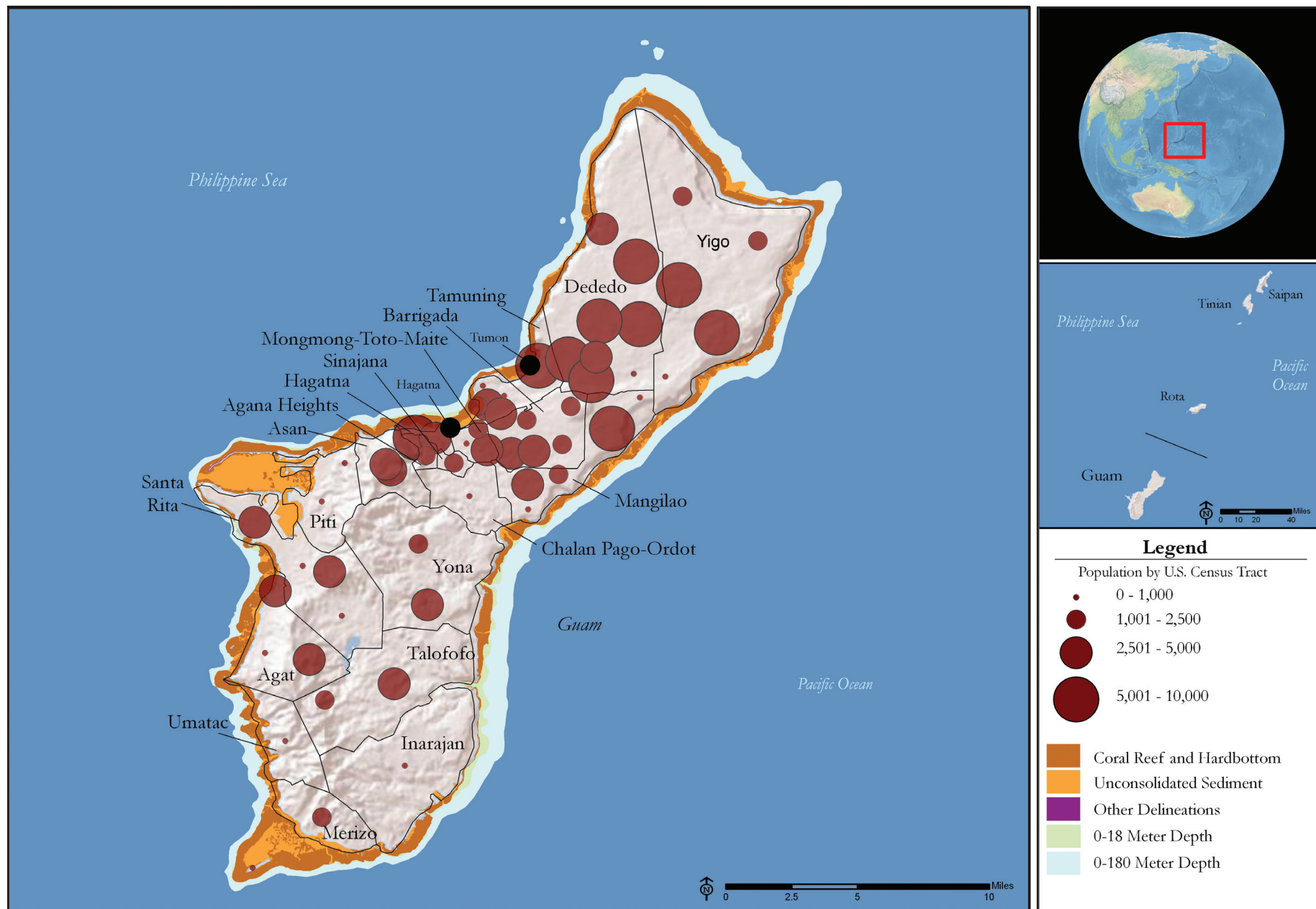


Figure 6. Population of Guam by U.S. Census tract adjacent to coral reef habitat. The population markers are shown at the center of each tract and should not be interpreted as exactly where population resides.

Source: U.S. Census Bureau, 2000; Rohmann et al., 2005.

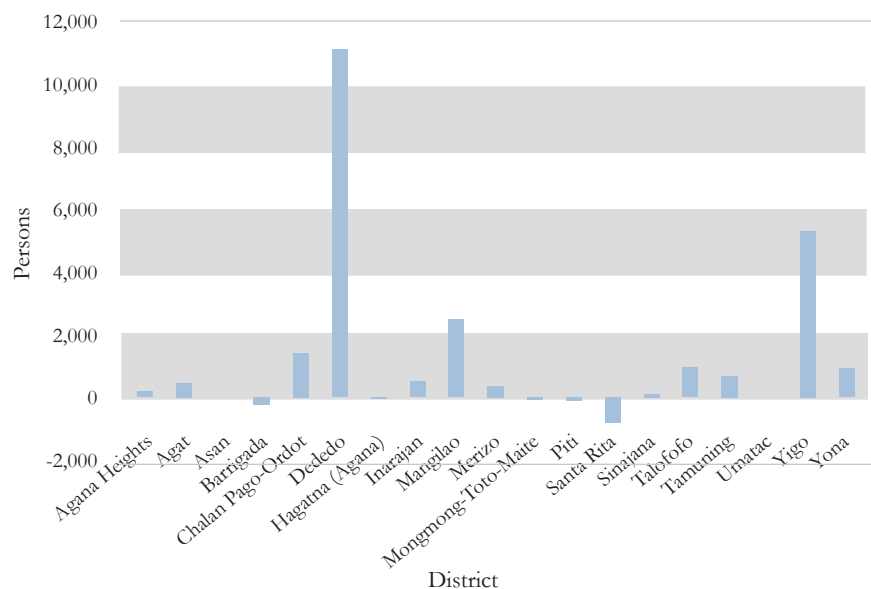


Figure 7. Expected population change in Guam from 2008 to 2015 by district.
Source: Woods and Poole Economics, Inc., 2007.

Table 9 presents the area of potential coral reef habitat and mapped coral reef habitat in relation to the number of residents on Guam. When compared to the other study areas in this report, Guam has the highest number of residents per square kilometer of potential coral reef habitat within the 0-180 meter depth curve.

Habitat Type	Area of Coral Reef Habitat	Persons Per Sq Km of Potential Coral Reef Habitat in 2008
<i>Depth Curves (sq km)</i>		
18 Meter Line	91	1,928
180 Meter Line	203	867
<i>Mapped Coral Habitat¹ (sq km)</i>		
Coral Reef Hardbottom	72	2,456
Submerged Vegetation	0	...
Unconsolidated Sediment	33	5,352
Other Delineations	<1	...

Table 9. Ratio of the area of potential coral reef habitat and mapped coral reef habitat to population.
Source: Woods and Poole Economics, Inc., 2007; Rohmann et al., 2005.

Gender

In 2000, Guam's population was comprised of 49% females and 51% males (35). Although generally consistent among Guam's districts, the ratio fluctuated in the Hagatna and Santa Rita Districts where it ranged from 39% female to 61% male, and 46% female to 54% male, respectively. Of all individuals greater than 15 years of age, 55% were married and 6% had been divorced (35).

Race/Ethnicity

In 2000, almost half of Guam's population (49%) was comprised of individuals of solely Native Hawaiian or Pacific Island descent. This was followed by individuals of solely Asian decent, making up 33% of the population, individuals of two or more races (9%), white (7%), black (1%), and other (1%) (35).

Age

Thirty-five percent of the total population of Guam in 2000 ranged in age from 0-17, followed by the age groups 25-34 (17%), 35-44 (15%), 45-59 (14%), 18-24 (11%), 60-69 (5%), and 70+ (3%). This was generally consistent across the most populated districts of Dededo, Yigo, and Tamuning (35).



A pair of orangefin anemonefish, *Amphiprion chrysopterus*, tend to their eggs at Hap's Reef, Guam.
Credit: Dave Burdick

Households

In 2000, the total number of households in Guam was 38,769. Eighty-three percent were family households. The size of family households was somewhat evenly distributed; with two-, three-, and four-person households ranging from 16-18% of the total, and five-, six-, and seven-person households ranging from 8-13% of the total. The district with the fewest number of family households was Tamuning, where they made up 68% of the household total. Most non-family households (79%) contained only one person (35).

Language

The primary language spoken in the home in Guam is distributed among several languages. The Chamorro language, spoken in 32% of homes is the native language of Guam. Table 10 shows this distribution (35).

Language	Percent of Households
Chamorro	32%
Philippine Languages	27%
English	20%
Asian Languages	10%
Pacific Island Languages	6%
Other Languages	6%

Table 10. Primary languages spoken in the home in Guam in 2000.
Source: U.S. Census Bureau, 2000.

Place of Birth

Of the total population, 52% were born in Guam, 21% were born in the neighboring Philippines, and 12% were born in the United States. The remaining population was born in the U.S. island areas and the Federated States of Micronesia. The districts with the highest percentage of Guam born individuals are the Umatac District (91%), Inarajan District (86%) and Merizo District (86%), all of which are located on the southernmost portion of island (35).

Income

In 2000, the average median household income was approximately \$41,821 per year. This is shown in Figure 8. In 2000, 23% of the population lived below the poverty level (35).

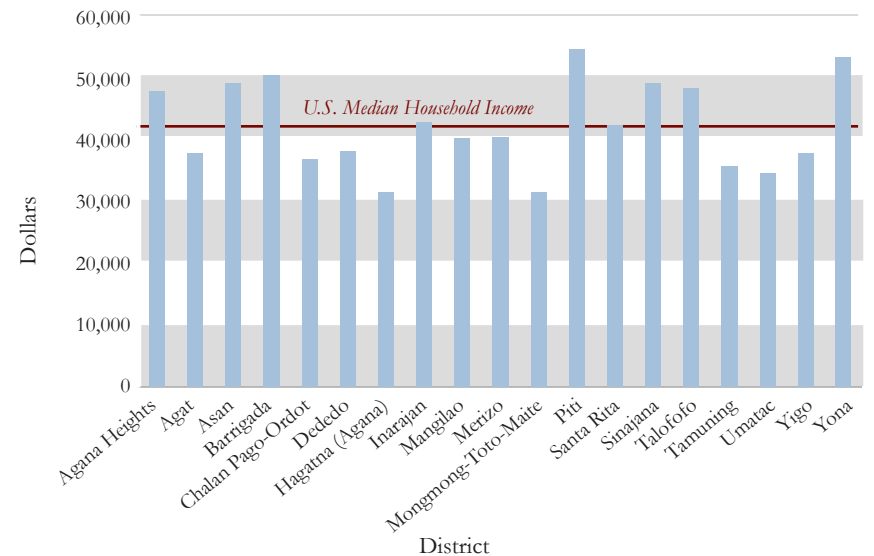
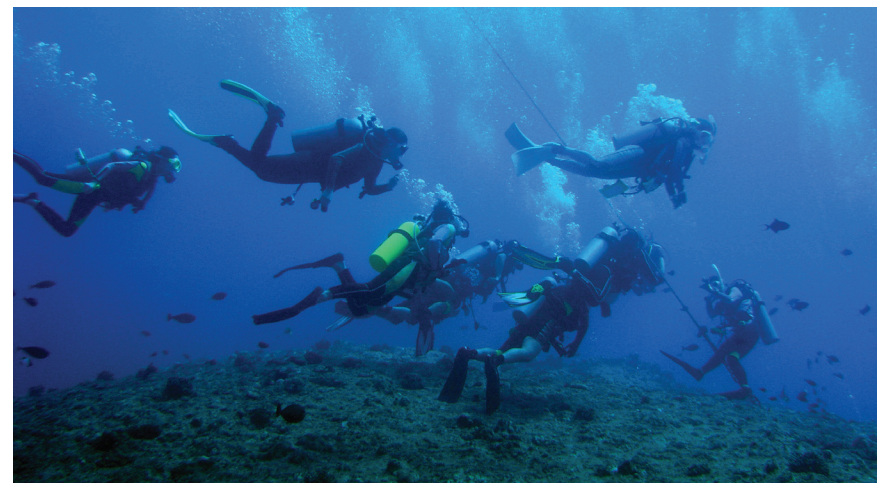


Figure 8. Median household income in Guam in 2000 by district.
Source: U.S. Census Bureau, 2000.



A group of divers at Blue Hole, one of the more popular dive sites on Guam.
Credit: Dave Burdick

Highlighted Issue:
Presence of U.S. Armed Forces

In 2000, for the population 18 to 64 years of age, approximately 5% were in the U.S. armed forces. This is the second leading U.S. Coral Reef Jurisdiction in percent population in the U.S. Armed Forces (just behind Hawaii). Eight percent of the total population of Guam was considered a military dependent. Additionally, of those individuals that were born outside of Guam and are actively employed, 49% were in the U.S. armed forces (35).

Andersen Air Force Base (AFB) is located mostly in the Yigo District and also extends into the Dededo District on the north end of Guam. Currently, the Air Force proposes to expand its facility, adding 3,000 personnel (as well as approximately 1,800 temporary migrant workers). This expansion has the potential to increase the amount of wastewater and solid waste from the facility, double the amount of vehicles on some roads, and increase development. The associated increased runoff from streets and buildings has the potential to lead to greater volumes of polluted water entering nearshore coral reef ecosystems (42).



Contractors pour concrete for the foundation of a new 165,000 square foot base exchange building. Credit: U.S. Air Force photo

Education

In 2000, 32% percent of the adult population (25 years of age and over) had a high school diploma. Approximately 24% had some college or an associate’s degree, and 15% held a bachelor’s degree or higher (35). This distribution is broken down by gender in Figure 9. Females with no high school diploma and those that held a bachelor’s degree or higher outnumbered males in these categories. The number of men with a high school diploma and some college was greater than the number of women in these categories.

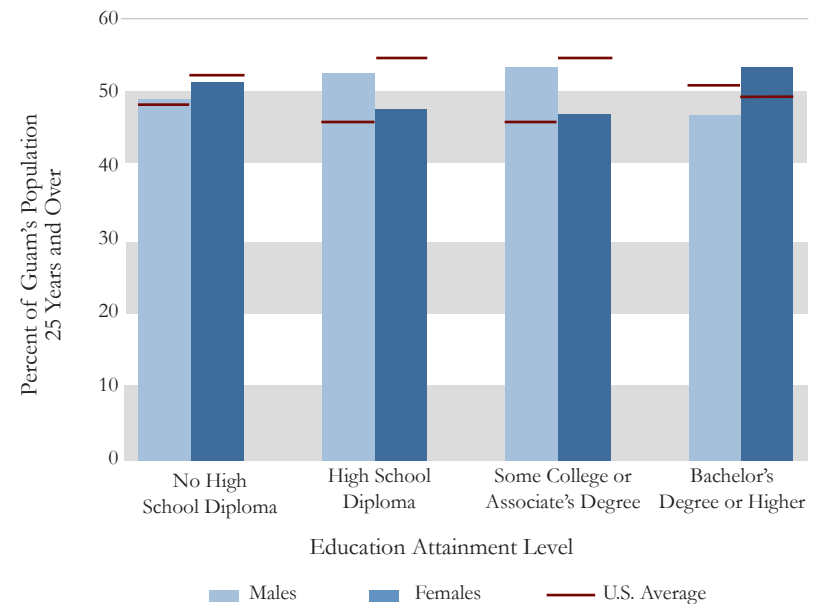


Figure 9. Education attainment by gender for the population 25 years and older in 2000. Source: U.S. Census Bureau, 2000.

Employment

Industry

In 2000, 36% of the civilian population 16 years of age and over was employed. This percentage represents 57,000 people. The industries that employed the most individuals in 2000 are listed in Table 11.

Industry	Percent Employed
Arts; entertainment; recreation; accommodation and food services	18
Educational; health and social services	15
Retail Trade	13
Public Administration	11
Construction	10
Transportation, Warehouse and Utilities	8
Professional; scientific; management; administrative and waste management services	7
Finance; insurance; real estate and rental and leasing	5
Other Services	4
Wholesale Trade	3
Information	3
Manufacturing	2
Agriculture; forestry; fishing and hunting; and mining	1

Table 11. Percent of the population 16 years of age and over employed by industry in Guam in 2000.

Source: U.S. Census Bureau, 2000.

Commute to Work

For the civilian population over 16 years of age, 83% worked outside their place of residence. The primary means of transportation to work was by carpooling in a private vehicle (70%) and driving alone in a private vehicle (23%). These were followed by walking (2%), other means of transportation (2%), public transportation (1%), and working at home (1%) (35).

Housing and Development

Housing Units

There were a total of 26,728 housing units in Guam in 2000. Of the total housing units, 36% were owner occupied, 43% were renter occupied, and 20% were reported as vacant (35).

Plumbing Facilities

In 2000, just under 7% of the housing units in Guam lacked complete plumbing facilities (35).

Source of Water

In 2000, over 99% of the 26,728 total housing units were connected to public water systems. Wells, catchment tanks, and other water sources made up less than 1% of the total water supply (35).

Sewage Disposal

In 2000, over 76% of housing units had public sewer connections. Most of the remaining homes (21%) were on septic tank or cesspool systems, while about 2% were reported as using “other means” of sewage disposal (35).

*Building Permits*²

Between 2000 and 2005, an average of 886 building permits were issued per year for new structures. Of those, an average of 290 per year were for residential construction (8).

Tourism

From 2000 to 2005, an average of 1,133,593 tourists per year (excluding same-day visitors) visited Guam. Over 93% of them came from Asia, East and Southeast/Oceania (34).



*A snorkeling guide observes his clients while standing atop a colony of yellow finger coral, *Porites cylindrica*, in the Tumon Bay Marine Preserve.*

Credit: Dave Burdick