

Final Report

CHARACTERIZING THE OCEAN ECONOMIES OF GUAM, AMERICAN SAMOA, AND THE COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS

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Lexington, Massachusetts



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NOAA's Office for Coastal Management

"Coastal management" is the term used by communities and organizations striving to keep the nation's coasts safe from storms, rich in natural resources, and economically strong. The national lead for these efforts is NOAA's Office for Coastal Management, an organization devoted to partnerships, science, and good policy. This agency, housed within the National Ocean Service, oversees major initiatives that include the National Coastal Zone Management Program, Coral Reef Conservation Program, Digital Coast, and National Estuarine Research Reserve System.

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Executive Summary

Purpose

The National Oceanic and Atmospheric Administration's (NOAA's) Economics: National Ocean Watch (ENOW) provides an annual time series of select employment, establishment, wage, and gross domestic product data for all 30 U.S. coastal and Great Lakes states as far back as 2005. As detailed in Section 4 of this report, ENOW covers 47 six-digit NAICS industries across the following six ocean- and Great Lakes-dependent sectors of the economy:

- Living resources
- Marine construction
- Marine transportation
- Offshore mineral resources
- Ship and boat building
- Tourism and recreation

ENOW data play an important role in characterizing and determining the relative importance of the ocean economies of the U.S. states and sub-state regions, as well as enhancing our understanding of the economic impacts of natural and human-made disasters, such as hurricanes and oil spills. Most importantly, ENOW allows NOAA and other stakeholders to clearly describe the importance of the ocean and coastal economies and to access such information for policy development.

This report characterizes the ocean economies of Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (CNMI) and assesses what information would be needed to develop an ENOW dataset for each of these Pacific Island Territories, none of which ENOW currently covers. Due to data availability issues similar to those faced in a prior NOAA effort to characterize the ocean economies of Puerto Rico and the U.S. Virgin Islands (NOAA OCM 2016), and additional issues unique to these Pacific Island Territories, this study relied primarily on U.S. Census County Business Patterns (CBP) data, local datasets, and information from interviews to describe these three ocean economies.

Methods

The ERG team, under contract to NOAA, performed in-person interviews in Guam, American Samoa, and CNMI in January and February 2018 to better estimate the size of the ocean economy in each territory. Using a combination of U.S. Census CBP data, local data, and information from interviews, ERG developed establishment and employment estimates for industries in the six ENOW sectors as well as other related industries in these sectors that we deemed ocean-dependent in an island setting (referred to as ENOW+ in this report).

Guam

ERG characterized Guam's overall economy using a combination of CBP, *Guam Statistical Yearbook*, and Guam Bureau of Labor Statistics data. These data indicate that the total economy included 3,475 private establishments that employed between 45,000 and 61,000 people in 2015. CBP data exclude

government employment, but the *Guam Statistical Yearbook* indicated that the government employed about 15,800 people in Guam (excluding about 7,200 military personnel) in 2015.

To characterize the ocean economy, ERG supplemented CBP data with local data sources and interviews whenever possible. These data indicate that the ***ocean economy*** included about 1,078 establishments that employed between 19,500 and 21,300 people. Therefore, Guam's ocean economy makes up roughly one third of the private establishments and employment.

There were no readily publicly available data in Guam that could be immediately used for ENOW development without significant manipulation or cross-walking. There does seem to be potential for eventual ENOW development with NOAA guidance over the next several years. The available CBP data for Guam do not provide enough establishment, employment and wage information for ENOW development, and do not include self-employment data. For ENOW development in Guam, local data sources would have to be relied on. Below are some options for how NOAA could assemble an ENOW dataset for Guam in the future:

- Convert limited employment Standard Industrial Classification data (from the Department of Labor, Guam) to NAICS.
- Convert Standard Occupational Classification codes (from the Department of Labor, Guam) to NAICS.
- Work with Guam to update their database and/or collection processes.
- Provide one or various offices with a form to collect necessary data directly.

American Samoa

ERG characterized American Samoa's overall economy using a combination of CBP and *American Samoa Statistical Yearbook* data. These sources indicate that the total economy includes about 486 private establishments that employed between 8,100 and 11,000 people (depending on data source) in 2015. CBP data exclude government employment, but the *American Samoa Statistical Yearbook* indicated that the government employed about 6,800 additional people in American Samoa.

To characterize the ocean economy, CBP data were supplemented by local data sources and interviews whenever possible. These data indicate that the ***ocean economy*** is made up of 100 private establishments that employed between 3,725 and 4,760 people. Therefore, American Samoa's ocean economy makes up roughly 20 percent of all private establishments in American Samoa and is responsible for employing approximately 40 percent of American Samoa's private employment.

American Samoa had no publicly available data that could immediately be used for ENOW development without significant manipulation or cross-walking. There may be potential for eventual ENOW development with NOAA guidance over the next several years. CBP data did not have the level of coverage in American Samoa as in Guam: most CBP data were suppressed, and CBP data does not include government employees, which make up a significant part of American Samoa's workforce. The best option for NOAA ENOW development in American Samoa may be to work with the territory's government to use its back-end non-published data. Our research indicates that the government maintains, but does not publish, establishment, employment, and possibly wage data. It may be a

significant effort to do this, as we believe several departments and offices would need to be involved. Other potential options for ENOW development include:

- Work with American Samoa Department of Commerce to capture establishment and employee data.
- Use Economic Census data to inform wage estimates.
- Work with the American Samoa Tax Office to obtain wage data.
- Provide a form to one or various offices to collect necessary data directly.

The Commonwealth of the Northern Mariana Islands

ERG characterized CNMI's total economy using a combination of CBP data and data from the Central Statistics Division (CSD). These data indicate that the total economy included approximately 1,717 private establishments that employed about 16,300 people in 2015. CBP data exclude government employment, but a CNMI official estimated (via email) that the government employs about 1,600 people in CNMI.

To characterize the ocean economy, ERG supplemented CBP and CSD data with local data sources and interviews whenever possible. These data indicate that the *ocean economy* includes 570 establishments that employed between 6,600 and 8,300 people. Therefore, CNMI's ocean economy makes up about one third of all private establishments in CNMI and is responsible for employing about 40 to 45 percent of CNMI's private employment.

There were no readily available data in CNMI that could immediately be used for ENOW development. Additionally, our research and interviews did not identify publicly available datasets that could immediately be a source for ENOW data, even with NOAA guidance. However, several agencies may be collecting data that could be used in conjunction as a source for ENOW data. Potential options for ENOW development in CNMI include:

- Work with the CNMI Department of Labor to attain establishment and potentially employment data.
- Work with the Revenue and Tax Office to obtain wage data.
- Work with CNMI's Business License Office to obtain establishment data.
- Provide a form to one or various offices to collect necessary data directly.

1. Introduction

The National Oceanic and Atmospheric Administration's (NOAA's) Economics: National Ocean Watch (ENOW) provides an annual time series of select employment, establishment, wage, and gross domestic product (GDP) data for all 30 U.S. coastal and Great Lakes states as far back as 2005. As further detailed in Section 4 of this report, ENOW covers 47 six-digit NAICS industries across the following six ocean and Great Lakes-dependent sectors of the economy:

- Living resources
- Marine construction
- Marine transportation
- Offshore mineral resources
- Ship and boat building
- Tourism and recreation

ENOW does not currently include the territories of the United States, all of which are coastal, including Puerto Rico, U.S. Virgin Islands (USVI), Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (CNMI).

ENOW data play an important role in characterizing and determining the relative importance of the ocean economies of the U.S. states and sub-state regions, as well as enhancing our understanding of the economic impacts of natural and human-made disasters, such as hurricanes and oil spills. Most importantly, ENOW allows NOAA and other stakeholders to clearly describe the importance of the ocean and coastal economies and to access such information for policy development. ENOW data can be used to support a wide variety of analyses that are important to making the case for coastal protection and investment in coastal resources, as well as choosing the most appropriate management approach from among a suite of alternatives.

In a recent report, NOAA characterized the ocean economies of the U.S. territories of Puerto Rico and USVI (NOAA OCM 2016). This report can be found on NOAA OCM's Digital Coast at <https://coast.noaa.gov/digitalcoast/training/econ-usvi-pr.html>. For these territories the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) data that underlie the wage, employment, and establishment data in ENOW were available, and the NOAA report assessed the accuracy of these data in both territories. The Bureau of Economic Analysis (BEA) GDP data, however, were not available at a granular enough (six-digit NAICS) level to support development of ENOW in these two territories.¹ Similarly, the Census Non-Employer Statistics (NES) data that underlie the self-employment data in ENOW were not available for these territories. In addition to assessing the accuracy of the QCEW data, that effort included in-person visits to describe the six ENOW sectors and recommended other (non-ENOW) industries to include as part of a more relevant characterization of the ocean economies, since island-based economies tend to be more interwoven with the ocean than those of coastal states.

¹ BEA's GDP by industry data are provided for aggregated economic sectors such manufacturing, distributive services, accommodations and amusement, all other, and government (BEA 2018).

This report characterizes the ocean economies of the three U.S. Pacific Island territories: American Samoa, Guam, and CNMI. As with Puerto Rico and USVI, Census NES (self-employment data) and BEA GDP data are not available for these three territories at a level to support ENOW development. Unlike Puerto Rico and USVI, the Pacific Island territories also have no BLS QCEW data, so this study relied primarily on Census County Business Pattern (CBP) data, local datasets, and information gleaned from interviews to describe these three ocean economies. The objectives of this effort include:

- Assessing the accuracy and completeness of Census CBP data.
- Discovering the best available local datasets to describe the ocean economies of the three territories.
- Describing the ocean economy quantitatively and qualitatively for each of the six ENOW sectors as well as any ocean-dependent activity outside these sectors.
- Recommending additional industries that could be included as part of ENOW (referred to as ENOW+ in this report) based on the unique nature of these island economies.
- Providing recommendations for how an ENOW dataset could be developed in the future, including where to find the best available data, whom to contact, and the limitations of the data.

This report's information on the ocean economies of American Samoa, Guam, and CNMI can be used by NOAA and others to understand the challenges that face the development of ENOW in the U.S. Pacific Island Territories and provide guidance as to how and where to access information about ocean-dependent industries.

Note: The data in this report are from 2015 unless otherwise noted.

2. Cross-Cutting Findings

This section presents some high-level findings that were common across Guam, American Samoa, and CNMI. Later sections present more detailed, territory-specific findings.

Census CBP data provide the most granular, annual publicly available set of data, but they are limited. CBP provides annual establishment data at the six-digit NAICS (industry) level. It also provides annual employment data and wage data; however, these data are often suppressed to protect sensitive information for businesses in industries with a limited number of reporters. This dataset is also limited in that it excludes most government employment, self-employment, and agricultural employment.

Census CBP data generally underestimate the ocean economy. When interviewees were shown employment and establishment data across the six ENOW sectors, they could generally point out how they underestimated the ocean economy. The root causes of this were generally linked to CBP data not capturing extensive self-employment across the territory, CBP data not capturing government employment, and businesses performing multiple economic activities that include ocean-dependent activity but reporting their economic activity under a non-ocean-dependent sector. The self-employment issue, coupled with issues of self-classification and reporting, make understanding employment, wages, and landings in the living resources sector challenging in the islands.

The three territories had very informative annual “statistical yearbooks” but the data are not granular enough to develop an ENOW dataset. Each territory publishes annual statistical yearbooks, which include a wealth of information about the economy. These yearbooks provide information about economic indicators such as government employment, self-employment, minimum wage by major sector, and employment by major sector. While these were quite useful to an understanding of the respective economies, the employment-related data were too aggregated to inform the development of an ENOW dataset.

The island economies are systematically dependent on the ocean, and there are gray areas when defining what is ocean-dependent and therefore should be part of ENOW. For example, trucking companies that exist almost exclusively to move cargo from ports, and electricity companies that power facilities in the ocean-dependent sector, have indirect ties to the ocean economy but would be very negatively impacted if ocean activity (maritime shipping, tuna canning) were to cease.

The territories seem to collect enough back-end data to ultimately produce an ENOW dataset; however, it may necessitate some coordination across territory organizations and some cross-walking from economic classes used in the territories to the NAICS system used in ENOW. The Department of Commerce, business license offices, and tax offices collect a variety of data about number of establishments, employees, and wages; however, this information is somewhat decentralized across the agencies or offices. Additionally, it is not always reported as granularly as the six-digit NAICS level, which is what ENOW is based on. For example, Guam and CNMI use SOC codes to align with Asian countries, and American Samoa is moving toward four-digit UN-based codes. It may be an easier task to build an island version of ENOW using these codes rather than NAICS codes, but sub-sector granularity may be an issue at times. Another option may be to develop a form for each of the territories to fill out to capture the appropriate employee, employment, and wage data at the six-digit NAICS level. These options are further discussed in Section 5 (Guam, p. 14), Section 6 (American Samoa, p. 36), and Section 7 (CNMI, p. 62).

3. Overview of ENOW and Previous Work

ENOW Data

NOAA collects, synthesizes, and publishes annual time series data via its ENOW program. NOAA currently uses industry-level (six-digit NAICS) data from BLS QCEW (establishments, employment, and wages) and state-level data from BEA (GDP) as the basis for ENOW. The purpose of the ENOW program and ENOW datasets is to identify and communicate the contribution of ocean and Great Lakes–dependent economic activities to the overall economy of the nation or a region, state, or county. NOAA has identified six ocean- or Great Lakes–dependent sectors:

- Living resources
- Marine construction
- Marine transportation
- Offshore mineral resources
- Ship and boat building

- Tourism and recreation

Table 3-1Error! Reference source not found. shows the six ocean- or Great Lakes–dependent sectors, along with the 47 ENOW-covered industries they comprise.

Table 3-1. ENOW Sectors and Industries by NAICS

Sector	General Industry	NAICS	NAICS Industry
Living Resources	Fishing Hatcheries and Aquaculture	112511	Finfish Farming and Fish Hatcheries
		112512	Shellfish Farming
		112519	Other Aquaculture
	Fishing	114111	Finfish Fishing
		114112	Shellfish Fishing
		114119	Other Marine Fishing
	Seafood Processing	311710	Seafood Product Preparation and Packaging
	Seafood Markets	445220	Fish and Seafood Markets
Marine Construction	Marine Related Construction	237990	Other Heavy and Civil Engineering Construction
Marine Transportation	Deep Sea Freight	483111	Deep Sea Freight Transportation
		483113	Coastal and Great Lakes Freight Transportation
	Marine Passenger Transportation	483112	Deep Sea Passenger Transportation
		483114	Coastal and Great Lakes Passenger Transportation
	Marine Transportation Services	488310	Port and Harbor Operations
		488320	Marine Cargo Handling
		488330	Navigational Services to Shipping
		488390	Other Support Activities for Water Transportation
	Search and Navigation Equipment	334511	Search, Detection, Navigation, Guidance, Aeronautical and Nautical System and Instrument Manufacturing
	Warehousing	493110	General Warehousing and Storage
		493120	Refrigerated Warehousing and Storage
		493130	Farm Product Warehousing and Storage

Sector	General Industry	NAICS	NAICS Industry
Offshore Mineral Resources	Limestone, Sand and Gravel	212321	Construction Sand and Gravel Mining
		212322	Industrial Sand Mining
	Oil and Gas Exploration and Production	211111	Crude Petroleum and Natural Gas Extraction
		211112	Natural Gas Liquid Extraction
		213111	Drilling Oil and Gas Wells
		213112	Support Activities for Oil and Gas Operations
		541360	Geophysical Exploration and Mapping Services
Ship and Boat Building	Boat Building and Repair	336612	Boat Building and Repair
	Ship Building and Repair	336611	Ship Building and Repair
Tourism and Recreation	Boat Dealers	441222	Boat Dealers
	Eating and Drinking Places	722511	Full Service Restaurants
		722513	Limited Service Eating Places
		722514	Cafeterias
		722515	Snack and Nonalcoholic Beverage Bars
	Hotels and Lodging	721110	Hotels (except Casino Hotels) and Motels
		721191	Bed and Breakfast Inns
	Marinas	713930	Marinas
	Recreational Vehicle Parks and Campsites	721211	RV Parks and Recreational Camps
	Scenic Water Tours	487210	Scenic and Sightseeing Transportation, Water
	Sporting Goods	339920	Sporting and Athletic Goods Manufacturing
	Amusement and Recreation Services	487990	Scenic and Sightseeing Transportation, Other
		611620	Sports and Recreation Instruction
		532292	Recreation Goods Rental
		713990	Amusement and Recreation Services Not Elsewhere Classified
	Zoos and Aquaria	712130	Zoo and Botanical Gardens
		712190	Nature Parks and Other Similar Institutions

Additional Ocean-Dependent Industries: ENOW+

On islands, especially remote islands, a wide variety of economic activity tends to be partially or completely dependent on the ocean. For example, airport or taxi operations may depend almost entirely on tourists, who in turn come primarily for ocean-related activities. If this ocean-dependent tourism suddenly stopped, airport and most taxi operations would be significantly reduced. Naval Base Guam is a major economic engine for the territory (the U.S. military owns a third of the island) and there are thousands of sailors, Marines, and airmen stationed there. However, these impacts are diffuse and not neatly quantifiable. In the 2016 NOAA Puerto Rico and USVI study, jewelry sales were identified as an ocean-dependent economic activity in USVI because of the heavy dependence on sales to tourists (NOAA OCM 2016). However, it is hard to make the case for the ocean-dependency of jewelry sales almost anywhere else in coastal states (NOAA OCM 2016).² As a result of that report, NOAA was able to identify a number of industries within four of the six existing ENOW sectors that are ocean-dependent on these Islands.

In this report, the ERG team refers to these additional industries or segments as “ENOW+.” While there are notable difference between the Caribbean territories and Pacific Island territories (for example, American Samoa is not nearly as tourist-dependent), we have included economic data for these ENOW+ industries in this report because—based on our experience visiting these islands—there are strong enough similarities to include the ENOW+ industries as they are at least partially ocean-dependent. Table 3-2 shows the ENOW+ framework developed from NOAA’s 2016 report (NOAA OCM 2016).

Table 3-2. ENOW+ Industries

Sector	NAICS	NAICS Industry
Living Resources	424460	Fish and Seafood Merchant Wholesalers
	445210	Meat Markets
	541620	Environmental Consulting Services
	813312	Environment and Conservation Organizations
	924120	Administration of Conservation Programs
Marine Construction	541330	Engineering Services
	541370	Other Surveying and Mapping Services
Marine Transportation	483212	Inland Water Passenger Transportation
	488510	Freight Transportation Arrangement
	493190	Other Warehousing and Storage
Tourism and Recreation	448110	Men’s Clothing Stores
	448120	Women’s Clothing Stores
	448310	Jewelry Stores
	448320	Luggage and Leather Goods Stores
	453220	Gift, Novelty, and Souvenir Stores
	485310	Taxi Service
	487110	Scenic and Sightseeing Transportation, Land

² In the Pacific Island Territories, jewelry stores were not identified as ocean-dependent to nearly the degree they were in the Caribbean.

Sector	NAICS	NAICS Industry
	481111	Scheduled Passenger Air Transportation
	481211	Nonscheduled Air Passenger Chartering
	481219	Other Non-scheduled Air Transportation
	488111	Air Traffic Control
	488119	Other Airport Operations
	488190	Other Support Activities for Air Transport
	512110	Motion Picture and Video Production
	531110	Lessors of Residential Buildings
	531210	Offices of Real Estate Agents and Brokers
	531311	Residential Property Managers
	531312	Nonresidential Property Managers
	532111	Passenger Car Rental
	541922	Commercial Photography
	561311	Employment Placement Agencies
	561320	Temporary Help Services
	561510	Travel Agencies
	561520	Tour Operators
	561599	All Other Travel Arrangement Services
	712120	Historical Sites
	721120	Casino Hotels
	721199	All Other Traveler Accommodation
	722410	Drinking Places, Alcoholic Beverages

Additional ENOW+ Industries from American Samoa, Guam, and CNMI

We have added a few industries to the existing ENOW+ list based on the in-person interviews in the U.S. Pacific island territories. These industries are included throughout this report as part of the ENOW+ framework; they are listed in Table 3-3 and described under the table.

Table 3-3. Additional ENOW+ Industries

Sector	NAICS	NAICS Industry
Marine Construction	236220	Commercial and Institutional Building Construction
Marine Transportation	484110	General Freight Trucking, Local
Tourism and Recreation	812199	Other Personal Care Services

236220, Commercial and Institutional Building Construction: This industry was identified as ocean-dependent in American Samoa. For American Samoa, available data indicate very limited activity that could be categorized as marine construction. Interviews indicated there is significant marine construction activity in American Samoa; however, the companies doing this work are not strictly classified as marine construction companies. Much of the marine-related construction is performed by general construction companies that ERG hypothesizes are classified under NAICS 236220. This NAICS is

also included as an ENOW+ industry for CNMI to capture similar marine-related construction activities; CNMI interviewees seemed to indicate there were several general construction companies that did some level of marine construction work. It is not, however, included for Guam as an ENOW+ industry because the major players in marine construction seemed to be captured by the NAICS in the traditional ENOW marine construction sector. Though it is not likely that all the activity captured under NAICS 236220 is marine-related in American Samoa and CNMI, a sizeable portion the activity under this NAICS may be marine-related, justifying the inclusion of this NAICS as ENOW+.

484110, General Freight Trucking, Local: The ERG team identified this NAICS as ocean-dependent in Guam. Interviews indicated significant general freight trucking activity that relies almost entirely on transporting cargo that arrives via the ports around the island. Interviewees believed that these freight trucking operations are an integral part of port operations and would be significantly affected by any major fluctuation in cargo entering Guam through the ports. Available CBP data corroborate the relative size of the general freight trucking industry in Guam. Though this NAICS was identified in Guam, it was also included for American Samoa and CNMI as an ENOW+ industry; available data and interviews confirmed that general freight trucking is a relatively significant contributor to the marine transportation sectors in both American Samoa and CNMI.

812199, Other Personal Care Services: The ERG team identified this NAICS as ocean-dependent in CNMI, due to the prevalence of spas and massage businesses. It is important to note that not all the activity captured in this NAICS class is attributable only to spas. For example, tanning salons and tattoo parlors both cater to tourists and are also captured under NAICS 812199. Spas and massage businesses are ubiquitous on Saipan, especially in tourist areas. Interviews indicated that without tourism, which is largely driven by Saipan's tropical island setting, most of these would disappear. This industry is also included for both American Samoa and Guam; however, from discussions, spas and massage businesses are somewhat less prevalent on Guam and rare in American Samoa.

4. Methods

This section outlines the ERG team's approach to characterizing the ocean economies of Guam, American Samoa, and CNMI. Sections 5, 6, and 7 highlight any territory-specific components of our approach for Guam, American Samoa, and CNMI, respectively.

Step 1, Data Search and Review: We began by searching and reviewing publicly available data. Census CBP provides establishment data at the six-digit NAICS level, and therefore was a logical starting point. CBP data also included employment and payroll/wage data at the six-digit NAICS level; however, employment data are often presented as a range rather than a point estimate to protect confidentiality. Payroll data for the vast majority of industries were withheld for the same reason. The exclusion of self-employed and most government workers from the CBP dataset are notable given how those are both key components of the ocean economy in the three U.S. Pacific island territories.

CBP synthesizes data from many sources, including Employer Identification Numbers (EINs) assigned to companies by the Internal Revenue Service (IRS); Economic Census data; other Census survey data, such as the Company Organization Survey (COS); and company administrative records (U.S. Census 2018a). To supplement CBP data, we found local data sources such as economic statistical yearbooks, NOAA and

Western Pacific Fishery Management Council (WPFMC) fishery data, and travel and tourism surveys to better understand the economy prior to interviews. Though the statistical yearbooks for each territory had a similar general structure, each one depended on its territory's local data gathering efforts, which varied significantly.

Step 2, Statistical Summary Development: Using CBP data as the backbone and other local data sources to supplement the gaps, we developed short, one- to two-page statistical summaries for each of the six ENOW sectors as well as a one-pager on the total economy of each territory. The statistical summaries included:

- A table of number of establishments and employees (or range of employees) for all ENOW and ENOW+ industries at the six-digit NAICS level in 2015.
- Contextual data about the size of the overall economy, including number working for government or self-employed (not typically available at the industry level).
- Other key statistics from local sources like tourism surveys, fishery datasets, or port data.
- Trends in employment to inform discussion about the economy over the last 10 years.
- A list of datasets used to inform discussion about other datasets that may be available.

Step 3, In-Person Interviews: Using the statistical summaries as a reference and strawman tool, we conducted interviews over four or five days in each location (see Sections 5, 6, and 7 for a list of organizations interviewed in each jurisdiction). The team set up many of these interviews before the visit, using our professional network and with help from each of the NOAA Liaisons: on-island NOAA employees with strong networks of contacts. We also set up additional interviews based on recommendations once on island. Most interviewees were provided the statistical summaries beforehand, as well as information about the project. Discussions were based generally on the following discussion questions:

- “Can you describe the ocean economy of the [ENOW] sector?” (This informs the traditional ENOW industries and other related industries that are dependent on the ocean.)
- “Do these data look reasonable? If not, how do the data differ from reality?” (We asked this after providing establishment, employment, and trend data for ENOW and ENOW+ industries.)
- “Are there better datasets to capture establishment, employment, wage, and self-employment data?”
- “Is there anyone else you recommend talking to regarding the ocean economy?”

Information from these interviews was used to qualitatively describe the total and ocean economies of each territory and refine the statistical summaries, which are presented in Sections 5, 6, and 7 of this report.



GUAM



5. Guam

Key Findings

The island of Guam is in the Western Pacific, about 3,900 miles west of Hawaii and 1,600 miles southeast of Japan (DistanceFromTo 2018). Guam is about 210 square miles and as of 2015, was home to about 162,000 people (BSP 2016, Table 12-05). The ERG team conducted in-person interviews in Guam to validate the ENOW sector summaries we developed for the territory using readily available information from the U.S. Census, the *Guam Statistical Yearbook*, and several other locally kept data sources. All data in this section are for 2015 unless otherwise specified.

Our key findings from the data collection and interviews are below.

Data Availability and Potential for ENOW Dataset

- U.S. Census CBP data and *Guam Statistical Yearbook* data provided the best available employment and establishment data and at some level of granularity, but they lacked or suppressed wage data by NAICS industry.
- The Guam BLS keeps extensive establishment and employment data by Standard Industrial Classification (SIC) code (Annual Census of Establishments through 2012), which can be cross-walked to NAICS.
- The government of Guam collects and publishes extensive wage, establishment, and employment data. However, these data are collected using the U.S. Department of Labor’s Standard Occupational Classification (SOC) codes, not NAICS. See the “Potential for ENOW Dataset” discussion in this section for recommendations. Much of this information is on the Guam BLS website at www.bls.guam.gov, under the “Occupational Employment Statistics” and “Economic Census” tabs.
- The General Licensing and Registration Branch likely has establishment data by NAICS because interviewees suggested that the General Licensing and Registration Branch assign NAICS to businesses upon applying for a business license. Interviewees indicated that the General Licensing and Registration Branch and the Department of Revenue and Taxation may be able to work with NOAA in the future to develop these NAICS level wage and employment data.

Total Economy

- Excluding military, the government employs about 30 percent of Guam’s employed labor force.
- Guam’s total economy is heavily dependent on tourist spending. Tourist spending surpassed \$1.6 billion in 2015 (Tourism Economics 2016).
- The economy of Guam is heavily dependent on the U.S. military, which owns one third of the island.

Ocean Economy

- **Overall:** According to interviewees, CBP data generally underestimated economic activity in the ocean economy.

- **Tourism and Recreation:** The entirety of the travel and tourism sector is difficult to capture accurately with one or two data sources. The Guam tourism sector as presented in our summary was generally deemed by interviewees to be underrepresented by CBP data, but nonetheless those data depict it as Guam’s largest ocean-dependent sector by a wide margin. The sector’s ocean-dependence is suggested by the first statement on the Guam Visitors Bureau website: “Only on Guam can you find five star-sand beaches, crystal clear blue skies and world-famous sunsets.” The Guam Visitors Bureau has higher-level data on tourism and calculates visitor expenditures via its visitor exit surveys and available in their FY visitor profiles.
- **Living Resources:** This is a particularly difficult sector to capture accurately with data, because of the high level of self-employment and because many fishermen who sell part or all of their catch do not have business licenses. As a result, CBP data and the Department of Revenue and Taxation underestimate this sector. NOAA Fisheries’ Western Pacific Fishery Information Network and Pacific Island Fisheries Science Center (PIFSC), as well as WPFMC’s annual Stock Assessment and Fishery Evaluation (SAFE) reports, provide data on the economics of Guam commercial fishing and fishery transshipment. There is no commercial marine aquaculture in Guam’s waters, though the University of Guam’s College of Natural & Applied Sciences (CNAS) is home to the Fadian Hatchery, the primary aquaculture operation in the Western Pacific (University of Guam CNAS n.d.). Guam’s aquaculture is further discussed in Section 5.1.1.
- **Marine Transportation:** Maritime transportation is a key feature of Guam’s ocean economy, and the Guam Port Master Plan and the Guam Port Authority website contain much information about this segment. Freight transportation (i.e., trucking) has a strong indirect tie to this sector as it largely exists to move cargo from arriving ships to businesses and sites on island.
- **Ship and Boat Building:** Interviewees felt the ship and boat building sector was underrepresented by available data.
- **Offshore Mineral Resources:** Offshore mineral extraction is not part of Guam’s ocean economy.

Methods

Section 4 provides an overview of the approach ERG used in all three territories, including information about the data search and review, statistical summary development, the objectives of the interviews, and more information about the Census CBP dataset. This section provides information specific to our approach for Guam.

As discussed in Section 4, we used CBP data as the foundation for the statistical summaries we developed for Guam, American Samoa, and CNMI. For the Guam summaries, we supplemented CBP data with information from the *Guam Statistical Yearbook* (a series of annual data first published in 2005) when possible. Additionally, Economic Census data are available for Guam (released every five years: 2012, 2007, 2002, 1997, etc.). Finally, it is worth noting that extensive occupational level data are maintained for Guam using U.S. Department of Labor SOCs, not NAICS. Though these data would not support ENOW development without extensive manipulation, these collection efforts indicate that the mechanisms necessary to collect data for ENOW development are in place.

The *Guam Statistical Yearbook* filled some gaps by providing a lower bound for private sector employment, government, and military employment figures. The yearbook shows data from U.S. Census

and BLS; other federal data sources; and local data sources such as the Department of Revenue and Taxation, the Bureau of Statistics and Plans, the Guam Port Authority, and many others.

Between February 17 and 22, an ERG team member visited Guam to interview a variety of contacts and solicit feedback on how accurately these statistical summaries portrayed Guam's economy. This included conversations with contacts at the:

- Guam Fishermen's Cooperative
- WPFMC
- Guam Bureau of Statistics and Planning
- Guam Port Administration
- Naval Base Guam
- Guam Visitors Bureau
- Guam Department of Labor

These discussions, which involved assessing the perceived accuracy of the statistical summaries, obtaining leads about better local data, and describing the economy qualitatively, are detailed further in Section 4.

Most of the employment and wage data in this section is based on CBP data. In most cases, the *Guam Statistical Yearbook* did not provide employment at a granular enough level to supplement CBP data; however, because CBP data do not include government employment, the yearbook was able to supplement CBP data by providing government and military employment figures.

Guam Total Economy

In 2015, Guam's civilian labor force was about 71,100 people; about 66,700 people were employed and about 4,400 people were unemployed, resulting in an unemployment rate of approximately 6.2 percent (BSP 2016, Table 16-02 four-month average). In 2015, there were about 50,500 people (16 years old and over) not in the labor force (BSP 2016, Table 16-02 four-month average). In Guam, the government employed 15,800 people (excluding military) in 2015, in addition to about 6,115 active duty military members, of whom 3,583 were active members of the U.S. Navy (another 7,211 people were categorized as military dependents) (BSP 2016, Tables 11-01 and 8-02). Finally, Guam's GDP in 2015 was \$5.7 billion (BEA 2018).

Table 5-1 shows public and private establishments, as well as employment and wage data based on data from CBP and the *Guam Statistical Yearbook*.

Table 5-1. Guam Economy at a Glance (2015)

	Establishments	Employees	Annual payroll (\$1,000)	Average Employee Salary
Private Sector	3,475 ³	45,970 ⁴ –46,930 ⁵	\$1,494,258 ⁶	\$30,396 ⁷
Public Sector		14,610 ⁸ –15,800 ⁹	693,829 ¹⁰	\$47,422 ¹¹

CBP data provide insight on the composition of Guam’s economy at the two-digit NAICS level. Table 5-2 shows the total establishments and employees by two-digit NAICS sector. As the table shows, retail trade and accommodation and food services are the largest sectors in Guam. Retail trade (NAICS 44–45) has the most establishments (684), while accommodation and food services (NAICS 72) has the most employees (13,496).¹²

The *Guam Statistical Yearbook* also provides some insight into employment by sector, although it is not entirely clear this is a perfect crosswalk to the two-digit NAICS. The yearbook indicates that in 2015 there were about 275 employees in the agriculture sector and about 4,500 employees in the transportation sector (BSP 2016, Table 16-05, four-month average); this is several times larger than the corresponding figures in Table 5-2. **Error! Reference source not found.** This is likely because CBP data do not count most agricultural workers, and it is possible that many transportation workers are government workers who would also not be captured by CBP data.

Table 5-2. Guam Industry Composition

Sector (Two-Digit NAICS)	Establishments	Paid Employees
11: Agriculture, Forestry, Fishing and Hunting	2	0–19
21: Mining, Quarrying, and Oil and Gas Extraction	1	0–19
22: Utilities	5	61
23: Construction	346	6,380
31–33: Manufacturing	57	911
42: Wholesale Trade	200	2,849
44–45: Retail Trade	684	9,801
48–49: Transportation and Warehousing	99	2,782
51: Information	52	1,227
52: Finance and Insurance	128	2,230
53: Real Estate, Rental, and Leasing	263	2,083

³ 2015 CBP data, Table CB1500A14, “Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas.”

⁴ Guam BLS (2016).

⁵ BSP (2016, Table 16-07).

⁶ 2015 CBP data, Table CB1500A14, “Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas.”

⁷ Guam BLS (2016).

⁸ Guam BLS (2016).

⁹ BSP (2016, Table 16-07). This figure excludes military employment of 7,211.

¹⁰ For the government of Guam and the federal government (Guam BLS 2016).

¹¹ For the government of Guam and the federal government (Guam BLS 2016).

¹² 2015 CBP data, Table CB1500A14, “Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas.”

Sector (Two-Digit NAICS)	Establishments	Paid Employees
54: Professional, Scientific, and Technical Services	262	2,646
55: Management of Companies and Enterprises	9	68
56: Administrative Support and Waste Management and Remediation Services	172	4,479
61: Education Services	60	1,255
62: Health Care and Social Assistance	204	3,758
71: Arts, Entertainment, and Recreation	69	1,174
72: Accommodation and Food Services	518	13,496
81: Other Services (Except Public Administration)	293	2,500
99: Industries Not Classified	51	196
Total Reported Activity (2015 CBP Data)	3,475	57,902¹³

Guam Ocean Economy

Based on data available from Census and the *Guam Statistical Yearbook*, Table 5-3 below shows total establishments and total employment in Guam for the six ENOW sectors. These data show that about 45 percent of Guam's total employment are part of the ocean economy within the ENOW and ENOW+ definitions.

Table 5-3. Guam Ocean Economy at a Glance

ENOW Sector	ENOW Establishments	ENOW Employees	ENOW+ Establishments	ENOW+ Employees	Total Ocean Establishments	Total Ocean Employees
Living Resources	13	61–129	10	51–89	23	112–218
Marine Construction	2	100–249	51	454	53	554–703
Marine Transportation	17	642–967	28	553–572	45	1,195–1,539
Offshore Mineral Resources	1	0–19	None	None	1	0–19
Ship and Boat Building	2	20–118	None	None	2	20–118
Tourism and Recreation	493	12,806–13,078	475	4,905–5,689	968	17,711–18,767
Total	528	13,629–14,560	564	5,963–6,804	1,092	19,592–21,364

As noted in Section 4, CBP data have limitations that do not allow them to be used as the sole basis for estimating the territory's ocean economy. These limitations include:

- Suppressing or protecting data with wide employment ranges.

¹³ This number is the total number of aggregate employees, which includes the employees for which a range is provided. Per the CBP data, there are likely six employees total between NAICS 11 and 22. See 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

- Not capturing self-employment.
- Not capturing government employment.
- Not capturing the activity of companies that do work within the ENOW sectors/industries, but for which this is not their primary business and that are therefore found under a different NAICS code.

Additionally, some economic activity that is not ocean-dependent in the coastal United States might qualify as such in an island setting. Many of those we interviewed noted that much of the territory's economy is directly or indirectly linked to the ocean. To explore these gaps further, we conducted in-person interviews in Guam to discuss the data, explore self-employment, and identify some of these non-ENOW ocean economy industries. Table 5-4 below summarizes notes and initial findings from in-person interviews in Guam. Following the table are analyses of data for each of the six ENOW sectors.

Table 5-4. Guam Summaries by Sector of In-Person Interviews

ENOW Sector	Data from In-person Interviews
Living Resources	<ul style="list-style-type: none"> • There is no harvest licensure requirement to fish commercially on Guam. • Although anyone selling anything on Guam is technically required to have a business license and pay taxes on the associated income, "Anyone can sell fish anywhere, anytime [without fear of being asked to show a business license or pay taxes]." • The Guam Fishermen's Co-op currently has about 50 members, and guarantees purchase for members' catch. • There has been a recent spike in non-local fishing for profit (e.g., by Micronesian immigrants). • Some fishermen use social media, like Facebook, to sell fish to hotels and restaurants. • Commercial landings are very fluid and seasonal. For example, fish sales are high during Lent, as a large proportion of the population is Roman Catholic.
Marine Construction	<ul style="list-style-type: none"> • Black Construction and Smithbridge (which performs harbor dredging among other things) are likely the two companies under NAICS 237990. • The Guam Contractors Association (GCA) provides monthly construction news, including GCA activities, bid invitations, and alien labor reports.
Marine Transportation	<ul style="list-style-type: none"> • There are a few boats (40' or so) that make runs from Guam to Rota, transporting goods and people between the Islands. There is no formal marine transportation between Guam and Rota. • Casamar is likely the Navigational Services to Shipping business employing between 250 and 499 people as indicated by CBP data. • Trucking has a strong link to the ocean economy: the majority of companies are trucking companies that transport only shipping containers around the island and are tied directly to port operations. • The Guam Port Administration published an extensive Master Plan in 2013, which can be used as a strong reference for port data. • The Guam Office of Public Accounts also maintains port and other data. • There is one commercial port. • The Guam Port Administration maintains data about nearly all aspects of port operations and can be a strong reference point for the type of data the Port Administration tracks. • The Port of Guam releases annual financial audit and staffing pattern reports

ENOW Sector	Data from In-person Interviews
	containing the number of employees by department and wages.
Offshore Mineral Resources	<ul style="list-style-type: none"> No interviewee reported knowing anything about any offshore mineral or oil extractive activities in Guam's territorial waters or adjacent Exclusive Economic Zone.
Ship and Boat Building	<ul style="list-style-type: none"> Interviewees noted that CBP data likely underrepresented this sector: they estimated about four boat building and repair shops on the Island, but only two are capable of building boats with fiberglass. Cabras Marine is the biggest ship and boat building and repair shop. U.S. Navy shipyard caters mostly, though not exclusively, to the Navy.
Tourism and Recreation	<ul style="list-style-type: none"> Interviewees thought data for visitor arrivals and prepaid vs. on-island expenditures look reasonable. Total establishment and employment data seem to underrepresent industry. There are four publicly owned marinas. The Guam Visitors Bureau collects and publishes visitor arrival statistics, exit survey data, monthly expenditure and revenue reports, and quarterly staffing patterns

5.1.1. Living Resources

The living resources sector generally includes fishing, seafood processing, and fish and seafood markets. Table 5-5 below describes the sector based on available data (CBP, *Statistical Yearbook*, interviews, WPFMC). The data are from CBP unless noted by a footnote. (Overall, interviewees felt CBP underrepresented the living resources sector; for some industries in the table below, we have provided more informed estimates.)

Commercial marine licensure is not required to fish commercially or sell fish in Guam.

Table 5-5. Guam Living Resources Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Fish Hatcheries and Aquaculture	112511: Finfish Farming and Fish Hatcheries	None	None
	112512: Shellfish Farming	None	None
	112519: Other Aquaculture	None	None
Fishing	114111: Finfish Fishing	1	50 ¹⁴ –70
	114112: Shellfish Fishing	1	0–19
	114119: Other Marine Fishing	None	None
Seafood Processing	311710: Seafood Product Preparation and Packaging	None	None
Seafood Markets	445220: Fish and Seafood Markets	11 ¹⁵	11–40 ¹⁶
ENOW Total		13	61–129

¹⁴ 50 is an estimate made by WPFMC and the lower bound for employment in this industry. CBP data indicated between 0 and 19 employees (who may or may not be included in the 50), resulting in the range shown (50–70).

¹⁵ Sabater (2018). CBP data indicated there were five establishments.

¹⁶ Sabater (2018) did not cover employment of fish-centric markets; this employment estimate was developed by ERG. CBP data indicated there were 18 employees.

Industry	NAICS Industry	Establishments	Paid Employees
ENOW+	424460: Fish and Seafood Merchant Wholesalers	1	0–19
ENOW+	813312: Environment and Conservation Organizations	1	0–19
ENOW+	924120: Administration of Conservation Programs	None	None
ENOW+	445210: Meat Markets	4	35
ENOW+	541620: Environmental Consulting Services	4	16
ENOW+ Total		10	51–89
Living Resources Sector Total (ENOW and ENOW+)		23	112–218

Fishing

Fishing is an important part of Guam’s economy. Figure 5-1 illustrates estimates of total commercial landings (NOAA NMFS 2016a, Guam). However, quantifying the number of commercial fishermen, and hence the magnitude of fishing’s economic impact, is difficult, for several reasons. A commercial harvest license is not necessary to sell fish on Guam, and our interviews indicated that the enforcement of business license and tax requirements for those selling products is not particularly strict. In addition, CBP data do not capture the number of self-employed. It should also be understood that motivations for fishing are very fluid in the islands. Many fishing trips are taken simultaneously for recreational, subsistence, and commercial purposes. Many fishermen sell their catch on the side of the road and at the farmer’s or flea market on Saturday and Sunday mornings. This is especially true during seasonal runs of big eye scad, juvenile rabbitfish, and juvenile goatfish.¹⁷ Though a fisherman who sells even one fish is considered a commercial fisherman by law, relatively few people on Guam fish as their sole source of income or are profit motivated. The decline in estimated total commercial landings between 2010 and 2015, shown in Figure 5-1, is due in part to both the decrease in tuna transshipping and the decline in local longline fishing during this time.¹⁸



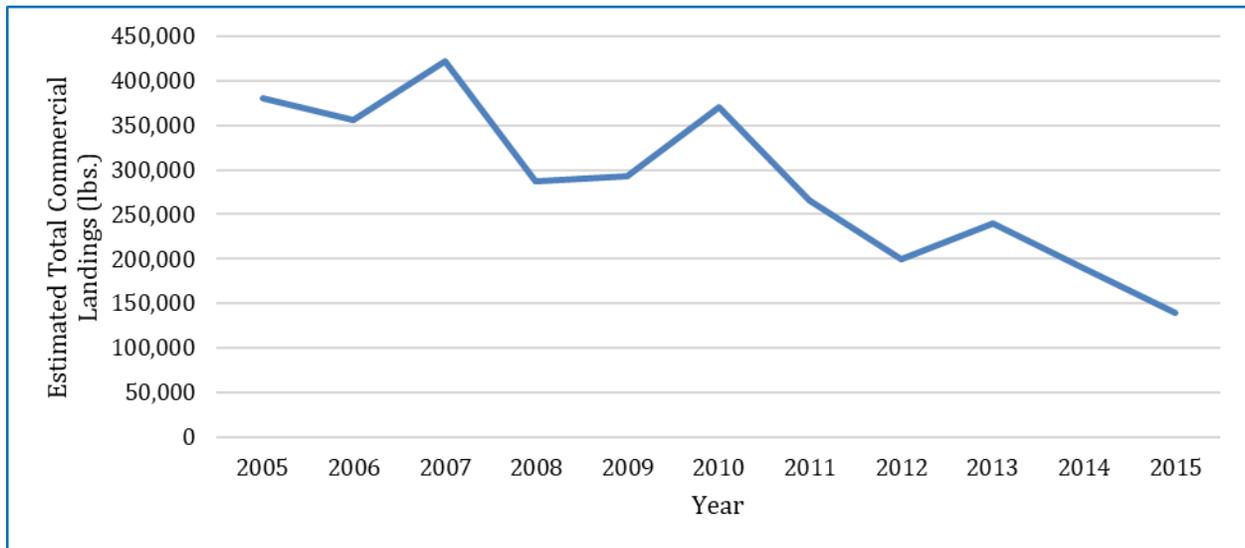
The Guam Fishermen’s Co-op has about 50 members. It guarantees the purchase of any member’s catch.



Guam does not require a commercial fishing license.

¹⁷ A. Loerzel, pers. com.

¹⁸ M. Sabater, WPFMC, pers. com.

Figure 5-1. Estimated Total Commercial Landings, 2005–2015

Fish Markets and Selling One's Catch

The WPFMC has recently conducted a seafood vendor project on Guam working with local fish markets to capture information about this sector. Though CBP data captured five fish markets, the Council's project identified 11 fish-centric markets that sell both local and imported catches (445220, Fish and Seafood Markets) (Sabater 2018).¹⁹ In addition, small stores in villages across the island sell a variety of



Fishermen often sell their catch to local fish markets, bush stores, hotels, and restaurants.

consumer goods and foodstuffs, including locally caught fish, so 11 fish markets do not capture the totality of economic activity related to selling fish on Guam. When asked about regulation governing fish sales on Guam, one interviewee stated, "anyone can sell fish anywhere at any time."²⁰ While this may not be true in a legal sense, it appears to be the common local practice, absent meaningful enforcement of business regulations for these people. Interviewees indicated that it was common for people to sell their daily catch to restaurants or hotels. However, interviewees indicated that many of the fishermen who do this do so infrequently and may not necessarily have exclusive deals with restaurants or hotels.

Aquaculture

The University of Guam College of Natural & Applied Sciences runs the Guam Aquaculture Development and Training Center (GADTC), also called the Fadian Hatchery (University of Guam CNAS n.d.). The Fadian Hatchery is the primary aquaculture center in the Western Pacific (University of Guam CNAS n.d.). It is a key contributor to applied aquaculture research, publishing information for the general public, and helping farmers both adapt to and develop new aquaculture technologies and best practices

¹⁹ A. Loerzel, pers. com.

²⁰ This interviewee was emphasizing the lack of any kind of fishing licensure and issues with enforcement. Note, however, that there are fishing rules and regulations, including closed areas.

(University of Guam CNAS n.d.). This massive bio-secure facility conducts a wide range of research using its laboratory and fresh and saltwater ecosystems (University of Guam CNAS n.d.). Additionally, there are some small, non-commercial freshwater aquaculture operations that incorporate salt or brackish water during the larval stages.²¹

5.1.2. Marine Construction

The marine construction sector is composed of heavy and civil engineering construction services, which include activities such as designing and constructing piers, seawalls, boat ramps, and dredging. Table 5-6 shows 53 establishments that employ between 554 and 703 people in Guam. It is important to note that CBP data indicated there were only two establishments, which interviewees identified as likely being Smithbridge and Black Construction. Interviewees felt the data represented this sector well; however, a close look at the Guam Contractors Association (GCA) highlighted the possibility that many more companies have the ability to engage in marine-related construction, as there are 597 companies that are members of the GCA.

For Guam, we excluded NAICS 236220 (Commercial and Institutional Building Construction) from the marine construction sector as an ENOW+ industry, because interviewees felt it was well represented by available data. The inclusion of NAICS 236220 skewed data away from marine-related construction beyond a negligible degree. *Guam Statistical Yearbook* data show 1,378 construction permits issued in Guam during 2015 (BSP 2016, Table 17-11). Of these 1,378 permits issued, 79 were grading permits—one type of permit issued as part of the land and coastal construction processes (BSP 2016, Table 17-11). The number of grading permits issued in 2015 can be reasonably traced to the number of establishments in this sector when including ENOW+ establishments. Additionally, there were 62 government-issued construction permits in 2015. The U.S. military is likely responsible for at least some of the 62 government permits issued in 2015, as the U.S. Naval base in Guam is a large, joint base that likely engages in marine-related construction.¹⁶

Table 5-6. Guam Marine Construction Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Marine Related Construction	237990: Other Heavy and Civil Engineering Construction	2	100–249
ENOW Total		2	100–249
ENOW+	541330: Engineering Services	48	427
ENOW+	541370: Other Surveying and Mapping Services	3	27
ENOW+ Total		51	454
Marine Construction Sector Total (ENOW and ENOW+)		53	554–703

Engineering Services

NAICS 541330 (Engineering Services) includes many ocean-dependent activities, such as boat engineering and design services, marine engineering services, maritime technology engineering services,

²¹ A. Loerzel, pers. com.

erosion control services, and many more (U.S. Census 2017b). Thus, its inclusion as an ENOW+ industry is appropriate, as is its importance to the marine construction sector in Guam. Per the Guam Contractors Association (GCA) website, many of the 597-member companies offer engineering services, it is likely that some or many of these services could be captured under NAICS 541330. This supports the CBP data which show over 425 employees under this NAICS. These activities are a critical driver of the marine construction sector, and a significant contributor to Guam’s ocean economy.

5.1.3. Marine Transportation

The marine transportation sector includes many industries from deep sea freight and marine passenger transportation, to farm product warehousing and search and navigation equipment. Overall, interviewees felt that these data misrepresented the marine transportation sector, but there was little consensus on how these data misrepresented this sector. That is, some felt the data underrepresented the sector while others felt the data were overestimates. Table 5-7 below shows that there are 48 establishments employing between 1,195 and 1,539 people in this sector. An independent audit was performed for the Port Authority of Guam indicated that in 2015 there were almost 350 employees working in the Port of Guam that were not captured by CBP data (63 in stevedoring, 285 in operations) (Deloitte and Touche LLP 2016). Outside of ERG’s in-person interviews, we learned that there is also regular, informal passenger and cargo transportation between Rota and Guam via private 20–25’ fishing vessels.²² These boats go up to Rota to fish and often carry passengers and cargo—sometimes for payment, sometimes as favors to family/friends. This activity is reported to be significant for Rota families as transportation options are limited.

Table 5-7. Guam Marine Transportation Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Deep Sea Freight	483111: Deep Sea Freight Transportation	None	None
	483113: Coastal and Great Lakes Freight Transportation	None	None
Marine Passenger Transportation	483112: Deep Sea Passenger Transportation	2	0–19
	483114: Coastal and Great Lakes Passenger Transportation	1	0–19
Marine Transportation Services	488310: Port and Harbor Operations	1	285 ²³
	488320: Marine Cargo Handling	2 ²⁴	63–82 ²⁵
	488330: Navigational Services to Shipping	1	250–499
	488390: Other Support Activities for Water Transportation	1	0–19

²² A. Loerzel, pers. com.

²³ Deloitte and Touche LLP (2016) cites 285 port operations (non-stevedoring) employees in the Port of Guam. CBP data did not capture any establishments or employment for this NAICS.

²⁴ Deloitte and Touche LLP (2016) cites one government entity, in addition to the one private entity captured by CBP data.

²⁵ Deloitte and Touche LLP (2016) cites 63 stevedoring employees in the Port of Guam. The range of 63–82 was developed to include 0–19 employees captured by CBP data.

Industry	NAICS Industry	Establishments	Paid Employees
Search and Navigation Equipment	334511: Search, Detection, Navigation, Guidance, Aeronautical and Nautical System and Instrument Manufacturing	None	None
Warehousing	493110: General Warehousing and Storage	9	44
	493120: Refrigerated Warehousing and Storage	None	None
	493130: Farm Product Warehousing and Storage	None	None
ENOW Total		17	642–967
ENOW+	483212: Inland Water Passenger Transportation	None	None
ENOW+	488510: Freight Transportation Arrangement	17	223
ENOW+	484110: General Freight Trucking, Local	10	330
ENOW+	493190: Other Warehousing and Storage	1	0–19
ENOW+ Total		28	553–572
Marine Transportation Sector Total (ENOW and ENOW+)		45	1,195–1,539

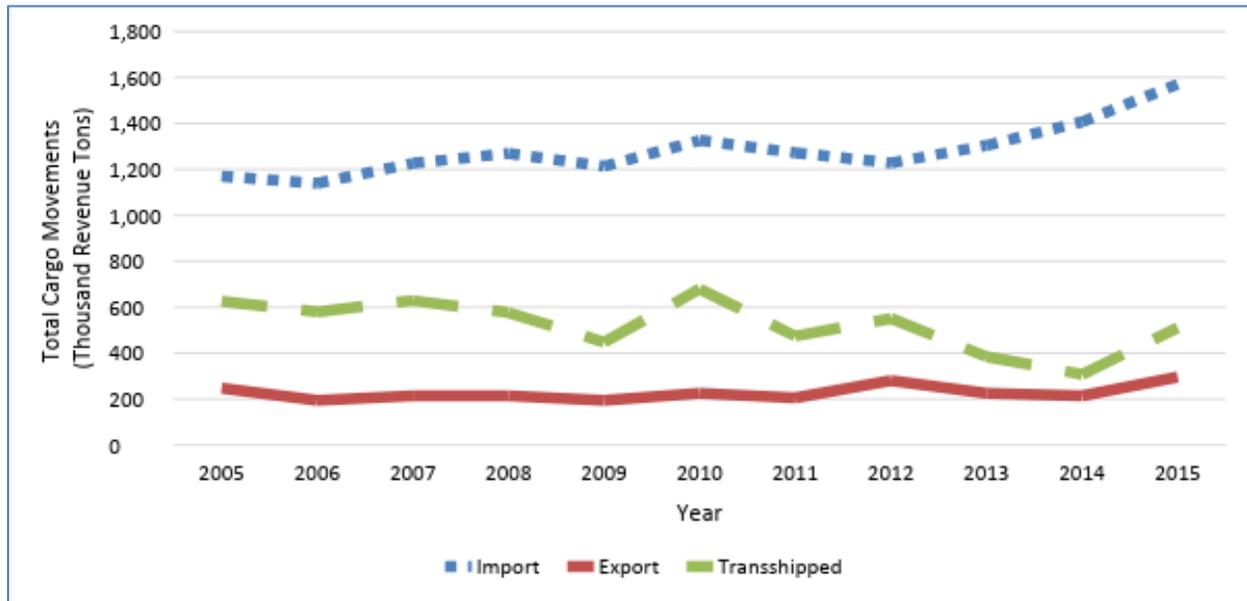
Cargo Shipping

The 2013 Guam Port Master Plan, which contains a significant amount of information for maritime shipping and port operations, states that vessels from four deep sea freight lines serve Guam across three trade routes: Trans Pacific, Asia Pacific, and Micronesia transshipment services²⁶ (Parsons Brinckerhoff 2013). However, employment for these vessels is likely not included, as many of them are foreign-based carriers. Seabridge Inc., a subsidiary of Cabras Marine Corporation, operates a feeder carrier service that carries cargo to/from Guam and CNMI for Matson and other carriers. One interviewee mentioned a small boat is now ferrying cargo between Guam and Rota in CNMI, however, other interviewees were not aware of this operation. Figure 5-2 uses Port Authority data from the *Guam Statistical Yearbook* to show total cargo movements (thousand revenue tons) in Guam between 2005 and 2015 (BSP 2016, Tables 20-05 and 25-06). These data show significant activity in this sector.



One of many container ships transporting cargo to Guam.

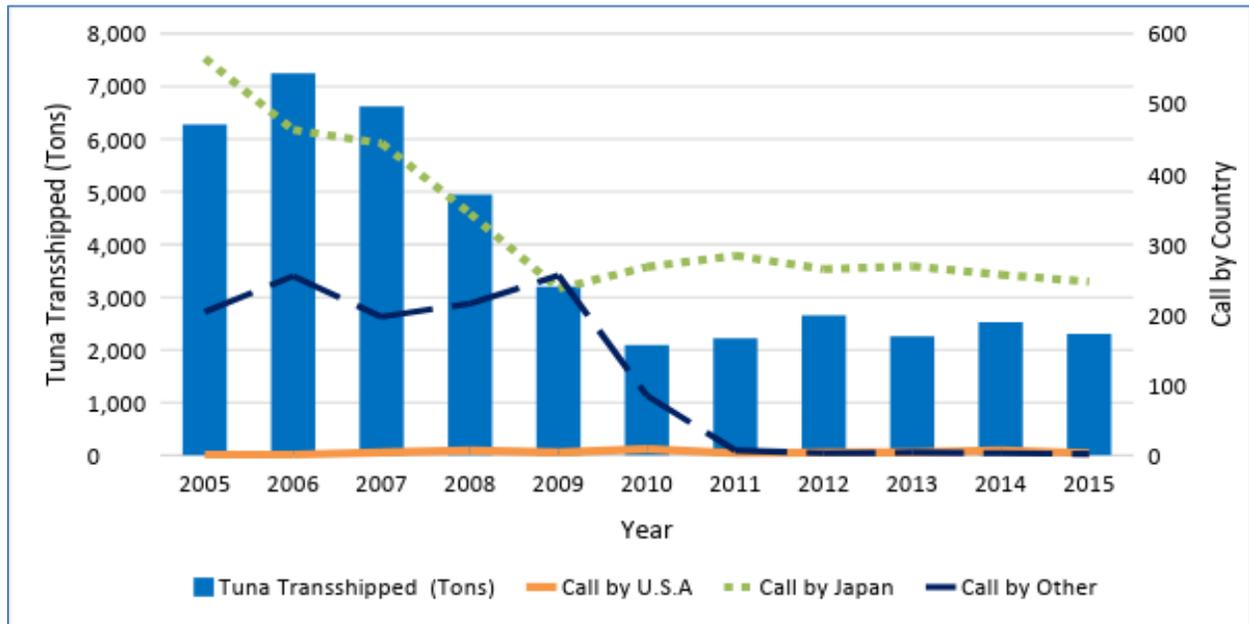
²⁶ The Trans Pacific route encompasses shipping from North America and Hawaii. Vessels on this route sometimes continue on to Asian ports before returning to North America. The Asia Pacific route comprises shipping from Asia, Australia, and New Zealand. The Micronesian route encompasses shipping to and from islands in Micronesia.

Figure 5-2. Total Cargo Movements, 2005–2015

Tuna Transshipment

Significant tuna transshipment takes place in Guam. Historically, vessels would call at the Guam Commercial Port, where the catch (more than 90 percent yellowfin and bigeye tuna and an estimated 3–5 percent billfish) was contracted to agents who handled the dockside offloading, inspection, weighing, boxing, and shipping of the fish (Hamnett and Pintz 1996; SPCPSW 1994). The fish are largely bound for the Japanese sashimi market, except for the portion of the catch that does not meet quality requirements. Near its peak in the early 1990s, benefits to the Guam economy from the transshipment industry were 150 direct jobs, and expenditures and tax revenues totaling \$33 million and \$3.5 million, respectively (Hamnett and Pintz 1996; SPCPSW 1994). However, the industry has changed since then, having evolved to include smaller aircrafts that bring catch from Palau and the Federated States of Micronesia to Guam for transshipment onto Asia and U.S. mainland-bound aircrafts, rather than vessels calling on the Port. Both the Guam BSP and NOAA’s PIFSC track major commercial species that are transshipped from Guam (Hamnett and Pintz 1996; SPCPSW 1994).

This activity is likely captured by ENOW+ NAICS 488510 (Freight Transportation Arrangement), as the transshipment process is moving tuna from one container ship to another. Figure 5-3 below shows the total tuna transshipment in Guam between 2005 and 2015, as well as the “Calls by flag,” which simply means a vessel’s country of registry (BSP 2016, Table 2-10). Most of the tuna transshipped in Guam is sent to Japan, which made 247 calls in 2015, compared to only three calls by the United States and two by other countries (BSP 2016, Table 2-10). NOAA’s PIFSC also houses extensive tuna transshipment data, citing over 1.8 million tunas transshipped in 2015 (NOAA NMFS 2016a, Guam).

Figure 5-3. Tuna Transshipment, Annual Calls by Flag²⁷

Trucking

Interviewees described the strong reliance of the trucking industry in Guam on the marine transportation sector—specifically, as almost exclusively reliant on moving goods from the ports around the island. We believe many of these companies report under NAICS 484110 (General Freight Trucking, Local), which, according to CBP data, adds 10 establishments and 330 employees to the marine transportation sector.²⁸ This makes trucking the single largest employer in the marine transportation sector, accounting for approximately 21 to 28 percent of employment.

5.1.4. Offshore Mineral Resources

The offshore mineral resources sector includes industries such as mineral and resources mining, gas extraction, and geophysical exploration and mapping services. Table 5-8 shows only one establishment employing between 0 and 19 people in Guam for this sector. However, interviewees were unsure what establishment this was, as they were not aware of any activity in this sector in Guam. Previous NOAA work identified no ENOW+ industries for the offshore mineral resources sector, and ERG did not identify any industries that could be classified as such.

²⁷ Metric tons were converted to tons for this figure.

²⁸ 2015 CBP data, Table CB1500A14, “Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas Patterns for Puerto Rico and the Island Areas.”

Table 5-8. Guam Offshore Mineral Resources Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Limestone, Sand and Gravel	212321: Construction Sand and Gravel Mining	None	None
	212322: Industrial Sand Mining	None	None
Oil and Gas Exploration and Production	211111: Crude Petroleum and Natural Gas Extraction	None	None
	211112: Natural Gas Liquid Extraction	None	None
	213111: Drilling Oil and Gas Wells	None	None
	213112: Support Activities for Oil and Gas Operations	1	0–19
	541360: Geophysical Exploration and Mapping Services	None	None
ENOW Total		1	0–19
Offshore Mineral Resources Sector Total (ENOW and ENOW+)		1	0–19

5.1.5. Ship and Boat Building

Ship and boat building includes primarily ship and boat manufacturing and repair activities. CBP data in Table 5-9 indicate there are only two establishments in Guam, which employ between 20 and 118 people. The former government-run Ship Repair Facility in Guam was privatized in the late 1990s (Global Security 2018) and employed nearly 250 employees until 2013, when about 150 were laid off (Losinio, L. 2017). Ultimately, interviewees felt these data underrepresented this sector; they indicated that there are four boat building and repair businesses in Guam but did not provide an estimate of employees at these businesses. (Table 5-9 simply reflects CBP data, given this lack of employee information.) Interviewees also indicated that only two of these four businesses have the capacity to work with fiberglass, which is required for many small vessels on Guam.



With both the quantity of and reliance on boats, it is unlikely there is only one boat/ship building and repair operations in Guam.

Table 5-9. Guam Ship and Boat Building Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Boat Building and Repair	336612: Boat Building and Repair	1	0–19
Ship Building and Repair	336611: Ship Building and Repair	1	20–99
ENOW Total		2	20–118
Ship and Boat Building Sector Total (ENOW and ENOW+)		2	20–118

5.1.6. Tourism and Recreation

The ENOW tourism and recreation sector is the largest of the six ENOW sectors, containing more ocean-related establishments and employment than any other ENOW sector. It is composed of many industries, including boat dealers, recreational goods rental services, hotels, zoos and aquaria, and restaurants. The tourism and recreation sector, including ENOW+ industries, account for approximately 90 percent of the private ocean economy employment in Guam, and approximately 30 to 40 percent of Guam’s total private employment.



Guam’s economy is heavily dependent on the Tourism and Recreation sector.

Overall, it was the most challenging ENOW sector to examine, for several reasons. It proved difficult for a handful of informants to understand the entirety of the sector, especially as it tends to be a seasonal and continuously changing sector. Overall, interviewees felt that the CBP data shown in Table 5-10 underrepresent the activity in this sector (i.e., interviewees indicated there were four public marinas, in addition to CBP data capturing two private sector marinas and a small, tourist-centered zoo with a marine component located on Tumon Bay), but did feel the tourist spending data shown in Table 5-11 were accurate.²⁹

Table 5-10. Guam Tourism and Recreation Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Boat Dealers	441222: Boat Dealers	1	0–19
Eating and Drinking Places	722511: Full Service Restaurants	243	4,453
	722513: Limited Service Eating Places	101	1,570
	722514: Cafeterias	None	None
	722515: Snack and Nonalcoholic Beverage Bars	42	432
Hotels and Lodging	721110: Hotels (except Casino Hotels) and Motels	36	5,819
	721191: Bed and Breakfast Inns	1	0–19
Marinas	713930: Marinas	2	20–99
Recreational Vehicle Parks and Campsites	721211: RV Parks and Recreational Camps	None	None
Scenic Water Tours	487210: Scenic and Sightseeing Transportation, Water	2	20–99
Sporting Goods	339920: Sporting and Athletic Goods Manufacturing	None	None
Amusement and Recreation Services	487990: Scenic and Sightseeing Transportation, Other	None	None
	611620: Sports and Recreation Instruction	31	307
	532292: Recreation Goods Rental	7	88
	713990: Amusement and Recreation Services Not Elsewhere Classified	12	97

²⁹ Other datasets were available from the World Bank’s World Tourism Organization (2018), the South Pacific Tourism Organization (SPTO 2017, 2018), and IndexMundi (n.d.).

Industry	NAICS Industry	Establishments	Paid Employees
Zoos and Aquaria	712130: Zoo and Botanical Gardens	4 ³⁰	0–76 ³¹
	712190: Nature Parks and Other Similar Institutions	11 ³²	None ³³
ENOW Total		493	12,806–13,078
ENOW+	448110: Men’s Clothing Stores	11	114
ENOW+	448120: Women’s Clothing Stores	28	193
ENOW+	448310: Jewelry Stores	34	237
ENOW+	448320: Luggage and Leather Goods Stores	20	237
ENOW+	481111: Scheduled Passenger Air Transportation	3	500–999
ENOW+	481211: Nonscheduled Air Passenger Chartering	6	25
ENOW+	481219: Other Nonscheduled Air Transportation	None	None
ENOW+	488111: Air Traffic Control	None	None
ENOW+	488119: Other Airport Operations	6	196
ENOW+	488190: Other Support Activities for Air Transport	2	0–19
ENOW+	531110: Lessors of Residential Buildings	59	296
ENOW+	531210: Offices of Real Estate Agents and Brokers	23	115
ENOW+	531311: Residential Property Managers	7	42
ENOW+	531312: Nonresidential Property Managers	4	18
ENOW+	541922: Commercial Photography	9	50
ENOW+	561311: Employment Placement Agencies	1	0–19
ENOW+	561320: Temporary Help Services	4	123
ENOW+	561510: Travel Agencies	21	455
ENOW+	561599: All Other Travel Arrangement Services	1	20–99
ENOW+	712120: Historical Sites	None	None
ENOW+	453220: Gift, Novelty, and Souvenir Stores	48	461
ENOW+	485310: Taxi Service	3	25
ENOW+	487110: Scenic and Sightseeing Transportation, Land	1	100–249
ENOW+	532111: Passenger Car Rental	37	343
ENOW+	561520: Tour Operators	41	510
ENOW+	721120: Casino Hotels	None	None
ENOW+	721199: All Other Traveler Accommodation	1	0–19
ENOW+	722410: Drinking Places, Alcoholic Beverages	69	523
ENOW+	512110: Motion Picture and Video Production	7	102
ENOW+	812199: Other Personal Care Services	29	220
ENOW+ Total		475	4,905–5,689
Tourism and Recreation Sector Total (ENOW and ENOW+)		968	17,711–18,767

³⁰ A. Loerzel, pers. com. U.S. CBP data indicated one establishment; ERG updated to four establishments.

³¹ U.S. CBP data show 0–19 employees for one establishment; ERG developed this employment range after updating establishments per A. Loerzel, pers. com.

³² A National Historic Park, five federally declared Marine Protected Areas (MPAs), and five MPAs declared by Guam’s government.

³³ ERG could not obtain reported employment for these 11 establishments, but we believe there are about two to four people employed at each MPA and a few more at the National Historical Park. MPA and NHP staff, pers. com.

The Guam Visitors Bureau published the industry highlights shown in Table 5-11 (GEDA 2018). Over 1.4 million visitors traveled to Guam in 2015, spending \$1.6 billion and supporting over 20,300 jobs. These data align reasonably well with CBP data presented in Table 5-10 above; the Guam Economic Development Authority data indicate that visitors support more than 20,300 employees, but those data do not specify whether this is direct employment or also includes indirect employment (multiplier effect) or specify the scope of the tourism industry. Table 5-11 (GEDA 2018) notes the top reason to visit Guam is natural beauty and beaches, further strengthening tourism as an ocean-dependent sector.

Table 5-11. Guam Visitor Information 2015

Visitor Arrivals	Visitor Spending	Total Tourism Economy Sales	Visitor Spending Support in Business Sales	Jobs	% of Total Employment	Jobs		Hotels		
						Income from Jobs	Top Reason for Visit	Rooms	GHRA ³⁴ Members	Airline Partners
1,409,050	\$1.6 B	\$1.7 B	\$2.3 B	20,300	33%	\$590 M	Natural beauty/beaches	8,291	26 (33 ³⁵)	17

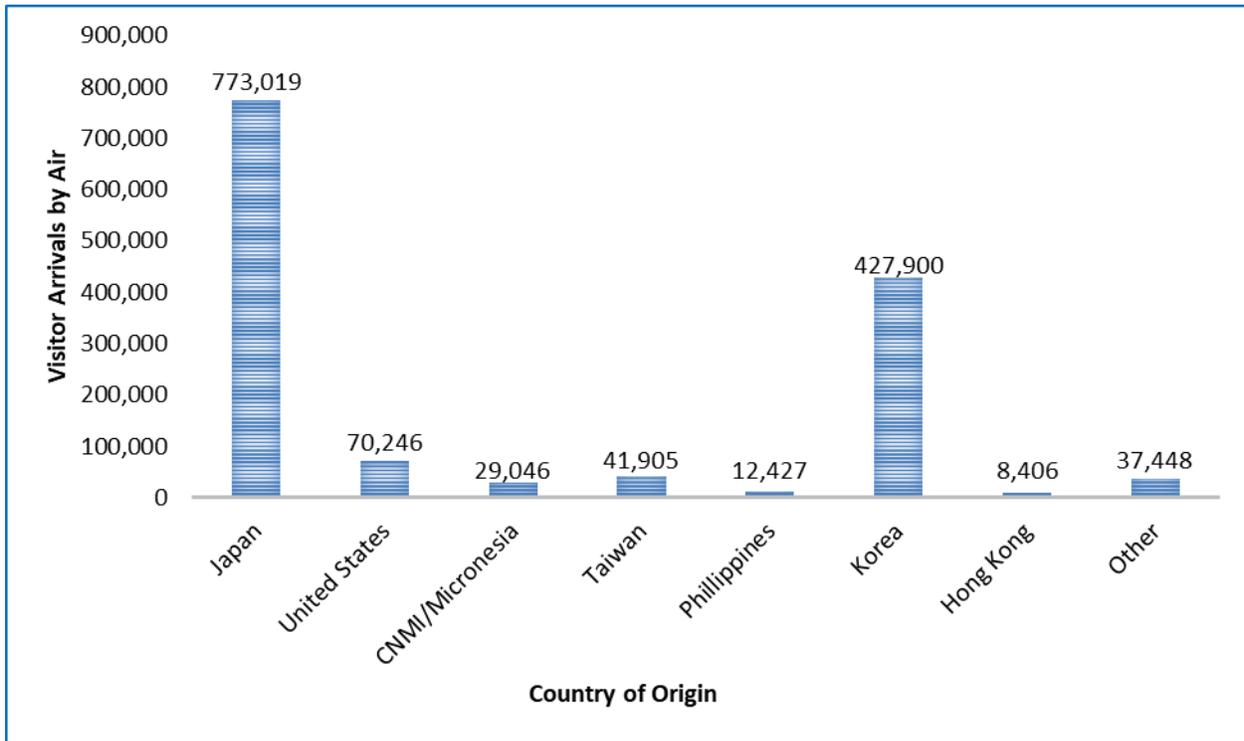
The importance of Guam's tourism industry is further demonstrated by the number of visitors from Japan (almost 800,000 air arrivals) and Korea (over 400,000), as shown in Figure 5-4 (BSP 2016, Table 21-01). The United States comes in a distant third, with 70,000 air arrivals. (Sea arrivals add a relatively small 10,000 visitors per year from all countries.) Additionally, as Table 5-12 shows, these arrivals from Japan and Korea spend between \$1,174 and \$1,367 per person per visit (prepaid and on-island expenditures) (BSP 2016, Table 21-31).



The beaches were among the top reasons visitors traveled to Guam.

³⁴ Guam Hotel & Restaurant Association

³⁵ GEDA (2018) data show 26 GHRA members, while BSP (2016, Table 21-14) shows 33 hotels in Guam in 2015.

Figure 5-4. Air Visitor Arrivals by Country of Residence, 2015

In 2015, about 55 percent of air arrivals were from Japan, compared to 31 percent from Korea and 5 percent from the United States (BSP 2016, Table 21-01). This is a relative decrease for Japan and increase for Korea, which in 2012 were responsible for 71 percent and 14 percent of air arrivals in Guam, respectively (BSP 2016, Table 21-01). (In 2017, arrivals from South Korea surpassed arrivals from Japan).³⁶ Additionally, the Guam Visitors Bureau estimates that over 2 million people will visit Guam in 2020 (GVB 2014). Guam's tourism and recreation economy will heavily rely on the growth of the tourist spending shown in Table 5-12 (GVB 2014).

Table 5-12. Total Expenditures per Person (\$ Prepaid and On-Island) by Major Market

Year	Japan	Korea	Taiwan	Russia
2015	\$1,174.33	\$1,367.16	\$1,431.64	\$2,362.24

Airbnb, VRBO, and FlipKey

In addition to the nearly 40 hotels, motels, and bed and breakfasts and nearly 6,000 employees shown in Table 5-10 above, the home rental market is also an important part of the ocean economy. ERG identified over 300 rental properties on Airbnb, 32 properties³⁷ on VRBO, and 29 properties on FlipKey. It is likely that there are some duplicate properties across websites, so the likely range is 300 to 350

³⁶ A. Loerzel, pers. com.

³⁷ "Properties" means single beds, rooms, apartments/condos, or entire homes.

rental properties. The size and relative importance of tourism to Guam’s ocean-economy and total economy prompted ERG to conduct brief searches of these three popular home-rental sites. Essentially, these websites allow anyone (so long as they own the property) to list a bed, a room, an apartment, or an entire home to be rented. This type of economic activity is not only relatively new and largely uncaptured, but extremely difficult to characterize. At any moment, homeowners can choose whether to list their properties: this makes determining the real number of rentals difficult, as it can fluctuate greatly between any two searches.

Of the roughly 1.4 million visitors who arrived in Guam in 2015, the vast majority, 76 percent, indicated that they stayed in one of Guam’s 8,700 (GVB 2014) to 9,000 (BSP 2016, Table 21-14) hotel rooms. This is compared to the 2.8 percent of visitors, or 33,431 people, who indicated they either stayed in a condominium or indicated “Other” when passing through Customs in Guam (BSP 2016, Table 21-26). Based on these data, a rough and conservative estimate of the size of the home-rental market is 300 property listings and about 33,400 renters annually.

War in the Pacific National Historical Park and Marine Protected Areas

Interviewees indicated that Guam’s National Historical Park and Marine Protected Areas (MPAs) were not reflected in the CBP data, which showed no employment in NAICS 712190 (Nature Parks and Other Similar Institutions). This is likely because they are government entities, and outside of the scope of CBP data. The War in the Pacific National Historical Park is a seven-unit park covering over 2,000 acres of land, sea, and beautiful beaches (NPS n.d.). The historical significance, natural beauty, and recreational activities were responsible for the 322,000 recreational visitors in 2015 (NPS n.d.). These 322,000 recreational visitors spent about \$18.5 million while visiting Guam’s historical park, across all seven park units (NPS n.d.). Furthermore, the National Park Service estimates that over 230 jobs were supported by the National Historical Park’s gateway economies (NPS n.d.). The War in the Pacific National Historical Park’s marine areas are designated protected areas that are critical to attracting visitors, as the beaches, fishing, and research areas are extremely popular.

The War in the Pacific National Historical Park is home to two of five federally designated MPAs (NOAA 2009). Guam has designated another five MPAs, making Guam home to 10 MPAs (NOAA 2009). These MPAs attract tourism, as they are among the most popular scuba diving sites in Guam.³⁸ They also MPAs serve as important sustainability tools, both preserving and ensuring a future for these diverse natural habitats (NOAA 2009).

Potential for ENOW Dataset

To develop ENOW for Guam along the lines of how the dataset is built for the coastal states, NOAA needs annual time series data of establishment, employment, and wages at the industry level (six-digit NAICS) for the 47 industries that ENOW covers, which would then be published in the six ENOW sectors (see **Error! Reference source not found.**). Preferably, self-employment data should also be available by ENOW sector as a supplement to total employment.

³⁸ A. Loerzel, pers. com.

The CBP dataset served as a useful starting point to understand the six ENOW sectors, providing industry-level (six-digit NAICS) data with the number of establishments. Employee data were often available at the six-digit NAICS level; however, these were often presented in large ranges. Additionally, wage data were almost entirely suppressed. The CBP dataset is also limited in that it does not include government employees, self-employed people, or (typically) agricultural workers.

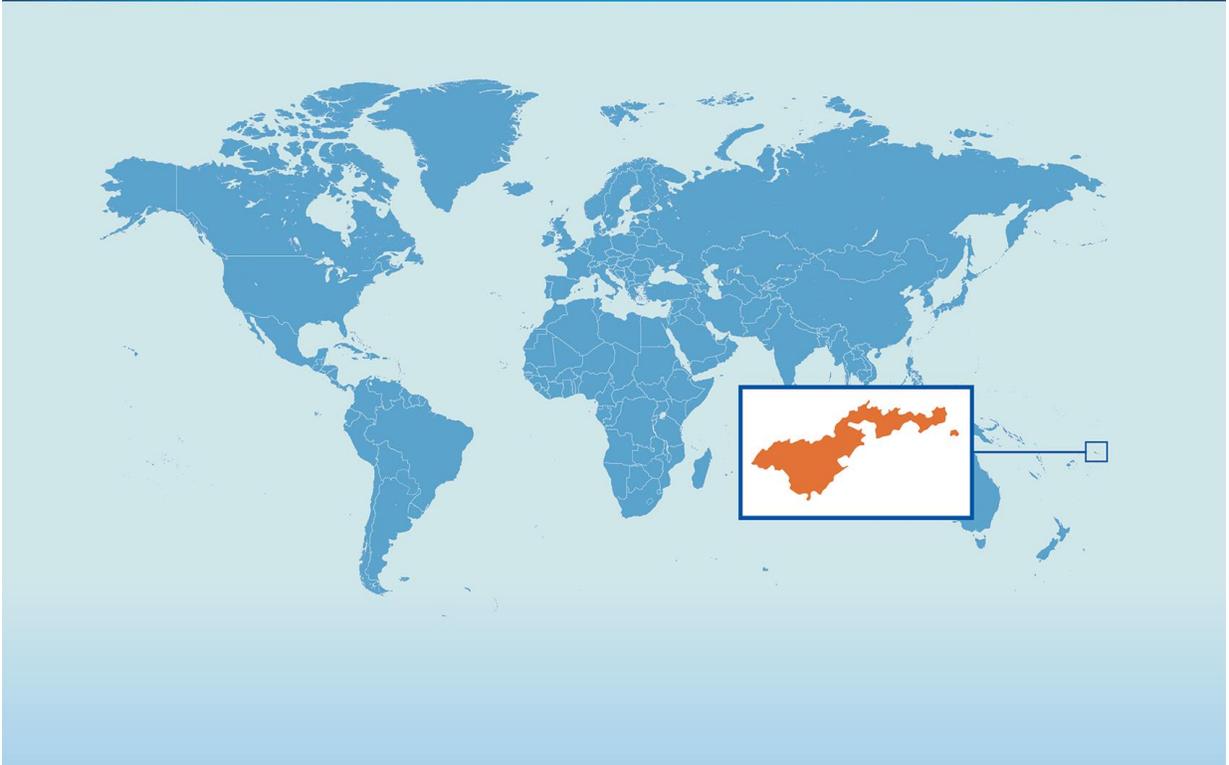
Below are options for how NOAA might assemble an ENOW dataset for Guam in the future.

Option 1: Crosswalk limited employment SIC data to NAICS. Guam’s Department of Labor implements an Annual Census of Establishments, and these employment data are available by SIC at the four-digit level and NAICS at the four-digit level (Guam BLS 2012). These data are only currently available through 2012 and only include employment data. The publicly available dataset does not include establishments or wages, and self-employed people are not captured. A contact at the Guam DOL confirmed that data through 2017 would soon be available, but it is not clear how often these data will be updated in the future.

Option 2: Crosswalk occupational code to NAICS. Guam’s Department of Labor maintains annual sector-based *employment and wage* estimates by occupation code. These are currently available through 2016 and seem to be updated regularly. However, while these data are useful, they cannot be crosswalked one-to-one to NAICS, as these occupational codes often span multiple NAICS. That said, the U.S. BLS publishes an industry/occupation matrix (https://www.bls.gov/emp/ep_table_109.htm). Though it would take some time to pull all the relevant spreadsheets together into a usable matrix to get from occupational data to ENOW industries, it should be possible given Guam’s small economy, but with the limitation we would be using the national distribution of what percent of each occupation code works in each NAICS.

Option 3: Work with Guam to update their database or data collection processes. Our research indicates the Guam business license application form does not ask applicants to identify a NAICS code, only one of four categories: wholesale, retail, service, and other (banking, home industry, hand manufacture, coin vending, etc.). However, our interviews suggest that—as in American Samoa and CNMI—staff at the General Licensing Branch input the appropriate NAICS code into the system when they process the application. Therefore, the General Licensing Branch may be able to tally annual establishments and employment by six-digit NAICS; however, this would not include wage data. It would also not include self-employment data.

Option 4: Provide a form to one or various offices to collect data from them directly. Our research and discussions seem to indicate that various Guam offices have access to establishment, employment, and wage data, and generally this seems to be available at the six-digit NAICS level. One approach may be to develop a standard form for collecting the information that is needed for each ENOW NAICS code to collect the information on an annual basis.



6. American Samoa

Key Findings

American Samoa is composed of seven islands, totaling 77 square miles, and is about 2,500 miles southwest of Hawaii (ASDOC 2016, p. ix). American Samoa is home to about 60,800 people, most of them on the island of Tutuila (ASDOC 2016, Table 10.1).

We conducted in-person interviews in American Samoa to validate ENOW sector summaries we developed for the Territory using readily available information from Census and the *American Samoa Statistical Yearbook*. All data in this section is for 2015 unless otherwise specified. Our key findings from the data collection and interviews are below:

Data Availability and Potential for ENOW Dataset

- U.S. Census CBP data and the *American Samoa Statistical Yearbook* data provided the best available employment and establishment data, and with some granularity (three-digit NAICS), but they lacked wage data by NAICS industry. CBP data were increasingly suppressed from four-digit to six-digit NAICS.
- The American Samoa Department of Commerce (ASDOC) collects employment and establishment data through business licensing and annual renewal forms. ASDOC assigns businesses a NAICS code based on their description (it is not self-selected) but does not collect wage data. While this information is not publicly available, working with ASDOC could be an option for developing ENOW datasets for employment and establishments.
- American Samoa is currently developing an American Samoa Industry Classification based on the U.N. Pacific Industry Classification and with NAICS concordances. This classification will be the basis of an American Samoa Business Registry. They hope to have this system in operation within 12–18 months.

Total Economy

- The government is a huge employer in American Samoa, employing 6,804 people (about 37 percent of total employment on the island).
- One large tuna cannery is the top private employer in American Samoa, with approximately 3,000 employees.
- The U.S. federal government financially supported American Samoa to temporarily restore about 70 percent of the jobs lost after the tuna cannery shut down in 2009. This was cited as a primary reason the entire economy of American Samoa did not crash.

Ocean Economy

- **Overall:** Interviewees felt CDP data underrepresented living resources, marine construction, marine transportation, boat building, and tourism and recreation sectors.
- **Tourism and Recreation:** Tourism is a small component of American Samoa's ocean economy, especially compared to Guam and CNMI. There is one charter fishing company, one watersports company, and no dive shops or boat rentals. Whereas Guam receives around 100,000 tourists

per month, American Samoa’s air-arriving tourists number around 4,000 per year. However, cruise ships are a significant component of American Samoa’s small ocean tourism landscape. The number of cruise ships visiting American Samoa increased in the past several years, with 16 cruise ships bringing over a total of 28,986 passengers and crew in 2015. In 2014, portside market vendors generated close to \$194,000 in revenue.

- **Living Resources:** The largest private employer in the territory (the StarKist Samoa tuna cannery, with 2,759 employees in 2015) is completely ocean-dependent. One component of fishing that is relatively easier to quantify is the local economic impact of the American Samoa longline and purse seine fleets. These fleets, which supply fish to the cannery, have a home port in Pago Pago—a key difference in terms of fisheries between American Samoa and Guam/CNMI. Though CBP did not list any fish markets, many markets and small shops sell fish as part of their broader economic activity.
- **Ship and Boat Building:** Although there are no private businesses that solely build or repair boats, several do this work as a secondary activity.
- **Marine Construction:** There are about three heavy construction companies and a number of smaller ones; however, they did not often classify themselves in industries that are part of ENOW.
- **Offshore Mineral Resources:** Offshore mineral extraction is not a part of American Samoa’s ocean economy. CBP data and interviews did not turn up any offshore mineral resource associated employment in American Samoa, though there are terrestrial quarries.

Methods

Section 4 provides an overview of the approach used in all three Pacific Island territories, including information about the data search and review, statistical summary development, the objectives of the interviews, and more information about the Census CBP dataset. This section provides information specific to our approach for American Samoa.

As discussed in Section 4, we used CBP data as the backbone of all the statistical summaries we developed across all three U.S. Pacific Island territories. In American Samoa, we also leaned heavily on the *American Samoa Statistical Yearbook* (a series of annual data first published in 2000) to supplement the CBP data when possible. The yearbook shows data from a few federal data sources, such as U.S. Census and the U.S. Department of Agriculture. However, unlike Guam, American Samoa has no BLS data. Because there are few federal data sources, the *American Samoa Statistical Yearbook* relies heavily on locally kept data sources. These sources include ASDOC; the American Samoa Department of Legal Affairs, Immigration Office; the Department of the Port Administration; the Department of Marine and Wildlife Resources (DMWR); and many others. The *American Samoa Statistical Yearbook* provides employment figures for some industry groupings (not as granularly as NAICS), but these data are from the 2010 American Samoa Census Profile. Thus, our interest is not in the data, but that there is a precedent to collect this type of information. Ultimately, the *American Samoa Statistical Yearbook* filled some gaps by providing self-employment data (but not by industry), government employment data, and more precise cannery employment data from local sources.

Over the week of January 15–19, an ERG team member visited American Samoa to interview a variety of contacts and solicit feedback on how accurately these statistical summaries portrayed the American Samoa economy. This included conversations with contacts at the:

- National Park of American Samoa
- American Samoa Port Administration
- ASDOC
 - Statistics Division
 - Planning Division
- DMWR
 - Director
 - Deputy Director
 - Chief Marine Biologist
- American Samoa National Marine Sanctuary
- WPFMC
- Pacific Energy Group (PEG)
- Industrial Gases
- Polynesian Shipping
- American Samoa Tourism Bureau
- South Pacific Watersports

These discussions, which involved assessing the perceived accuracy of the statistical summaries, obtaining leads about better local data, and describing the economy qualitatively, are detailed further in Section 4.

Most of the employment and wage data in this section are based on CBP data. In most cases, the *American Samoa Statistical Yearbook* did not provide employment at a granular enough level to supplement CBP data; in some cases, we used the yearbook for more precise estimates of employment—for example, tuna cannery employment—than the ranges provided by CBP. Additionally, as CBP data do not count government workers, we were occasionally able to find employment data at a few ocean-related government organizations to supplement the table below.

American Samoa Total Economy

In 2015, total estimated employment was 17,853 people (ASDOC 2016, Table 10.1). Of the 17,853 total employed persons, 6,804 were employed in government, and about 2,759 were employed in tuna processing and canning (ASDOC 2016, Table 10.1). About 8,290 people were employed in private sectors other than the cannery and an estimated 520 people reported themselves as self-employed in the 2010 Census; in that year, there was an unemployment rate of 9.2 percent.³⁹ In 2015, there were 3,769 registered businesses in American Samoa (ASDOC 2016, Table 14.12). Finally, American Samoa’s GDP in 2015 was \$641 million (BEA 2018).

³⁹ 2010 American Samoa Census Profile (ASDOC 2016, Tables 10.4 and 10.8).

Table 6-1 shows public and private establishment, employment, and wage data based on data from CBP and the *American Samoa Statistical Yearbook*.

Table 6-1. AS Economy at a Glance (2015)

	Establishments	Employees	Annual Payroll (\$1,000)	Average Employee Salary
Private Sector	486 ⁴⁰	8,156 ⁴¹ –11,049 ⁴²	\$140,751 ⁴³	\$12,739–\$17,257 ⁴⁴
Public Sector⁴⁵		6,804 ⁴⁶		

Figure 6-1 shows total government employment, tuna cannery employment, other private sector employment (non-cannery), and total employment from 2005 to 2015 (ASDOC 2016, Table 10.1). Of note, one of the two tuna canneries closed in 2008, and this led to a large drop in cannery employment in 2009. Ultimately, people found jobs in other private sectors and government and employment sharply rebounded in 2010. In fact, between 2009 and 2010, government employment increased sharply from 4,486 to 5,226, increasing contract employees, local government employees, and those employed by special government programs by significant margins (ASDOC 2016, Table 10.3). A larger spike in private employment, from 6,542 to 10,527, occurred in the same period, though it is not clear in what industries these jobs were created (ASDOC 2016, Table 10.1).

⁴⁰ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

⁴¹ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

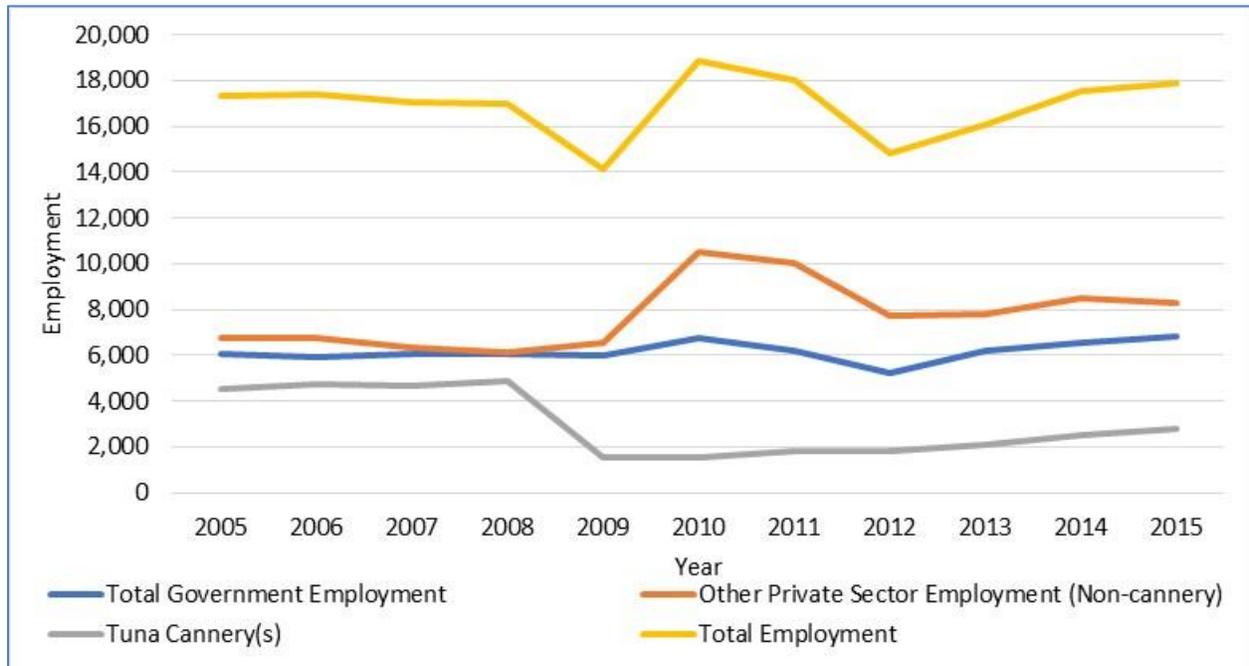
⁴² The private employment upper bound in this range was calculated from ASDOC (2016, Table 10.1).

⁴³ Calculated from average employee U.S. Census 2018b (CBP) data.

⁴⁴ This range was calculated using the upper (ASDOC 2016) and lower (CBP data) private sector employment range.

⁴⁵ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

⁴⁶ ASDOC (2016, Table 10.1) estimates that 6,804 people were employed in government in 2015. Of these, 5,217 were employed in general government, 182 by the American Samoa Telecommunication Authority, 725 by the LBJ Tropical Medical Center Authority, 403 by ASPA, and 277 by American Samoa Community College.

Figure 6-1. AS Total Economy Employment, 2005–2015

Census CBP data provide insight into American Samoa’s economic sectors (at the two-digit NAICS level), which the *American Samoa Statistical Yearbook* also does, though not by NAICS and using 2010 data. (The *American Samoa Statistical Yearbook* uses sectors of economic activity similar to NAICS, though it is not specified whether they are identical.) In 2010, the *American Samoa Statistical Yearbook* indicates that 2,357 people were employed in construction, extraction, and maintenance, as a single grouping. This is dramatically different from the 345 employees 2010 CBP data (about 500 in 2015) show for the construction sector NAICS 23, which is composed of construction of buildings or engineering projects. Though the groupings used in the yearbook initially appear comparable to the NAICS sectors, the two grouping systems do not seem compatible enough to accurately compare data. Finally, the yearbook data are from the 2010 Census, which makes it extremely difficult to accurately compare to CBP data which is available through 2016.

Table 6-2 shows total establishment and employment by sector according to Census CBP data.⁴⁷ As the table shows, manufacturing, retail trade, and construction contribute the most to employment in American Samoa. Almost all the manufacturing activity can be attributed to the tuna cannery, while retail trade and construction show more diversified economic activity. As noted in Section 4, CBP data do not typically count government employees, those in agriculture, or those self-employed; however, the *American Samoa Statistical Yearbook* estimated about 501 agriculture employees in 2010 (ASDOC 2016, Table 10.7).

⁴⁷ 2015 CBP data, Table CB1500A14, “Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas.”

Table 6-2. AS Industry Composition

Sector (Two-Digit NAICS)	Establishments	Employees
11: Agriculture, Forestry, Fishing and Hunting	1	0–19
21: Mining, Quarrying, and Oil and Gas Extraction	None	None
22: Utilities ⁴⁸	None	None
23: Construction	30	500
31–33: Manufacturing	38	3,160
42: Wholesale Trade	25	264
44–45: Retail Trade	170	1,465
48–49: Transportation and Warehousing	27	326
51: Information	6	168
52: Finance and Insurance	10	110
53: Real Estate, Rental, and Leasing	13	67
54: Professional, Scientific, and Technical Services	26	199
55: Management of Companies and Enterprises	2	0–19
56: Administrative Support and Waste Management and Remediation Services	24	116
61: Education Services	4	127
62: Health Care and Social Assistance	15	500–999
71: Arts, Entertainment, and Recreation	1	0–19
72: Accommodation and Food Services	40	448
81: Other Services (Except Public Administration)	45	399
99: Industries not Classified	9	26
Total Reported Activity (2015 CBP data)	486	8,156

American Samoa Ocean Economy

Based on data available from Census and the *American Samoa Statistical Yearbook*, Table 6-3 shows 2015 establishments and employment in American Samoa for the six ENOW ocean economy sectors.⁴⁹ The data show that about 40 percent of American Samoa’s total employment is part of the six ENOW ocean economy sectors.

Table 6-3. AS Ocean Economy at a Glance

ENOW Sector	ENOW Establishments	ENOW Employees	ENOW+ Establishments	ENOW+ Employees	Total Ocean Establishments	Total Ocean Employees
Living Resources	4	2,864–2,982	2	0–38	6	2,864–3,020
Marine Construction	1	0–19	8	200–517	9	200–536
Marine Transportation	6	20–194	6	46–319	12	66–319
Offshore Mineral Resources	None	None	None	None	None	None

⁴⁸ ASDOC (2016, Table 10.1), estimated 403 ASPA employees in 2015. These are government employees, which is why CBP did not include them.

⁴⁹ These data were collected at the six-digit NAICS level for the industries that make up the six ENOW sectors. These data were then aggregated to show totals for each ENOW sector.

ENOW Sector	ENOW Establishments	ENOW Employees	ENOW+ Establishments	ENOW+ Employees	Total Ocean Establishments	Total Ocean Employees
Ship and Boat Building	1	30	None	None	1	30
Tourism and Recreation	42	491–586	32	74–343	74	565–929
Total	54	3,405–3,811	48	320–1,217	102	3,725–4,834

As noted in Section 4, CBP data have limitations that do not allow them to be used as the sole basis for estimating the territory’s ocean economy. These limitations include:

- Suppressing or protecting data using wide employment ranges.
- Not capturing self-employment.
- Not capturing government employment.
- The activity of companies that do work within the ENOW sectors/industries, but for which this is not their primary business and therefore are found under a different NAICS code.

Additionally, some economic activity that is not ocean-dependent in the coastal United States might qualify as such in an island setting. Many of those we interviewed noted that much of the territory’s economy is directly or indirectly linked to the ocean. To explore these gaps further, we conducted in-person interviews in American Samoa to discuss the data, explore self-employment, and identify some of these non-ENOW ocean economy industries. Table 6-4 summarizes notes and initial findings from in-person interviews in American Samoa. Following the table are analyses of data for each of the six ENOW sectors.

Table 6-4. AS Summaries by Sector of In-Person Interviews

ENOW Sector	Information from In-person Interviews
Living Resources	<ul style="list-style-type: none"> • The American Samoa government requires commercial licenses to sell fish, even on the side of the road. DMWR has been actively working to enforce this. • About 45 percent of PEG’s petroleum fuel sales are to the pelagic fishing fleets (longline and purse seine vessels). • Five percent of PEG’s sales are to the tuna canneries. • The American Samoa Power Authority (ASPA) purchases diesel fuel to produce electricity; 20 percent of that power is sold to canneries. • The cannery workforce underpins a significant amount of the commuter transport sector. These “aiga” (family) buses are described below. • Marine aquaculture is currently nonexistent in American Samoa. • CBP data does not capture federal and locally permitted commercial fishermen as they are primarily self-employed. DMWR has better data on numbers of commercial fishermen and NMFS has some fisheries revenue data.

ENOW Sector	Information from In-person Interviews
Marine Construction	<ul style="list-style-type: none"> • Three major heavy construction companies (Fletcher, Paramount, and McConnell Dowell) operate in American Samoa, as do about 10 smaller ones. A number of government projects that are contracted to these companies are coastal and marine-related (e.g., shoreline armoring, dock and pier work). • Most of these companies would not have chosen a NAICS in ENOW's marine construction sector, as some but not a majority of their work is marine construction-related.
Marine Transportation	<ul style="list-style-type: none"> • The American Samoa Port Administration maintains data on most aspects of port operations, and these data can vary from both CBP and ASDOC data (e.g., the Port Administration's numbers for incoming/outgoing vessel traffic differ from those reported by AS DOC). • Port fees generate between \$2.5 and \$3.5 million in revenue per year. • Eight to 10 shipping lines dock in American Samoa. • Two stevedore companies and several freight forwarding companies (NAICS 488320) operate in American Samoa. • Three interisland vessels carry passengers and/or equipment: the M/V <i>Manuatele</i>, M/V <i>Sili</i>, and M/V <i>Lady Naomi</i>, which goes back and forth between American Samoa and Samoa.
Offshore Mineral Resources	<ul style="list-style-type: none"> • Interviewees were not aware of any offshore mineral extraction activity near American Samoa.
Ship and Boat Building	<ul style="list-style-type: none"> • Some local machinery businesses (fewer than five) perform boat building/repair on request but would not be found under ship or boat building NAICS in ENOW.
Tourism and Recreation	<ul style="list-style-type: none"> • There are very few marine-related tourism operations in American Samoa. South Pacific Watersports in Utulei and Pago Pago Fishing Charters are the exceptions. • There are four tour companies, two of which cater solely to cruise ship passengers. In addition to arranging island tours (using aiga buses), these companies work with select villages to provide cultural experiences to tour groups. • The American Samoa Port Administration reported that the cruise ship arrival data in the <i>Statistical Yearbook</i> need to be checked against port data. For example, though the yearbook suggests 26 cruise ships called on American Samoa in 2012, the Port Administration indicated that American Samoa has never received (at least in recent memory) that many cruise ships in one year. • Hotel data appear to be inaccurate, as most interviewees reported there are more than five hotels in American Samoa. TripAdvisor shows four hotels and seven bed and breakfasts, inns, or motels. • The American Samoa Tourism Bureau released the results of an air arrival tourism expenditure study on January 24, 2018 (SPTO 2018).

6.1.1. Living Resources

The living resources sector generally includes fishing, seafood processing, and fish and seafood markets (NOAA OCM n.d.). Table 6-5 shows data for the living resources sector based on CBP and *American Samoa Statistical Yearbook* data. Overall, interviewees felt that seafood product preparation and packaging were well

Seafood product preparation and packaging were well captured by existing data.

represented by the data; however, fishing and fish markets were underrepresented by CBP data—as is the case virtually everywhere—and we put an estimate into the table based on the *American Samoa Statistical Yearbook*, which identified 84 fishermen in 2015, and a WPFMC study that identified 21–30 fish vendors in American Samoa (ASDOC 2016, Table 13.12; Sabater 2018).

Table 6-5. AS Living Resources Sector Employment

Industry	NAICS Industry	Establishments	Employees
ENOW			
Fish Hatcheries and Aquaculture	112511: Finfish Farming and Fish Hatcheries	None	None
	112512: Shellfish Farming	None	None
	112519: Other Aquaculture	None	None
Fishing	114111: Finfish Fishing	1	84 ⁵⁰
	114112: Shellfish Fishing	1	0–19
	114119: Other Marine Fishing	None	None
Seafood Processing	311710: Seafood Product Preparation and Packaging	2	2,759 ⁵¹ –2,858 ⁵²
Seafood Markets	445220: Fish and Seafood Markets	None ⁵³	21 ⁵⁴
ENOW Total		4	2,864–2,982
ENOW+	424460: Fish and Seafood Merchant Wholesalers	1	0–19
ENOW+	813312: Environment and Conservation Organizations	None	None
ENOW+	924120: Administration of Conservation Programs	None	None
ENOW+	445210: Meat Markets	1	0–19
ENOW+	541620: Environmental Consulting Services	None	None
ENOW+ Total		2	0–38
Living Resources Sector Total		6	2,864–3,020

Tuna Canning

The data and interviews quickly identified the StarKist Samoa tuna cannery as the second largest employer in the territory, behind the government. The cannery employs about 2,759 people, accounting for most of the employment in the living resources sector (ASDOC 2016, Table 10.1). In 2015, American Samoa exported about \$365,587,000 of canned tuna, making up over 94 percent of American Samoa’s total exports (ASDOC 2016, Table 14.8).

The cannery accounts for approximately 25 percent of American Samoa’s total employment.

⁵⁰ ASDOC (2016, Table 13.12).

⁵¹ ASDOC (2016, Table 10.1).

⁵² The upper range is based on 2012 Economic Census data showing the second largest establishment in NAICS 31–33 is 50–99 employees (U.S. Census 2017a, Table IA1200A03).

⁵³ Sabater (2018) identified 21 “fish-vendors” (see footnote 36). Because these are not “fish-centric” markets, no establishments can be attributed to this economic activity.

⁵⁴ In Guam and CNMI, Sabater (2018) identified “fish-centric” markets. However, in American Samoa, they only identified “fish-vendors.”

Figure 6-2 shows tuna cannery employment in American Samoa from 2000 to 2015 (ASDOC 2009; ASDOC 2016, Table 10.1). The dramatic drop in employment shown in Figure 6-2 represents a closure of one of the territory's two canneries, Chicken of the Sea, in 2009 (Associated Press 2010). This closure

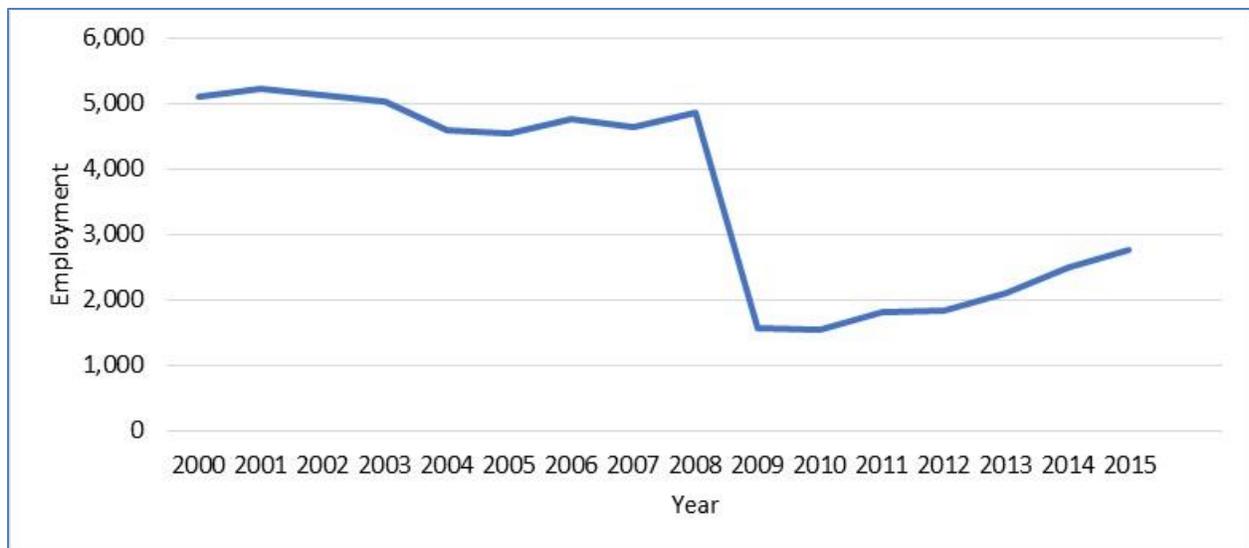


StarKist Tuna Cannery employs nearly 3,000.

occurred in part because implementation of the Fair Minimum Wage Act in American Samoa (2007) increased the cost of labor, which resulted in Chicken of the Sea searching for cheaper labor elsewhere (Grace-McCaskey 2015). Between 2,000 and 3,300 cannery jobs were lost from 2008 to 2009, while one government report estimates total job loss to be just under 6,000.⁵⁵ The closing of the cannery contributed to a decrease in American Samoa exports by over 20 percent (Hamano 2011). The U.S. government put federal dollars into the American Samoa economy through different channels, temporarily restoring about 70 percent of the jobs lost; this is cited

as the primary reason the American Samoa economy did not completely crash (Grace-McCaskey 2015). After Chicken of the Sea closed in 2009, Tri Marine, Inc., took over the cannery and spent about \$70 million on renovations to reopen, but only operated for about a year before closing in December 2016 (Associated Press 2010, 2016). Since Tri Marine closed in 2016, only StarKist has been operating in the territory. StarKist experiences occasional production halts, sometimes leaving workers unemployed for weeks (RNZ 2017). These slowdowns or production halts are typically driven by decreased fishery production by the fleets providing fish to the cannery. These slowdowns or halts occur with some regularity and may be related to conditions that influence oceanic productivity regimes.

Figure 6-2. AS Tuna Canning Employment, 2000–2015



⁵⁵ Calculations from ASDOC (2016, Table 10.1) indicate 3,299 jobs were lost between 2008 and 2009 in the cannery industry, while Grace-McCaskey (2015) estimated about 2,000 cannery jobs as lost during the same period.

Fishing

While CBP data did not capture much fishing employment, other local data sources and interviews revealed that fishing is a significant part of the living resources sector.

Figure 6-3 shows estimated total commercial landings in American Samoa between 2005 and 2015 (NOAA NMFS 2016b, AS). Figure 6-4 shows that in 2015, there were 84 fishermen using 28 boats in American Samoa (ASDOC 2016, Table 13.12). These figures are likely licensed “local” fishermen and boats and are accredited with having caught approximately 110,000 pounds of fish (ASDOC 2016, Table 13.12). It is unclear whether these “local” fishermen shown in Figure 6-4 are self-employed or engaged in subsistence fishing. The interviews revealed that licensure is also required to sell fish, even for individuals on the side of the road, and DMWR tracks the number of fishermen through these licenses. The drop in 2009 and 2010 is likely due to the decline in bottomfish landings from the loss of alia vessels (small, locally made fishing vessels) from the large tsunami that hit the island in 2009.

Figure 6-3. Estimated Total Commercial Landings, 2005 - 2015

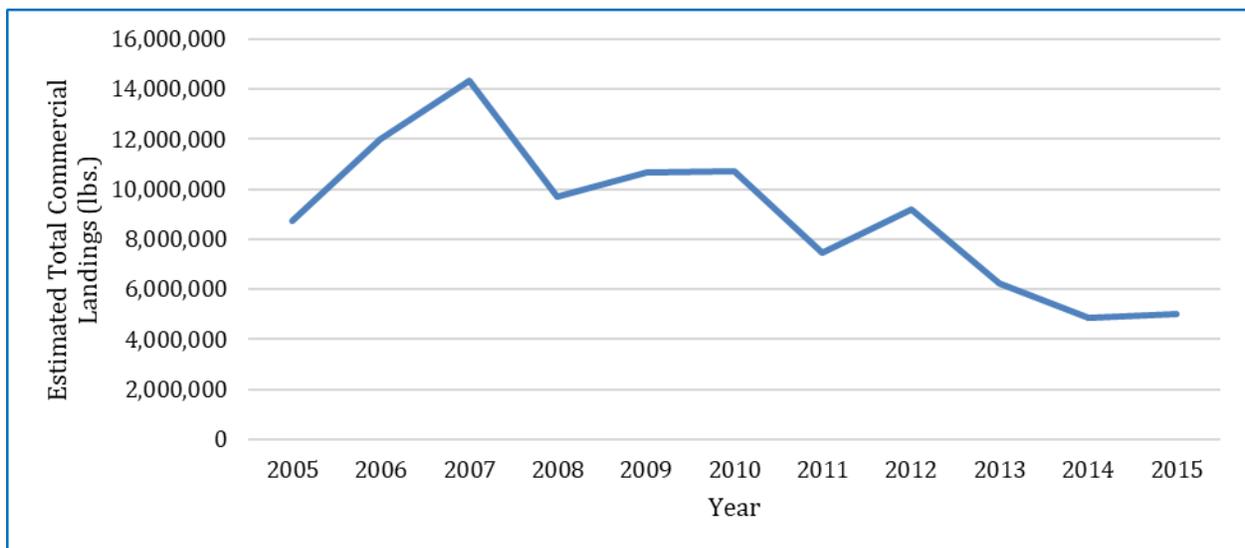
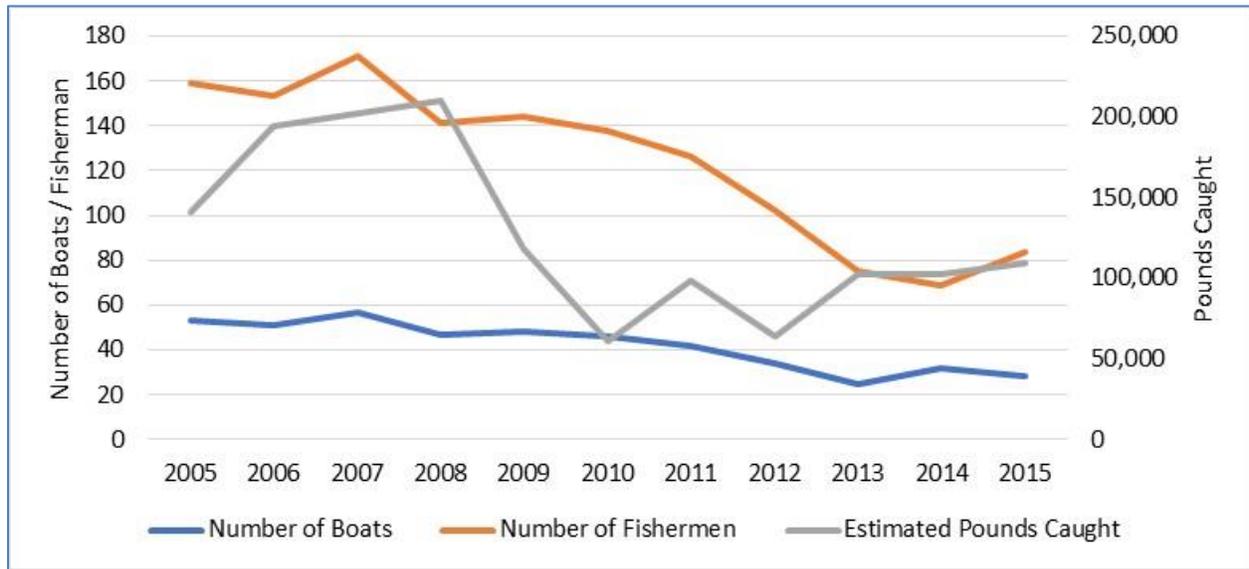


Figure 6-4. AS Boats, Fishermen, and Estimated Pounds Caught

The National Marine Fisheries Service (NMFS) has extensive fishery data for American Samoa via the Western Pacific Fisheries Information Network (WPacFIN). For example, NMFS data indicate estimated 5 million pounds of commercial landings in American Samoa in 2015 (Figure 6-3), generated approximately \$5.5 million in revenue for fishermen (NOAA NMFS 2016b, AS).

Furthermore, 2010 Census data indicated that 1,614 people were in the labor force and employed in subsistence work, and 633 people were not in the labor force but engaged in subsistence activities, totaling about 2,247 engaged in subsistence activities (ASDOC 2016, Table 10.4). Interviewees indicated that subsistence activities were not explicitly defined, “but are assumed to be farming, fishing, domestic work, or other activities not for wages or cash payment.”⁵⁶ Though these activities are not defined, a good number of the 2,247-people engaged in subsistence activities are contributing to the living resources sector through fishing.

Fish Markets

There is one dedicated fish market in American Samoa, but it is relatively new and has been open only sporadically over the past year. A fish market operated from 2014 to 2016, but it has since closed. No fish markets were captured by the data, but interviewees stated that many businesses (e.g., “bush stores”) sell fish “on the side,” in addition to their primary business activities. General merchandise shops and small stores that also sell fish are quite common throughout villages in American Samoa (there are between 21 and 30⁵⁷); however, because these businesses are classified under



Fresh fish in a local store in Tafuna, American Samoa.

⁵⁶ Department of Commerce, pers com.

⁵⁷ Sabater (2018) and on-islands interviews.

a different NAICS, they are not currently captured as part of the living resources sector in the data.

Aquaculture

Interviewees validated the data from Census that marine aquaculture does not exist in American Samoa.

Key Indirect Economic Activity Linked to the Living Resources Sector

ENOW and ENOW+ industries are directly dependent on the ocean; however, quite a bit of economic activity is indirectly dependent on the ocean because those industries are strongly linked to and dependent on the ocean-dependent industries. Electricity and fuel and aiga buses are two industries that have shown a strong dependence on the cannery over the years.

Aiga Buses

Interviewees identified an indirect relationship between aiga (“family”) buses and the ocean economy through their strong linkage to the cannery. Aiga buses are family-owned, often vibrantly painted trucks or pickup trucks. These trucks have been heavily modified (e.g., the addition of a large bed) to function as mini-buses, with an enclosure and seats installed on the bed.



Aiga bus in American Samoa.

Interviewees indicated that the aiga buses are also the primary transportation source for the cannery workforce and are the primary means of public transportation in American Samoa. While the buses support the tourism and recreation sector to some level, interviewees noted that there are significantly fewer aiga buses on the road when the cannery (or canneries) are shuttered, as they rely heavily on thousands of people commuting to the cannery each day.

Electricity and Fuel

Both fuel and electricity were also identified in interviews as important indirect economic activity with links to the living resources sector. In an interview, PEG informed the ERG team that about 45 percent of its fuel sales were to the pelagic fishing fleets (longline and purse seine vessels), an obvious pillar of the living resources sector.⁵⁸ Additionally, about 5 percent of PEG’s sales are to the cannery.⁵⁹ This means that about half of PEG’s business directly supports the largest identified driver of the living resources sector. Similarly, about 28 percent of PEG’s total diesel fuel sales are to ASPA, to produce electricity.⁶⁰ About 20 percent of that power is then sold to the canneries.⁶¹ These indirect links are not captured by current ENOW definitions despite being a critical input to the living resources sector. This again shows how other industries are more ocean-dependent in an island setting than they might be in the U.S. mainland coastal economies.

⁵⁸ Interview with PEG.

⁵⁹ Interview with PEG.

⁶⁰ PEG, pers. com.

⁶¹ Interview with ASPA.

6.1.2. Marine Construction

The marine construction sector is composed of heavy and civil engineering construction services, which include activities such as designing and constructing piers, seawalls, boat ramps, and dredging.⁶² Data in Table 6-6 show that only one establishment and between 0 and 19 employees were in this ENOW sector in 2015.⁶²

Most marine construction is performed by companies classified under construction industry codes not in ENOW (e.g., 236).

Interviews indicated that marine-related construction is underrepresented by the data. Interviewees identified three large construction companies and about 10 smaller companies, some of which engage in government contracts that include work that is coastal and marine-related, such as shoreline armoring, dock building, and pier work. However, because these companies have been assigned NAICS codes outside NAICS 237990, they are not captured as part of the data. It appears these companies are likely classified under NAICS 236, which contains approximately 254 employees based on CBP data; however, it is unclear what portion of these jobs are significantly related to the ocean economy.⁶³

Table 6-6. AS Marine Construction Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Marine Related Construction	237990: Other Heavy and Civil Engineering Construction	1	0–19
ENOW Total		1	0–19
ENOW+	236220: Commercial and Institutional Building Construction	4	100–249
ENOW+	541330: Engineering Services	3	100–249
ENOW+	541370: Other Surveying and Mapping Services	1	0–19
ENOW+ Total		8	200–517
Marine Construction Sector Total (ENOW and ENOW+)		9	200–536

Inclusion of the above ENOW+ industries dramatically increases the total number of establishments and employees that are part of the marine construction sector. The ERG team identified NAICS 236220 (Commercial and Institutional Building Construction) as the industry likely responsible for the marine-related construction described by interviewees (this NAICS rolls up into NAICS 236).

Construction NAICS 236220 seems to be a key contributor to the marine construction sector despite not being part of the ENOW-defined sector.

⁶² These data were collected at the six-digit NAICS level for the industries that make up the six ENOW sectors. These data were then aggregated to show totals for each ENOW sector.

⁶³ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

6.1.3. Marine Transportation

The marine transportation sector includes many industries, from deep sea freight and marine passenger transportation to farm product warehousing and search and navigation equipment (NOAA OCM n.d.). Table 6-7 shows CBP data for the marine transportation sector. Overall, approximately 66-319 are employed across ENOW and ENOW+ industries.⁶⁴

Table 6-7. AS Marine Transportation Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Deep Sea Freight	483111: Deep Sea Freight Transportation	1	0–19
	483113: Coastal and Great Lakes Freight Transportation	None	None
Marine Passenger Transportation	483112: Deep Sea Passenger Transportation	None	None
	483114: Coastal and Great Lakes Passenger Transportation	1	20–99
Marine Transportation Services	488310: Port and Harbor Operations	1	0–19
	488320: Marine Cargo Handling	1	0–19
	488330: Navigational Services to Shipping	None	None
	488390: Other Support Activities for Water Transportation	1	0–19
Search and Navigation Equipment	334511: Search, Detection, Navigation, Guidance, Aeronautical and Nautical System and Instrument Manufacturing	None	None
Warehousing	493110: General Warehousing and Storage	None	None
	493120: Refrigerated Warehousing and Storage	None	None
	493130: Farm Product Warehousing and Storage	1	0–19
ENOW Total		6	20–194
ENOW+	483212: Inland Water Passenger Transportation	None	None
ENOW+	484110: General Freight Trucking, Local	2	20–99
ENOW+	488510: Freight Transportation Arrangement	4	26
ENOW+	493190: Other Warehousing and Storage	None	None
ENOW+ Total		6	46–125
Marine Transportation Sector Total (ENOW and ENOW+)		12	66–319

Overall, interviewees felt the data underrepresented the marine transportation sector. A list of American Samoa port users, provided by one interviewee, notes the following private sector users:

- One cannery.
- Two stevedore companies (CBP data only capture one in NAICS 488320, but we have not updated as we do not have employment data).
- Twenty-three shipping agents.
- One bulk petroleum company.

⁶⁴ CBP presents these data in a range to protect confidential business information.

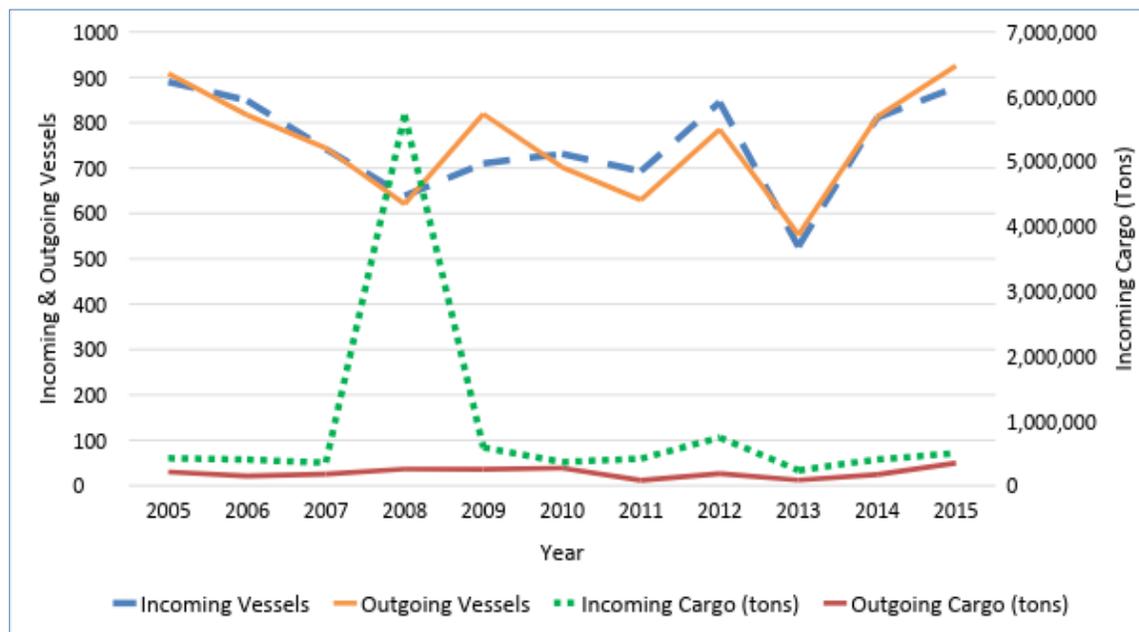
This list also identifies seven local agencies and one federal agency as regular port users. Interviewees also mentioned several freight forwarding companies that are captured by neither CBP nor *Statistical Yearbook* data. Finally, interviewees noted there are two domestic interisland ferries and one ferry that travels between American Samoa and Samoa, transporting people and goods, and these were not captured in these ENOW ocean economy marine transportation NAICS. Interviewees also identified eight to 10 shipping lines that regularly conduct business in American Samoa; however, these companies are primarily major international shipping lines (e.g., Hamburg-Sud; Maersk), so the vessel employment would not be counted as American Samoa employment in an ENOW dataset.



The M/V *Lady Naomi* travels between American Samoa and Samoa with people and light cargo.

While there is not necessarily much American Samoa employment attributed to cargo vessels, they play a key role in the economy. In 2013, this sector helped support \$388 billion in exports and \$374 billion in imports (ASDOC 2013). There are several ports and harbors in American Samoa, but the largest and busiest is Pago Pago Harbor on Tutuila. Figure 6-5 shows significant vessel traffic at Pago Pago Harbor between 2005 and 2015 (ASDOC 2016, Table 12.4).

Figure 6-5. Vessel Traffic at Pago Pago Harbor, 2005–2015



Interviewees indicated that the American Samoa Port Administration houses data that cover “just about every aspect of port operations” and may be more reliable than what is found in the *American Samoa Statistical Yearbook*. For example, Port Administration data on the number of cruise ships that called on Pago Pago in 2012 contradict the number found in the *Statistical Yearbook* for the same year (26). Interviewees could not recall anything that would explain the inordinate spike in incoming cargo tons in 2008, but it could just be a data reporting error. Additionally, interviewees shared data with the ERG team that showed that port fees, such as for electricity and potable water, generate between \$2.5 to

\$3.5 million in annual revenue.⁶⁵ These fees are not delineated specifically in the *American Samoa Statistical Yearbook*. The American Samoa Shipyard, located in Pago Pago Harbor, states on its website that the port relies heavily on cannery shipping, yet another way the cannery contributes to the ocean economy (ASSYD 2016).

Trucking

Interviewees identified the trucking industry in Guam as extremely reliant on the marine transportation sector, which prompted an analysis of the trucking industry American Samoa. Interviewees indicated that trucking in American Samoa was also reliant on moving goods from the ports, and CBP data indicate that there were two establishments captured under NAICS 484110 (General Freight Trucking, Local) that employ between 20 and 99 people.⁶⁶ This makes that industry one of the largest in the marine transportation sector in American Samoa, as it accounts for between 19 and 30 percent of the marine transportation sector employment.

6.1.4. Offshore Mineral Resources

The offshore mineral resources sector includes industries such as mineral and resources mining, gas extraction, and geophysical exploration and mapping services (NOAA OCM n.d.). In American Samoa, the CBP data and the *American Samoa Statistical Yearbook* revealed no employment for the offshore mineral resources sector. Additionally, interviewees were not aware of any offshore mineral resources activity in American Samoa, corroborating the data. Table 6-8 below shows the industries that comprise the offshore mineral resources sector.⁶⁷

Table 6-8. AS Offshore Mineral Resources Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Limestone, Sand and Gravel	212321: Construction Sand and Gravel Mining	None	None
	212322: Industrial Sand Mining	None	None
Oil and Gas Exploration and Production	211111: Crude Petroleum and Natural Gas Extraction	None	None
	211112: Natural Gas Liquid Extraction	None	None
	213111: Drilling Oil and Gas Wells	None	None
	213112: Support Activities for Oil and Gas Operations	None	None
	541360: Geophysical Exploration and Mapping Services	None	None
Total Reported Activity		None	None
Offshore Mineral Resources Sector Total (ENOW and ENOW+)		None	None

⁶⁵ Interview with AS Port Administration.

⁶⁶ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

⁶⁷ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

6.1.5. Ship and Boat Building

Ship and boat building includes primarily ship and boat manufacturing and repair activities (NOAA OCM n.d.). Table 6-9 below shows the ship and boat building sector. CBP data capture no employment in this sector.⁶⁸ There is a shipyard run by the government, but CBP data would not capture this employment. Interviewees indicated the government shipyard has about 30 full-time employees.

Table 6-9. AS Ship and Boat Building Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Boat Building and Repair	336612: Boat Building and Repair	None	None
Ship Building and Repair	336611: Ship Building and Repair	1	30 ⁶⁹
ENOW Total		None	None
Ship and Boat Building Sector Total (ENOW and ENOW+)		1	30

Interviewees, however, indicated that some local machinery businesses perform boat building and repair activities upon request. These businesses are not captured because ship and boat building is not their primary business and is therefore outside their assigned NAICS codes.

Supplementary data further support the idea that ship and boat building and repair takes place in American Samoa. Figure 6-6 shows time series data for ship parts imported to American Samoa from 2005 to 2015 (ASDOC 2016, Table 14.9). About \$25 million worth of ship parts were imported in 2015 (ASDOC 2016, Table 14.9). The data do not, however, show who is using the ship parts.

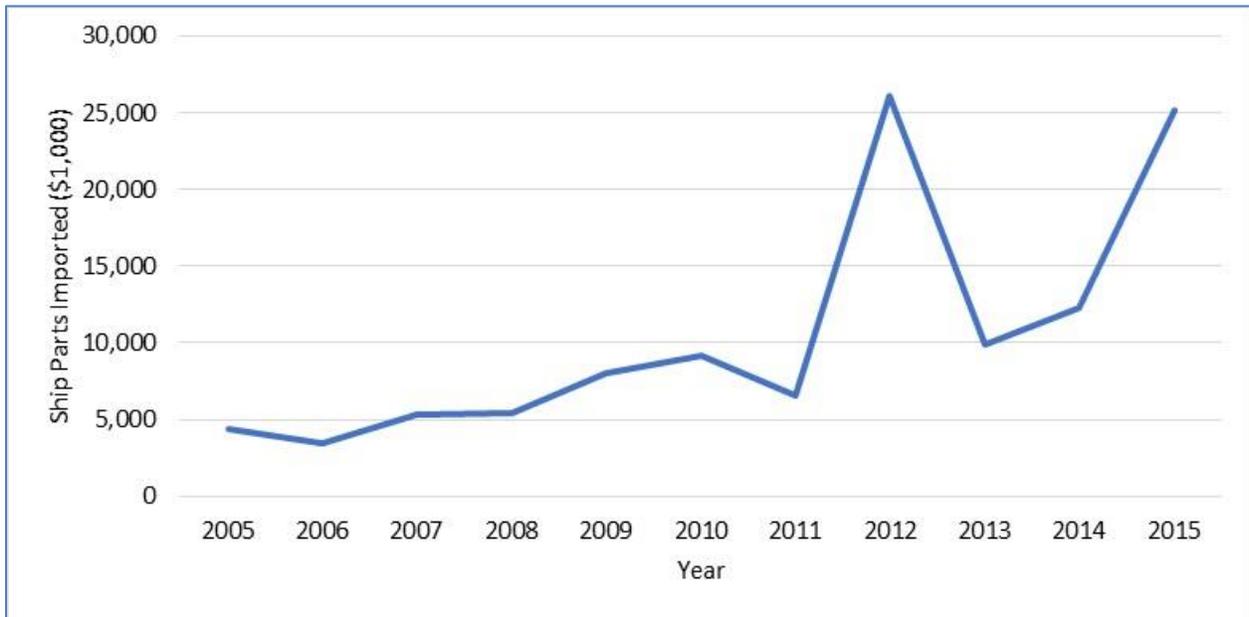


American Samoa government-run shipyard.

⁶⁸ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

⁶⁹ Employment figure (for the government-run shipyard) from American Samoa Port Administration.

Figure 6-6. AS Value of Ship Parts Imported, 2005–2015



6.1.6. Tourism and Recreation

The ENOW tourism and recreation sector is composed of many industries, ranging from boat dealers, recreational goods rental services to hotels, zoos and aquaria, and restaurants (NOAA OCM n.d.). Relative to Guam and CNMI, the contribution of tourism to American Samoa’s total economy is small. Whereas Guam typically receives more than 100,000 tourists per month, American Samoa’s tourist arrivals were around 4,650 in 2015, making up about 17 percent of American Samoa’s 27,000 total visitors (i.e., business travel, employment, in transit) in 2015 (ASDOC 2016, Table 7.2). Table 6-10 shows data for the industries that compose the tourism and recreation sector, showing about 565 to 930 employees in this sector (primarily according to CBP data⁷⁰).⁷¹ As described in more detail below, interviewees generally found the data to underrepresent the tourism and recreation sector.



Two Dollar Beach, a relatively new beach recreation site.

Table 6-10. Tourism and Recreation at a Glance

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Boat Dealers	441222: Boat Dealers	1	0–19
	722511: Full Service Restaurants	11	53

⁷⁰ 2015 CBP data, Table CB1500A14, “Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas.”

⁷¹ Other datasets were available from the World Bank’s World Tourism Organization (2018), the South Pacific Tourism Organization (SPTO 2017, 2018), and IndexMundi (n.d.).

Industry	NAICS Industry	Establishments	Paid Employees
Eating and Drinking Places	722513: Limited Service Eating Places	18	256
	722514: Cafeterias	None	None
	722515: Snack and Nonalcoholic Beverage Bars	None	None
Hotels and Lodging	721110: Hotels (except Casino Hotels) and Motels	5	123
	721191: Bed and Breakfast Inns	4 ⁷²	0–76 ⁷³
Marinas	713930: Marinas	None	None
Recreational Vehicle Parks and Campsites	721211: RV Parks and Recreational Camps	None	None
Scenic Water Tours	487210: Scenic and Sightseeing Transportation, Water	None	None
Sporting Goods	339920: Sporting and Athletic Goods Manufacturing	None	None
Amusement and Recreation Services	487990: Scenic and Sightseeing Transportation, Other	None	None
	611620: Sports and Recreation Instruction	None	None
	532292: Recreation Goods Rental	None	None
	713990: Amusement and Recreation Services Not Elsewhere Classified	None	None
Zoos and Aquaria	712130: Zoo and Botanical Gardens	None	None
	712190: Nature Parks and Other Similar Institutions	3	59 ⁷⁴
ENOW Total		42	491–586
ENOW+	448110: Men’s Clothing Stores	None	None
ENOW+	448120: Women’s Clothing Stores	2	0–19
ENOW+	448310: Jewelry Stores	1	0–19
ENOW+	448320: Luggage and Leather Goods Stores	None	None
ENOW+	481111: Scheduled Passenger Air Transportation	2	20–99
ENOW+	481211: Nonscheduled Air Passenger Chartering	None	None
ENOW+	481219: Other Non-scheduled Air Transportation	1	0–19
ENOW+	488111: Air Traffic Control	None	None
ENOW+	488119: Other Airport Operations	1	0–19
ENOW+	488190: Other Support Activities for Air Transport	None	None
ENOW+	531110: Lessors of Residential Buildings	None	None
ENOW+	531210: Offices of Real Estate Agents and Brokers	1	0–19
ENOW+	531311: Residential Property Managers	1	0–19
ENOW+	531312: Nonresidential Property Managers	None	None
ENOW+	541922: Commercial Photography	None	None

⁷² H. Hattori, pers. com. U.S. CBP data did not indicate there were any establishments under this NAICS.

⁷³ ERG developed this range per H. Hattori, pers. com. U.S. CBP data indicated there was no employment under this NAICS.

⁷⁴ Interviews and research identified one National Park employing 52 people, 1 Marine Sanctuary employing six people, and one Marine National Monument employing one person.

Industry	NAICS Industry	Establishments	Paid Employees
ENOW+	561311: Employment Placement Agencies	None	None
ENOW+	561320: Temporary Help Services	1	0–19
ENOW+	561510: Travel Agencies	5	15
ENOW+	561599: All Other Travel Arrangement Services	None	None
ENOW+	712120: Historical Sites	None	None
ENOW+	453220: Gift, Novelty, and Souvenir Stores	3	15
ENOW+	485310: Taxi Service	1	0–19
ENOW+	487110: Scenic and Sightseeing Transportation, Land	None	None
ENOW+	532111: Passenger Car Rental	5	18
ENOW+	561520: Tour Operators	4 ⁷⁵	0–19
ENOW+	721120: Casino Hotels	None	None
ENOW+	721199: All Other Traveler Accommodation	None	None
ENOW+	722410: Drinking Places, Alcoholic Beverages	3	6
ENOW+	512110: Motion Picture and Video Production	None	None
ENOW+	812199: Other Personal Care Services	1	0–19
ENOW+ Total		32	74–343
Tourism and Recreation Sector Total (ENOW and ENOW+)		74	565–929

Hotels and Motels

Interviewees identified industries they felt were not adequately represented in the table above. They noted that there are between nine and 11 hotels and motels with other short-term rental options (not five, as the table indicates); this roughly aligns with results shown on hotel booking websites, which show between three and five hotels and as many as seven bed and breakfast, inns, and motels.⁷⁶ Travel booking websites and interviews indicate there are about four bed and breakfasts/inns in American Samoa. These data were included in the table, but ERG generated a rough employment range based on interview information.

Interviewees indicated the data well underrepresents hotels and motels, noting there were between nine and 11 hotels, with other rental options.

Airbnb, VRBO, and FlipKey

In American Samoa, web searches reveal 10 properties⁷⁷ listed on Airbnb, one property on VRBO (duplicating an Airbnb property), and one property on FlipKey. These relatively low home-rental numbers align with the size and importance of tourism to the American Samoa ocean economy and total economy. These websites allow anyone (so long as they own the property) to list a bed, a room, an apartment, or an entire home to be rented. This type of economic activity is not only relatively new and largely uncaptured, but extremely difficult to characterize. At any moment, homeowners can choose whether to list their properties online: this makes determining the real number of rentals extremely difficult, as the number can fluctuate greatly from day to day. Though there may be more homes that use these websites but were not listed at the time of ERG's search, these home-rentals represent a

⁷⁵ NMSAS analyst, pers. com.

⁷⁶ TripAdvisor, Kayak, Expedia, Hotels.com.

⁷⁷ "Properties" can mean single beds, rooms, apartments/condos, or entire homes.

relatively small part of the economic activity in the tourism sector. Accordingly, this economic activity is not reflected in Table 6-10 above.

National Park

Interviewees noted that employment data from the National Park of American Samoa and its Marine Unit were absent from available data from CBP. This is likely because government employees are not included in CBP data estimates, which means that similar employment for the American Samoa EPA, DMWR, the National Marine Sanctuary of American Samoa (NMSAS), and other government-sponsored environmental organizations. The National Park should be captured under NAICS 712190 as part of the ENOW ocean economy.

The National Park of American Samoa covers more than 9,100 acres, 2,800 acres of which are coral reefs and ocean. In 2015, the park had almost 14,000 recreational visitors (in 2016 there were almost 29,000 visitors, and in 2017, there were just over 69,000 visitors) (NPS n.d.). The Park employs 16 National Park Service staff members and 36 American Conservation Experience employees (52 total).⁷⁸

National Marine Sanctuary and Marine National Monument

Like the National Park, interviewees indicated that neither the NMSAS nor the Rose Atoll Marine National Monument (MNM) were captured by CBP data under NAICS 712190. Like the National Park, this is likely the case because these institutions are staffed by the government. One interviewee indicated that about 45,000 tours of the Tauese P.F. Sunia Ocean Center have been conducted since October 2012.⁷⁹ One interviewee indicated that the NMS employed six people.⁸⁰ The Rose Atoll MNM spans about 10,156 square miles and employs one person.⁸¹

Top 10 Things to Do

Given American Samoa's relative population and visitation statistics (below), these National Park, NMS, and MNM data represent the strong possibility that significant portions of visitors and the American Samoa population are supporting these national territories. A recent visitors survey indicated that sightseeing and walking/hiking were in the top 10 things visitors wanted to do when in American Samoa—activities that both the National Park and the NMS lend themselves to (SPTO 2018). Additionally, interviewees identified one watersports rental business and one fishing charter business that are popular among visitors, but not represented by CBP data.

Cruise Ships

The *Statistical Yearbook* cites the number of incoming cruise ships to Pago Pago Harbor. Interviewees indicated that these data should be cross-checked with Port Administration numbers. For example, the Port Administration indicated that the yearbook's 26 cruise ships docking in American Samoa (as shown in Table 6-11 (ASDOC 2016, Table 12.5) in 2012 may not be accurate.

⁷⁸ Superintendent of the National Park of American Samoa, pers. com.

⁷⁹ NMSAS analyst, pers. com.

⁸⁰ American Samoa NOAA Liaison, pers. com.

⁸¹ WPFMC staff, pers. com; USFWS (2017).

Interviewees also referenced two tour companies that cater primarily to cruise ship passengers and employ aiga buses to transport passengers to select villages for sightseeing and cultural experiences. Cruise ships often bring bursts of tourism activity to the island—nearly 2,000 passengers may arrive in port with a single ship. However, many of them do not disembark at port, and the ships often only dock for part of the day, limiting the overall impact on the ocean economy.

Table 6-11. Incoming Vessel Traffic: Cruise Ships 2005–2015

Incoming Cruise Ships											
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Incoming Cruise Ships	6	6	5	8	10	8	7	26	10	21	13

Air Arrivals

In 2015, about 17 percent of all air arrivals—4,655 people—were tourists (ASDOC 2016, Table 7.2). The primary purpose of travel to American Samoa (42 percent in 2015), for each year from 2005 to 2015, has been to visit a relative (ranging from 33 percent to 45 percent of visitors) (ASDOC 2016, Table 7.2). Note that a person visiting a relative may engage in economic activities defined in the tourism and recreation sector, thus supporting this sector without explicitly traveling to American Samoa as a tourist. Table 6-12 shows a steady decline of both tourists traveling to and total arrivals in American Samoa (ASDOC 2016, Table 7.2).

17 percent of air arrivals in 2015 were tourists, while 45 percent of visitors indicated they were visiting relatives.

Table 6-12. Visitor Air Arrivals by Purpose of Travel

Year	Total Arrivals	Total Tourist Arrivals	% Arrivals that were Tourists
2005	31,395	7,027	22%
2006	33,493	7,762	23%
2007	33,237	7,521	23%
2008	33,710	7,084	21%
2009	32,292	6,474	20%
2010	29,533	6,126	21%
2011	29,036	5,682	20%
2012	28,316	5,469	19%
2013	26,247	5,130	20%
2014	27,361	4,812	18%
2015	26,895	4,655	17%

Potential for ENOW Dataset

To develop ENOW for American Samoa along the lines of how the dataset is built for the coastal states, NOAA needs annual time series data of establishment, employment, and wages at the industry level (six-digit NAICS) for the 47 industries that ENOW covers, which would then be published in the six ENOW sectors (see Table 3-1 **Error! Reference source not found.**). Preferably, self-employment data should also be available by ENOW sector as a supplement to total employment.

The local *American Samoa Statistical Yearbook* and the CBP dataset were good starting points for our investigation. The yearbook provided very useful data to understand the economy of American Samoa. It provided exact employment at the canneries, a breakdown of government employees, the total number of estimated self-employed workers, and annual employment by sector. Unfortunately, the yearbook itself did not provide employment, establishments, or wages at the six-digit NAICS level; industries were more aggregated.

The CBP dataset served as a useful starting point to understand the six ENOW sectors, providing industry-level (six-digit NAICS) data with the number of establishments. Employee data were often available at the six-digit NAICS level; however, these were often presented in large ranges. Additionally, wage data were almost entirely suppressed. The CBP dataset is also limited as government employees, self-employed workers, and agricultural workers are typically not captured.

Our research indicates the American Samoa government can be engaged to obtain provide annual time series data on establishments, employment, and possibly wages at the industry level, though several departments and offices may need to be involved. These would include the Departments of Commerce, Human Resources, Planning and Budget, and Treasury. A mixture of the options below would possibly be needed to develop an ENOW dataset.

Option 1: Work with ASDOC to capture establishment and employee data. Though it does not publish them, it appears that ASDOC has establishment and employment data by six-digit NAICS because it assigns every business a NAICS code. Furthermore, each business is required to complete an annual business license renewal form, on which it indicate its location(s) and total employees (both full- and part-time). These data could provide the foundation for an ENOW dataset. Possible limitations include:

- The lack of wage data (only establishments and employees are captured).
- The lack of self-employment data.
- Not capturing activity from the many businesses performing multiple activities and assigned NAICS outside ENOW (described further below).
- Potential error from ASDOC assigning NAICS codes on business license data.

Option 2: Use Economic Census data to inform wage estimates. Our research and interviewees did not identify any wage data by six-digit NAICS for American Samoa. Interviews indicated that the closest thing to these data comes from the Economic Census, which most recently published data in 2012. Economic Census data are typically available at the two-, three-, four-, and very occasionally five-digit NAICS level. This may be a starting point, but more information would likely be needed for more useful wage data.

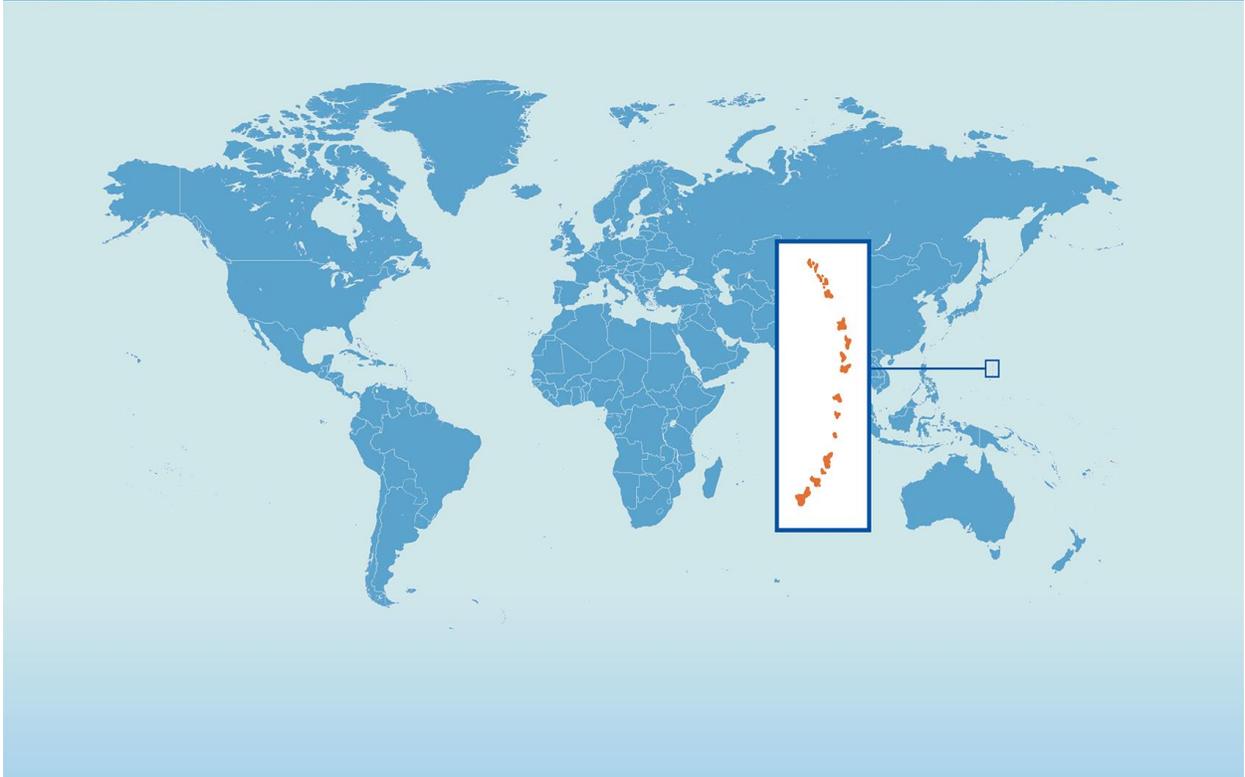
Option 3: Work with the Tax Office to crosswalk wages to NAICS: Interviewees also indicated that Tax Office data provide wage data by tax identification number; however, there appears to be no clear crosswalk between the tax identification number and the NAICS of the business, but the development of this crosswalk could allow for the development of an American Samoa ENOW dataset with wage data.

Option 4: Use a form to collect data directly from one or various offices. Our research and discussions seem to indicate that various American Samoa offices have access to establishment, employment, and

wage data (mentioned in the previous three options). One approach may be to develop a standard form for the needed information for each ENOW NAICS code and collect the information each year.



COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS



7. CNMI

Key Findings

The Northern Mariana Islands is a 14-island archipelago roughly 3,300 miles west of Hawaii (DOI OIA n.d.). There are three primary islands: Saipan is the largest (46.5 square miles) and is home to the vast majority of residents and economic activity, followed by Tinian (39.2 square miles) and Rota (32.7 square miles) (CNMI DOC CSD 2015, p. 187). CNMI is home to an estimated 50,000 people, a decrease since the 2010 Census (CNMI CSD and Levin 2016).

The ERG team conducted in-person interviews in CNMI to validate ENOW sector summaries developed for the territory using information from the U.S. Census Bureau, the Central Statistics Division Economic Indicator and Labor Force Participation reports, and several other locally kept data sources. All data in this section are for 2015 unless otherwise specified.

Our key findings from the data collection and interviews are below.

Data Availability and Potential for ENOW Dataset:

- U.S. Census CBP data and the CNMI *Statistical Yearbook* provided the best available employment and establishment data but data were regularly suppressed for wages and employment by CBP; data from the CNMI *Statistical Yearbook* were not granular enough at the industry level for ENOW development.
- Businesses are required to register with the Department of Labor and choose a six-digit NAICS when doing so, which may indicate that DOL seemingly has the ability to output establishment and possibly employment data by six-digit NAICS.⁸²
- The Business License Office assigns NAICS codes to new businesses when processing a business license application. The Business License Office might be able to provide a list of all businesses for each relevant NAICS code.⁸³
- All businesses are also required to list a local four-digit business code on their business license application and are required to have a license and separate four-digit code for varying types of business they engage in, although it does not appear businesses always list more than one code, even when they should. There could also be double-counting regarding number of employees for such businesses, if reporters are not careful to separate out their employee pools by code rather than total employment.
- Our interviews suggested that the Departments of Labor and Finance (Revenue and Tax Office) can, upon request, develop data on number of employees and wages based on the NAICS codes.
- CNMI just awarded a contract to conduct a coastal economic valuation study. It will be worth reviewing whether any outcomes of this study, when they are available, would inform ENOW dataset development.

⁸² Did not receive explicit confirmation from the CNMI DOL.

⁸³ Did not receive explicit confirmation from the Business License Office.

Total Economy

- Tourism is a driving force of the total economy in CNMI; the vast majority of tourists come from Korea and Japan.
- Interviewees revealed that both the U.S. Navy and U.S. Army call on or ship between islands in CNMI.

Ocean Economy

- **Overall:** The main island of Saipan generates most of the economic activity. Interviewees generally noted they felt CBP data underrepresented the size of the ocean economy.
- **Tourism and Recreation:** Tourism is CNMI's single largest industry and the ocean is the major tourist draw. CNMI was ranked the third-fastest-growing tourist destination in the world in 2017, according to the UN World Tourism Organization's World Tourism Barometer. In 2016, tourism arrivals grew by 37.3 percent, with 531,000 visitors in 2016 (Saipan Tribune 2017). As CNMI is a tropical island chain, the tourism and recreation sector is highly ocean-dependent. Additionally, as a major part of the tourism industry, spas/massage businesses were found in CNMI to have a location quotient of 3.82 (U.S. Census 2018b).⁸⁴
- **Living Resources:** This industry was underestimated by CBP data but also very difficult to create quantitative estimates for—the CNMI government does not require a commercial fishing license. Several sources of information can be accessed to quantify the living marine resources segment. Boat owners who use their boats for commercial fishing are supposed to register those boats as commercial fishing vessels. Micronesia Environmental Services has the names of 85 percent of all spearfishermen who sell their catch. (Spearfishermen produce nearly all the reef fish sold.) NMFS' Western Pacific Fishery Information Network and PIFSC, as well as WPFMC's annual Stock Assessment and Fishery Evaluation (SAFE) reports, provide data on the economics of CNMI commercial and charter fishing. Interviewees confirmed there was no marine aquaculture.
- **Marine Construction:** Interviewees felt CBP data underrepresent marine-related construction sector. Interviewees identified two large companies, Black Construction and GPPC that engage in dredging and sheet piling work, among other types of large marine construction projects. In addition to traditional heavy construction companies, several smaller construction companies can and do handle boat ramp construction and repair, small seawalls, etc.
- **Ship and Boat Building:** Interviewees felt CBP data, which only identified one establishment, underrepresents the ship and boat building sector. There are two companies that can handle larger vessel repairs and at least one company (Joeten) that handles engine repairs. Finally, a number of self-employed mechanics work on small boats.
- **Offshore Mineral Resources:** Offshore mineral extraction was noted as a non-contributor to CNMI's ocean economy.

⁸⁴ NAICS 812199 (Other Personal Care Services) appeared in CNMI with a frequency of .0098 or 1 percent; in the Continental United States, the frequency was .0026, or 0 percent. $(.0098 \div .0026) = 3.86$. Note that business operations, other than spas and massage businesses, exist under NAICS 812199.

Methods

Section 4 provides an overview of the approach used in all three Pacific Island territories, including information about the data search and review, statistical summary development, the objectives of the interviews, and more information about the Census CBP dataset. This section provides information specific to our approach for CNMI.

As discussed in Section 4, we used CBP data as the backbone of all the statistical summaries we developed across all three U.S. Pacific Island territories. ERG leaned heavily on Economic Indicator reports and Labor Force Surveys to supplement CBP data. These reports are published by the CNMI Central Statistics Division (CSD), part of the CNMI DOC, more regularly than many other CSD reports.

ERG did not use the CNMI *Statistical Yearbook* the same way it used the Guam and American Samoa *Statistical Yearbooks*. The CNMI *Statistical Yearbook* seems to serve a different function than the yearbooks for Guam and American Samoa: it seems to primarily display existing federally collected data, and some locally kept data, rather than to publish a wide array of locally kept data. The CNMI *Statistical Yearbook* does reference some locally kept data sources, such as the Marianas Visitors Authority, Commonwealth Health and Vital Statistics Office, the Commonwealth Ports Authority, and more. Though some of these data were recent (2014), most data ERG was interested in were less current.

Between February 23 and February 28, an ERG team member visited CNMI to interview a variety of contacts and solicit feedback on how accurately these statistical summaries portrayed the ocean economy of CNMI. This included conversations with contacts at the:

- Bureau of Environmental and Coastal Quality
 - Administrator
 - Coastal Zone Management (CZM) Program
- CNMI Department of Finance (Business License Office)
- Marianas Visitors Authority
- Angil Design, Inc.
- Saipan Chamber of Commerce
- Micronesian Islands Nature Alliance (MINA)
- Micronesian Environmental Services (MES)
- Saipan Shipping, Inc.

These discussions, which involved assessing the perceived accuracy of the statistical summaries, obtaining leads about better local data, and describing the economy qualitatively, are detailed further in Section 4.

Most of the employment and wage data in this section are CBP data. Neither the CNMI *Statistical Yearbook* nor other CSD reports provide 2015 employment at a granular enough level to supplement CBP data. The CNMI *Statistical Yearbook* technically shows sector-level, two-digit NAICS data, which seems to be derived from the 2012 Economic Census.

CNMI Total Economy

In 2016, 24,109 people were employed (CNMI CSD and Levin 2016); of those 24,109, 716 were self-employed. The unemployment rate was 13.8 percent (about 3,300 people) (CNMI CSD and Levin 2016). The GDP of CNMI in 2015 was \$922 million (BEA 2018).

Table 7-1 shows public and private establishments' employment and wage data based on data from CBP and the CNMI Central Statistical Division (which produces the CNMI *Statistical Yearbook*).

Table 7-1. CNMI Economy at a Glance

	Establishments	Employees	Annual payroll (\$1,000)	Average Employee Salary
Private Sector	1,717	16,276	\$301,267	\$18,510 ⁸⁵
Public Sector		1,609 ⁸⁶		

CBP data provide insight on the composition of CNMI's economy at the two-digit NAICS level. As mentioned above, the CNMI *Statistical Yearbook* does replicate 2012 Economic Census data, by NAICS. However, the CNMI *Statistical Yearbook* does not offer much more recent data by NAICS, as they seem to primarily rely on the Economic Census for these data (CNMI DOC CSD 2015). Table 7-2 shows the total establishments and employees by two-digit NAICS sector. As Table 7-2 shows, retail trade, administration support and waste management and remediation services, and transportation and warehousing are the largest sectors in CNMI.

Table 7-2. CNMI Industry Composition

Sector (Two-Digit NAICS)	Establishments	Paid Employees
11: Agriculture, Forestry, Fishing and Hunting	2	0–19
21: Mining, Quarrying, and Oil and Gas Extraction	1	20–99
22: Utilities	4	250–499
23: Construction	80	842
31–33: Manufacturing	48	442
42: Wholesale Trade	83	681
44–45: Retail Trade	346	2,475
48–49: Transportation and Warehousing	48	1,038
51: Information	23	409
52: Finance and Insurance	47	277
53: Real Estate, Rental, and Leasing	163	563
54: Professional, Scientific, and Technical Services	102	556
55: Management of Companies and Enterprises	5	24
56: Administrative Support and Waste Management and Remediation Services	147	1,646
61: Education Services	68	340
62: Health Care and Social Assistance	45	1,042

⁸⁵ Calculated from 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

⁸⁶ Figure provided by email exchange with CNMI official. This figure does not include federally funded government workers in CNMI.

Sector (Two-Digit NAICS)	Establishments	Paid Employees
71: Arts, Entertainment, and Recreation	53	459
72: Accommodation and Food Services	195	4,203
81: Other Services (Except Public Administration)	166	651
99: Industries Not Classified	98	217
Total Reported Activity (2015 CBP data)	1,724	16,276

CNMI Ocean Economy

Table 7-3 below provides information from the CBP data on the number of establishments and total employment in CNMI for each of the six ENOW sectors. We have added some information gleaned from informants and provide more detail later in the section. Based on these data, the ocean economy in CNMI is responsible for about 45 to 50 percent of total employment in CNMI.

Table 7-3. CNMI Ocean Economy at a Glance

ENOW Sector	ENOW Establishments	ENOW Employees	ENOW+ Establishments	ENOW+ Employees	Total Ocean Establishments	Total Ocean Employees
Living Resources	10	26–64	7	7–64	17	33–128
Marine Construction	1	0–19	22	154	23	154–173
Marine Transportation	5	100–287	13	106–200	18	206–487
Offshore Mineral Resources	1	20–99	None	None	1	20–99
Ship and Boat Building	1	20–99	None	None	1	20–99
Tourism and Recreation	231	3,462–3,544	278	2,772–3,809	509	6,234–7,353
Total	249	3,628–4,112	320	3,039–4,227	569	6,667–8,339

As noted in Section 4, CBP data have limitations that do not allow them to be used as the sole basis for estimating the territory's ocean economy. These limitations include:

- Suppressing or protecting data with wide employment ranges.
- Not capturing self-employment.
- Not capturing government employment.
- The activity of companies that do work within the ENOW sectors/industries, but for which this is not their primary business and that therefore are found under a different NAICS code.

Additionally, some economic activity that is not ocean-dependent in the coastal United States might qualify as such in an island setting. Many of those we interviewed noted that much of the territory's economy is directly or indirectly linked to the ocean. To explore these gaps further, we conducted in-person interviews in CNMI to discuss the data, explore self-employment, and identify some of these

non-ENOW ocean economy industries. Table 7-4 below summarizes notes and initial findings from in-person interviews in CNMI. Following the table are analyses of data for each of the six ENOW sectors.

Table 7-4. CNMI Summaries by Sector from In-Person Interviews

ENOW Sector	Data from In-person Interviews
Living Resources	<ul style="list-style-type: none"> • Motivations for fishing are very fluid, and many fishing trips are taken simultaneously for recreational, subsistence, and commercial purposes. Those who fish for their sole source of income are relatively few. Fishing is also influenced by season. For example, many people in the Marianas are of the Catholic faith and eat more fish during Lent. • The CNMI government does not have a commercial fishing licensing requirement. • Boat owners who use their boats for commercial fishing are supposed to register their vessel as such. • Pelagic fish are the staple. PIFSC’s Socioeconomic Program may have the best data on this from small boat surveys. • Micronesian Environmental Services conducted a study and as a result has names of 85 percent of all spearfishermen who sell their catch. About 95 percent of all reef fish sold are taken by spearfishermen. • There are several (between 10 and 20) mobile roadside fish vendors. According to interviewees, these vendors are licensed businesses and pay taxes. It is unclear under which NAICS code the CNMI Business License Office has used for mobile roadside fish vendors.
Marine Construction	<ul style="list-style-type: none"> • CBP data underrepresent this ENOW sector: interviewees reported that two large companies, Black Construction and GPPC, engage in dredging and sheet piling work, among other types of large marine construction projects. • Additionally, there are several smaller construction companies that can handle limited marine related construction, such as repairing a small boat ramp. • At least one interviewee found the “Other Heavy Construction and Civil Engineering” category confusing. In CNMI (and perhaps elsewhere) they are separate activities. Several businesses that engage in civil engineering and permitting, but not heavy construction, and vice versa. • There are about a dozen surveyor companies in CNMI, but only three shown in the ENOW+ table.
Marine Transportation	<ul style="list-style-type: none"> • The U.S. Navy ships various items, such as personnel gear and maintenance supplies, between islands; Naval ships do make port calls in Saipan. • The U.S. Army Reserve ships supplies to and from Saipan, and interisland within CNMI. • Four businesses ship interisland (typically between Saipan, Tinian, and Rota). These companies do not offer regular shipping services, however. • There are small vessels used to transport freight and people between islands for individuals/businesses. For example, GPPC Construction has a flat-bottom vessel to transport its own equipment. • The company that transports crew and supplies to the AMSEA (maritime prepositioning) ships anchored outside the Saipan Lagoon. Their vessels are based on Saipan, and this company can be chartered for interisland trips for passengers and supplies. • Four deep sea lines call on Saipan: Kyowa, Matson, American President Lines, and Marianas Express. • M/V <i>MANA</i> operates between Guam and Saipan. • M/V <i>Super Emerald</i> takes passengers interisland.

ENOW Sector	Data from In-person Interviews
	<ul style="list-style-type: none"> • Saipan Crew Boats, Inc. (a subsidiary of Cabras Marine based on Guam) will transport passengers between islands on a charter basis. • Saipan Stevedoring is the main marine cargo handling company in CNMI, though there are several freight forwarding companies that could be included under marine cargo handling.
Offshore Mineral Resources	<ul style="list-style-type: none"> • There are no offshore gravel and sand mining activities on CNMI. Larger quantities of gravel and sand come from one of several land-based quarries.
Ship and Boat Building	<ul style="list-style-type: none"> • There are few boat and ship building/repair companies in CNMI, though there is more than the one establishment captured by CBP. • There are several small machine shops that can undertake small boat repairs. • Joeten, Inc., handles boat engine repair. • Seafix and Pacific Marine Enterprises are the only two companies capable of conducting major boat repairs in CNMI. • At least one repair shop can address fiberglass hull repair needs: Pikasso.
Tourism and Recreation	<ul style="list-style-type: none"> • Tourists are mainly from China, Korea, and Japan. • One interviewee estimates that for 80 percent of tourists, the primary reason to come to CNMI is to enjoy beaches, coral reefs, warm water, and ocean sports. • The number of Airbnb establishments has increased dramatically in recent years. • Saipan has a handful of established photographers, but in recent years there has been a large increase in those advertising wedding photography services via social media (e.g., Facebook). • Saipan has a handful of established taxi companies, but in recent years there appears to be an increase in illegal or unregulated livery services. • Several companies engage in both water- and land-based sightseeing/tours. • There are no boat dealers in CNMI. A resident wishing to purchase a new boat might be able to work with a local company to order and ship one, but more often they will purchase the boat from an off-island dealer or independent seller and arrange for third-party shipping. • Interviewees suggested there are likely more than 22 car rental operations, though most are very small, with under 10 cars. • At least one interviewee indicated that the number of sports and recreation instruction companies in the data seems higher than currently in operation. • There was a zoo before a recent typhoon.

7.1.1. Living Resources

The living resources sector generally includes fishing, seafood processing, and fish and seafood markets. Most interviewees indicated that the available data seem to underrepresent the true extent of the living resources sector in CNMI. Table 7-5 below shows CBP CNMI *Statistical Yearbook* data for the living resources sector in CNMI.

There is no licensure requirement to fish commercially in CNMI.

Table 7-5. CNMI Living Resources Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Fish Hatcheries and Aquaculture	112511: Finfish Farming and Fish Hatcheries	None	None
	112512: Shellfish Farming	None	None

Industry	NAICS Industry	Establishments	Paid Employees
	112519: Other Aquaculture	None	None
Fishing	114111: Finfish Fishing	1	0–19
	114112: Shellfish Fishing	None	None
	114119: Other Marine Fishing	None	None
	311710: Seafood Product Preparation and Packaging	1	0–19
Seafood Markets	445220: Fish and Seafood Markets	8 ⁸⁷	26 ⁸⁸
ENOW Total		10	26-64
ENOW+	424460: Fish and Seafood Merchant Wholesalers	2	0–19
ENOW+	813312: Environment and Conservation Organizations	1	0–19
ENOW+	924120: Administration of Conservation Programs	None	None
ENOW+	445210: Meat Markets	1	0–19
ENOW+	541620: Environmental Consulting Services	3	7
ENOW+ Total		7	7-64
Living Resources Sector Total (ENOW and ENOW+)		17	33-128

Fishing

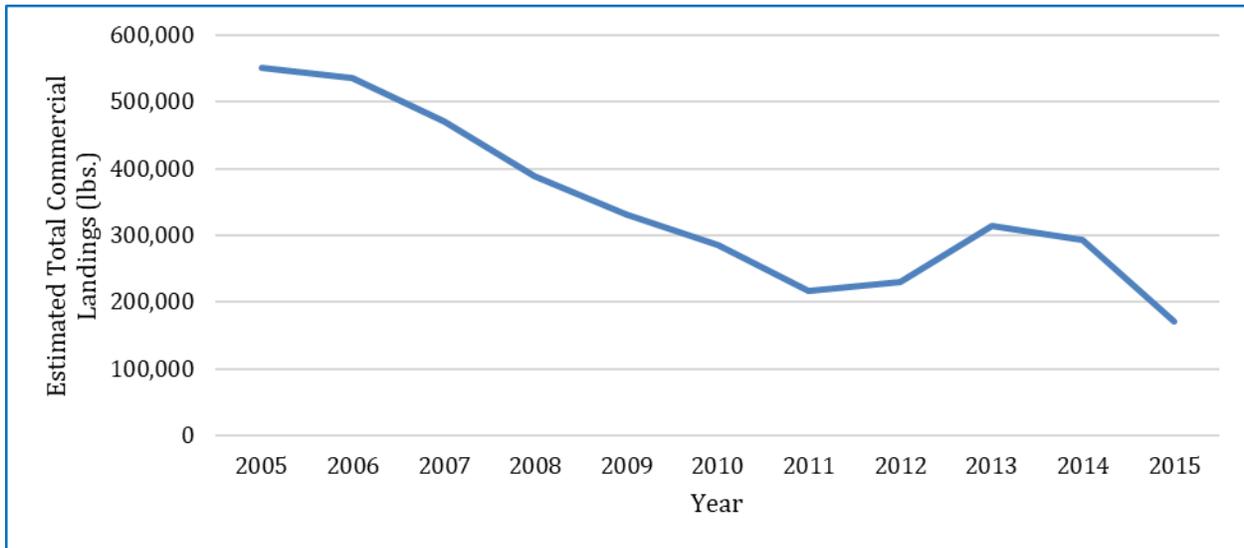
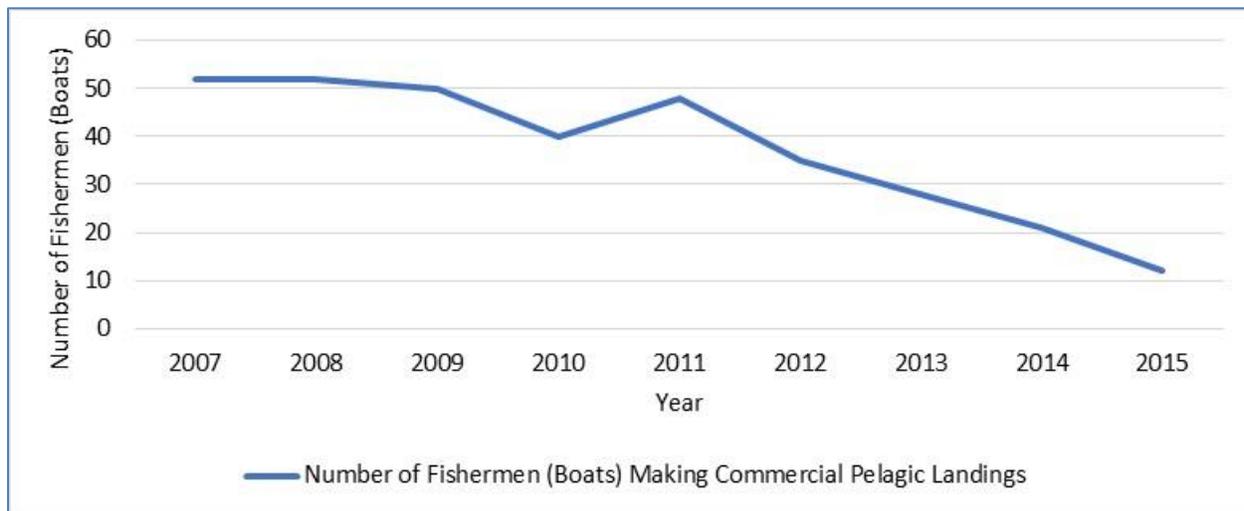
Interviewees indicated that CBP data underestimated the number of fishermen. Quantifying the number of commercial fishermen in CNMI is difficult because a license is not necessary to sell fish in CNMI, and CBP data do not capture the number of self-employed. Motivations for fishing are very fluid in the islands. Many fishing trips are taken simultaneously for recreational, subsistence, and commercial purposes. Relatively few people fish as a sole source of income and would be legally considered commercial. This is likely why most interviewees felt that relying on the CPB data underrepresents the living resources sector in CNMI regarding fishing. Figure 7-1 and Figure 7-2 below show the total estimated commercial landings and the number of fishermen (boats) and trips, respectively (NOAA NMFS 2016c, CNMI). Figure 7-2 shows just over 10 fishermen employed in 2015.



There are no license requirements to fish in CNMI.

⁸⁷ Sabater (2018).

⁸⁸ Sabater (2018) did not collect employment data; this is 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

Figure 7-1. Estimated Total Commercial Landings, 2005–2015**Figure 7-2. Number of Fishermen (Boats)**

Fish Markets and Selling One's Catch

Interviewees also found that CBP data underestimated the number of fish markets and fish market employees. CNMI does not require a commercial marine license to harvest fish, nor does it stipulate that an individual or business must have a special license to sell fish. Interviewees also felt that the CBP data underrepresent fish and seafood markets. One informant indicated that there are between seven and nine true fish markets on Saipan. This is in line with information from WPFMC. The Council has recently conducted a seafood vendor project on Saipan working with local fish markets to capture information about this sector. The project identified eight or nine fish-centric markets. This information, as well as information gleaned from our data trip to Saipan, necessitates an upward



A small fish market in the village of Garapan, on Saipan, CNMI.

revision of the CBP data, which indicate only three establishments classified under NAICS 445220 (Fish and Seafood Markets). In addition, “bush stores” around the island sell a variety of consumer good and foodstuffs, including locally caught fish. Though a vast majority of these sell fish, it is likely that none of them are classified under NAICS 445220, because selling fish is not their *primary* means of business, even if they rely on it.

7.1.2. Marine Construction

The marine-related construction sector is composed of heavy and civil engineering construction services, which include activities such as designing and constructing piers, seawalls, boat ramps, and dredging. Interviewees felt that the available data underrepresented this sector. Table 7-6 indicates that there is are 23 establishments in CNMI across ENOW and ENOW+ industries, employing between 154 and 173 people.

Two large marine construction companies, and many smaller companies, engage in limited marine-related construction work.

Table 7-6. CNMI Marine Construction Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Marine Related Construction	237990: Other Heavy and Civil Engineering Construction	1	0–19
ENOW Total		1	0–19
ENOW+	236220: Commercial and Institutional Building Construction	8	89
ENOW+	541330: Engineering Services	11	49
ENOW+	541370: Other Surveying and Mapping Services	3	16
ENOW+ Total		22	154
Marine Construction Sector Total (ENOW and ENOW+)		23	154–173

Interviewees indicated that there is a significant deal of marine-related construction by companies outside NAICS 237990. They explained that there are two large construction companies, as well as a number of smaller companies that engage in marine-related construction projects. The two larger companies, Black Construction and GCCP, are equipped to handle more extensive projects—such as piers, shoreline armoring, docks, and wharfs—while the smaller companies can build or repair small boat ramps, small seawalls, and minor repairs to shoreline armoring. Several of these smaller companies are likely part of NAICS 236220 (Commercial and Institutional Building Construction), which is why it was included as an ENOW+ industry in the table above. In CNMI, eight establishments employing 89 people are captured under NAICS 236220. Though it is unlikely that all of the activity generated under NAICS 236220 is marine-related construction, our findings, combined with our experience in American Samoa, indicate that some of this activity may in fact be marine-related.

In 2015, a total of 212 building permits were issued in CNMI, including 11 government permits, 107 residential permits, and 94 commercial permits (CNMI DOC CSD 2016). These data indicate a significant amount of construction activity in CNMI.

7.1.3. Marine Transportation

The marine transportation sector includes many sub-industries, such as deep-sea freight and marine passenger transportation, farm product warehousing, and search and navigation equipment. Interviewees felt that the data shown in Table 7-7 dramatically underrepresent this sector.

Table 7-7. CNMI Marine Transportation Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Deep Sea Freight	483111: Deep Sea Freight Transportation	1	0–19
	483113: Coastal and Great Lakes Freight Transportation	None	None
Marine Passenger Transportation	483112: Deep Sea Passenger Transportation	None	None
	483114: Coastal and Great Lakes Passenger Transportation	None	None
Marine Transportation Services	488310: Port and Harbor Operations	None	None
	488320: Marine Cargo Handling	2	100–249
	488330: Navigational Services to Shipping	None	None
	488390: Other Support Activities for Water Transportation	None	None
Search and Navigation Equipment	334511: Search, Detection, Navigation, Guidance, Aeronautical and Nautical System and Instrument Manufacturing	None	None
Warehousing	493110: General Warehousing and Storage	2	0–19
	493120: Refrigerated Warehousing and Storage	None	None
	493130: Farm Product Warehousing and Storage	None	None
ENOW Total		5	100–287
ENOW+	483212: Inland Water Passenger Transportation	4 ⁸⁹	15–30 ⁹⁰
ENOW+	484110: General Freight Trucking, Local	2	20–99
ENOW+	488510: Freight Transportation Arrangement	7	71
ENOW+	493190: Other Warehousing and Storage	None	None
ENOW+ Total		13	106–200
Marine Transportation Sector Total (ENOW and ENOW+)		18	206–487

CBP data reveal 18 establishments that employ between 206 and 487 people. One possible reason interviewees felt so strongly that this sector was underrepresented is that several of the companies engaged in marine transportation may not have CNMI business licenses and therefore would not be picked up in a CBP data search. It is also likely that some companies engaged in marine-related cargo handling and interisland passenger and freight transportation are not classified under those activities' NAICS codes. In terms of freight and passenger transportation, there are four deep sea lines that call on Saipan. At least three companies are currently available on a charter



CNMI is a large transshipment point from the Pacific to the continental United States and Asia.

⁸⁹ Interviewees identified four interisland passenger transportation companies.

⁹⁰ ERG estimate.



This shipping company is the only line that is operated out of CNMI.

basis to carry interisland freight and at least two companies are available on a charter basis to carry passengers interisland. Saipan Stevedoring is the primary marine cargo handling outfit, though interviewees reported that several local freight forwarding companies (e.g., Triple B Freight Forwarders) could be considered marine cargo handlers. Similarly, Saipan Stevedoring is the only company that interviewees could readily name in terms of marine-related general warehouse storage, but there upwards of 10 wholesale/distribution companies on island are involved in the warehousing of goods that arrive on cargo ships (but have not

been added to Table 7-7 because we do not have employment information).

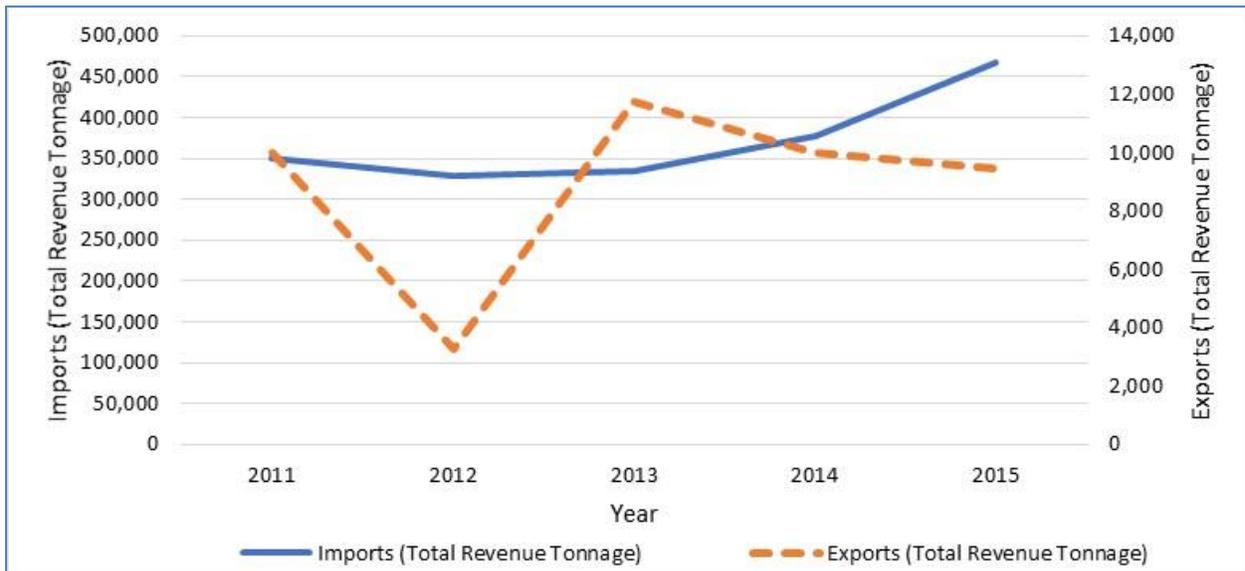
Imports and Exports

Figure 7-3 below shows total imports to and exports from CNMI between 2011 and 2015 (CNMI DOC CSD 2016, Tables 11 and 12). The data originate from the Port of Saipan (Commonwealth Ports Authority), indicating that they are for incoming and outgoing shipments, and do not include imports and exports via air. Though interviewees felt the data for this sector underrepresent the activity, these data provide a different indicator for the importance of the marine transportation industry to the CNMI economy.



The Port of Saipan handles a high volume of imports for this isolated territory.

Figure 7-3. CNMI Imports and Exports



Trucking

Interviewees identified the trucking industry in Guam as extremely reliant on the marine transportation sector, which prompted an analysis of CNMI's trucking industry. Interviewees indicated that trucking in CNMI was also reliant on moving goods from the ports, and CBP data indicate that there were two establishments captured under NAICS 484110 (General Freight Trucking, Local) that employ between 20 and 99 people.⁹¹ This makes local general freight trucking one of the largest industries in the marine transportation sector in CNMI, as it accounts for between 10 and 20 percent of the marine transportation sector employment.

7.1.4. Offshore Mineral Resources

The ENOW offshore mineral resources sector includes industries such as mineral and resources mining, gas extraction, and geophysical exploration and mapping services. Interviewees were not aware of any oil, gas, or other precious materials extraction in CNMI waters or the adjacent Exclusive Economic Zone. Table 7-8 reveals one construction sand and/or gravel business that employs between 20 and 99 people (NAICS 212321). Interviewees indicated that this is likely a land-based quarry.

Table 7-8. CNMI Offshore Mineral Resources Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Limestone, Sand and Gravel	212321: Construction Sand and Gravel Mining	1	20–99
	212322: Industrial Sand Mining	None	None
Oil and Gas Exploration and Production	211111: Crude Petroleum and Natural Gas Extraction	None	None
	211112: Natural Gas Liquid Extraction	None	None
	213111: Drilling Oil and Gas Wells	None	None
	213112: Support Activities for Oil and Gas Operations	None	None
	541360: Geophysical Exploration and Mapping Services	None	None
ENOW Total		1	20-99
Offshore Mineral Resources Sector Total (ENOW and ENOW+)		1	20-99

7.1.5. Ship and Boat Building

Several interviewees felt that CBP data underrepresent this ENOW sector. Ship and boat building primarily covers ship and boat manufacturing and repair activities. Table 7-9 below shows that CBP data suggest that just one business in CNMI is engaged in ship and boat building and repair, employing between 20 and 99 people. Interviewees reported that there are no operations that can build a ship or larger vessel in CNMI, but there are a couple of machine shops that might be able to build a small boat. Interviewees also reported that there are two shops, Seafix and Pacific Marine Enterprises, that



With both the quantity of and reliance on boats, it is unlikely that CNMI has only one boat/ship building and repair operation.

⁹¹ 2015 CBP data, Table CB1500A14, "Geography Area Series: County Business Patterns for Puerto Rico and the Island Areas."

can repair larger vessels (but not large ocean-going ships) and that there are several machine shops that can probably repair small metal and fiberglass boats. However, this is not the main line of business for these shops (and we have not added them to Table 7-9 or Table 7-7).

Table 7-9. CNMI Ship and Boat Building Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Boat Building and Repair	336612: Boat Building and Repair	None	None
Ship Building and Repair	336611: Ship Building and Repair	1	20–99
ENOW Total		1	20–99
Ship and Boat Building Sector Total (ENOW and ENOW+)		1	20–99

7.1.6. Tourism and Recreation

The tourism and recreation sector is composed of many industries, including boat dealers, recreational goods rental services, hotels, zoos and aquaria, and restaurants. The data shown in Table 7-10 suggest that in CNMI, tourism and recreation accounts for about 90 percent of CNMI’s ocean economy employment, and between 40 and 50 percent of CNMI’s total employment.⁹² Following the demise of the garment industry (Saipan was home to 34 garment factories, the last of which closed in 2012), tourism has emerged as CNMI’s most important industry. Overall, it was the most challenging ENOW sector to examine, for several reasons. It proved difficult for only a handful of interviewees to understand the entirety of the sector, especially as it tends to be the least static of any of the ENOW sectors. Interviewees’ main concerns with the numbers presented in Table 7-10 are follows:

- Boat dealers: interviewees could not identify a boat dealer in CNMI.
- Bed and breakfast Inns: in addition to a recent increase in Airbnb accommodations, interviewees felt there is more than one traditional-style bed and breakfast inn in CNMI.
- Marinas: there are two public marinas on Saipan, and no private marina (but we have not modified Table 7-10 as we do not have corresponding employment data).
- Sports and recreation Instruction: several interviewees felt the CBP number was too high.



A tour bus from one of the many tour operations in CNMI.



The Marianas Visitors Authority provides prospective visitors with information on hotels, activities, and places to go in CNMI.

⁹² Other datasets were available from the World Bank’s World Tourism Organization (2018), the South Pacific Tourism Organization (SPTO 2017, 2018), and IndexMundi (n.d.).

Table 7-10. CNMI Tourism and Recreation Employment

Industry	NAICS Industry	Establishments	Paid Employees
ENOW			
Boat Dealers	441222: Boat Dealers	1	0–19
Eating and Drinking Places	722511: Full Service Restaurants	82	790
	722513: Limited Service Eating Places	25	155
	722514: Cafeterias	2	0–19
	722515: Snack and Nonalcoholic Beverage Bars	16	129
Hotels and Lodging	721110: Hotels (except Casino Hotels) and Motels	32	2,054
	721191: Bed and Breakfast Inns	1	0–19
Marinas	713930: Marinas	1	0–19
Recreational Vehicle Parks and Campsites	721211: RV Parks and Recreational Camps	None	None
Scenic Water Tours	487210: Scenic and Sightseeing Transportation, Water	7	77
Sporting Goods	339920: Sporting and Athletic Goods Manufacturing	None	None
Amusement and Recreation Services	487990: Scenic and Sightseeing Transportation, Other	None	None
	611620: Sports and Recreation Instruction	41	122
	532292: Recreation Goods Rental	3	21
	713990: Amusement and Recreation Services Not Elsewhere Classified	17	105
Zoos and Aquaria	712130: Zoo and Botanical Gardens	None	None
	712190: Nature Parks and Other Similar Institutions	3	9–15 ⁹³
ENOW Total		231	3,462–3,544
ENOW+	448110: Men’s Clothing Stores	1	0–19
ENOW+	448120: Women’s Clothing Stores	13	48
ENOW+	448310: Jewelry Stores	7	38
ENOW+	448320: Luggage and Leather Goods Stores	2	20–99
ENOW+	481111: Scheduled Passenger Air Transportation	2	0–19
ENOW+	481211: Nonscheduled Air Passenger Chartering	2	100–249
ENOW+	481219: Other Nonscheduled Air Transportation	1	0–19
ENOW+	488111: Air Traffic Control	None	None
ENOW+	488119: Other Airport Operations	5	414
ENOW+	488190: Other Support Activities for Air Transport	1	0–19
ENOW+	531110: Lessors of Residential Buildings	61	213
ENOW+	531210: Offices of Real Estate Agents and Brokers	4	9
ENOW+	531311: Residential Property Managers	9	30
ENOW+	531312: Nonresidential Property Managers	2	0–19
ENOW+	541922: Commercial Photography	1	0–19
ENOW+	561311: Employment Placement Agencies	1	0–19
ENOW+	561320: Temporary Help Services	4	53
ENOW+	561510: Travel Agencies	23	123
ENOW+	561599: All Other Travel Arrangement Services	1	20–99

⁹³ Email exchanges and research identified one MPA employing one person, one National Park employing between nine and 10 people (excluding leadership who live off CNMI), and one Marine National Monument (trench) employing between one and three people.

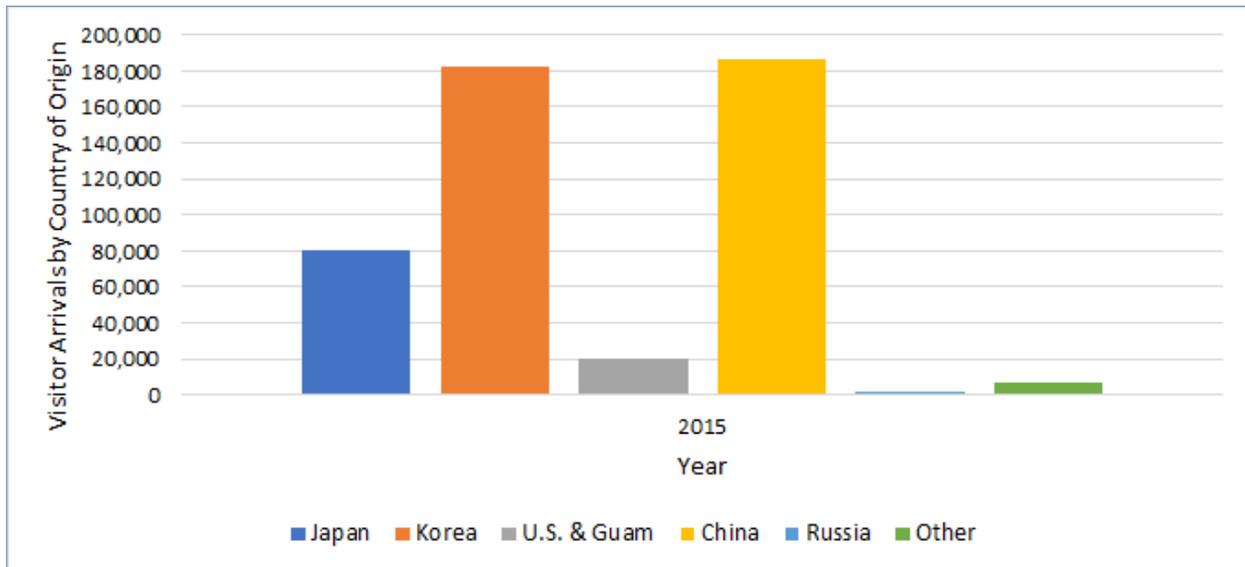
Industry	NAICS Industry	Establishments	Paid Employees
ENOW+	712120: Historical Sites	None	None
ENOW+	453220: Gift, Novelty, and Souvenir Stores	23	359
ENOW+	485310: Taxi Service	4	2
ENOW+	487110: Scenic and Sightseeing Transportation, Land	1	20–99
ENOW+	532111: Passenger Car Rental	22	90
ENOW+	561520: Tour Operators	48	475
ENOW+	721120: Casino Hotels	1	500–999
ENOW+	721199: All Other Traveler Accommodation	None	None
ENOW+	722410: Drinking Places, Alcoholic Beverages	21	138
ENOW+	512110: Motion Picture and Video Production	2	0–19
ENOW+	812199: Other Personal Care Services	16	120
ENOW+ Total		278	2,772–3,809
Tourism and Recreation Sector Total (ENOW and ENOW+)		509	6,234–7,353

Tourism has been growing rather rapidly in CNMI, especially from Korea and China.

Figure 7-4 below shows total visitor arrivals by major market area and underscores the importance of tourism to the CNMI total economy (CNMI DOC CSD 2016, Tables 4 and 4a). Interviewees were shown a time series of data that showed Chinese arrivals increasing by 130,000 and Korean arrivals increasing by 75,000 from 2011 to 2015; they agreed with the general upward trend of Chinese and Korean tourists to CNMI, as well as the total arrival data for 2015.



CNMI's beautiful beaches are a major draw for its tourism market.

Figure 7-4. Visitor Arrivals by Major Market Area

Airbnb, VRBO, and FlipKey

ERG conducted web searches that identified over 300 properties⁹⁴ listed for rent on Airbnb, two properties on VRBO, and nine properties on FlipKey in CNMI. Interviewees indicated that CNMI has seen a significant increase in the number of online marketplace and hospitality services, such as Airbnb, which prompted ERG's search. These websites allow anyone (so long as they own the property) to list a bed, a room, an apartment, or an entire home to be rented. This type of economic activity is not only relatively new and largely uncaptured, but extremely difficult to characterize. At any moment, homeowners can choose whether to list their properties or not: this makes determining the real number of rentals difficult, as it can fluctuate greatly between any two searches.

It is likely that visitors who rent any of these 300-plus properties are captured in visitor arrival statistics. What is not captured is how reliant the homeowner is on the income they might make from using their home as a business.

American Memorial Park (National Park)

Interviewees noted that CNMI's one National Park, the American National Park, was absent from available data. This is likely because CBP data estimates do not include government employees, and the park is a government entity. The National Park should have been captured under NAICS 712190 as part of the ENOW ocean economy.

⁹⁴ "Properties" can mean single beds, rooms, apartments/condos, or entire homes.

American Memorial Park has about 130 acres of beaches, boat marinas, and walking and picnic areas. It also contains 30 acres of protected wetlands (NPS 2018).

Marianas Trench Marine National Monument and Marine Protected Areas

Interviewees indicated that CBP data captured neither the Marianas Trench Marine National Monument nor the local MPAs. As with American National Park, this is because they are government entities. The Marianas Trench Marine National Monument is over 95,000 square miles of ocean, and its preservation is a contributor to the ocean economy (NOAA PIFSC n.d.). Of CNMI's six MPAs (DLNR DFW 2016), five strictly prohibit fishing of any kind, and one has a severe species restriction (DLNR DFW 2016). Both of these marine-based sanctuaries generate some ocean-dependent employment and, to some extent, attract tourists. The Managaha MPA, often referred to as the "jewel of the Marianas," is a leading tourist attraction in CNMI (MVA 2012). Though the Managaha MPA is relatively small, at less than one-third of a square mile (CRI NMI n.d.), it attracted over 340,000 visitors in 2015, generating over \$1.7 million in revenue (CNMI DPL 2017).

Spas

We added NAICS 812199 (Other Personal Care Services) as an ENOW+ industry because interviewees revealed the extensive use of spas and massages by tourists in CNMI. The location quotient for this NAICS is 3.86, showing that these businesses are much more densely found in CNMI than the rest of the United States. Interviewees indicated that these spas were entirely dependent on tourism, as the relatively low prices make this a desirable experience for tourists.

Potential for ENOW Dataset

To develop ENOW for CNMI along the lines of how the dataset is built for the coastal states, NOAA needs annual time series data of establishment, employment, and wages at the industry level (six-digit NAICS) for the 47 industries that ENOW covers, which would then be published in the six ENOW sectors (see **Error! Reference source not found.**). Preferably, self-employment data should also be available by ENOW sector as a supplement to total employment.

The CBP dataset was a good starting point for our investigation to understand the six ENOW sectors, providing industry-level (six-digit NAICS) data with the number of establishments. Employee data were often available at the six-digit NAICS level; however, these were often presented in large ranges. Additionally, wage data were almost entirely suppressed. The CBP dataset is also limited as government employees are not counted, self-employed are not included, and agricultural workers are typically not captured.

Our research or interviewees could not identify publicly available datasets that could be the source of ENOW data. Based on our research and conversations, CNMI lacks any publicly available datasets that could be translated into ENOW employment, establishments, or wages.

Several agencies may be collecting data that could be used together to create an ENOW dataset. Our research indicates that the CNMI government could likely provide annual time series data at the six-digit NAICS level, though these data are not publicly available. This could require coordination with multiple

organizations/agencies to get data for establishments, employees, and wages. Thus, a combination of the options below may be needed to develop a full ENOW set.

Option 1: Work with the CNMI Department of Labor to attain establishment and possibly employment data. Businesses are required to register with the Department; when doing so, they must list their six-digit NAICS (CNMI DOL n.d.). Therefore, the Department may have a database of numbers of businesses by six-digit NAICS—and possibly accompanying employment figures, as the form also asks for number of employees.

Option 2: Work with the Revenue and Tax Office to attain wage data. Our interviews suggested that the Revenue and Tax Office (part of the Department of Finance) can, upon request, develop data on the number of employees and wages based on the NAICS codes. (These data are not publicly available.)

Option 3: Work with CNMI’s Business License Office to get establishment data. Our research indicates the Business License Office assigns NAICS codes to new businesses when processing a business license application. The Business License Office could potentially provide a list of all businesses for each relevant NAICS code.⁹⁵ It would also not include self-employment data.

Option 4: Provide a form to one or various offices to collect data from them directly. Our research and discussions seem to indicate that various CNMI branches have access to establishment, employment, and wage data, and generally this seems to be available at the six-digit NAICS level or a local four-digit code, which could be crosswalked. One approach may be to develop a standard form for what information is needed for each ENOW NAICS code to collect the information on an annual basis.

⁹⁵ Did not receive explicit confirmation from the Business License Office.

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