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and

Hawaiian Islands Humpback Whale National Marine Sanctuary Community Profile, 2010–2022

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Cover photos: Top left: A team conducting shoreline marine debris removal at Lisianski Island, PapahānaumokuākeaMarine National Monument. Photo: NOAA. Top right: A visitor enjoys a sunset surf in Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS). Photo: Matt McIntosh/NOAA. Bottom left: A diver inspects the wreck of a Curtiss SB2C Helldiver at rest in HIHWNMS. Photo: NOAA. Bottom right: Scientists and NOAA Corps personnel perform a wildlife survey using an unmanned aircraft system at French Frigate Shoals. Photo: Justin Rivera/NOAA

About the National Marine Sanctuaries Conservation Series

The Office of National Marine Sanctuaries, part of the National Oceanic and Atmospheric Administration, serves as the trustee for a system of underwater parks encompassing more than 620,000 square miles of ocean and Great Lakes waters. The 15 national marine sanctuaries and two marine national monuments within the National Marine Sanctuary System represent areas of America's ocean and Great Lakes environment that are of special national significance. Within their waters, giant humpback whales breed and calve their young, coral colonies flourish, and shipwrecks tell stories of our nation's maritime history. Habitats include beautiful coral reefs, lush kelp forests, whale migration corridors, spectacular deep-sea canyons, and underwater archaeological sites. These special places also provide homes to thousands of unique or endangered species and are important to America's cultural heritage. Sites range in size from less than one square mile to almost 583,000 square miles. They serve as natural classrooms and cherished recreational spots, and are home to valuable commercial industries.

Because of considerable differences in settings, resources, and threats, each national marine sanctuary has a tailored management plan. Conservation, education, research, monitoring, and enforcement programs vary accordingly. The integration of these programs is fundamental to marine protected area management. The National Marine Sanctuaries Conservation Series reflects and supports this integration by providing a forum for publication and discussion of the complex issues currently facing the National Marine Sanctuary System. Topics of published reports vary substantially and may include descriptions of educational programs, discussions on resource management issues, and results of scientific or historical research and monitoring projects. The series facilitates integration of natural sciences, socioeconomic and social sciences, education, and policy development to accomplish the diverse needs of NOAA's resource protection mandate. All publications are available on the Office of National Marine Sanctuaries website.

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Report Availability

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Abstract

This report gives an economic and demographic profile of the region surrounding Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) and Papahānaumokuākea Marine National Monument (PMNM). To properly analyze the impact of sanctuary management decisions, it is essential to know the economic landscape of the surrounding region. The findings of this report will help assess the relationship between the sanctuary and nearby counties. By characterizing the area containing most of the social and economic impacts of activities taking place within the sanctuary, sanctuary managers have an increased understanding of the community around the sanctuary.

The sanctuary community of HIHWNMS and PMNM comprises the entire state of Hawai‘i. Economic and demographic indicators show an increase in the total population and an increase in total employment of the sanctuary community between 2010 and 2022. Employment and income by sector show a large portion of the regional economy is related to government and government enterprises, accommodation and food services, and health care and social assistance.

Key Words

Hawaiian Islands Humpback Whale National Marine Sanctuary, Papahānaumokuākea Marine National Monument, sanctuary community profile, Hawai‘i, ecosystem services, culture, visitation, demographics, population, local and regional economies

Chapter 1: Introduction

Sanctuary Community Profile Overview

Sanctuary community profiles (SCPs) provide information on the socioeconomic, cultural, and ecosystem services benefits of national marine sanctuaries. SCPs aid the National Oceanic and Atmospheric Administration (NOAA) Office of National Marine Sanctuaries (ONMS) in developing condition reports and management plan reviews. These profiles also help ONMS meet requirements of the National Environmental Policy Act and the Regulatory Flexibility Act. Most data presented in SCPs are sourced from the U.S. Census Bureau, U.S. Bureau of Economic Analysis (BEA), and other federal and state agencies. These data describe activities that take place within national marine sanctuaries, providing sanctuary managers with an increased understanding of the local community.

The following SCP focuses on Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) and Papahānaumokuākea Marine National Monument (PMNM). Objectives of this profile are to:

- Provide a socioeconomic profile of the economic region most closely tied to HIHWNMS and PMNM,
- Assess the relationship between the sanctuary/monument and nearby counties,
- Characterize the social and economic impacts of activities that take place within HIHWNMS and PMNM,
- Describe the ecosystem services (i.e., benefits the environment provides to people) derived from HIHWNMS and PMNM, and
- Provide sanctuary/monument managers with an increased understanding of the economic study area associated with HIHWNMS and PMNM.

Key Takeaways

1. PMNM is the single largest conservation area under the U.S. flag, encompassing an area of 582,578 square miles of the Pacific Ocean.
2. HIHWNMS is dedicated to protecting humpback whales and their habitat and protects 1,370 square miles around the Hawaiian Islands.
3. The economic study area of HIHWNMS and PMNM includes all five counties of the Hawaiian Islands.
4. The sanctuary and monument are notable for their high number of unique and endemic species and contribute to one of the most biodiverse regions on the planet.

Overview of PMNM

PMNM is known globally for its unique and expansive array of natural and cultural resources. This vast area, spanning 582,578 square miles, includes several interconnected ecosystems, including coral islands surrounded by shallow reef; deeper reef habitat characterized by seamounts, banks, and shoals; mesophotic reefs with extensive algal beds; pelagic waters

connected to the greater North Pacific Ocean; and deep-water habitats such as abyssal plains 5,000 meters below sea level. These ecosystems support over 7,000 known species of plants, mammals, birds, fish, and invertebrates, including endemic, highly endangered, and threatened marine and terrestrial species (Office of National Marine Sanctuaries [ONMS], 2020). Culturally, Papahānaumokuākea is a place of deep cosmological significance and existing laws and management incorporate the values and knowledge of Kānaka Maoli (Native Hawaiians). Papahānaumokuākea is as much a spiritual as a physical geography, rooted deep in Native Hawaiian creation and settlement stories (ONMS, 2020). PMNM also includes the location of the Battle of Midway, a turning point in World War II for the allies in the Pacific Theater. Research indicates 60–80 military vessels and hundreds of aircraft are scattered across its seafloor. In addition to Navy steamers and aircraft, there are whaling ships, Japanese junks, Hawaiian fishing sampans, Pacific colliers, and other vessels from the 19th and 20th centuries.

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve was established on December 4, 2000 by Executive Order 13178, which also established a Reserve Advisory Council to provide advice and recommendations on the Reserve Operations Plan and designation and management of any sanctuary. The sanctuary designation process was curtailed when the area was designated a marine national monument on June 15, 2006 under the authority of the Antiquities Act; PMNM was later expanded in 2016. The monument is jointly administered by the four co-trustees, NOAA, the U.S. Fish and Wildlife Service, the State of Hawai‘i, and the Office of Hawaiian Affairs. A seven-member Monument Management Board oversees day-to-day management. The board consists of representatives from ONMS, NOAA Fisheries, U.S. Fish and Wildlife Service Ecological Services, U.S. Fish and Wildlife Service Refuges, Hawai‘i Department of Land and Natural Resources (DLNR) Division of Aquatic Resources and Division of Forestry and Wildlife, and the Office of Hawaiian Affairs, working with many partners to carry out its mission. Currently, the marine portions of PMNM are being considered for designation as a national marine sanctuary.

In addition to its designation as a marine national monument, the area has several additional designations that add to its significance as a beacon for cultural and resource protection. These additional U.S. designations include the Hawaiian Islands National Wildlife Refuge, Kure Atoll State Wildlife Sanctuary, Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, Northwestern Hawaiian Islands State Marine Refuge, Midway Atoll National Wildlife Refuge, and Battle of Midway National Memorial. Additional designations include Particularly Sensitive Sea Area and inscription as the nation’s first mixed (natural and cultural) UNESCO World Heritage site in 2008 (ONMS, 2020).

Overview of Hawaiian Islands Humpback Whale National Marine Sanctuary

HIHWNMS was designated in 1992 by Congress in consultation with the state of Hawai‘i and encompasses 1,370 square miles. The sanctuary includes five separate marine protected areas and is jointly managed through a cooperative federal-state partnership between ONMS and the state of Hawai‘i through the state’s Division of Aquatic Resources.

HIHWNMS was designated to protect the North Pacific humpback whale population and their winter breeding grounds in the Hawaiian Islands. Each winter and spring, approximately half of the animals within the North Pacific humpback whale population, representing approximately 10,000 animals, visit the waters around the Hawaiian Islands, including sanctuary waters. Within HIHWNMS, they breed, give birth, and nurse their young. Humpback whales are generally seen in Hawai‘i from November through April, with the peak season from January through March. Throughout Hawai‘i, humpback whales engage in all aspects of the breeding cycle, including competing for mates, mating, giving birth, and nursing newborn calves.

Economic Study Area

Every national marine sanctuary and monument is associated with “primary” and “secondary” counties. Primary counties are typically adjacent to the sanctuary and experience concentrated sanctuary use and associated socioeconomic impacts. Secondary counties are typically adjacent to primary counties and are economically impacted via multiplier impacts of spending in the primary counties. Both primary and secondary counties are viewed as the “economic study area” for any given sanctuary or monument. Hawai‘i is one of the most isolated archipelagos in the world, located in the middle of the Pacific Ocean. As a result, each of the Hawaiian counties are considered primary counties, with no secondary counties. Those counties are Hawai‘i, Honolulu, Kaua‘i, and Maui. Kalawao County is also a primary county, but due to its small size, data and information on this county are often combined with that of Maui County.

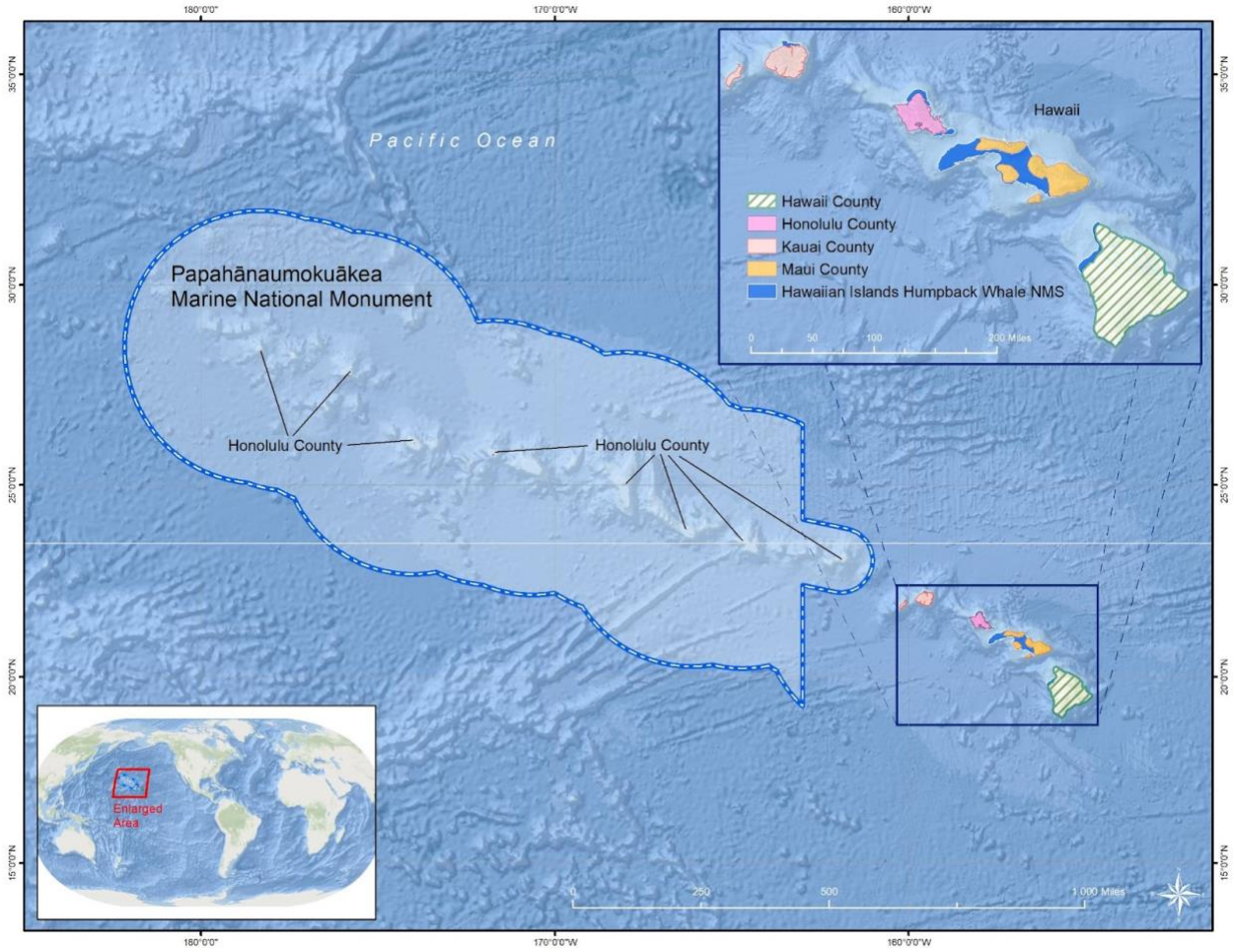

Figure 1.1. Map of the location of PMNM, HIHWNMS, and the counties in Hawai'i. Image: Tony Reyer/NOAA

Sanctuary and Monument Visitor Centers

PMNM's visitor center, the Mokupāpapa Discovery Center, is a valuable asset for public outreach. This 30,000-square-foot facility, free to the public, was built to interpret the natural science, culture, and history of the Northwestern Hawaiian Islands (NWHI). Interactive displays, three-dimensional models, a wet lab, and an immersive theater allow visitors to experience this special and remote area. A 3,500-gallon saltwater aquarium displays fishes from NWHI reefs. *Lost on a Reef*, a 2010 film focused on PMNM maritime heritage and archaeology, complements the exhibit. Approximately 80,000 people visit the Mokupāpapa Discovery Center each year.

In addition to providing insight about the number or people reached by PMNM education and outreach programs and messaging, visitation to the visitor center may be used to determine the economic contribution of national marine sanctuaries and marine national monuments to local communities, based on visitor spending patterns. Although PMNM is a remote location and regulations prohibit visitation by the general public, tourists and residents who travel to the

Mokupāpapa Discovery Center are likely to spend money on food, housing, travel, and other commodities in the region, contributing to the local economy.

HIHWNMS has two visitor centers. The first, located in Kīhei on the south shore of Maui, includes HIHWNMS headquarters. It sits at an ideal spot to learn about the marine environment and even see humpback whales breaching. This scenic beachfront location has views of Kahoʻolawe, Lānaʻi, and West Maui looking across sanctuary waters. The visitor center features exhibits, interactive displays, and regularly scheduled programs for the whole family.

The second site is Kauaʻi Ocean Discovery, an admission-free learning facility that shares the traditions and knowledge of ocean connections and inspires stewardship. It is managed by HIHWNMS in partnership with the National Marine Sanctuary Foundation, the State of Hawaiʻi, and Kukui Grove Center. It features exhibits, displays, and a variety of family activities. Sanctuary education programs include naturalist trainings, a public lecture series, teacher workshops, citizen/community science programs, school field trips, and participation in community festivals (Hawaiian Islands Humpback Whale National Marine Sanctuary, 2002).

Community Engagement in PMNM

Community engagement is a critical component of the PMNM mission. The education and outreach program at PMNM aims to increase understanding of ecosystem management, develop an ocean stewardship ethic, and train the next generation of leaders to be both scientifically and culturally grounded. Outreach efforts have focused on bringing the public an experience through outreach materials (websites, posters, brochures, exhibits, and films). The monument co-trustees along with key partners and collaborators (Table 1.1), support these efforts.

Table 1.1. PMNM key partners. Source: NOAA

Type of Partner	Partner Name
Federal	National Park Service—Hawaiʻi Volcanoes National Park
Federal	United States Geological Survey
State and county	Hawaiʻi Institute of Marine Biology
State and county	University of Hawaiʻi at Hilo
State and county	University of Hawaiʻi at Mānoa—Botany Department
Local	Awaiaulu
Local	Friends of Midway Atoll
Local	Kure Atoll Conservancy
Local	Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve Advisory Council
Private and public	American Bird Conservancy
Private and public	Bernice Pauahi Bishop Museum
Private and public	Big Ocean
Private and public	COSEE Island Earth
Private and public	National Marine Sanctuary Foundation
Private and public	Pacific Islands Climate Change Cooperative
Private and public	Pacific Islands Ocean Observing System
Private and public	Waikīkī Aquarium

Community Engagement in HIHWNMS

Community engagement is a critical component of the HIHWNMS mission. The education and outreach program at HIHWNMS aims to increase understanding of the history and cultural, economic, and environmental importance of whales in Hawai‘i; encourage responsible wildlife viewing; and develop an ocean stewardship ethic. Outreach efforts have focused on giving the public a personal experience at our visitor centers and through community outreach and materials (websites, posters, brochures, exhibits, films, etc.). The sanctuary's state co-manager, along with key partners and collaborators (Table 1.2), support these efforts.

The Sanctuary Ocean Count is one example of an ongoing successful community educational project. Three times a year, volunteer community members and tourists conduct a shore-based census of humpback whales and document the surface activities of whales. This program fosters community engagement with HIHWNMS, promotes public education on humpback whales, and adds to the scientific information gathered from other research efforts (ONMS, n.d.).

The Sanctuary Advisory Council of HIHWNMS is made up of multiple state and federal agency partners and stakeholders from the larger Hawai‘i community, including representatives from the fishing, boating, tourism, recreation, whale watching, Indigenous Hawaiian, and conservation communities, as well as representatives from each of the Main Hawaiian Island communities. Members of the Sanctuary Advisory Council represent their constituents while providing advice to HIHWNMS management.

The on-water partnership between HIHWNMS and the boating community in Hawai‘i is critical to its success. These partners serve as eyes on the water, identifying whales in distress, serving as first responders, and ensuring boaters are following rules and guidelines to protect humpback whales. HIHWNMS has engaged and trained more than 1,000 community partners in entanglement response across the islands.

Local coastal communities are also critical partners in the islands. There are dozens of communities focused on coastal management across the islands, many of which are integrating local knowledge and traditional Hawaiian management practices into their work. Many of these communities are natural partners for HIHWNMS and the sanctuary system because they are already actively engaged in ocean management within sanctuary waters. Together, HIHWNMS and its partners are building relationships and understanding of respective work and shared objectives to work together to protect coastal and sanctuary resources.

HIHWNMS co-managers at the State of Hawai‘i Division of Aquatic Resources have also committed to community-based co-management through their Holomua Initiative (State of Hawai‘i Division of Aquatic Resources, 2022). This includes planning, monitoring, and promotion of pono (right or proper) practices. Working with the Division of Aquatic Resources and other partners, HIHWNMS is supporting Indigenous community efforts to protect and restore habitat within the sanctuary based on cultural values such as Mālama—to care for and protect, Kuleana—to take responsibility, ‘Ike Pono—to know and do what is right, and Ho‘omau—to persevere and perpetuate.

Table 1.2. HIHWNMS key partners. Source: NOAA

Type of Partner	Partner Name
Federal	NOAA Office of Protected Species
Federal	NOAA National Marine Fisheries Service
Federal and state	Sanctuary Advisory Council members
State	Division of Aquatic Resources
State	University of Hawai‘i at Hilo
State	University of Hawai‘i at Mānoa
County	Maui County
Academic	Woods Hole Oceanographic Institution
Academic	Syracuse University
Local	Multiple whale watching businesses on Maui and Hawai‘i Island
Local	Maui Ocean Center
Local	Pacific Whale Foundation
Private	National Marine Sanctuary Foundation
Private	Outrigger Resorts
Private	Hawai‘i Wildlife Discovery Center
Private	Aoao O Na Loko Ia O Maui & Kimokeo Foundation

Chapter 2:
Sanctuary Uses and Livelihoods

Both HIHWNMS and PMNM protect natural, historical, and cultural resources that provide ecosystem services important to the lives and livelihoods of those who live within the economic study area. Data gaps in how humans use HIHWNMS and PMNM for enjoyment and cultural practices—and depend on them for their livelihoods—make it challenging to isolate the intensity and use of resources specifically located within these marine protected areas. Further, prohibitions within PMNM limit the use of many types of ecosystem services (e.g., commercial fishing or recreation). These prohibitions are designed to protect the unique resources of PMNM.

Tourism

Tourism activities in the NWHI and PMNM are severely limited and fall under a permitting program operated by PMNM's co-trustees. The program is designed to manage and minimize human impact, while conserving Papahānaumokuākea's natural, cultural, and historical resources. All activities in PMNM require a permit, with limited exceptions (e.g., response to emergencies threatening life, property, or the environment; law enforcement activities; activities and exercises of the Armed Forces, including the U.S. Coast Guard; passage without interruption).

There are limited ways (boat and plane only) to access PMNM, and access is granted only for specific purposes, such as to conduct cultural practices, research, habitat restoration, and scientific work, as well as to develop educational and media products. Access for general visitation purposes was previously allowed at Midway Atoll National Wildlife Refuge; however, due to recent reductions in refuge staff and operational capacity, historical and eco-tour access is currently not offered. The U.S. Fish and Wildlife Service is considering visitation options in the future if operational support becomes available.

Virtual visits to PMNM are still possible. Internet users can virtually visit the remote islands and atolls using Google Street View, the Ka'ena Point mobile app, and other interactive material created by U.S. Fish and Wildlife Service and NOAA staff. Through these resources, visitors can stroll among millions of seabirds and various historic sites on Midway Atoll, or encounter monk seals and green sea turtles basking along the shores of Lisianski Island (Kapou) and Laysan Island (Kamole).

Kaʻena Point on the North Shore of Oʻahu shares similar ecosystem, plant, and animal features as those of Papahānaumokuākea. Kaʻena Point is often used as an interpretive site to teach students and other groups about its unique cultural, ecological, and geographic features, while highlighting the similarities between it and Papahānaumokuākea.

Every year, thousands of tourists learn about humpback whales by visiting HIHWNMS visitor centers in Kihei and Kauai, HIHWNMS partners at Maui Ocean Center, and through whale watching tours. In 2008, NOAA estimated that whale watching alone had an economic impact of $74 million annually (ONMS, 2023). That number has steadily increased over the past 15 years,

and does not include the value of sanctuary habitat that covers 1,370 square miles from the shoreline out to 600 foot depth.

Tourism and visitation to the Main Hawaiian Islands is popular and available. Reasons for visiting Hawai‘i vary, but include vacationing, weddings, meetings and conventions, and visits to friends or relatives.

Tourist Arrivals

In 2022, a total of 9.2 million visitors came to the Main Hawaiian Islands, primarily by air service and also by cruise ship. These individuals spent an average of $231 per person per day on their visit. The largest spending category for tourist arrivals was lodging, followed by food and beverages, transportation, shopping, and supplemental business spending (State of Hawai‘i Department of Business, Economic Development, and Tourism [DBEDT], 2022a).

Of the tourists who traveled by air service, the average party size was 2.22, and the busiest month for air visitors in 2022 was July (278,257 visitors per day). Of the global markets for air service, the western United States was the origin for the majority of arrivals to Hawai‘i. There were 3.2 million arrivals in 2013 with a steady increase to 5.3 million in 2022 from that region. The eastern United States and Japan contributed 1.7 and 1.5 million visitors in 2013 and 2.5 and 200,000 visitors in 2022, respectively. The decline in visitors from Japan in 2022 may have been a result of the COVID-19 pandemic. Canada was the fourth largest air service market to Hawai‘i, sending 414,000 visitors in 2022, down from 517,000 in 2010 (DBEDT, 2022a).

For travelers arriving from the United States in 2021, 98% participated in recreation while in Hawai‘i. Of those visitors, the non-mutually exclusive recreational activities with the greatest visitor participation were beach visits and sunbathing (89%), ocean swimming (73%), snorkeling (51%), and hiking (50%; DBEDT, 2022b).

When residents and visitors travel in Hawai‘i, they spend money that supports local communities and economies. Future efforts could use surveys to identify how many residents and visitors use HIHWNMS and PMNM, as well as their associated expenditures.

Commercial Fishing

Commercial fishing takes place in HIHWNMS and surrounding areas but is prohibited in PMNM. The data presented here is for Hawaiian fisheries and is not specific to activity that occurs within HIHWNMS. According to the National Marine Fisheries Service (NMFS), commercial fisheries refer to “fishing operations that sell their catch for profit. The term does not include saltwater anglers that fish for sport or subsistence fishers. It also excludes the for-hire sector, which earns its revenue from selling recreational fishing trips to saltwater anglers” (National Marine Fisheries Service [NMFS], 2023).

The major fisheries operations in Hawai‘i include large vessel trolling for pelagic species, such as tuna (aku), marlin (a‘u), wahoo (ono), and dolphinfish (mahimahi); deepwater hook-and-line bottom fishing; and various forms of net fishing that target nearshore pelagic and reef fish species (NMFS, 2023). These fleets of large boats account for the majority of Hawai‘i’s catch and landings income. Small-boat commercial fishers typically operate closer to the islands and are

more difficult to classify. Besides generating income, the small boat fleet helps build social and community networks, preserves fishing traditions, and supplies fish to local residents (Western Pacific Regional Fishery Management Council, 2020).

One study by Chan and Pan (2017) took a sample (n = 824) of fishers who held a State of Hawai‘i commercial marine license, fished using small vessels, and sold at least one fish during 2013. These small-boat fishers were interviewed in 2014 and asked to classify themselves between fully commercial and noncommercial. In total, 7% identified as full-time commercial, 51% as part-time commercial, 27% as recreational where they sold some catch to offset fishing expenses, 11% as purely recreational, 3% as subsistence, and 1% as cultural.

Value of the Seafood Industry

In 2020, the seafood industry in Hawai‘i—including the commercial harvest sector, seafood processors and dealers, seafood wholesalers and distributors, importers, and seafood retailers—generated $557 million in sales impacts and approximately 5,600 full- and part-time jobs (NMFS, 2023). These values represent a considerable decline from 2019, in which the seafood industry accounted for roughly $786 million in sales and 7,700 jobs (NMFS, 2022). The COVID-19 pandemic is likely responsible for this decline. Because the most recent report shows 2020 data, it's unclear how the industry may have recovered.

In 2019, the seafood product preparation and packaging sector had three employer firms in Hawai‘i and the seafood retail sector had 22 employer firms. These sectors employed 321 workers and had a total annual payroll of $8.9 million (NMFS, 2023). The seafood wholesale sector had 30 employer firms in 2019. These establishments employed 688 workers and had a total annual payroll of $25.4 million (NMFS, 2023).

In 2020, the seafood industry supported 5,611 full- and part-time jobs and generated $557 million in sales in Hawai‘i. Commercial harvesters generated $53.4 million in income and were responsible for 2,448 jobs (NMFS, 2023). These numbers have all decreased since before the COVID-19 pandemic. In 2019, the seafood industry supported 7,693 full- and part-time jobs (37% more than 2020) and generated $786 million in sales (41% more than 2020).

Landings Revenue

In 2020, landings revenue for the state of Hawai‘i totaled $93.9 million, a 21% decrease from 2011 and a 25% decrease from 2019 (Table 2.1; NMFS, 2023).

Table 2.1. Hawai‘i commercial landings, 2011–2023. Source: NMFS, 2023

Year	Total Landings (Thousands of Pounds)	Total Landings Revenue (Thousands of 2022 USD)
2011	29,296	$ 118,140.65
2012	31,053	$ 142,227.19
2013	32,453	$ 134,479.34
2014	33,480	$ 123,958.46
2015	34,625	$ 125,377.53
2016	35,055	$ 141,919.21
2017	37,166	$ 137,347.71
2018	35,497	$ 137,425.84
2019	34,684	$ 124,487.10

Year	Total Landings (Thousands of Pounds)	Total Landings Revenue (Thousands of 2022 USD)
2020	27,264	$ 93,874.85

Finfish landings revenue accounted for almost 100% of all landings revenue. In 2020, tunas (aku) were responsible for $67.9 million in revenue, swordfish (mekajiki) were responsible for $3.0 million, and dolphinfish (mahimahi) accounted for $1.9 million. Together, these top three species accounted for 87% of total landings revenue.

Sustenance Fishing

Although subsistence fishing occurs within Hawaiian waters surrounding the Main Hawaiian Islands, it is not well documented. Further, data specific to HIHWNMS are not available.

Within the PMNM, Native Hawaiian subsistence fishing (state waters) and sustenance fishing (federal waters), where catch must be consumed within PMNM, occurs at low levels and is managed through a monument-issued permit. Monument permits allow for subsistence and sustenance fishing within PMNM as a term or condition of a permit. Between 2007 and 2021, 26 monument permits included the provision to sustenance fish, where permittees were required to report the type of gear used and the number and type of fish caught. Permittees reported catching 35 fish, including 17 yellowfin tuna (‘ahi), 12 gray snapper (uku), three wahoo (ono), and two dolphinfish (mahimahi). Some permit recipients elected not to fish despite their permit authorization.

Recreational Activities

Recreational activities in the Main Hawaiian Islands include recreational fishing and nonconsumptive recreation, such as tours, beach visitation, snorkeling, surfing, scuba diving, sailing, canoe paddling, kayaking, and wildlife viewing. Most of these activities occur year-round, except for whale watching, which occurs primarily from October to April. The information presented here is for recreational activities that occur throughout Hawai‘i and is not specific to activity that occurs within the boundaries of HIHWNMS or PMNM.

State agencies most directly connected with ocean recreation include the Hawai‘i DLNR Division of Aquatic Resources, the DLNR Division of Boating and Ocean Recreation, and the DLNR Division of State Parks. Many organizations and businesses also contribute to recreation opportunities.

Within PMNM, all recreational activities, including fishing, are allowed via permit only at Midway Atoll, though Midway has been closed to visitors since 2009. As such, recreational activities for PMNM are not discussed in the subsequent section.

Recreational Fishing

Economic impacts from recreational fishing activities in Hawai‘i generated 3,292 jobs and $464.9 million in sales in 2020 (NMFS, 2023). Shore fishing trips also had an economic impact, accounting for 67% of employment impacts. Trip expenditures for shore and private boat modes

totaled $383.7 million, with a large portion (62%) of these trip expenditures coming from shore mode trips (NMFS, 2023).

The 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation estimated that 157,000 people over 16 years old participated in saltwater angling in Hawai‘i in 2011. They fished for approximately 1.9 million combined days, with an average of 12 days per angler. This study estimated that fishing-related expenditures totaled $203 million, with each angler spending an average of $651 on trip-related costs (U.S. Department of the Interior & U.S. Department of Commerce, 2011).

According to NMFS (2023), “in 2020, recreational fishers took 3.9 million saltwater fishing trips in the state of Hawai‘i. This number represented a 182% increase from 2011 and a 12% increase from 2019. Of all fishing trips, 81% were taken from the shore sector.”

The fish most frequently caught by recreational fishers in 2020 were bigeye and mackerel scad (akule and ‘opelu, respectively; 3.7 million fish), jacks (trevallys and other jacks; 639,598 fish), and goatfishes (530,290 fish; NMFS, 2023).

“From 2011 to 2020, blue marlin (a‘u; 579%), wahoo (ono; 443%), and deep seven bottomfish (345%) had the largest increases. There were no percent decreases. From 2019 to 2020, other snappers (28%) and blue marlin (a‘u; 4%) had the largest increases, while deep seven bottomfish (-55%), yellowfin tuna (‘ahi; -25%), and skipjack tuna (aku; -11%) had the largest decreases” (NMFS, 2023).

Beach Visitation

Beach recreation, swimming, wading, and snorkeling are primary activities for Hawai‘i residents (Allen et al., 2022) and tourists (DBEDT, 2022b).

A 2015 survey of Hawai‘i residents (n = 2,240) inquired about participation in reef-related activities. In the survey, 80.9% of respondents reported swimming at least once or more per month, with 80.2% recreating at the beach once or more per month, 55.7% snorkeling once or more per month, and 32.7% performing scuba or free diving once or more per month (Gorstein et al., 2018).

Of all U.S. visitors to Hawai‘i in 2021, 88.9% engaged in “beach use/sunbathing,” 72.5% swam in the ocean, and 51.4% snorkeled (DBEDT, 2022b).

Wildlife Viewing

Whales migrate to Hawaiian waters to breed and give birth during the winter months. The abundant whale population of Hawai‘i, coupled with its clear and shallow waters, make it a premier destination for whale watching. In particular, the Au‘au Channel between Moloka‘i, Maui and Lāna‘i have some of the best whale sightings in Hawai‘i (Hawai‘i Tourism Authority, 2024).

The environments of Hawai‘i nurture many species in addition to humpback whales. Hawai‘i is globally recognized as a biological hotspot—not only for its endemism and biodiversity, but also because its flora and fauna are highly vulnerable to habitat loss and alteration, invasive species,

natural disasters, and the effects of climate change. This endemism and diversity gives residents and tourists the opportunity to see unique species and diverse habitats only found in Hawai‘i.

Wildlife viewing can take place year-round during targeted viewing activities such as commercial whale watching boat tours or indirectly while performing other recreation activities such as hiking. With eight national parks and historic sites, 10 national wildlife refuges, 55 state parks, 56 state forest reserves, 31 state harbors and boating facilities, and hundreds of county park and recreation areas within the Main Hawaiian Islands, there are an abundance of opportunities for wildlife-associated recreation (State of Hawai‘i Department of Land and Natural Resources, 2009).

Over 260,000 individuals participated in wildlife viewing in 2010 (155,000 residents and 107,000 nonresidents). These participants spent an average of seven days per year participating in wildlife viewing activities, totaling 1,109,000 days and $210,414,000 in yearly expenditures on this activity, or an average of $793 per participant (Conry, 2010).

Other Uses

Shipping

The Hawaiian commercial port system is collectively known as Port Hawai‘i. Roughly 20.4 million short tons (i.e., 2,000 pounds) of cargo was handled by the Port Hawai‘i system in 2022 (State of Hawai‘i Department of Transportation, 2023). Port Hawai‘i receives containerized cargo, liquid (e.g., petroleum products) and dry bulk (e.g., aggregates) cargoes, neo-bulk cargo (e.g., construction materials such as lumber), and break-bulk cargo (e.g., miscellaneous general cargo; State of Hawai‘i Department of Transportation, 2012).

Port Hawai‘i consists of 9 commercial ports on six of the Main Hawaiian Islands. On O‘ahu, there is Honolulu Harbor and Kewalo Basin (harbor). Honolulu Harbor serves as the hub for the Port Hawai‘i system, where inter-island cargo is distributed to the neighboring islands, receiving over eight million short tons of cargo per year. On neighbor islands, Maui has Kahului Harbor, Moloka‘i has Kaunakakai Harbor, Lāna‘i has Kaumalapau Harbor, the island of Hawai‘i has Hilo Harbor and Kawaihae Harbor, and Kaua‘i has Nāwiliwili Harbor and Port Allen Harbor (State of Hawai‘i Department of Transportation, 2023).

There are no commercial ports in PMNM, and with the exception of a few small boats at Lalo, Kuaihelani, and Hōlanikū, no vessels have home ports in the NWHI. Within PMNM, almost all marine traffic consists of transiting merchant vessels, research ships, and fishing vessels. During periods where storms generate dangerous conditions, these vessels, primarily freighters and tankers, deviate from their regular great circle routes, transiting southward between the islands to take advantage of more favorable sea conditions in the lee of the NWHI.

Chapter 3:
Population and Socioeconomic Drivers

Population statistics are a key factor in determining the pressures placed on sanctuary resources. They also help show who may benefit from the ecosystem services provided by the sanctuary. Primary drivers that place strain on sanctuary resources and that are largely affected by population statistics include demand for seafood, imported and exported goods via maritime shipping, and recreation involving consumptive and nonconsumptive activities. Secondary drivers that indirectly place pressure on marine and aquatic resources include demand for local development and infrastructure—such as housing, transportation, personal services, education, and sewage or waste disposal—and demand for energy and communication infrastructure such as cables and pipelines.

In addition, socioeconomic factors influence people's perceptions of the environment and can help inform the process of developing conservation strategies (Cinner & Pollnac, 2004; Sesabo et al., 2006). Income, unemployment, poverty, and access to utilities and telecommunication services are examples of socioeconomic factors managers and researchers can use as variables and starting points to guide strategy development (Barreto et al., 2020).

The sections below contain information on population, population growth, projected population growth, and population density for the sanctuary community. To assess the economic status of the sanctuary community, information on per capita income, unemployment rates, and poverty rates is also provided. The data for the sanctuary community are compared to that of the United States as well as the individual counties of the sanctuary community to determine the relative health of the sanctuary community for selected measures.

The human costs and economic impacts of the devastating wildfires on August 8, 2023 in Lahaina and Kula on the island of Maui are still being assessed and are not reflected in the results below. While the loss of life and personal costs to those directly impacted is immeasurable, preliminary estimates place the economic costs at between $4–6 billion, including the loss of homes, businesses, and revenue from tourism. Government agencies and conservation organizations are still trying to understand the impacts of the fires on the environment and are currently assessing chemical and other pollutants in soil, freshwater systems, and coastal ecosystems, as well as potential impacts on humpback whales, coral reef ecosystems, and nearshore fisheries.

Key Takeaways

1. The August 8, 2023 wildfires significantly impacted Maui's community, economy, and environment, but human, social, economic, and environmental costs are still being assessed.
2. Population and socioeconomic factors influence ecological pressures, community perceptions, and use of marine resources in HIHWNMS and PMNM.
3. The sanctuary community has varying levels of access to services such as electricity, water, sanitation, internet, and telephone service. Access to services affects community well-being and development of infrastructure and tourism industries.

Population Growth and Density

Population is a major driver within any sanctuary community. A large percentage of the community's population benefits from the ecosystem services generated from sanctuary resources. Population is also key when assessing the conditions of sanctuary resources to determine the pressures placed on them.

Populations exert pressures on marine resources (Kronen et al., 2010), and population has generally been shown to have a negative relationship with biodiversity (Luck, 2007). Information on population, population growth, and population density in and around the sanctuary community may help prioritize sanctuary management strategies.

From 2010 to 2022, the sanctuary community's population grew 8.8%, which is similar to the population growth of the United States over that same period (8.9%). Each county in the sanctuary community had a population growth rate between 7.8% and 12.3% (Table 3.1).

The population of the United States is anticipated to increase about 1.0% per year between 2015 and 2030 (Woods & Poole Economics, Inc., 2016). Between 2016 and 2045, the average annual growth rate for Hawai'i is anticipated to be 0.5% (Kim et al., 2018).

In 2022, the average population density for the sanctuary community was 225.9 people per square mile for all counties, but this value dropped to 103.1 people per square mile when Honolulu County was excluded. Both values were greater than the population density of the United States (93.7 people per square mile). The county with the greatest population density in 2022 was Honolulu at 1,681.4 people per square mile, followed by Maui and Kalawao at 140.4. The counties with the lowest population density were Hawai'i and Kaua'i, with population densities of 50.2 and 118.6 people per square mile, respectively (Table 3.1).

Table 3.1. Population indicators for Hawaiian counties, the state of Hawai'i, and the United States, 2010–2022. Source: U.S. Census Bureau, 2022

Location	Total Population 2010	Total Population 2022	Population Growth 2010–2022	Population Density 2010 (persons per square mile)	Population Density 2022 (persons per square mile)
Hawai'i County	180,362	202,163	12.1%	44.8	50.2
Honolulu County	936,984	1,010,100	7.8%	1,559.7	1,681.4
Kaua'i County	65,460	73,511	12.3%	105.6	118.6
Maui and Kalawao counties	150,785	164,815	9.3%	128.5	140.4
State of Hawai'i	1,333,591	1,450,589	8.8%	207.6	225.9
United States	303,965,272	331,097,593	8.9%	86.1	93.7

Per Capita Income

Per capita income is the average annual income earned per person in a given area, regardless of age or work status. It serves as an indicator of the health and economic status of a community.

The real per capita income—adjusted for inflation into 2022 U.S. dollars (2022 USD)—of the sanctuary community experienced an increase from 2010 to 2022 (Figure 3.1). In 2010, the real per capita income for the sanctuary community was $54,621 in 2022 USD, and in 2022, it increased to $61,779 (Table 3.2). In 2022, Hawai‘i County had the lowest real per capita income at $49,476 and Honolulu County had the greatest at $64,936. The United States, the State of Hawai‘i, and each county in the sanctuary community experienced a net increase in real per capita income from 2010 to 2022 (Figure 3.1). The real per capita income of Hawai‘i was slightly lower than that of the United States in 2022 ($61,779 and $65,470, respectively).

Table 3.2. Selected economic indicators for Hawaiian counties, the state of Hawai‘i, and the United States, 2010–2022. All real per capita income values are reported in 2022 USD. Note that per capita and real per capita income metrics for Maui County reflect both Maui and Kalawao counties combined. Source: U.S. Bureau of Economic Analysis [BEA], 2022; U.S. Census Bureau, 2022a

Location	Per Capita Income (2010)	Per Capita Income (2022)	Real Per Capita Income (2010)	Real Per Capita Income (2022)	Real Per Capita Income Growth Rate (2010–2015)	Real Per Capita Income Growth Rate (2015–2022)	Unemployment Rate (2010)	Unemployment Rate (2022)	Persons Below Poverty (2010)	Persons Below Poverty (2022)
Hawai‘i County	$31,211	$49,476	$41,080	$49,476	8.1%	11%	7.7%	6.5%	33,478	28,162
Honolulu County	$44,945	$64,936	$59,156	$64,936	3.1%	6%	5.0%	4.8%	84,077	86,612
Kaua‘i County	$35,001	$56,697	$46,068	$56,697	8.9%	13%	5.7%	4.1%	7,636	6,040
Maui County	$35,333	$60,376	$46,505	$60,376	10.8%	17%	6.8%	5.4%	16,994	15,120
Kalawao County	–	–	–	–	–	–	0.0%	0.0%	3	7
State of Hawai‘i	$41,499	$61,779	$54,621	$61,779	4.7%	8%	5.6%	5.1%	142,185	135,941
United States	$40,557	$65,470	$53,381	$65,470	9.1%	12%	7.9%	5.3%	46,215,956	40,521,584

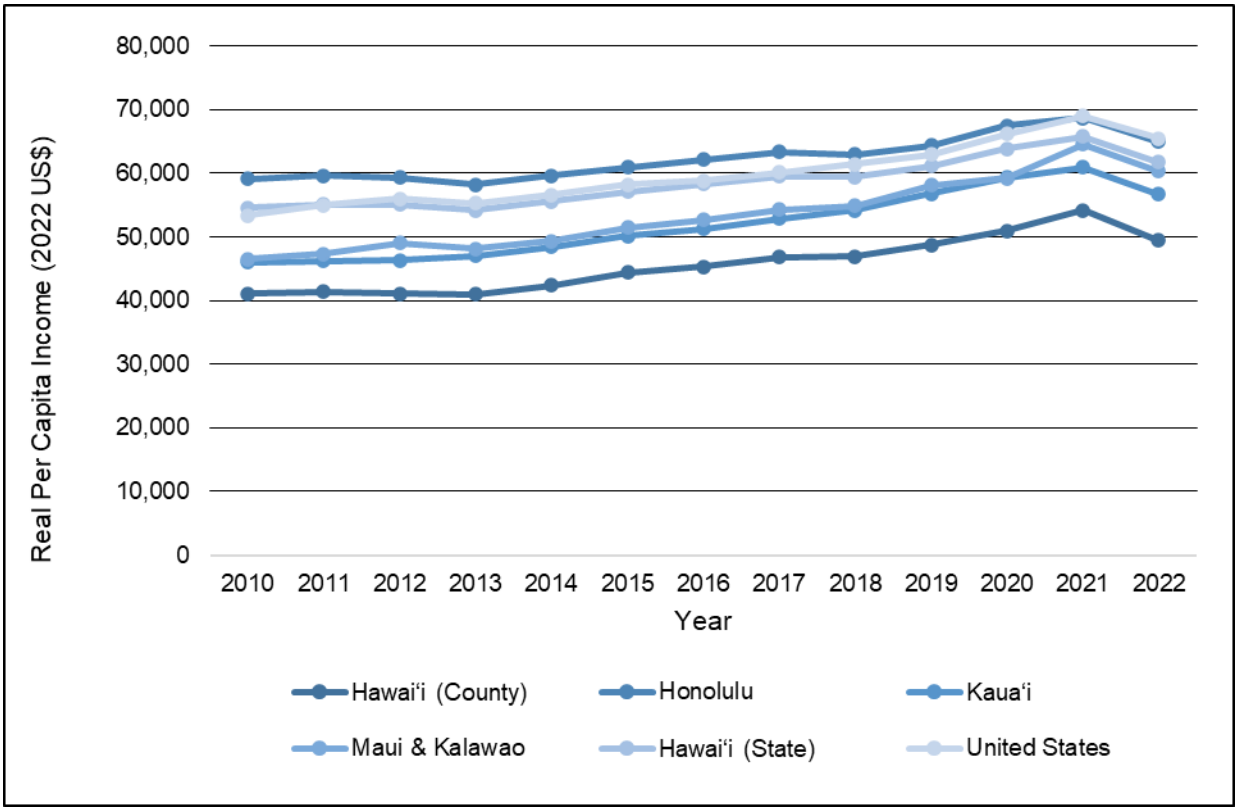

Figure 3.1. Real per capita income for Hawaiian counties, the State of Hawai'i, and the United States, 2010–2022. Source: BEA, 2022

Poverty Rates

In 2022, the poverty rate in the sanctuary community was 9.6%, with the lowest rate of 8.3% in Kaua'i County and the highest rate of 14.9% in Kalawao County (Figure 3.2 below). In 2022, the poverty rate of the sanctuary community was less than that of the United States. The U.S. poverty threshold in 2022 was $14,880 for an individual and $23,280 for a family of three (2022 USD; U.S. Census Bureau, 2022).

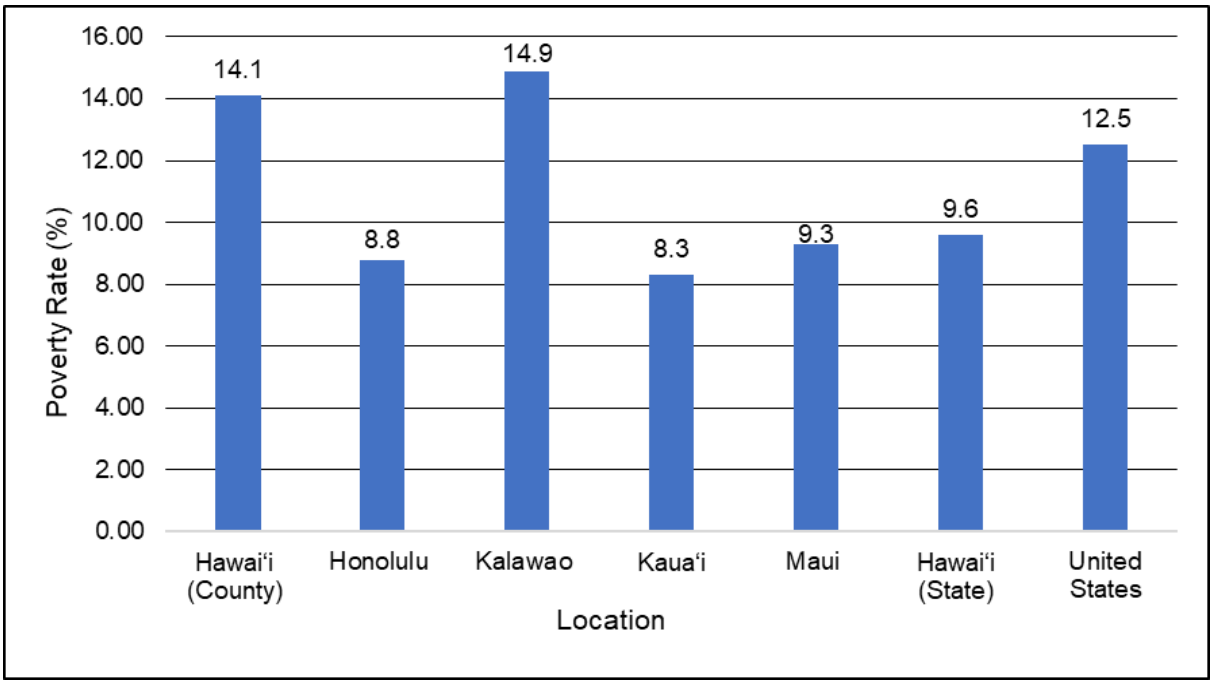

Figure 3.2. Poverty rate of individuals in Hawaiian counties, the State of Hawai'i, and the United States, 2022. Source: U.S. Census Bureau, 2022

Unemployment Rates

The unemployment rate is another indicator of the economic health of the sanctuary community. In 2022, the unemployment rate in the sanctuary community was 5.1%; the lowest unemployment rate was in Kaua'i County at 4.1% and the highest was in Hawai'i County at 6.5%. Unemployment rates decreased for the sanctuary community and the U.S. between 2010 and 2022 (Figure 3.3).

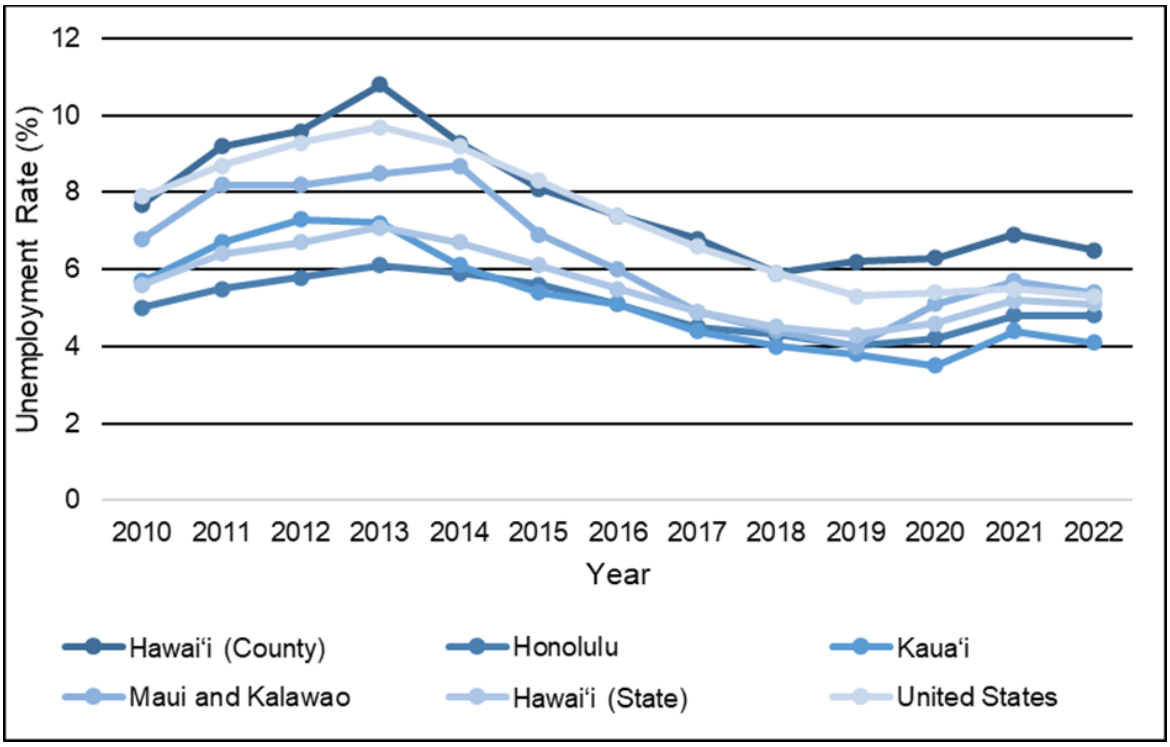

Figure 3.3. Unemployment rate in Hawaiian counties, the state of Hawai'i, and the United States, 2010–2022. Source: U.S. Census Bureau, 2022

Access to Telecommunications and Utilities

Access to services such as gasoline, electricity, water and sanitation, and internet and telephone service affects the well-being of people living in the sanctuary community and the development and impact of coastal tourism facilities, marine activities and recreation, and infrastructure to support visitors and recreation.

Gasoline

Personal vehicle access is high for residents of Hawai'i. Of 483,906 households, 39,142 (8.1%) did not have at least one vehicle available in 2022. More than half of households (59.1%) had access to more than one vehicle (U.S. Census Bureau, 2022).

Motor vehicle fuel consumption remained similar between 2010 and 2022, falling slightly from 501 million gallons to 500 million. The gallons of fuel consumed per vehicle fell over that same time. In 2010, the gallons consumed per vehicle was 447, and in 2022 it shrank to 400. Vehicle miles traveled (in millions of miles) rose from 10,111 to 11,251 between 2010 and 2022, which equaled 9,027 and 9,017 miles driven per vehicle, respectively (DBEDT, 2022b).

Internet and Phone Service

In 2022, 90% of Hawai'i residents had internet access (435,393 of 483,906 households). This number was slightly below the national rate of 91.2% (U.S. Census Bureau, 2022). Of residents with a computing device (e.g., desktop computer, laptop, smartphone, tablet) in 2022, 97.2% had a smartphone, tablet, or other portable wireless computer (U.S. Census Bureau, 2022).

Telephone ownership (the annual average percentage of households with telephone service) remained high in Hawai‘i, increasing from 95.7% in 2010 to 98.3% in 2021 (DBEDT, 2022b).

Electricity

Electric utilities are widely available in Hawai‘i. Each island has a separate electricity grid, none of which are connected by undersea electricity transmission cables. According to the U.S. Energy Information Administration the vast majority of electricity in Hawai‘i is generated by petroleum products (U.S. Energy Information Administration [EIA], n.d.). The reliance on fossil fuels is largely due to the remote nature of the Hawaiian Islands, but an increase in alternative energy sources has brought petroleum-fired energy generation to its lowest levels in more than two decades (EIA, n.d.).

Residents of Hawai‘i absorb the higher cost associated with relying on imported petroleum for energy production. This cost is reflected in the average retail electricity price of Hawai‘i, which is nearly triple the U.S. average rate—the highest of any state. That price is despite Hawai‘i having the fourth lowest electricity demand in the country and the lowest per capita electricity consumption (EIA, n.d.).

There were 416,141 total residential customers of electric utilities in 2010 (an estimated 86.0% of households). That number rose to 443,737 customers in 2022 (an estimated 91.7% of households) (DBEDT, 2022b). Hawaiian Electric provides power to 95% of the islands’ residents (EIA, n.d.).

Renewable Energy

Transitioning to renewable energy is a priority for the state government of Hawai‘i, and a variety of infrastructure projects and a diverse energy portfolio can support this transition. For example, the state has opportunities to utilize various renewable energy sources available in the Hawaiian archipelago, including bioenergy, geothermal, hydropower, ocean energy, solar energy, and wind energy (EIA, n.d.).

The government of Hawai‘i aims to utilize renewable energy sources for the equivalent of 100% of its electricity sales by 2045. They met their 2015 goal of 15%, and in 2022, renewable energy produced 40% of the state’s energy sales (Hawai‘i State Energy Office, 2022). Some completed infrastructure projects to support this goal include eight new solar and solar-plus-battery storage projects on the islands of O‘ahu, Maui, and Hawai‘i, as well as the first utility-scale solar-plus-storage facility of O‘ahu (Hawai‘i State Energy Office, 2022).

Renewable sources contributed 30% of electricity generation in Hawai‘i in 2022. The largest portion of that was solar (58%), followed by wind (20%) and geothermal (10%). Of the 58% that was solar energy production, 70% was from small-scale sources (EIA, n.d.).

Chapter 4:
Demographic Characteristics

The relevant demographic characteristics of the sanctuary community include gender, racial, and ethnic composition; national origin; age distribution; language; and education level. Demographic information may be integrated into designs for effective sanctuary planning and management. For example, sanctuary managers may consider environmental awareness programs that are targeted to specific community demographics to increase access to sanctuary resources and participation rates in outdoor recreational activities.

Key Takeaways

1. Demographic characteristics such as gender, racial and ethnic composition, age distribution, and education level affect perceptions and use of marine resources in PMNM and HIHWNMS.
2. Sanctuary managers should adapt outreach and management strategies for the community.

Gender

Gender analyses are necessary to enhance coastal management and marine spatial planning, because perceptions and uses of marine resources and ecosystems vary between men and women (de la Torre-Castro et al., 2017). Gender has been shown to be an important variable in the perceived effect of conservation on fishing, with one case study indicating that women were less likely than men to report a marine protected area as having a positive effect on their fishing, and that women were less likely than men to actively participate in marine protected area management decision making (Kleiber et al., 2018). In addition, gender influences participation in outdoor recreational fishing (Milon, 2000; Burkett, 2019).

From 2010 to 2022, more people identified as male than female in the sanctuary community (Figure 4.1). From 2010 to 2022, the percentage of female residents in the sanctuary community was consistently between 49.5% and 49.9% (U.S. Census Bureau, 2022). The distribution of male to female population in Hawai‘i (50.5% male, 49.5% female) was similar to the gender distribution of the United States in 2022 (49.6% male, 50.4% female).

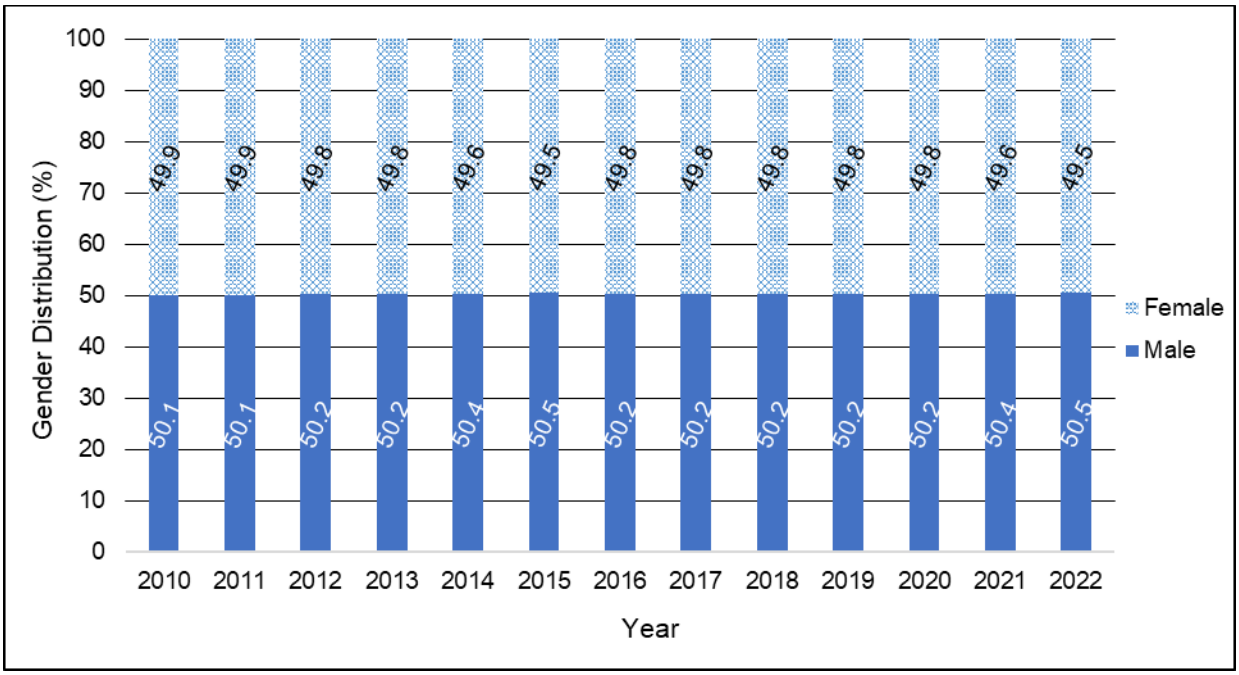

Figure 4.1. Distribution of gender in Hawai‘i, 2010–2022. Source: U.S. Census Bureau, 2022

Racial and Ethnic Composition

Race and ethnicity are essential for conducting social science research and informing environmental justice analysis required by the National Environmental Policy Act.

Race and ethnicity are treated separately in the United States census, as shown in the annual American Community Surveys. Racial categories for the United States include “White,” “Black or African American,” “American Indian and Alaska Native,” “Asian,” “Native Hawaiian and other Pacific Islander,” “some other race,” and “two or more races.” These categories are discussed below in the section on race.

“Hispanic” represents ethnicity and is recorded separately from race in the census, with any race able to identify as Hispanic. For this reason, ethnicity is discussed separately from race in the SCP. The section below on race presents information for non-Hispanic respondents. The section on ethnicity includes information for respondents of any race who indicated Hispanic ethnicity.

Race

In 2022, the greatest portion of the sanctuary community population identified as Asian at 37.2% of the population, with “two or more races” and White comprising 25.5% and 23.0%, respectively (Figure 4.2). The sanctuary community is much more racially diverse than the United States, which is 65.9% White. The second largest racial group in the United States was Black or African American (12.5%; Figure 4.2).

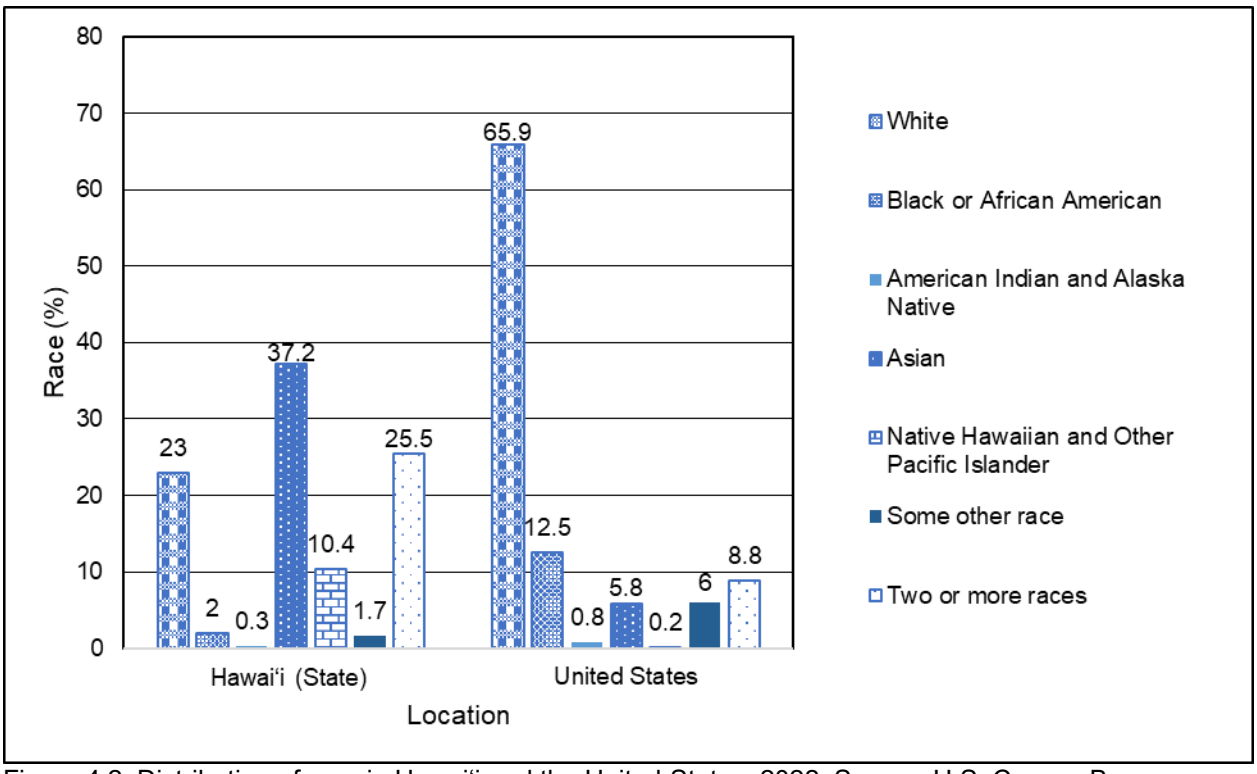

Figure 4.2. Distribution of race in Hawai'i and the United States, 2022. Source: U.S. Census Bureau, 2022

The overall percentage of respondents in the sanctuary community who identified as "two or more races" increased from 2010 to 2022, from 22.9% to 25.5%. There were also slight increases in respondents who identified as Black or African American, Native Hawaiian or other Pacific Islander, and "some other race" over the same period. The portion of respondents who identified as White or Asian experienced a slight net decrease during this period, and the portion of respondents who identified as American Indian and Alaska Native remained constant (Figure 4.3).

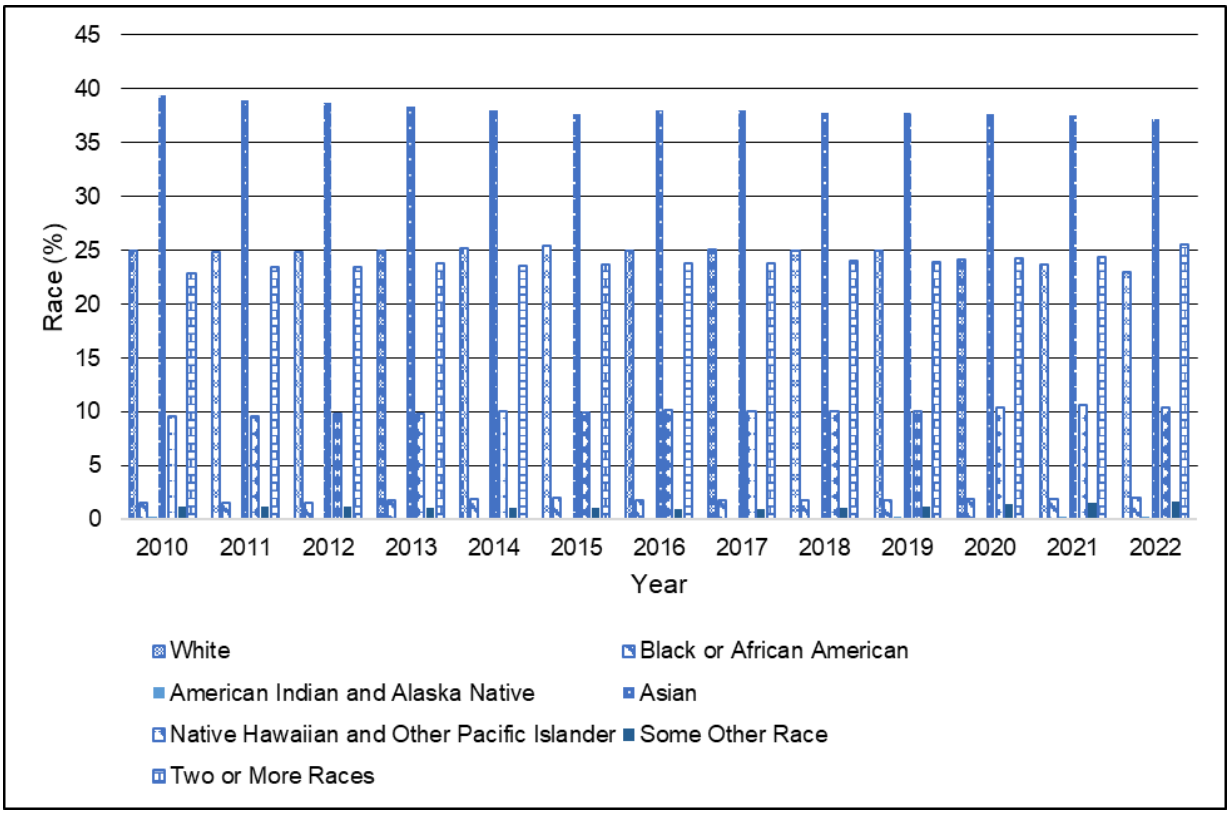

Figure 4.3. Distribution of race in Hawai‘i, 2010–2022. Source: U.S. Census Bureau, 2022

Ethnicity

In the census, Hispanic represents those of Hispanic, Latino, or Spanish origin. In the sanctuary community and the United States, most respondents identified as non-Hispanic in 2022. See the previous section for information on race distribution excluding Hispanic ethnicity. Information for Hispanic ethnicity by racial group was not available (U.S. Census Bureau, 2022).

In 2022, 11% of respondents in the sanctuary community were Hispanic, compared to 18.7% of the U.S. population. The percentage of Hispanic respondents in the sanctuary community increased slowly between 2010 (8.7%) and 2022 (11.0%) (Figure 4.4).

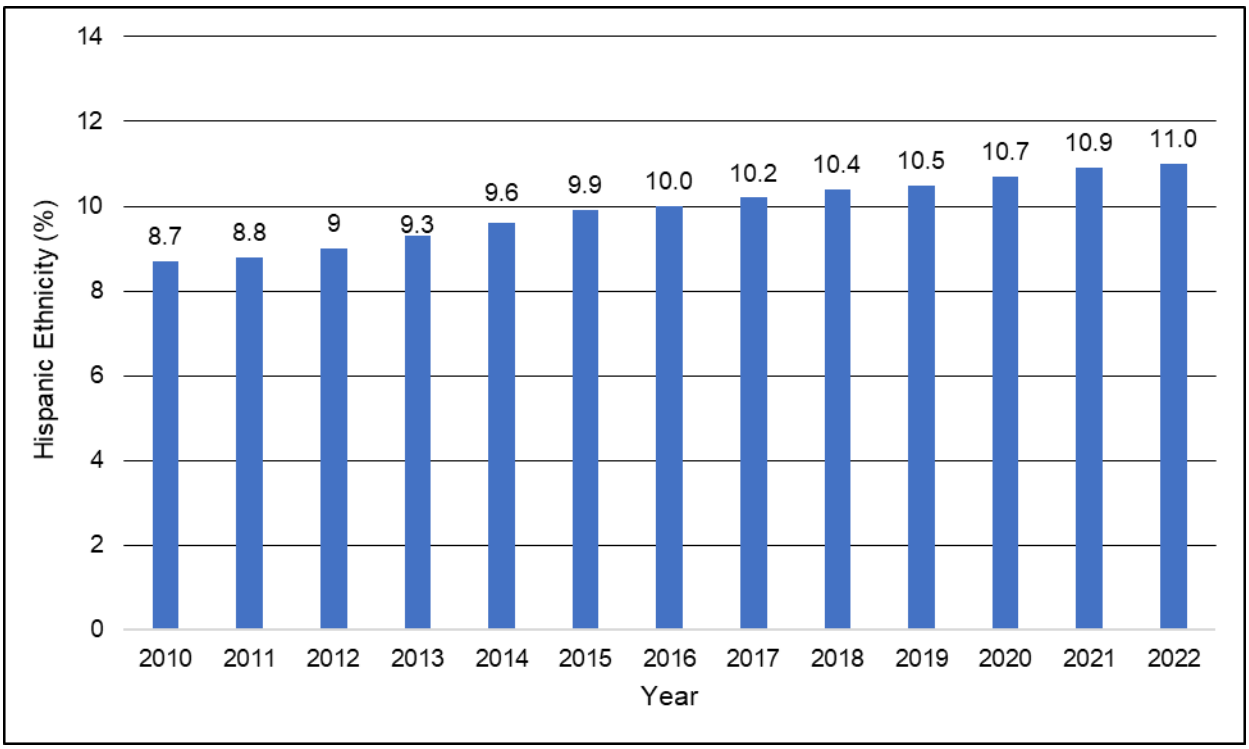

Figure 4.4. Distribution of Hispanic ethnicity in Hawai‘i, 2010–2022. Source: U.S. Census Bureau, 2022

Age Distribution

In 2022, the age distribution of the sanctuary community was similar to that of the United States (Figure 4.5). In both the sanctuary community and the United States, the largest percentage of people were between 25 and 34 years of age.

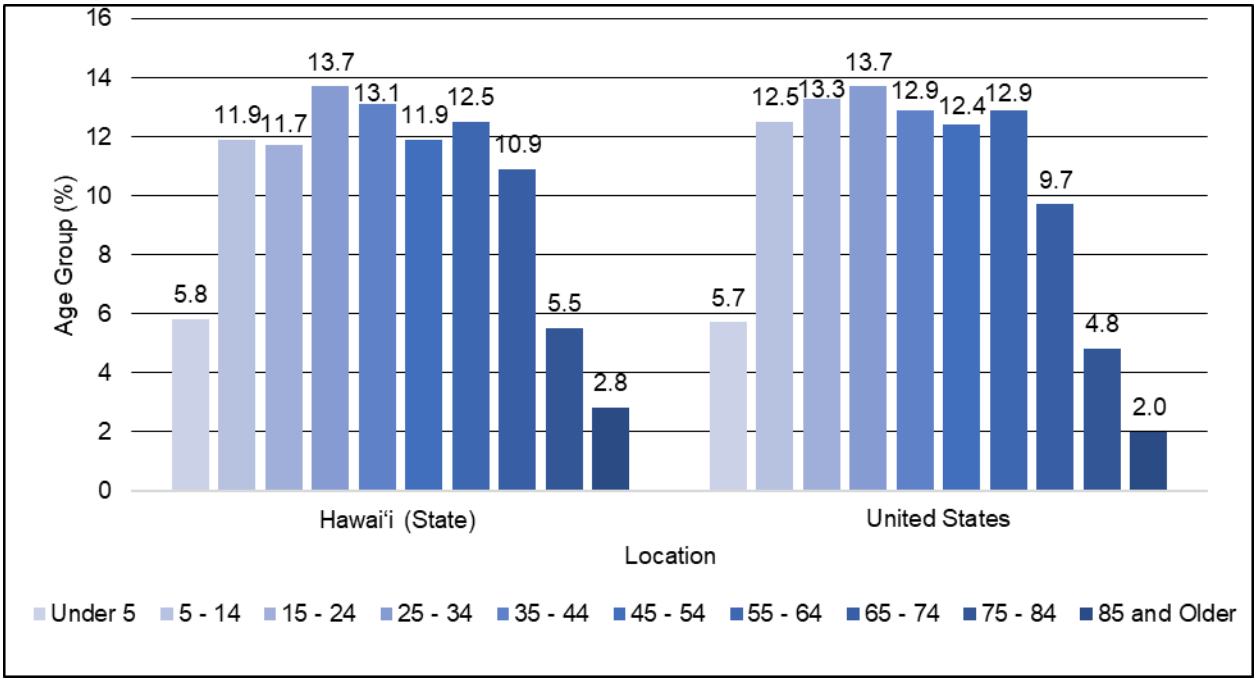

Figure 4.5. Age distribution in Hawai‘i and the United States, 2022. Source: U.S. Census Bureau, 2022

Language

A five-year study between 2009 and 2013 asked Hawai‘i residents about their language usage at home. The English language is largely ubiquitous in Hawai‘i. Of residents five years of age and older, roughly 960,000 out of a 1.3 million spoke only English at home. The remaining 327,000 residents spoke a language other than English at home. Tagalog (58,000 speakers), Ilocano (54,000), Japanese (46,0000), and Chinese (including Cantonese, Mandarin, and other Chinese languages; 31,000) were the languages other than English spoken most often (U.S. Census Bureau, 2015). The survey did not specify if households spoke more than one language at home.

Within the total population of Hawai‘i, 160,000 residents reported being able to speak English less than “very well.” All of these residents spoke a language other than English at home (U.S. Census Bureau, 2015). A county-level breakdown of language usage in Hawai‘i was not available for the years 2010 to 2022.

As an official language of the state of Hawai‘i, the Hawaiian language is also used throughout the state. In 2015, over 18,000 people spoke Hawaiian at home (DBEDT, 2016). The use of the Hawaiian language has grown in the past few decades as efforts to preserve the language, including establishing schools that teach in Hawaiian, have increased (Ka Haka ʻUla O Keʻelikōlani College of Hawaiian Language, n.d.).

Education Level

Sanctuary managers may use information about educational attainment in the community to adapt outreach, informal education, community engagement, and events to better meet the needs of community residents. Education attainment responses were reported by the highest level of education completed.

Compared to the United States, similar percentages of the sanctuary community’s population reported receiving a high school diploma (or equivalent), some college education, or bachelor’s degrees as their highest level of education completed. However, a lower proportion of the community received graduate/professional degrees and a larger proportion had no high school diploma or equivalent compared to the United States.

In the sanctuary community, 22.2% of people had a minimum of a bachelor’s degree in 2022, which increased from 19.7% in 2010. About 26.7% of the sanctuary population reported having a high school diploma or equivalent as their highest level of education in 2022, which is a decrease from 29.0% in 2010. However, the proportion of the sanctuary community who attained a high school diploma or equivalent in addition to a higher level of education increased between 2010 and 2022 (Figure 4.6). These data suggest an increasingly educated population over this period.

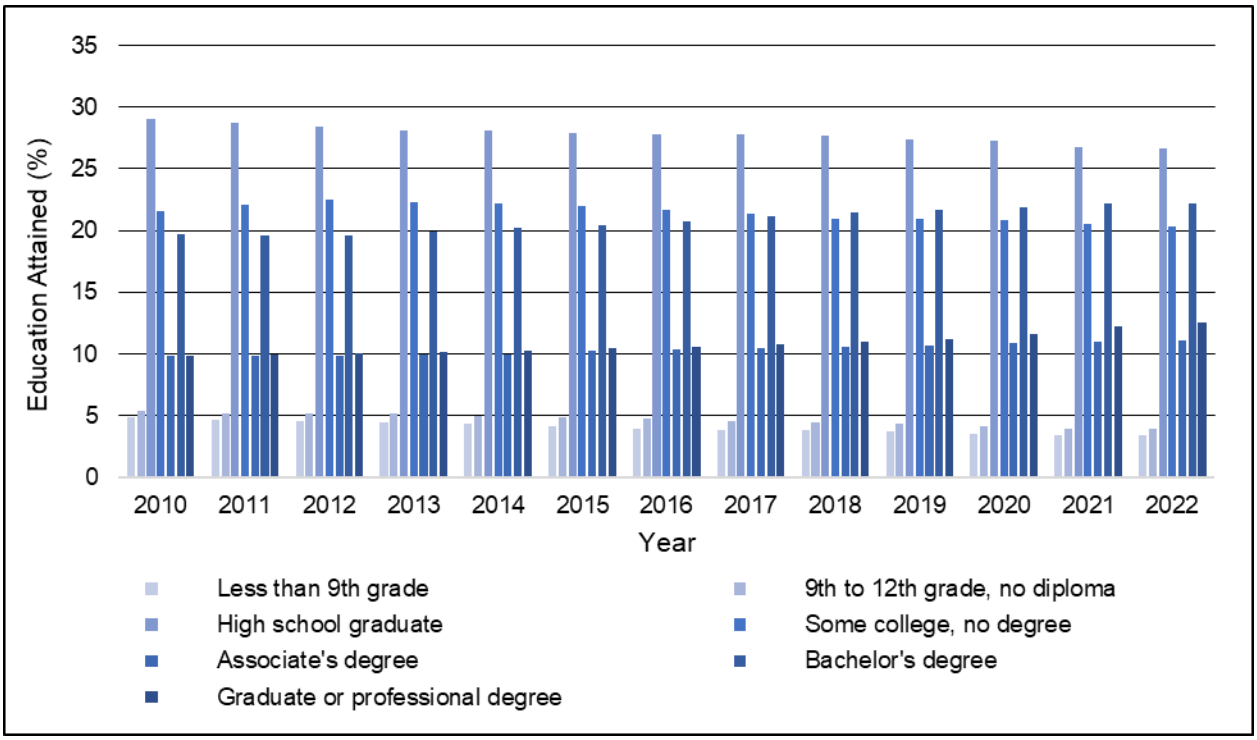

Figure 4.6. Education attainment in Hawai‘i for adults 25 years of age and older, 2010–2022. Source: U.S. Census Bureau, 2022

Chapter 5:
Economic Profile

This chapter presents several key indicators of economic health, including labor force, employment, and personal income (see Chapter 3 for information on per capita income, unemployment rates, and poverty rates). Labor force, employment, and personal income are suggestive of the relative health of the sanctuary community's economy. They indicate whether the economy is healthy or stagnant and suggest opportunities for employment and economic growth in the community. These elements are important for assessing whether people can adapt to changes in resource management and policy decisions that may displace them from resource use.

Economic measures related to proprietors (i.e., business owners) are also analyzed in this chapter, including income, employment, and the proportion of the sanctuary community's income and employment accounted for by proprietors. Proprietor activity is usually an indicator of small businesses and their contributions to the local economy, which are often connected to resource use in the sanctuary community (e.g., commercial fishing operations, recreation- and tourism-related businesses).

This section also explores employment and annual payroll by industry sector. By linking spending in the local economy—as related to resource use in the sanctuary community—to economic sectors, it is possible to leverage input-output models such as IMPLAN (IMPLAN, 2018). The IMPLAN model can estimate the multiplier impacts on the local economy and assess the proportion of the local economy affected by resource use in the sanctuary.

Income and employment data by sector are also important for understanding how resilient a local economy may be to disruption. High concentrations of employment across a few sectors may indicate that the health of the economy has a higher level of dependence on specific industries compared to a region with employment spread across many sectors.

Key Takeaways

1. Economic indicators such as labor force, employment, and personal income indicate whether the sanctuary community's economy is healthy and suggest whether sanctuary users can adapt to changes in resource management and policy in PMNM and HIHWNMS.
2. Government and government enterprises, health care and social assistance, and accommodation and food services were among the industries that employed the most people and comprised the highest percentage of total income in the sanctuary community in 2022.
3. Small businesses help create jobs and generate income in the sanctuary community.

Labor Force and Employment

Labor Force

Labor force and its growth are good indicators of the potential for economic expansion within the sanctuary community and local economy.

In 2022, the sanctuary community labor force was over 760,000 people. Between 2010 and 2022, the labor force increased by over 46,000 people. Every county's labor force grew between 2010 and 2022 except Kalawao County. The labor force of the sanctuary community grew on average at a slower rate than the United States between 2010 and 2022 (Table 5.1).

Table 5.1. Distribution of labor force in Hawaiian counties, the state of Hawai'i, and the United States, 2010–2022. Source: U.S. Census Bureau, 2022

Location	Labor Force 2010	Labor Force 2015	Labor Force 2022	Growth Rate 2010–2015	Growth Rate 2015–2022
Hawai'i County	93,190	89,572	96,264	−3.9%	7.5%
Honolulu County	501,779	523,197	539,759	4.3%	3.2%
Kalawao County	64	69	36	7.8%	−47.8%
Kaua'i County	35,100	36,149	37,417	3.0%	3.5%
Maui County	83,934	87,952	86,911	4.8%	−1.2%
State of Hawai'i	714,067	736,939	760,387	3.2%	3.2%
United States	155,163,977	159,913,288	169,093,585	3.1%	5.7%

Employment

Total employment is another indicator of the health of the economy, and over time it can inform the causal relationship between protected areas and employment outcomes. In 2022, the sanctuary community employed over 675,000 people. The employment rate in the sanctuary community had a net growth between 2010 and 2022 (6.1%), but it grew at a slower rate than the United States. Over the 2010 to 2015 period, every county experienced employment growth except for Hawai'i County. Kalawao County was the only county to experience a decrease in employment for the 2015 to 2022 period, with the rest experiencing an increase (Table 5.2).

Table 5.2. Distribution of employment in Hawaiian counties, the state of Hawai'i, and the United States, 2010–2022. The asterisk (*) indicates that values exclude service members of the Armed Forces. Source: U.S. Census Bureau, 2022

Location	Employment 2010	Employment 2015	Employment 2022	Growth Rate 2010–2015	Growth Rate 2018–2022
Hawai'i County	85,780	82,124	89,643	−4.3%	9.2%
Honolulu County	439,691	455,481	468,113	3.6%	2.8%
Kalawao County	60	64	36	6.7%	–43.8%
Kaua'i County	32,933	33,996	35,683	3.2%	5.0%
Maui County	77,990	81,619	81,596	4.7%	0.0%
State of Hawai'i	636,454	653,284	675,071	2.6%	3.3%

Location	Employment 2010	Employment 2015	Employment 2022	Growth Rate 2010–2015	Growth Rate 2018–2022
United States*	141,833,331	145,747,779	158,913,204	2.8%	9.0%

Household Income

In 2022, the distribution in household income was similar between the sanctuary community and the United States (Figure 5.1). The largest percentage of households earned between $100,000 and $149,999 in both the sanctuary community and the United States.

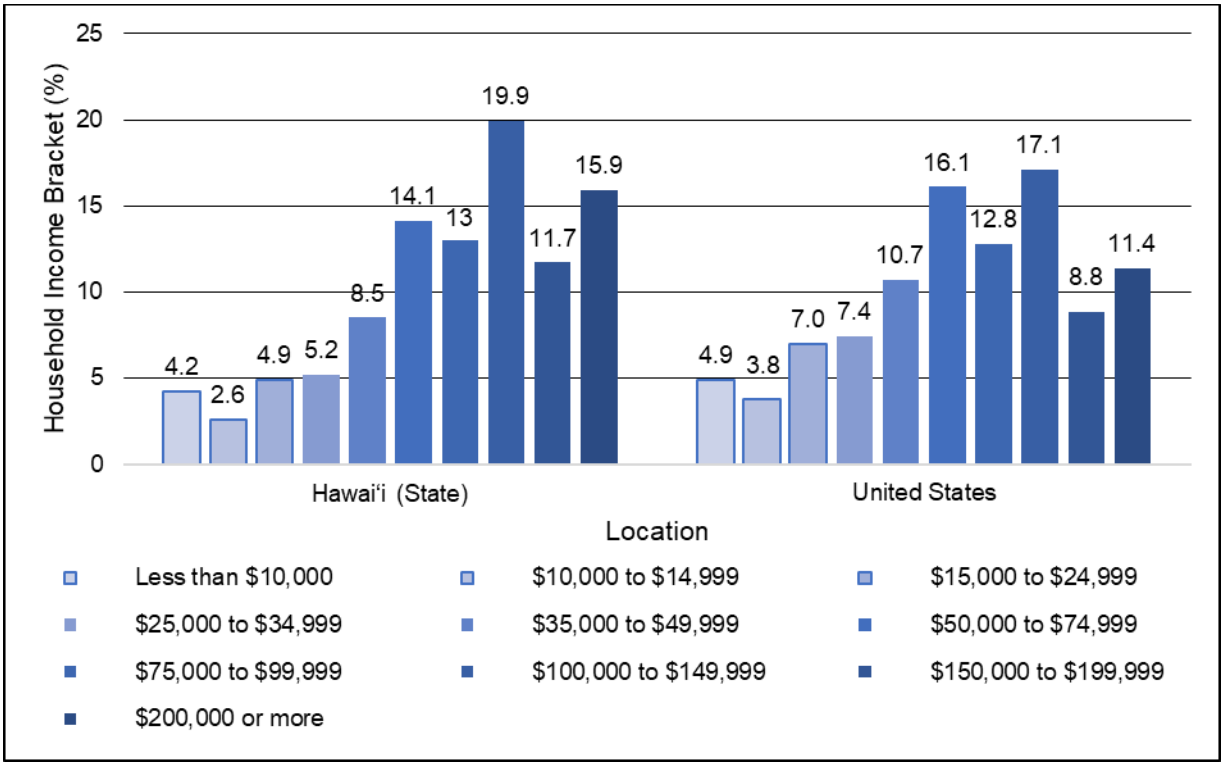

Figure 5.1. Household income in Hawai'i and the United States, 2022. Source: U.S. Census Bureau, 2022

Personal Income

BEA maintains two concepts of personal income in their Regional Economic Information System. Income is reported by "place of work" and by "place of residence." Income by place of work is the income generated based upon where a person works, regardless of where they live, and is reported by economic sector (e.g., farm, manufacturing, retail, wholesale). Income by place of residence is reported by where the worker lives regardless of where they work (BEA, 2024). For example, if a person works in the sanctuary community, but lives outside the community, their income would be reported in the sanctuary community for place of work but would be reported outside of the sanctuary community for place of residence. In addition to the total income from workers who live in the sanctuary community, income by place of residence also includes income from investments, pensions, social security payments, and other transfer payments.

This information comes from the Census of Inter-county Commuters. BEA uses this information to form the "residence adjustment," which can be either positive or negative depending on whether people living in but working outside the sanctuary community are earning more or less than people living outside but working inside the sanctuary community. When an area is largely composed of people who live inside but work outside of it, economists often refer to the area as a "bedroom community." Income by place of work as a percentage of total income by place of residence serves as an indicator of two key sanctuary community economic traits: whether the economy has a significant bedroom community and/or whether it has a large retirement community. When the percentage of income by place of work is low relative to income by place of residence, economists then look to the resident adjustment and the amount of transfer payments in pensions and social security payments to further describe the nature of the local economy.

People who commute to a different county to work (i.e., inter-county commuters) can still receive income not derived by work in the area where they live, such as income from interest, dividends, and capital gains from investments. Retirees can receive pensions and social security, while unemployed residents may receive unemployment benefits. Sources of income that are not connected to the status of work in the local economy can make the economy more resilient and better able to handle changes in local employment opportunities.

In 2022, income by place of work as a percent of income by place of residence for the sanctuary community was 69.1%, which means that nearly 70% of the community's income came from inside the sanctuary community, and about 30% of the income came from outside the community. Across the different counties, this percentage varied from a low of 57.3% (Hawai'i) to a high of 71.6% (Honolulu; Table 5.3). From 2010 to 2022, this percentage was largely constant within the sanctuary community, with a decrease of around three percentage points over that period (Figure 5.2; Table 5.4).

Table 5.3. Income by place of residence and by place of work for Hawaiian counties and the state of Hawai'i, 2022. Source: BEA, 2022

Location	Income by Place of Residence (2022 USD)	Income by Place of Work (2022 USD)	Work as Percent of Residence
Hawai'i County	$10,207,652,000	$5,851,235,000	57.32%
Honolulu County	$64,652,972,000	$46,305,715,000	71.62%
Kaua'i County	$4,184,827,000	$2,674,136,000	63.90%
Maui and Kalawao counties	$9,927,886,000	$6,628,434,000	66.77%
State of Hawai'i	$88,973,337,000	$61,459,520,000	69.08%

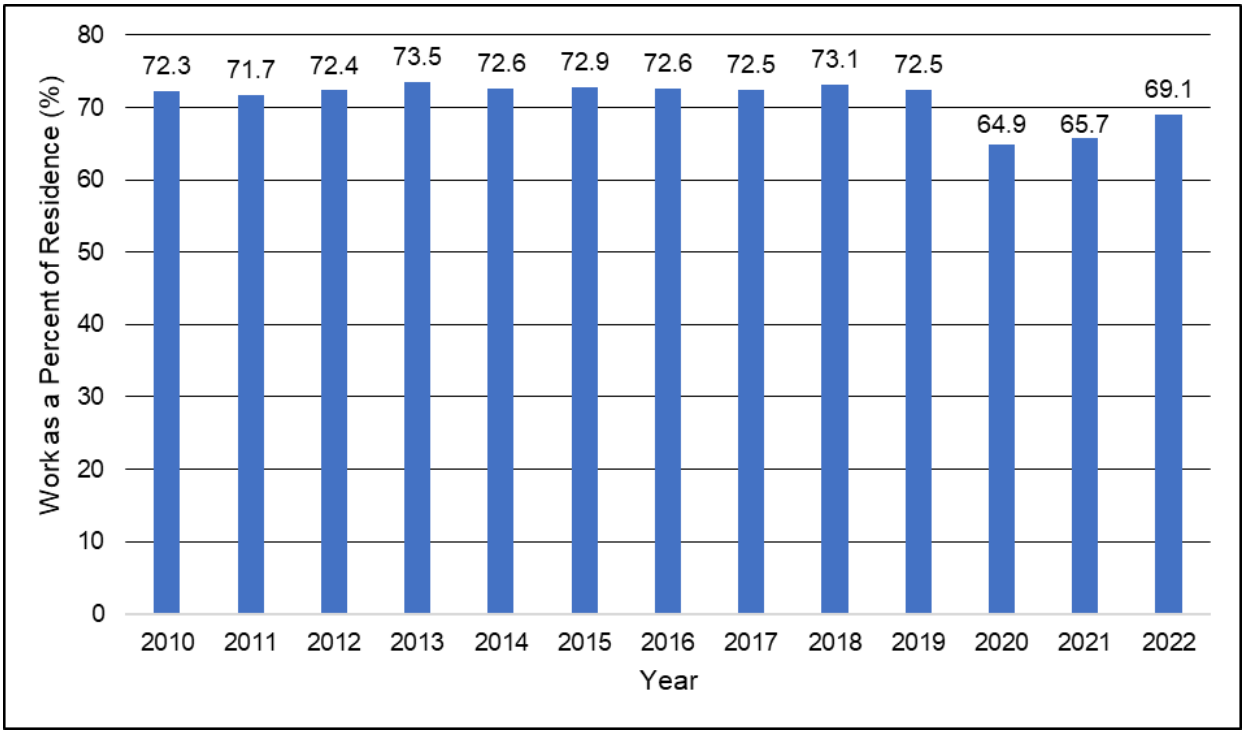

Figure 5.2. Income by place of work as a percent of income by place of residence for Hawai‘i, 2010–2022. Source: BEA, 2022

Table 5.4. Income by place of residence and by place of work for Hawai‘i, 2010–2022. Source: BEA, 2022

Year	Income by Place of Residence (2022 USD)	Income by Place of Work (2022 USD)	Work as Percent of Residence
2010	$74,561,589,445	$53,888,962,641	72.3%
2011	$76,377,784,318	$54,740,947,291	71.7%
2012	$77,431,067,399	$56,022,812,134	72.4%
2013	$77,158,334,143	$56,748,335,429	73.5%
2014	$79,751,653,020	$57,897,007,030	72.6%
2015	$82,677,560,105	$60,240,027,981	72.9%
2016	$84,954,115,229	$61,716,531,229	72.6%
2017	$86,882,858,034	$62,994,415,605	72.5%
2018	$86,805,353,632	$63,465,656,551	73.1%
2019	$89,098,787,252	$64,561,561,340	72.5%
2020	$92,650,462,351	$60,174,423,549	64.9%
2021	$95,210,725,510	$62,561,590,451	65.7%
2022	$88,973,337,000	$61,459,520,000	69.1%

Employment and Annual Payroll by Industry Sector

In its Regional Economic Information System, BEA reports income and employment for different geographic areas by industry or economic sector using North American Industry

Classification System codes. The North American Industry Classification System codes identify different sectors of the economy. For some counties within the sanctuary community, the information is classified as "D" or "ND," indicating the numbers cannot be reported because there are fewer than 10 firms in that industry or economic sector.

Figures and tables have shortened industry titles for ease of reading. The full list of industries is:

- Farm employment
- Forestry, fishing, and related activities
- Mining, quarrying, and oil and gas extraction
- Utilities
- Construction
- Manufacturing
- Wholesale trade
- Retail trade
- Transportation and warehousing
- Information
- Finance and insurance
- Real estate and rental and leasing
- Professional, scientific, and technical services
- Management of companies and enterprises
- Administrative and support and waste management and remediation services
- Educational services
- Health care and social assistance
- Arts, entertainment, and recreation
- Accommodation and food services
- Other services (except government and government enterprises)
- Government and government enterprise

Employment by Industry

In 2022, the industries constituting the five highest percentages of total employment in the sanctuary community were government and government enterprises (19.1%), accommodation and food services (11.8%), health care and social assistance (9.5%), retail trade (9.3%), and real estate (5.9%; Figure 5.3).

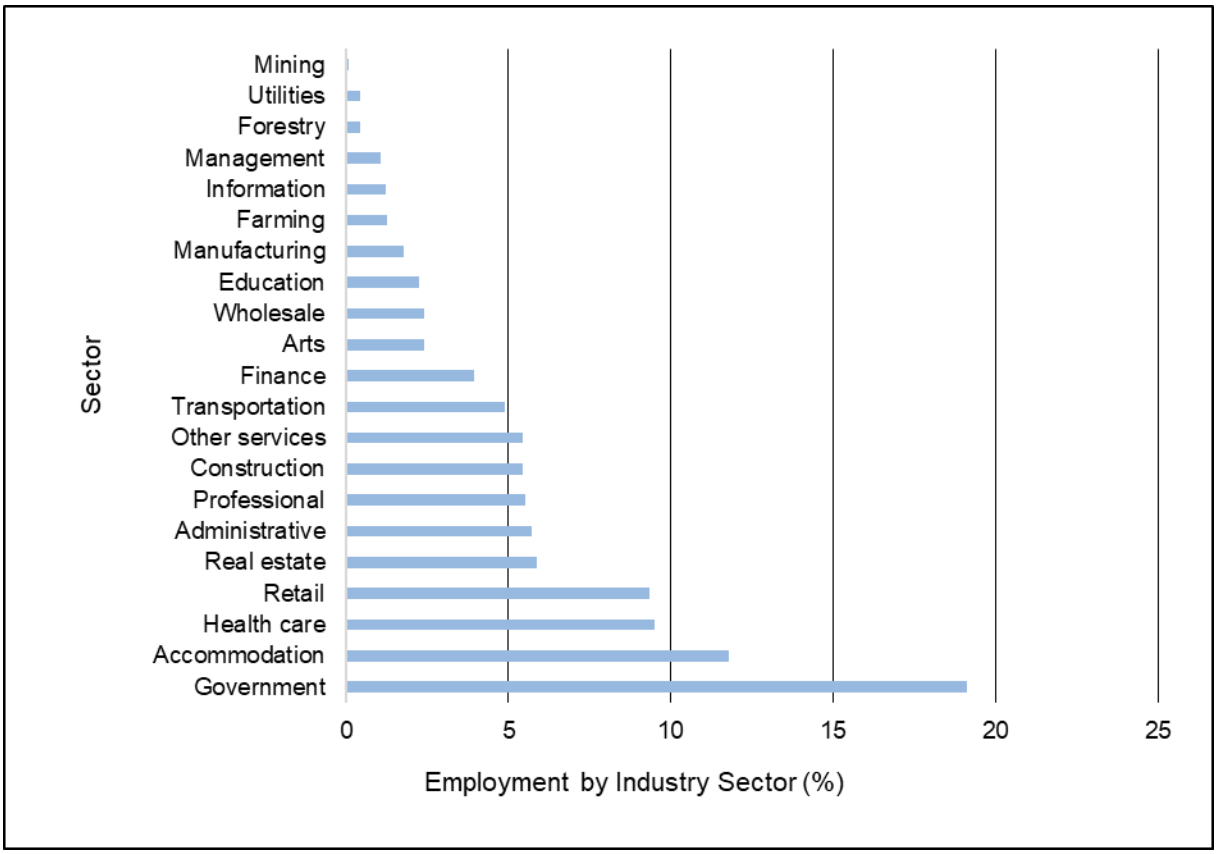

Figure 5.3. Employment by industry sector in Hawai‘i, 2022. Source: BEA, 2022

Personal Income by Industry

In 2022, the industries constituting the highest percentage of total income in the sanctuary community were government and government enterprises (27.7%), health care and social assistance (11.0%), accommodation and food services (9.5%), construction (7.5%), and professional, scientific, and technical services (6.3%; Figure 5.4).

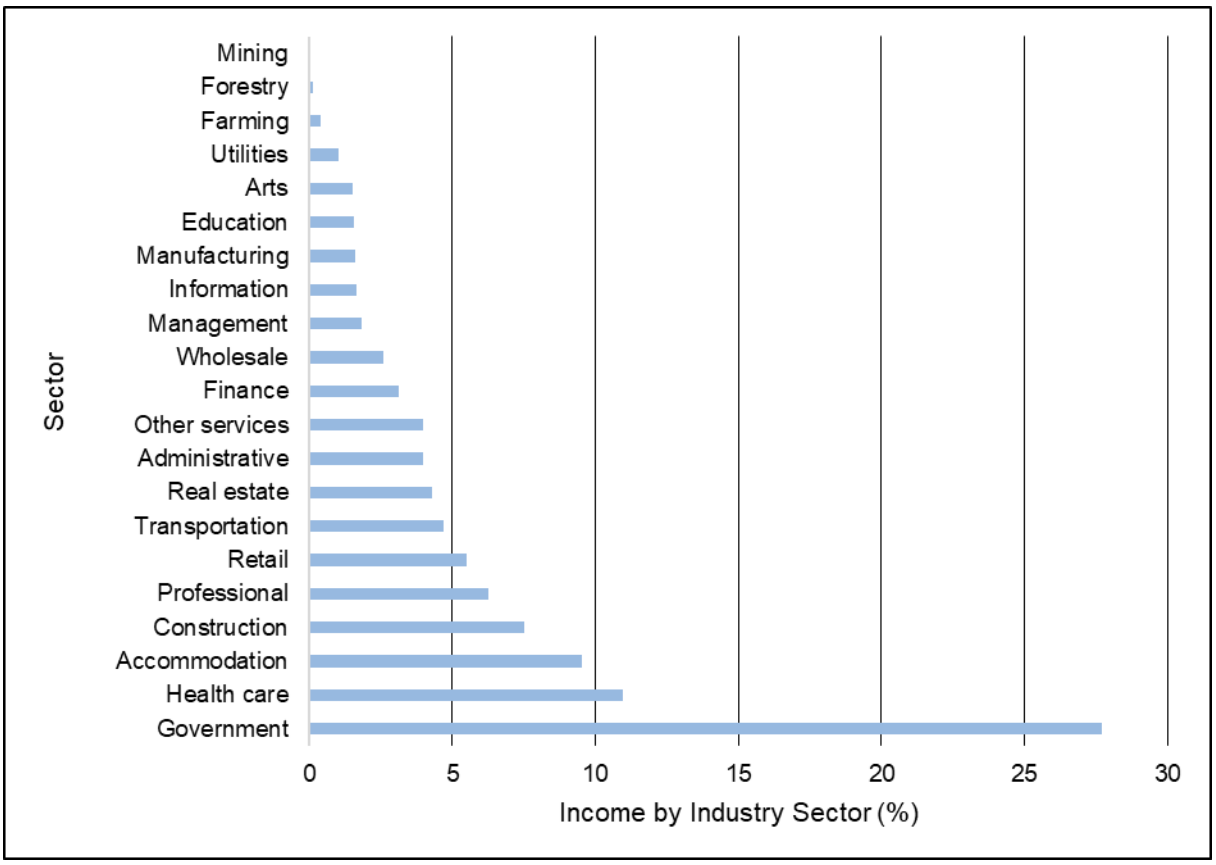

Figure 5.4. Income by industry sector in Hawai‘i, 2022. Source: BEA, 2022

Proprietor Income and Employment

SCPs provide the basis for analyses to establish how dependent local communities and economies are on sanctuary resources. The profiles also help assess how people can adapt to or mitigate policy or management changes that affect the way they use the sanctuary resources or receive benefits provided by the resources. Many small businesses depend on sanctuaries and the resources they provide, such as museums, dive operations, and educational institutions.

This report also analyzes the income and employment of proprietors (i.e., business owners), as well as the proportion of the sanctuary community's income and employment accounted for by the proprietors. This information usually indicates there are small businesses in the area, which are often connected to resource use in the sanctuary, such as commercial fishing operations and recreation- or tourism-related businesses. Typically, the greater the proprietors' income and employment, the greater the number of small businesses present in the area. The larger the proportion of the sanctuary community's income and employment accounted for by proprietors, the more dependent the economy is on small businesses.

In 2022, over 216,000 people were employed by proprietors in the sanctuary community, making up 24.0% of total employment in the sanctuary community. This number is an increase from the percent of total employment in 2010 (19.8%). Proprietors in the sanctuary community

collectively earned $6,521,000,000 in 2022, which constituted 10.6% of total income earned in the sanctuary community that year (Table 5.5).

Table 5.5. Proprietors' income and employment in Hawai'i (State), 2010–2022. Percent of total income was calculated as proprietors' income divided by income earned in the sanctuary community ("place of work" income). Source: BEA, 2022

Year	Proprietors' Income (2022 USD)	Percent of Total Income	Proprietors' Employment (# of Individuals)	Percent of Total Employment
2010	$5,791,775,138	10.7%	163,345	19.8%
2015	$6,273,846,715	10.4%	186,124	20.7%
2022	$6,521,000,000	10.6%	216,862	24.0%

Acknowledgements

We appreciate the review and feedback of PMNM staff, Kevin Kelly and Alyssa Miller; and HIHWNMS Superintendent, Kim Hum.

Glossary of Acronyms

BEA	U.S. Bureau of Economic Analysis
DBEDT	State of Hawai‘i Department of Business, Economic Development, and Tourism
DLNR	Hawai‘i Department of Land and Natural Resources
EIA	U.S. Energy Information Administration
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NWHI	Northwestern Hawaiian Islands
ONMS	Office of National Marine Sanctuaries
PMNM	Papahānaumokuākea Marine National Monument
SCP	Sanctuary Community Profile
USD	United States Dollar

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