



**Describing the Ocean Economies
of the U.S. Virgin Islands
and Puerto Rico**

Submitted to:

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Acronyms

Abt	Abt Associates
ACS	American Community Survey
ADR	average daily rate
BCSC	Bateman Civil Survey Company
BEA	Bureau of Economic Analysis
BER	Bureau of Economic Research
BLS	Bureau of Labor Statistics
BREA	Business Research and Economic Advisors
CENSUS	U.S. Census Bureau
CROP	Caribbean Regional Ocean Partnership
CZM	Coastal Zone Management
DLCA	Department of Licensing and Consumer Affairs
DNER	Department of Natural & Environmental Resources
DPNR	Department of Planning and Natural Resources
ENOW	Economics: National Ocean Watch
FCCA	Florida Caribbean Cruise Association
GDP	gross domestic product
HTA	Hotel and Tourism Association
MTA	Marine Transportation Authority
NAICS	North American Industrial Classification System
NES	Non-Employer Statistics
NOAA	National Oceanic and Atmospheric Association
NPS	National Park Service
OCM	Office of Coastal Management
PRHTA	Puerto Rico Hotel & Tourism Association
PRPA	Puerto Rico Ports Authority
PRPB	Puerto Rico Planning Board
PRSA	Puerto Rico Shipping Association
PRTC	Puerto Rico Tourism Company
PUMS	Public Use Microdata Sample
QCEW	Quarterly Census of Employment and Wages
RV	recreational vehicle
SFSC	Southeast Fisheries Science Center
SIC	Standard Industrial Classification
USVI	U.S. Virgin Islands
UVI	University of the Virgin Islands
VIPA	Virgin Islands Port Authority
VRBO	Vacation Rental By Owner
WICO	West Indian Company Limited
WTTC	World Travel and Tourism Council

1. Introduction

This report provides a summary of key findings and recommendations from the National Oceanic and Atmospheric Association (NOAA) Office of Coastal Management (OCM) project, *Describing the Ocean Economies of the U.S. Virgin Islands and Puerto Rico* (Task Order EA-133C-14-BA-0039/C-003).

1.1 Background and Objectives

NOAA's OCM maintains the Economics: National Ocean Watch (ENOW) dataset, which provides time-series data for six economic sectors within the United States that are dependent on the oceans and the Great Lakes. Based on data from the Bureau of Labor Statistics (BLS), the U.S. Census Bureau (Census), and the Bureau of Economic Analysis (BEA), ENOW data makes it possible to better understand the degree to which state, regional, and national economies rely on the oceans and the Great Lakes. This allows policymakers and government agencies to make more informed decisions about the management, protection, and use of these resources.

The ENOW dataset currently covers the 30 coastal states within the United States; it does not provide information for the Territories of the United States, including the U.S. Virgin Islands (USVI), Puerto Rico, Guam, American Samoa, and the Northern Marianas Islands. Recognizing the high level of ocean-dependency in these areas, OCM recently developed a summary of BLS Quarterly Census of Employment and Wages (QCEW) data for ocean-dependent sectors in the USVI and Puerto Rico, using the same ENOW classification scheme that it uses to assess the ocean-dependency of coastal areas on the U.S. mainland.¹ However, given their unique nature as islands, the USVI and Puerto Rico are more reliant on ocean-related activity than most U.S. states. Thus, OCM may need to expand the traditional ENOW framework in order to fully capture ocean-dependent activity in these territories.

The USVI and Puerto Rico also have a large number of small, independently owned businesses and a relatively high level of informal economic activity, which is not reflected in the QCEW data. When developing ENOW data for coastal states, OCM uses Census Non-Employer Statistics (NES) to capture self-employment activity; however, this data is not available for U.S. territories. In addition, BEA does not develop gross domestic product (GDP) data for U.S. territories at a level of detail that will allow OCM to develop estimates of the ocean economy's GDP.

For these reasons, OCM retained Abt Associates (Abt), Advantage Business Consulting, and Dr. Charles Colgan with the Middlebury Institute of International Studies Center for the Blue Economy (the project team) to gain a better understanding of the true ocean-dependency of the economies of the USVI and Puerto Rico, and to assess the applicability of the ENOW methodology for these locations. This research involved conducting in-person meetings to obtain input from local stakeholders and analyzing local data and information to meet the following objectives:

1. OCM's BLS summary data includes information on total establishments, employment, and wages within ENOW-defined economic sectors.

- Assess the accuracy and completeness of the OCM's QCEW summary data for ENOW ocean-dependent sectors in the USVI and Puerto Rico
- Describe the ocean-dependent activities and sectors that are not captured in the QCEW data
- Make recommendations for developing a more complete characterization of USVI and Puerto Rico's economic dependency on the ocean.

1.2 Report Organization

The remainder of this report describes the general methodology and results of our research, as follows:

- Section 2 provides an overview of our general methods, including the organizations the project team met with in the USVI and Puerto Rico
- Section 3 briefly describes the methodology that OCM uses to develop the ENOW dataset for coastal counties on the U.S. mainland
- Section 4 presents the findings of this research for the USVI, including an analysis of the QCEW summary data that OCM developed for the territory, as well as a more complete description of ocean-dependent activities based on findings from in-person meetings and analysis of local data sources
- Section 5 presents the findings of this research for Puerto Rico
- Section 6 provides a summary of overall findings, and the project team's recommendations for how OCM can develop a more complete characterization of the ocean-dependency of the local economies of the USVI and Puerto Rico.

2. Methods and In-Person Meetings

Members of the project team met with representatives from 22 organizations in Puerto Rico and the USVI in November and December of 2015. To identify candidate in-person meeting participants, we spoke with several individuals with extensive knowledge of local economic conditions, including Puerto Rico-based project team members from Advantage Business Consulting, as well as individuals familiar with specific ocean-dependent sectors. We also analyzed OCM's QCEW summary data for the two territories, and the QCEW data for all North American Industrial Classification System (NAICS) industries in the USVI and Puerto Rico.² This helped us to identify high-priority, ocean-dependent sectors (including ENOW and non-ENOW sectors) and sectors that seemed particularly under-represented in OCM's QCEW summary data.

Based on this initial research, we selected 8 to 10 organizations to meet with in both the USVI and Puerto Rico. In several cases, we met with more than one individual from an organization. Exhibit 2.1 presents our final list of meeting participants; Appendix A provides additional details, including the individuals we met with, and our interview schedule.

Exhibit 2.1. USVI and Puerto Rico meeting participants

USVI	Puerto Rico
Gold Coast Yachts, St. Croix	Puerto Rico Department of Natural & Environmental Resources (DNER)
Independent commercial fisherman, St. Croix	Puerto Rico DNER (Mayagüez)
St. Thomas Diving Club	Puerto Rico Hotel & Tourism Association (PRHTA)
USVI Bureau of Economic Research (BER)	Puerto Rico Maritime Authority, Department of Transportation
USVI Charter Yacht League	Puerto Rico Ports Authority (PRPA)
USVI Department of Natural Resources, Coastal Zone Management (CZM) Division	Puerto Rico Shipping Association (PRSA)
USVI Department of Natural Resources, Fish and Wildlife Division	Puerto Rico Tourism Company (PRTC)
USVI Department of Tourism	Tourism Association of Rincón
USVI Game Fishing Club	"Villa del Ojo," Commercial Fishery (Aguadilla)
USVI Hotel and Tourism Association (HTA)	
USVI National Park Service (NPS)	
USVI Port Authority	
West Indian Company Limited (WICO)	

Prior to each meeting, we provided background materials to the participants, including an overview of the project's objectives, a summary of OCM's QCEW dataset, and a list of general questions and topic areas for discussion. We tailored these materials to match the expertise of the meeting participants (e.g., when meeting with commercial fishermen, we provided them with information for the ENOW living resources sector, rather than information for all sectors).

2. NAICS is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. economy.

Through our various discussions, we obtained information and insights on economic activity that depends on the ocean, including formal and informal activity in ENOW-defined sectors, as well as in sectors that OCM does not currently include in the ENOW classification scheme, but that are ocean-dependent in the small island economies of the USVI and Puerto Rico. Several meeting participants also provided us with suggestions for local data and reports,³ as well as suggestions for additional contacts. Following the meetings, we followed up on these suggestions, as feasible within the scope and budget for this research; we have incorporated our relevant findings from this additional information into this report and final recommendations.

3. This information is provided in Appendices B and C, which include a summary of findings from our in-person meetings in the USVI and Puerto Rico, respectively.

3. Overview of ENOW Methodology

NOAA OCM produces annual ENOW data for about 400 coastal counties in 30 coastal states. For each county and state, ENOW measures total establishments, employment, wages, and GDP for each of the six ENOW economic sectors:

1. Living Resources
2. Marine Construction
3. Marine Transportation
4. Offshore Mineral Resources
5. Ship and Boat Building
6. Tourism and Recreation.

As shown in Exhibit 3.1, these 6 sectors comprise 23 specific ocean industries that NOAA has identified as being ocean- or Great Lakes-dependent in coastal regions. These ocean industries in turn comprise 47 6-digit NAICS code industries.

Exhibit 3.1. ENOW sectors and industries by BLS six-digit NAICS code industries

ENOW sector	ENOW ocean industry	BLS six-digit NAICS code industry
Living resources	Fish hatcheries and aquaculture	Finfish farming and fish hatcheries
		Shellfish farming
		Other aquaculture
	Fishing	Finfish fishing
		Shellfish fishing
		Other marine fishing
	Seafood processing	Seafood product preparation and packaging
Seafood markets		
Seafood markets	Fish and seafood markets	
Marine construction	Marine-related construction	Other heavy and civil engineering construction
Marine transportation	Deep sea freight	Deep sea freight transportation
		Coastal and Great Lakes freight transportation
	Marine passenger transportation	Deep sea passenger transportation
		Coastal and Great Lakes passenger transportation
	Marine transportation services	Port and harbor operations
		Marine cargo handling
		Navigational services to shipping
		Other support activities for water transportation
	Search and navigation equipment	Search, detection, navigation, guidance, aeronautical and nautical system and instrument manufacturing
	Warehousing	General warehousing and storage
		Refrigerated warehousing and storage
		Farm product warehousing and storage
	Offshore mineral resources	Limestone, sand, and gravel
Industrial sand mining		
Oil and gas exploration and production		Crude petroleum and natural gas extraction
		Natural gas liquid extraction
		Drilling oil and gas wells
		Support activities for oil and gas operations
Geophysical exploration and mapping services		

Exhibit 3.1. ENOW sectors and industries by BLS six-digit NAICS code industries

ENOW sector	ENOW ocean industry	BLS six-digit NAICS code industry
Ship and boat building	Boat building and repair	Boat building and repair
	Ship building and repair	Ship building and repair
Tourism and recreation	Boat dealers	Boat dealers
	Eating and drinking places	Full service restaurants
		Limited service eating places
		Cafeterias
		Snack and nonalcoholic beverage bars
	Hotels and lodging	Hotels (except casino hotels) and motels
		Bed and breakfast inns
	Marinas	Marinas
	Recreational vehicle (RV) parks and campsites	RV parks and recreational camps
	Scenic water tours	Scenic and sightseeing transportation, water
	Sporting goods	Sporting and athletic goods manufacturing
	Amusement and recreation services	Scenic and sightseeing transportation, other
		Sports and recreation instruction
		Recreation goods rental
		Amusement and recreation services not elsewhere classified
Zoos and aquaria	Zoo and botanical gardens	
	Nature parks and similar institutions	

OCM includes a business establishment in ENOW when the establishment is either associated with an industry whose definition explicitly ties it to the ocean (e.g., deep sea freight transportation, shellfish fishing), or it is in an industry that is partially related to the ocean and is located in a shore-adjacent ZIP code (e.g., a hotel in a shore-adjacent ZIP code). OCM designed ENOW to capture direct economic linkages to the ocean, rather than indirect economic activity. For example, establishments within the ENOW marine transportation sector include activities directly related to port and harbor operations and cargo handling; it does not include the value of the cargo itself.

When developing ENOW data for coastal states, OCM obtains sector-level GDP data from the BEA, and information on self-employment and sole proprietorships from the Census NES. However, as noted above, BEA does not publish GDP data for U.S. territories at the level necessary to include in ENOW and the NES does not provide data for U.S. territories. Thus, OCM was only able to use BLS QCEW data to characterize the ocean-dependent economies of USVI and Puerto Rico within the traditional ENOW framework. The QCEW includes data on establishments, employment, and total wages by ocean industry and sector.

In addition, although ENOW typically only includes data for counties located adjacent to the ocean or the Great Lakes, OCM included all of the counties in Puerto Rico (i.e., including 45 shore adjacent counties and 33 non-adjacent counties) in the QCEW summary data because of its unique reliance on the ocean as an island. OCM also included all of the USVI, which only has three ZIP codes (one for each island).

4. Ocean-Dependency of USVI’s Economy: ENOW and Beyond

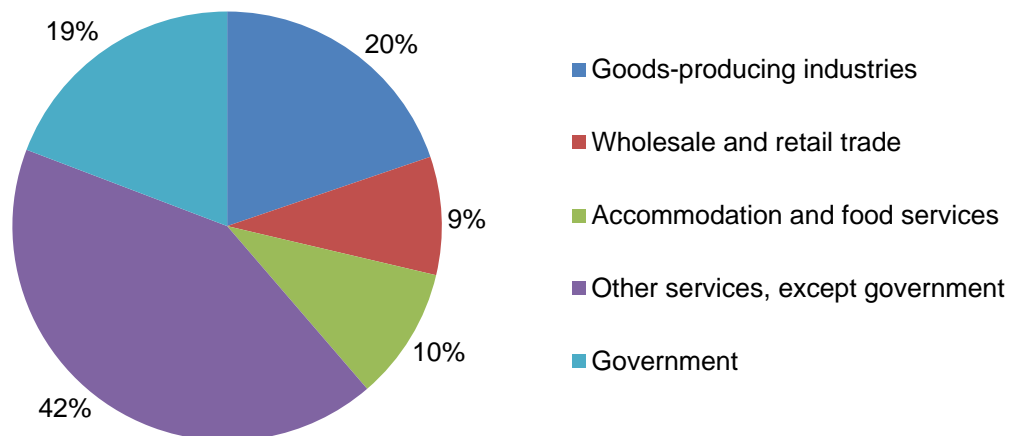
This section describes the ocean-dependency of the USVI’s economy, based on our in-person meetings, analysis of OCM’s QCEW data for ocean-dependent sectors, and subsequent research. First, we provide an overview of the overall USVI economy, and present the QCEW data that OCM developed for the territory. We then compare the QCEW data for each ENOW sector to the information and data we obtained from our meetings, and describe additional ocean-dependent activities that are not captured in the traditional ENOW framework, but that are ocean-dependent in the USVI.

4.1 Overall USVI Economy

The USVI economy is much less diverse than the economy of Puerto Rico, and is primarily driven by service-related industries that cater to more than 570,000 tourists and 2.1 million cruise ship passengers that visit the islands each year. Key economic sectors in the USVI include retail trade, public administration (i.e., government), and accommodation and food services. Manufacturing also contributes to the overall economy, particularly in terms of total wages. Based on our in-person meetings, most economic activity in the USVI is in some way linked to the ocean and, particularly, the tourism industry.

In 2012, the USVI’s GDP amounted to \$4.14 billion, about 0.02% of the GDP for the United States as a whole. As shown in Exhibit 4.1, service-producing industries account for more than 60% of the islands’ GDP, while goods-producing industries and government each account for approximately 20%. Several sources indicate that across these different sectors, as much as 80% of the USVI’s GDP can be attributed to tourism-related activities.

Exhibit 4.1. USVI GDP by high-level industry sector, 2012. Note: Similar to Puerto Rico, the relatively high percentage of goods-producing GDP may be misleading as an economic indicator, as many of the profits associated with these industries do not stay in the USVI.



Source: BEA, 2014.

Exhibit 4.2 shows establishments, average annual employment, and total average annual wages for the USVI's high-level industry sectors, based on BLS QCEW data for 2012. As shown, retail trade accounts for a high percentage of total establishments and employment (19% and 17%, respectively), but a relatively low percentage of total wages (10%). Accommodation and food services and public administration are also key sectors, accounting for 18% and 17% of total average annual employment, respectively. Public administration makes up 21% of the islands' total average annual wages, while most additional economic activity is distributed across a number of high-level sectors.

As shown in Exhibit 4.2, in 2012, manufacturing also accounted for a large percentage of total annual wages in the USVI (11%) but a relatively small percentage of total employment (3%). In that year, much of the activity reported for the manufacturing sector was likely associated with the HOVENSA oil refinery, which has since closed down operations. By 2014, total employment and wages in the USVI manufacturing sector decreased by 50% and 82%, respectively, from 2012 levels. Average wages per employee (as reported by BLS) also declined significantly, from approximately \$124,500 in 2012 to \$45,600 in 2014.

4.2 USVI QCEW Data for ENOW Sectors

Exhibit 4.3 shows USVI establishments, employment, and total wages within the six ENOW sectors. As shown, the tourism and recreation sector accounts for the vast majority of ENOW-defined economic activity in the USVI. Based on the QCEW data, approximately 52% of the ENOW establishments presented in Exhibit 4.3 are located on St. Thomas, 35% are on St. Croix, and the remaining 13% are on St. John.

BLS reports 404 establishments and 6,738 employees for ENOW-defined industries in the USVI (Exhibit 4.3). This accounts for approximately 11% and 19%, respectively, of total establishments and employment that BLS reported for the territory in 2012 (Exhibit 4.2). However, as described in more detail below, for several reasons, the QCEW data underestimates ocean-dependent economic activity. In the following sections, we provide a broader picture of the ocean-dependency of USVI's economy, based on findings from our in-person meetings and available local data sources.

4.3 Living Resources

The BLS reports only one establishment within the ENOW living resources sector in USVI: a seafood market on St. Thomas (BLS does not report employment and wage data for this establishment because of nondisclosure rules). This means that the BLS data do not capture any economic activity associated with commercial fishing, fish hatcheries and aquaculture, or seafood processing that may exist on the islands.

Based on our in-person meetings, it is clear that the QCEW data underrepresent the living resources sector, particularly with respect to commercial fishing and related activities. Ms. Ruth Gomez, Director of the Fish and Wildlife Division of the USVI Department of Planning and Natural Resources (DPNR), stated that there are approximately 120 fishermen on St. Thomas, more than 150 fishermen on St. Croix, and about 10 fishermen on St. John. Mr. Eddie Schuster, a commercial fisherman on St. Croix, estimated that there are 280 fishermen registered on St. Croix, but that only 50 of them actively fish. He also stated that there are likely another 50 fishermen that actively fish, but are not registered. Commercial fishing operations typically

Exhibit 4.2. Summary of USVI establishments, employment, and total annual wages by industry sector, 2012

Sector	Establishments		Average annual employment		Total annual wages	
	Total	% of total	Total	% of total	Total (millions)	% of total
Retail trade	652	19%	6,188	17%	\$145	10%
Construction	342	10%	1,706	5%	\$67	5%
Professional and technical services	340	10%	1,123	3%	\$59	4%
Other services, except public administration	329	9%	1,514	4%	\$70	5%
Accommodation and food services	327	9%	6,427	18%	\$157	11%
Health care and social assistance	247	7%	1,605	4%	\$54	4%
Real estate and rental and leasing	218	6%	1,127	3%	\$40	3%
Administrative and waste services	208	6%	1,889	5%	\$56	4%
Transportation and warehousing	158	5%	1,600	4%	\$59	4%
Finance and insurance	130	4%	1,149	3%	\$59	4%
Public administration	106	3%	6,144	17%	\$288	21%
Wholesale trade	90	3%	682	2%	\$28	2%
Manufacturing	89	3%	1,265	3%	\$157	11%
Educational services	68	2%	859	2%	\$23	2%
Other ^a	168	5%	2,937	8%	\$131	9%
Total	3,472		36,215		\$1,393	

a. Other sector represents an aggregate of sectors that each individually make up less than 2% of all economic indicators.

Source: BLS, 2012.

Exhibit 4.3. Establishments, employment, and total average annual wages by ENOW sector

ENOW sector	Establishments	Employment	Total wages (\$)
Living resources	1	ND ^a	ND
Marine construction	2	ND	ND
Marine transportation	22	214	\$11,030,080
Offshore mineral resources	5	ND	ND
Ship and boat building	1	ND	ND
Tourism and recreation	373	6,524	\$161,751,217
Total	404	6,738	\$172,781,297

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

Source: BER, 2014.

include one fishermen and one helper. Depending on the type of gear used and the size of the boat, some operations require two or three helpers. The fishing season is usually about 9 months long – most activity ceases during hurricane season, which typically begins in late July or early August and ends in late October.

All commercial fishing operations must register and file a monthly Commercial Catch Report with DPNR, which DPNR in turn provides to NOAA Fisheries. These data, which we obtained from NOAA's Southeast Fisheries Science Center (SFSC), indicate that commercial fishermen caught close to 810,000 pounds of fish in 2014. The price per pound averaged between \$5.00 to \$6.00 for most species, with some high-value species (e.g., lobster) selling for more than \$9.00 per pound (Kojis, 2014). SFSC reports that gross and net revenues for USVI fishermen in 2013 amounted to \$4.26 and \$2.48 million, respectively (Matt McPherson, NOAA SFSC, personal communication, January 22, 2016).

Most harvesters market their catch themselves, selling to restaurants, supermarkets, or at one of eight fish markets across the territory, including four on St. Thomas (Fort Mylner, Smith Bay, the Ballpark/Lionel Roberts Stadium, and Frenchtown/Gustave Quetel Fish House), three on St. Croix (Frederiksted, La Reine, and Christiansted), and one on St. John in Cruz Bay. Although restaurants purchase local seafood, particularly lobster, larger hotels import most of the seafood they sell. Imported fish provides these establishments with a more reliable, consistent source of supply.

In 2013 and 2014, Kojis (2014) obtained data on the local seafood markets in the territory, reporting two additional informal markets on St. Thomas. Kojis also reports that the Frenchtown/Gustave Quetel Fish House, the Ballpark/Lionel Roberts Stadium, and the Frederiksted/Gustave Quetel Fish House are government-run fish markets. These markets have separate areas for fish cleaning; fishermen that sell fish at these locations often employ fish cleaners.

The Frenchtown/Gustave Quetel Fish House is the largest seafood market in the USVI. It has 29 small rooms available for fishermen to rent, and tables lined with stainless steel for selling and cleaning fish. DPNR oversees the facility and collects rent for the rooms. In 2013, DPNR charged \$70 per room per month. According to Kojis (2014), the \$70 rental fee did not fully cover the facility's operational costs. DPNR reportedly paid \$125 per room per month for water

and electricity, and also hired someone to keep the facility clean. The nongovernment fish markets in the USVI seem to be more informal locations, where fishermen sell their catch out of the back of their pickup trucks or coolers.

In addition to commercial fishing activity, the University of the Virgin Islands (UVI) is home to an extensive marine and environmental science program, including marine biology. This activity is not captured in the QCEW data for the ENOW living resources sector because the university is likely registered under a NAICS code associated with higher education.

Finally, although not included in the living resources sector as an ENOW-defined industry, it appears that there are a number of government-run conservation programs in the USVI, many of which are likely directly related to the ocean and/or marine resources. The BLS QCEW reports 9 establishments and 97 employees under NAICS code industry 924120: public administration of conservation programs. There are also several nonprofit organizations, such as Friends of the Virgin Islands National Park and the Nature Conservancy, which focus on ocean-related issues and marine conservation throughout the territory.

Overall, the living resources sector, although not a huge component of the economy in terms of total employment and wages, plays a larger part in the local economy than the QCEW summary data indicate. Based on our discussions, it appears that there are likely 200 to 250 active commercial fishermen in the territory (including unlicensed fishermen), which likely each employ at least 1 helper. Commercial fishermen support several local seafood markets, and provide fish to many local restaurants, and some hotels. Fishermen are self-employed business owners, and many of the seafood markets in the territory are informal. In addition, ENOW does not include several sectors that are ocean-dependent in the USVI, including marine-related programs at UVI, and government and nonprofit conservation programs.

4.4 Marine Construction

BLS reports two establishments within the ENOW marine construction sector in the USVI, both privately owned and located on St. Thomas. Because of the small number of establishments, BLS does not report employment and wage data for the NAICS code industry associated with this ENOW sector.

Based on our in-person meetings and subsequent research, the QCEW data for this sector may not be too far off. We found three companies in the USVI that provide marine construction-related services: Stefferson Marine & Construction LLC and USVI Commercial Divers, both located on St. Thomas; and the Bateman Civil Survey Company (BCSC), located on St. Croix. Stefferson Marine & Construction and USVI Commercial Divers offer a variety of services, including commercial diving, mooring installation and maintenance, underwater welding, berth construction, salvage and vessel recovery, underwater surveying, and more. USVI Commercial Divers also provides boat maintenance and towing services. BCSC performs underwater inspections and surveys, as well as land-based surveys and other engineering and environmental services. The company reports on its website that it is registered under several NAICS codes, including 541330 (engineering services), 541370 (other surveying and mapping services),

541620 (environmental consulting services), and 561990 (all other support services).⁴ It is likely that there are similar engineering/consulting firms in the territory that provide ocean-related services and are registered under NAICS codes that are not represented in the ENOW dataset.

The Virgin Islands Port Authority (VIPA) and other government departments, including the Water and Power Authority, and DPNR, typically hire companies to perform marine construction activities, such as mooring installation and dock/berth construction, rather than performing them in house. VIPA likely works with the two companies in St. Thomas that are registered under the NAICS code associated with the ENOW marine construction sector (237990, other heavy and civil engineering construction), as well as companies registered under closely related NAICS codes, such as 541330 (engineering services), 541370 (other surveying and mapping services), 541620 (environmental consulting services), and 561990 (all other support services).

4.5 Marine Transportation

The BLS QCEW reports 22 establishments within the ENOW marine transportation sector for 2012. As shown in Exhibit 4.4, USVI supports activity in three of the ocean industries within the broader marine transportation sector, including deep sea freight, marine passenger transportation, and marine transportation services. The marine freight industry accounts for the largest percentage of economic activity in this sector, with 10 establishments, 173 employees, and nearly \$9.4 million in total wages.

It is clear that marine transportation is an important sector in the USVI. VIPA operates 13 major seaports in the territory, including 5 at St. Thomas, 5 at St. Croix, and 3 at St. John. WICO operates St. Thomas' major cruise ship port, Yacht Haven Grande, and there are a number of marinas located on the islands. The USVI's seaports are used for passenger transportation (e.g., ferries between islands), cargo operations and storage, seaplanes, and cruise ships. Large cargo businesses, such as Crowley, Seastar, and Tropical, also have local operations, but are mostly headquartered in Florida. There are also two water taxi services in the USVI – one takes passengers from Caneel Bay Resort on St. John to Charlotte Amalie on St. Thomas, and the other from the Marriott on St. Thomas to the Charlotte Amalie waterfront. In addition, the USVI Water and Power Authority operates its own terminals for fuel imports.

The BLS data for the 22 establishments in the ENOW marine transportation ocean industries show that these establishments are privately owned and not government agencies. Based on information from usbiz.org and manta.com, it appears that VIPA is registered as a private business under the NAICS code for marine cargo handling (488320), because it generates its own revenues. BLS does not disclose the employment and wages associated with the two businesses registered under this NAICS code because of non-disclosure rules. However, VIPA has 62 employees in the marine division that oversees St. Thomas and St. John, and 18 employees on St. Croix. In addition, all ships over 100 tons (including cruise ships) must pay wharfage and user fees to VIPA, which serve as VIPA's primary marine transportation revenue source. In 2014, VIPA collected \$7.65 million in wharfage fees and \$14.7 million in user fees.

4. BLS assigns only one NAICS code per establishment based on its primary activity – generally the activity that generates the most revenue for the establishment. Other agencies and organizations that have adopted NAICS for use in programs that are not statistical (e.g., regulatory activities and procurement) often allow for more than one NAICS code per establishment.

Exhibit 4.4. Establishments, employment, and total wages by ocean industry, ENOW marine transportation sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Deep sea freight	Deep sea freight transportation	0	0	\$0
	Coastal and Great Lakes freight transportation	10	173	\$9,374,901
	<i>Total (ocean industry)</i>	<i>10</i>	<i>173</i>	<i>\$9,374,901</i>
Marine passenger transportation	Deep sea passenger transportation	1	ND ^a	ND
	Coastal and Great Lakes passenger transportation	4	ND	ND
	<i>Total (ocean industry)</i>	<i>5</i>	<i>ND</i>	<i>ND</i>
Marine transportation services	Port and harbor operations	0	0	\$0
	Marine cargo handling	2	ND	ND
	Navigational services to shipping	2	ND	ND
	Other support activities for water transportation	3	41	\$1,655,179
	<i>Total (ocean industry)</i>	<i>7</i>	<i>41</i>	<i>\$1,655,179</i>
Search and navigation equipment	Search, detection, navigation, guidance, aeronautical and nautical system and instrument manufacturing	0	0	\$0
Warehousing	Farm product warehousing and storage	0	0	\$0
	General warehousing and storage	0	0	\$0
	Refrigerated warehousing and storage	0	0	\$0
	<i>Total (ocean industry)</i>	<i>0</i>	<i>0</i>	<i>\$0</i>
Sector total		22	214	\$11,030,080

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

VIPA also rents out space at all of its ports to concessionaires and commercial businesses. In 2014, VIPA reported \$5.39 million in revenues from rentals at port facilities (VIPA, 2014). VIPA also rents facilities for the operation of seaplanes on St. Thomas and St. Croix. Seaborne Airlines is the primary operator of seaplanes in the USVI, offering flights between these two islands. Exhibit 4.5 describes VIPA's seaports at St. John, St. Thomas, and St. Croix, respectively.

Without a more comprehensive accounting of local marine transportation establishments located in the USVI, it is difficult to determine how well the ENOW dataset represents private industry data for this sector. However, there are some clear gaps; this is primarily because many marine transportation and cargo companies seem to be classified under NAICS codes that OCM does not include in the ENOW dataset. For example, BLS reports 15 companies under NAICS code 488510: freight transportation arrangement. A quick review of companies registered under this code indicates that many (but not all) provide services related to marine cargo and/or coastal freight transportation (e.g., companies such as C&C Port Services and Global Marine). WICO, which employs 77 individuals, is also registered under this NAICS code. WICO manages Yacht Haven Grande and coordinates all cruise ship activities at the port. Yacht Haven Grande is a large retail center that caters primarily to cruise ship passengers and their crews.

In addition, BLS reports 4 companies, 46 employees, and \$1.35 million in annual wages under NAICS code 483212: inland water transportation. Because there are very few inland water bodies in the USVI, we suspect these companies are likely registered under incorrect NAICS codes. They are likely water taxis or companies that provide other ocean-related transportation services.

Exhibit 4.5. VIPA Marine Facilities

St. John

The Loredon Lawrence Boynes Sr. Dock (Cruz Bay) can accommodate four vessels simultaneously and is the main port of entry to St. John. Several ferry operators provide service from this facility to Red Hook and the Charlotte Amalie Harbor on St. Thomas. Dinghy dock berthing is also available. There is also a passenger terminal at this facility that houses the Port Authority's dock master's office, a ferry ticket booth, and an open air waiting area.

The Theovald Eric Moorehead Dock and Terminal (Enighed Pond) is a cargo facility that was opened in 2006 to accommodate the increase of cargo traffic at the St. John Cargo Dock, which previously handled cargo and foreign vessels in a limited space in Cruz Bay (all cargo activity now takes place at Enighed Pond). The facility consists of 650 lineal feet of berthing space for cargo vessels, 6 acres for cargo handling and storage, and a channel and turnaround area for vessels up to 175 feet in length.

The Victor William Sewer Marine Facility (Cruz Bay) has a small, one-acre area for cargo handling and temporary storage. However, after the completion of the new cargo facility at Enighed Pond, the Port Authority has ceased all cargo operations at this port. This dock is now used for the berthing of passenger ferries and tenders. Passenger ferries and charter vessels that require federal inspection must also use this facility.

St. Thomas

Austin "Bab" Monsanto Marine Terminal (Crown Bay) is one of two cruise ship ports on St. Thomas (the other is Yacht Haven Grande). It has two docks that can accommodate three cruise ships simultaneously. In 2003, the Port Authority invested \$28 million in this port to expand the cruise ship pier and develop the Crown Bay Center, an upscale commercial mall that offers dining, shopping, and other entertainment venues. The Port Authority made this investment to meet the demands of cruise lines that are building larger ships and bringing in more passengers.

Crown Bay Cargo Port Facility (Crown Bay) handles containerized and general cargo. This port is a vital link to the USVI economy as most of its foods, materials, and other goods are imported. The Crown Bay Cargo Port also serves as a trans-shipment port for cargo being shipped to many of the other Caribbean islands. Major cargo companies include Crowley, Tropical Shipping, and Seastar Line. These companies have operations on St. Thomas but the boats come from Florida (and the companies are mostly headquartered there).

Edward Wilmoth Blyden IV Marine Facility (Charlotte Amalie) is a hub for seaplane service between St. Thomas, St. Croix, and St. John, and ferry service between the USVI and the British Virgin Islands, and between St. Thomas and Puerto Rico. The terminal houses the St. Thomas offices of the Marine Division of the Port Authority, federal inspection services, ferry ticket booths, a restaurant, and an open-air waiting area. The Charles F. Blair Jr. Seaplane Terminal is located adjacent to the Blyden Terminal. Air service is available from St. Thomas to Christiansted, St. Croix, and Puerto Rico.

The Waterfront (Charlotte Amalie) was constructed in the mid-1950s by the U.S. Navy. It encompasses 3,200 feet of bulkhead space that runs parallel to the shopping district on St. Thomas. The Waterfront can accommodate mini-cruise ships and cruise ship tenders.

Urman Victor Fredericks Marine Terminal (Red Hook) is located on the eastern end of St. Thomas and primarily serves passengers traveling between St. Thomas and St. John, and St. Thomas and the British Virgin Islands. This facility was built in 2007 by Island Roads Corporation Amenities. Inside the terminal are inter-island ferry ticket counters, a bar, small restaurants, and a variety of other stores. A relatively large number of retail stores and restaurants have been built in the area surrounding the terminal in recent years. These are frequented by yacht owners and other boaters that dock at the terminal

St. Croix

Ann E. Abramson Marine Facility (Frederiksted) is the only cruise ship port on St. Croix. Voyager-class vessels can berth on the southern portion of the dock, and eagle-class and smaller vessels may berth on either side. Anchorage is also available in the outer harbor for larger ships. The platform of the pier is equipped with a fendering system that is designed for submarines. All berths at this facility have access to potable water. Fuel is available in blends as specified by the cruise lines, and cargo handling is arranged by the ship's agent or directly by the cruise line. A shopping area is located within walking distance to the pier. Additionally, ground transportation and tours are available from the pier to historical sites, beaches, and dive venues. As an incentive to prospective cruise lines, the Port Authority has waived all marine fees for cruise ships visiting St. Croix.

Exhibit 4.5. VIPA Marine Facilities (cont.)

The Gallows Bay Dock (Christiansted) is a vital link for small cargo vessels serving St. Croix and other Caribbean islands. It can accommodate mini-cruise vessels, small inter-island sloops, ferries, private yachts, cargo vessels, and U.S. Coast Guard vessels. Forklifts and other services are available through the ship's agent. Inter-island ferry service is available from Gallows Bay, St. Croix to downtown Charlotte Amalie, and St. Thomas four days a week.

The Svend Aage Ovesen Seaplane Terminal (Christiansted). Seaplane service is available from this facility daily from Christiansted to downtown Charlotte Amalie, St. Thomas. Flights are also available to San Juan, Puerto Rico, and packages are offered to connect passengers to the British Virgin Islands via inter-island ferries.

The Wilfred “Bomba” Allick Port and Transshipment Center (Krause Lagoon, locally known as “The Containerport”) is located on a 45-acre parcel on the south shore of St. Croix next to HOVENSA and VIPA’s Molasses Pier. This port is the hub for commercial and industrial marine activity on St. Croix and serves as a trans-shipment center to many other locations. A 30,000-square foot warehouse is located on the site for storage of cargo that is less than a container load. Several acres are also available for the open storage of containerized and other large cargo or equipment.

The Gordon A. Finch Molasses Pier (Krause Lagoon) sits on an eight-acre site on the south shore of St. Croix. It provides docking space for cable vessels and cable storage, molasses, and aggregate vessels. The facility is primarily used to import molasses by tanker vessels to the Virgin Islands Rum Industries Limited distillery. It is also used for the importation of all liquid asphalt to the island, for bulk cargo such as gravel, cement blocks, and for other construction material critical to St. Croix’s construction industry. The pier can also accommodate submarine cable vessels, which are used to lay and repair intercontinental underwater telephone cables. The Port Authority is planning to shift all cargo operations from the Gallows Bay Dock in Christiansted to this pier.

4.6 Offshore Mineral Resources

The BLS QCEW data indicate that in 2012, USVI was home to five establishments in the ENOW offshore mineral resources sector. All five establishments are within the oil and gas exploration and production ocean industry: one is classified under geophysical surveying and mapping services, and four constitute support activities for oil and gas operations (based on six-digit NAICS code industries). BLS did not report employment and wage data for the industries within this sector.

The 2012 BLS data indicate that all of the establishments within the offshore mineral resources sector were located on St. Croix, and it is not clear whether they still exist. In early 2012, the large oil refinery on St. Croix (HOVENSA) shut down operations, although the facility continued to operate as an oil storage facility until March 2015. The closing of HOVENSA likely resulted in subsequent shutdowns of related business operations. Regardless, it appears that the establishments reported by BLS under the NAICS industry. “Support activities for oil and gas operations,” are not ocean-dependent, but likely related to oil refining or storage at the HOVENSA facility.

Our in-person meetings confirmed that there is very little activity within this sector. USVI prohibits the offshore extraction of mineral resources, and most sand, gravel, and other mineral resources are imported. DPNR’s Office of CZM manages all sand mining and beach renourishment activities. DPNR reports that there is one company in the USVI that provides beach renourishment services: TNT (although the aforementioned BCSC also advertises beach renourishment and shoreline stabilization services on its website). TNT imports the sand it uses for this purpose from other locations in the Caribbean.

Hotels and other private property owners interested in rebuilding their coast lines must receive a permit from CZM. CZM conducts an analysis of the imported sand to ensure it is compatible with local sand. In addition, although sand mining is prohibited, DPNR reports that there are a

few companies on St. Thomas that are sometimes able to obtain permits from CZM to extract small amounts of sand to mix with concrete/aggregate. These companies would likely be registered under construction-related NAICS codes, or NAICS codes associated with mining or manufacturing.

4.7 Ship and Boat Building and Repair

According to the BLS QCEW data, there is only one establishment in the USVI within the ENOW ship and boat building sector – a boat building and repair establishment located on St. Croix. However, as we suspected, many of the people we met with indicated that there are several boat building/repair shops in the territory. It is not clear why the BLS-based ENOW data do not capture these businesses, but it may be because they are classified under alternative NAICS codes. Some of these businesses may also be owned and operated by self-employed individuals or are part of the informal economy (i.e., they do not report employment to avoid paying unemployment insurance).

We met with the owner and president of Gold Coast Yachts, a world-renowned, yacht building company located on St. Croix, which is likely the business establishment that is reflected in the ENOW data. The company currently employs about 38 people, but typically employs closer to 45. Gold Coast Yachts does about \$5 million in sales annually; their total annual payroll is approximately \$1.8 million.

Richard Difede, owner and president of Gold Coast Yachts, identified four boat-building companies in the territory as well as eight repair companies. Representatives from VIPA, the USVI Game Fishing Club, and the Charter Yacht League also identified 15 to 20 ship/boat repair shops, which are mostly located on St. Thomas. This includes two large operations, Independent Boat Yard and the Subbase Dry Dock, both of which employ more than 50 people. The individuals we met with indicated that most repair shops are smaller, with between two and four employees.

Mr. Difede noted that boatbuilding has a relatively high multiplier effect. For example, Gold Coast Yachts relies on heavy equipment operators, workshops for parts (some of them informal operations), and transportation of cargo by both air and ship, among others. However, Gold Coast Yachts has to import the majority of materials that they use to build their boats.

4.8 Tourism and Recreation

As is true in almost all coastal regions, the tourism and recreation sector accounts for the majority of ENOW-defined economic activity in the USVI, comprising 373, or 92%, of the 404 reported ENOW establishments. Based on the ENOW dataset, this sector employed 6,524 individuals in 2012. In that year, total average annual wages amounted to more than \$161.8 million.

As shown in Exhibit 4.6, eating and drinking places and hotels and lodging places account for the majority of economic activity within the ENOW-defined tourism and recreation sector. While there are more eating and drinking establishments, the hotels and lodging industry accounts for 54% and 68% of employment and total wages, respectively. The contribution of other ocean industries to the overall tourism and recreation economy is relatively small; however, these sectors do support a fair amount of employment and total wages compared to ocean industries in many other ENOW sectors.

Exhibit 4.6. Establishments, employment, and total wages by ocean industry, ENOW tourism and recreation sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Amusement and recreation services	All other amusement and recreation industries	21	122	\$2,237,889
	Recreational goods rental	12	58	\$1,653,516
	Scenic and sightseeing transportation (non-water-based)	1	ND ^a	\$0
	Sports and recreation instruction	5	16	\$301,568
	<i>Total (ocean industry)</i>	<i>39</i>	<i>196</i>	<i>\$4,192,973</i>
Boat dealers	Boat dealers	13	60	\$1,901,945
Eating and drinking places	Cafeterias, grill buffets, and buffets	2	ND	ND
	Full-service restaurants	126	1,398	\$23,169,488
	Limited-service restaurants	98	1,065	\$15,717,255
	Snack and nonalcoholic beverage bars	14	ND	ND
	<i>Total (ocean industry)</i>	<i>240</i>	<i>2,463</i>	<i>\$38,886,743</i>
Hotels and lodging places	Bed-and-breakfast inns	4	7	\$136,321
	Hotels and motels, except casino hotels	40	3,503	\$108,998,909
	<i>Total (ocean industry)</i>	<i>44</i>	<i>3,510</i>	<i>\$109,135,230</i>
Marinas	Marinas	7	112	\$3,333,770
RV park and campgrounds	RV parks and campgrounds	2	ND	ND
Scenic water tours	Scenic and sightseeing transportation, water	19	85	\$2,146,066
Sporting goods manufacturing	Sporting and athletic goods manufacturing	0	0	\$0
Zoos and aquaria	Nature parks and other similar institutions	6	7	\$121,017
	Zoo and botanical gardens	3	91	\$2,033,473
	<i>Total (ocean industry)</i>	<i>9</i>	<i>98</i>	<i>\$2,154,490</i>
Sector total		373	6,524	\$161,751,217

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

We met with individuals from several tourist-related organizations to get a better idea of activity within this sector, including representatives from the USVI Department of Tourism, the USVI HTA, the USVI Game Fishing Club, the USVI Charter Yacht League, the USVI National Park (on St. John), and the owner of a local dive shop. The USVI BER also provided us with a dataset of annual economic tourism-related indicators. Findings from our in-person meetings confirmed that tourism drives the local economy, and that OCM's QCEW summary data does not fully capture tourist-dependent economic activity. It seems that most economic sectors in the USVI are in some way, whether directly or indirectly, linked to tourism.

According to BER, approximately 570,000 people came to the USVI in 2013 as overnight visitors, and an additional 2.1 million people came in on cruise ships or air excursions from other islands. This compares to a resident population of approximately 105,000 people. In 2013, tourist and cruise ship passenger expenditures in the USVI amounted to \$851 million and \$381 million, respectively (BER, 2014). BER estimates that tourism accounts for approximately 60% of USVI's GDP, which totaled \$3.79 billion in 2013. However, the USVI HTA believes the tourism sector accounts for closer to 80% of economic activity, noting that since the loss of more than 2,000 jobs and \$1.5 billion in GDP associated with the HOVENSA closing in 2012, the island's share of non-tourism-related activity has been very small.⁵

Cruise ship passengers and overnight visitors participate in a variety of activities when visiting the USVI. In addition to going to the beach, recreational fishing, charter yachts, shopping, snorkeling, scuba-diving, and boat trips (day trips/tours and boat rentals) are all popular tourist activities. Many of these activities have a significant impact on the local economy. For example, the USVI is known for its world-class recreational blue marlin fishery. Lori Bailey, president of the USVI Game Fishing Club, reports that during the peak fishing season (summer), there are typically 20 to 30 large boats docked at Red Hook Marina, on the east end of the island. Most of these boat owners visit specifically to catch blue marlin and other billfish, and to participate in the USVI Game Fishing Club's annual blue marlin tournament. Boat owners and their crews (typically three) spend a considerable amount of money on St. Thomas on entertainment, food, and other supplies; many also stay in local hotels. Although recreational fishing boats usually bring their own crews, they do employ some local labor for boat washing and boat repair and maintenance; however, many larger boats often fly in their own mechanics. According Ms. Bailey, boat owners do not typically store their boats in St. Thomas in the off-season.

The QCEW data underrepresent economic activity associated with the tourism sector in two ways. First, within the ENOW-defined sectors and associated six-digit NAICS code industries, the QCEW data do not fully capture current activity. This seems to be because many individuals that work within these industries are self-employed, and therefore are not represented in the QCEW data. There also seems to be some level of misclassification within NAICS code industries. Second, the ENOW classification scheme does not include several sectors that are heavily reliant on tourism in the USVI, including taxis, car rental agencies, airports, many retail shops, temporary staffing agencies that help the tourism industry find seasonal employees, and others. As described in more detail in Section 6, it may make sense to include some of these sectors in the ENOW classification scheme for the USVI. However, in some cases, only part of the sector is ocean-dependent.

For example, the USVI HTA has 63 members that are hotels, yet the BLS reports a total of 44 hotel and lodging establishments in the territory, including bed and breakfast inns. Similarly, a representative from the Charter Yacht League estimates that there are more than 150 charter yachts operating in the USVI, not including charter boats that run day trips from the island, all of which are registered businesses in the territory. The representative we spoke with from the USVI Game Fishing Club indicated that there are at least 12 recreational fishing charter businesses, just

5. The difference in estimates of tourism-related GDP is likely attributable to how these different organizations define tourism-related spending. For example, it is likely that USVI HTA includes spending in some industries that are indirectly affected by tourism.

on St. Thomas. However, BLS only reports 19 and 39 establishments in the Scenic Water Tours and Amusement and Recreation Services ENOW industries, respectively. Based on our meetings, it appears that tour operators, charter yachts, and other recreational businesses greatly exceed these numbers. The large majority of these operations are sole proprietorships.

Data from the USVI NPS indicates that there are at least 168 tourist-related businesses on St. John alone. Exhibit 4.7 shows the number of permits that NPS issued to concessionaires that operated on park lands in 2015, by business type. As shown, this included permits for 103 tour boat operators, 3 kayaking and stand-up paddle boarding instructors, and 7 tour companies. All of these vendors fall within the ENOW classification scheme, but it appears that most of them are not captured in the BLS data. In addition, NPS issued permits to several types of businesses that ENOW does not define as ocean-dependent, including wedding event planners, taxis, and photographers. In the USVI, these businesses are heavily reliant on tourism, and therefore dependent on the ocean.

Exhibit 4.7. NPS permits for park vendors on St. John, 2015

Business type	Number of permits
Taxis	28 ^a
Wedding/event planners	13
Photography	11
Kayaking	2
Stand-up paddle boarding	1
Hiking	3
Tour companies	7
6 to 12 passenger vessels	78
12 to 24 passenger vessels	9
25 to 49 passenger vessels	16
Total	168

a. This includes 90 vehicles registered under 7 taxi association permits and 21 individual taxi permits.

As noted above, the USVI BER develops a series of tourism-related economic indicators each year, including information on visitor expenditures, hotel room nights, and tourism-related employment. Exhibit 4.8 shows BER tourism-related employment data compared to the federal QCEW employment data for the ENOW tourism and recreation sector. The BER representative we met with indicated that the employment data BER generates are based on information from the local BLS. Thus, the data that BER reports for specific sectors are relatively the same as the data that the federal BLS reports for those sectors, with some small differences. For example, BER reports a higher level of employment in the eating and drinking places sector. This is likely because BER includes additional six-digit NAICS industries in its definition of eating and drinking places (e.g., BER may include drinking places and alcoholic beverages in its definition, while ENOW does not), or because of differences in local and national data disclosure rules.

Exhibit 4.8. Tourism-related employment, USVI BER and pilot ENOW dataset

	2012 USVI BER	2012 ENOW
Hotels and other lodging places	3,617	3,510
Gift shops	1,326	–
Eating and drinking places	2,821	2,463
Transportation by air	459	–
Scenic and sightseeing transportation	116	85
Total tourism-related employment	8,339	6,524 ^a
Total employment (including non-tourist related)	40,466	36,215

a. Employment numbers do not total due because BLS did not disclose employment data for some tourism-related sectors.

As shown above, BER also includes additional industry sectors in its definition of tourism, including gift shops and transportation by air. BER reports 1,326 employees in the “gift shop” industry; this compares to the federal QCEW estimate of 207 employees in NAICS sector 453220 (gift, novelty, and souvenir shops). Thus, BER’s definition of gift shops likely includes additional retail NAICS industries. In addition, the federal QCEW does not disclose employment for the six-digit air transportation industry. The local BLS likely has different disclosure rules and is therefore able to report this information. In addition, OCM does not include the NAICS industry for tour operators (561520) in ENOW because in most states it is difficult to separate ocean-related tours from non-ocean related tours (it is not clear if this is included in BER’s definition). However, in the USVI, tour operators are likely entirely dependent on ocean-related tourism. In 2012, the BLS reports 7 establishments, 36 employees, and \$1.19 million in wages for this sector.

The retail industry is the largest tourism-dependent industry in the USVI that is not included in the ENOW dataset. Duty-free shopping is an important part of the tourism-related economy, and is a common activity for both overnight visitors and cruise ship passengers. Exhibit 4.9 shows establishments, employees, and annual wages for five retail sectors with the highest location quotients in the retail industry. Location quotients provide a measure of how concentrated a particular industry is in a given region as compared to the nation. For example, the location quotient shown in Exhibit 4.9 for jewelry stores indicates that jewelry stores are 16.7 times more concentrated in the USVI (per capita) than they are in the U.S. as a whole. In the USVI, the location quotients for many retail industries are high because of the large number of duty-free shops that cater to cruise ship passengers and other tourists.

Exhibit 4.9. Establishments, employment, and wages for retail industries with highest location quotients in the USVI

Retail industry	Establishments	Employees	Annual wages	Location quotient (establishments)
Jewelry stores	140	ND ^a	ND	16.7
Luggage and leather goods stores	3	ND	ND	5.84
Gift, novelty, and souvenir stores	35	207	\$5.16	3.85
Women’s clothing stores	41	211	\$3.15	3.91
Men’s clothing stores	8	10	\$0.26	3.47

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using “ND” for non-disclosed.

A recent study commissioned by the Florida Caribbean Cruise Association (FCCA) and participating cruise destinations confirms the importance of cruise ship tourism for the retail industry, as well as overall local economic activity. Conducted by Business Research and Economic Advisors (BREA), this study analyzed cruise-related spending and its impact on the economies of cruise ship destinations, including the USVI. To estimate the impact of cruise-related tourism, BREA conducted passenger and crew surveys on board ships of the FCCA member cruise lines between October 2014 and May 2015, and obtained expenditure data from the cruise lines. Exhibit 4.10 presents the results of this study.

Finally, in addition to the sectors described above, a percentage of real estate and rental activity can also be attributed to tourism. For example, online house rental sites, such as Air B&B and Vacation Rental By Owner (VRBO), are also an important part of the local tourism economy. Two or three years ago, the USVI HTA conducted an inventory of vacation home rentals available on these sites. At the time there were approximately 500 rentals; the USVI HTA estimates that there are now likely 1,500 to 2,000. In many cases, the owners of vacation homes rely on rental agencies or local residents to manage the properties for them. There is not a comprehensive data source on the number of rentals available because only a small percentage of renters go through the proper channels to register as a business and pay taxes. Those that are registered are also likely sole proprietorships and therefore would not be captured in the QCEW data.

4.9 Summary

Our in-person meetings and review of local data confirmed that in the USVI, most economic activity in the territory can in some way, whether directly or indirectly, be linked to the ocean. This is particularly true since the closing of the HOVENSA oil refinery on St. Croix in 2012, which had generated \$1.5 billion annually in GDP for the territory, but was not directly dependent on the ocean. Tourism is the primary driver of local economic activity in the USVI, accounting for 60% to 80% of the islands' GDP. Activities associated with the ENOW marine transportation, ship and boat building and repair, and living resources sectors also provide meaningful employment and generate economic activity throughout the territory.

It appears that the BLS QCEW data and ENOW classification scheme underrepresent the local economy's dependence on the ocean for several reasons: (1) there a large number of self-employed individuals in the USVI, particularly in the living resources and tourism and recreation sectors, and the BLS does not included data on self-employed individuals⁶; (2) many businesses that provide ocean-related services that ENOW intended to capture are registered under NAICS codes that are not included in the ENOW classification scheme; and (3) ENOW's classification scheme excludes many sectors that are ocean-dependent in the USVI, particularly in the tourism industry. This includes sectors such as taxis, car rental agencies, temporary staffing services, and others that may not be ocean-dependent in other coastal areas of the United States, but that are ocean-dependent in the USVI because of its large tourism industry.

6. OCM uses Census NES to include information on sole proprietorships in ENOW for other coastal areas of the U.S. However, NES data is not available for U.S. territories.

Exhibit 4.10. Economic impact of cruise-related tourism in the USVI (BREA, 2015)

Approximately 2.1 million cruise passengers arrived in the USVI aboard cruise ships during the 2014–2015 cruise year. Of these, an estimated 1.84 million passengers (90%) disembarked and spent time onshore. In addition, 790,200 crew members were aboard the cruise ships, of which 351,070 (44%) left the ship.

Each passenger cruise party spent an average of \$304.92 in the USVI. Expenditures by cruise passengers were concentrated in four primary categories: shore excursions, food and beverages, watches and jewelry, and clothing. For the entire 2014–2015 cruise year, the estimated 1.84 million cruise passengers who visited the USVI spent a total of \$276.3 million.

Estimated passenger spending, 2014–2015 cruise year

Purchase categories	Average expenditure per party	Share of all onshore visits	Weighted average expenditure per party ^a
Shore excursions	\$73.70	58.9%	\$43.45
Food and beverage at restaurants and bars	\$28.90	47.3%	\$13.66
Taxis/ground transportation	\$28.20	43.4%	\$12.24
Watches and jewelry	\$505.40	31.5%	\$159.29
Clothing	\$57.60	48.4%	\$27.88
Entertainment/night clubs/casinos	\$100.00	1.2%	\$1.20
Other purchases	\$126.50	19.7%	\$24.97
Perfumes and cosmetics	\$71.50	4.4%	\$3.12
Local crafts and souvenirs	\$32.00	31.1%	\$9.94
Retail purchases of liquor	\$50.60	11.7%	\$5.91
Electronics	\$184.70	1.5%	\$2.82
Telephone and internet	\$20.20	2.2%	\$0.44
Total spent per cruise party			\$304.92
Average size of a cruise party			2.0
Total spent per cruise passenger			\$150.21
Cruise passenger onshore visits			1,839,719
Total cruise passenger expenditures			\$276,338,473

a. The average expenditure per cruise party represents the average for parties that actually spent money in a specific category. The weighted average expenditure represents the expenditure across total cruise parties that visited the USVI (including those who did not necessarily make a purchase in a given category).

Each crew member spent an average of \$110.27. Expenditures by crew were concentrated in four categories: food and beverages, watches and jewelry, clothing, and other (unspecified) purchases. For the entire 2014–2015 cruise year, the 351,070 crew who visited the USVI spent an estimated total of \$38.7 million. In addition, BREA estimated that cruise lines spent \$29.2 million in the USVI during the 2014–2015 cruise year. Seventy percent of these expenditures were payments for port fees, taxes, and navigation services, while the remaining 30% were payments for provisions and supplies.

In total, passenger, crew, and cruise line expenditures in the USVI amounted to \$344.3 million. This generated direct employment for 3,396 USVI residents, and \$75.0 million in annual wages. Spending by local businesses that benefited from direct cruise-related expenditures generated an additional 3,000 jobs and \$66 million in wage income.

Exhibit 4.11 provides a summary of the ocean-dependency of the local economy by ENOW sector, including the QCEW data and additional economic activity that we discovered through our in-person meetings. Section 6 of this report provides recommendations on how OCM can better capture this activity in ENOW.

Exhibit 4.11. Summary of findings from in-person meetings and additional data sources

ENOW ocean-dependent sector	Establishments (and employment) by ENOW industry	Findings from interviews and local data sources	Additional sectors/activity not included in ENOW
Living resources	1 seafood market on St. Thomas	<ul style="list-style-type: none"> • 200 to 250 active local fishermen, plus helpers and fish cleaners • \$4.26 million in gross revenues for fishermen • 8+ seafood markets, 3 of which are government-run, the rest of which are informal operations • 1 aquaculture operation (UVI) 	<ul style="list-style-type: none"> • Marine-based conservation organizations • Government-run marine-based programs (BLS reports 9 estimated with 97 employees) • UVI marine sciences program
Marine construction	2 privately owned establishments on St. Thomas, marine-related construction	<ul style="list-style-type: none"> • ENOW data seem reasonable • Research discovered 3 marine-construction-related companies, 2 on St. Thomas and 1 on St. Croix • These companies perform a variety of marine-related activities • VIPA and other government agencies contract out marine construction activities 	<ul style="list-style-type: none"> • Company on St. Croix registered under NAICS codes not included in ENOW • Similar companies that provide ocean-related construction activities may be registered under: engineering services, other surveying and mapping services, environmental consulting services, all other support services, or other
Marine transportation	10 deep sea freight (173 employees) 5 marine passenger transportation services 7 marine transportation services	<ul style="list-style-type: none"> • ENOW data seem to underrepresent this sector • VIPA alone has 80 employees in the marine division • VIPA collected \$22.4 million in wharfage and user fees in 2014 • Many cargo/freight companies, most of which have operations on the USVI if headquartered elsewhere • At least two water taxi companies 	<ul style="list-style-type: none"> • Many marine cargo/freight companies registered under freight transportation arrangement (BLS reports 15 establishments) • WICO registered under freight transportation arrangement, with 77 employees • 4 companies with 46 employees registered under inland water transportation, likely ocean-based water taxis
Offshore mineral resources		<ul style="list-style-type: none"> • Extraction of offshore resources is prohibited in USVI • Very little economic activity in this sector • 1 or 2 companies that offer beach renourishment (sand is imported) • Oil and gas operations in ENOW dataset (St. Croix) likely not ocean-dependent 	

Exhibit 4.11. Summary of findings from in-person meetings and additional data sources

ENOW ocean-dependent sector	Establishments (and employment) by ENOW industry	Findings from interviews and local data sources	Additional sectors/activity not included in ENOW
Ship and boat building	1 boat building establishment on St. Croix	<ul style="list-style-type: none"> • 15 to 20 boat repair and maintenance shops, 2 of which employ 50+ individuals, most have 2 to 4 employees • 4 boat/ship building companies, 1 employs approximately 40 people • Repair and maintenance shops • Recreational boaters and charter yachts often employ local residents (informally) for boat washing and some other related services 	Boat maintenance and repair shops may be registered under alternative NAICS codes related to their specific service (e.g., woodworking) or a broader industry; some also may be registered under boat dealers (captured in ENOW tourism and recreation sector)
Tourism and recreation	39 (196 employees) amusement and recreation services 13 (60 employees) boat dealers 240 (2,463 employees) eating and drinking places 44 (3,510 employees) hotels and lodging places 7 (112 employees) marinas 2 (ND ^a) RV park and campgrounds 19 (85) scenic water tours 9 (98) zoos and aquaria	<ul style="list-style-type: none"> • Tourists include 570,000 overnight visitors, and 2.1 million cruise ship passengers/air excursionists from other islands (2013) • Tourist and cruise ship passenger expenditures equal \$851 million and \$381 million (2013) • Many self-employed individuals and small businesses in this sector • USVI HTA has 263 members, including 63 hotels, as well as airlines, restaurants, car rental agencies, retail shops, and more • 150+ charter yacht boats • 168 vendors operating in the National Park • 12+ recreational charter fishing operations • BER reports 8,339 employees for selected tourism sectors 	Tourism sector is much larger than defined in ENOW; it also includes retail shops, taxis, car rental agencies, air transportation, tour operators, temporary staffing agencies, real estate/vacation rentals, bars, and likely portions of other sectors

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

5. Puerto Rico's Ocean-Dependent Economy: ENOW and Beyond

This section describes the ocean-dependency of Puerto Rico's economy, based on our in-person meetings, analysis of OCM's QCEW data for ENOW sectors, and subsequent research. First, we provide an overview of the overall economy, and present the QCEW data that OCM compiled for the territory. We then compare the QCEW data for each ENOW sector to the information and data we obtained from our meetings, and describe additional ocean-dependent activity that is not included in the ENOW classification scheme, but that is ocean-dependent in the Puerto Rico context.

5.1 Overview of Puerto Rico's Economy

Puerto Rico has the most diverse and competitive economy in the Caribbean and Latin American region. Key economic sectors include manufacturing (primarily pharmaceuticals, textiles, petrochemicals, and electronics, all of which are mostly exported); and the service industry, most notably finance, insurance, real estate, and tourism. Because of Puerto Rico's small size as an island and lack of natural resources, it is highly dependent on imports (e.g., the island imports approximately 85% of its foodstuffs). The territory is also subject to U.S. trading restrictions and regulations on its shipping industry. As has been well-publicized, Puerto Rico has been experiencing an economic depression for 10 consecutive years (2006–2015); in 2014, the average annual unemployment rate was 18.5% (ACS, 2015a).

In 2012, Puerto Rico's GDP amounted to \$101.6 billion, about 0.65% of the GDP for the United States as a whole. Manufacturing accounts for close to 50% the island's total GDP, while the "real estate and rental leasing" and "public administration" industries also account for relatively large percentages. In terms of employment and wages, retail trade and "health care and social assistance" are the territory's two leading economic sectors.

As shown in Exhibit 5.1, although manufacturing far surpasses Puerto Rico's other economic sectors in terms of GDP, it accounts for a relatively small percentage of total establishments and employment. This is because many manufacturing firms move to Puerto Rico to take advantage of the island's relatively low taxes and tax incentives. These companies generate large profits; however, a significant percentage of these profits do not stay in Puerto Rico. Thus, manufacturing accounts for a much lower percentage of local economic activity than the GDP data might suggest.

The American Community Survey (ACS) indicates that in 2014, approximately 1.04 million residents (age 16 and over) were gainfully employed. In that year, approximately 128,300 of the employed population, or 12.3%, was self-employed (ACS, 2015b); this compares to 9.7% for the United States as a whole.

5.2 Puerto Rico ENOW Data

Exhibit 5.2 shows establishments, employment, and total wages for Puerto Rico by ENOW sector. As shown, the tourism and recreation sector accounts for the vast majority of ENOW-defined economic activity.

Exhibit 5.1. Summary of Puerto Rico key economic indicators by industry sector, 2012

Industry sector	GDP		Establishments		Average annual employment		Total annual wages	
	Total (millions)	% of total	Total	% of total	Total	% of total	Total (millions)	% of total
Manufacturing	\$46,971	46%	1,983	4%	80,069	9%	\$2,864	12%
Real estate and rental leasing	\$15,383	15%	1,674	3%	12,863	1%	\$302	1%
Public administration	\$8,278	8%	1,524	3%	150,293	16%	\$4,198	17%
Finance and insurance	\$5,176	5%	1,646	3%	31,891	3%	\$1,406	6%
Retail trade	\$4,809	5%	9,720	20%	129,651	14%	\$2,389	10%
Health care and social assistance	\$3,380	3%	7,638	16%	89,727	10%	\$2,346	9%
Other/unclassified	\$3,246	3%	4,568	9%	39,773	4%	\$1,354	5%
Wholesale trade	\$2,819	3%	2,406	5%	32,868	4%	\$1,327	5%
Information	\$2,465	2%	586	1%	19,133	2%	\$724	3%
Accommodation and food services	\$1,849	2%	4,244	9%	71,728	8%	\$1,019	4%
Administrative and waste services	\$1,765	2%	1,701	4%	72,699	8%	\$1,286	5%
Professional and technical services	\$1,622	2%	4,366	9%	28,141	3%	\$1,071	4%
Construction	\$1,335	1%	2,238	5%	35,562	4%	\$762	3%
Transportation and warehousing	\$ 946	1%	1,173	2%	16,826	2%	\$583	2%
Agriculture, forestry, fishing and hunting	\$816	1%	2,113	4%	11,297	1%	\$112	0%
Educational services	\$704	1%	933	2%	107,243	12%	\$3,160	13%
Total	\$101,565		48,513		929,764		\$24,903	

Note: totals may not sum due to rounding.

Sources: BLS, 2012; Puerto Rico Planning Board, 2015.

Exhibit 5.2. Establishments, employment, and total average annual wages by ENOW sector, Puerto Rico, 2012

ENOW sector	Establishments	Employment	Total wages
Living resources	14	10	\$145,331
Marine construction	19	642	\$19,816,175
Marine transportation	123	3,406	\$103,046,969
Offshore mineral resources	43	17	\$334,582 ^a
Ship and boat building	5	ND ^b	ND
Tourism and recreation	4,091	62,645	\$798,495,848
Total	4,295	66,720	\$921,838,905

a. The offshore mineral resources sector includes 36 establishments within construction sand and gravel mining. BLS did not disclose employment and wage data for this six-digit NAICS industry. Thus, total employment and wages for this sector are higher than reported in this exhibit.

b. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

Per Exhibit 5.2, the BLS reports 4,295 ocean-dependent establishments (as defined in ENOW) for Puerto Rico and an associated 66,720 employees and nearly \$922 million in total wages for 2012. Thus, based on the QCEW data for all economic sectors (Exhibit 5.1), ENOW-defined economic activity accounts for 8.8% of total business establishments, 7.2% of employment, and 3.7% of annual wages in Puerto Rico. However, similar to the USVI, the QCEW data seem to underestimate ocean-dependent economic activity in the territory. In the following sections, we provide a broader picture of the ocean-dependency of Puerto Rico's economy based on findings from our in-person meetings and available local data. This includes a discussion of ocean-dependent activity within each ENOW sector, as well as ocean-dependent activity within Puerto Rico that is not included in the current ENOW classification scheme.

5.3 Living Resources

Exhibit 5.3 presents the 2012 QCEW data for the four ocean industries within the ENOW living resources sector, and the associated six-digit NAICS industries. As shown, BLS reported four fish hatcheries and aquaculture establishments, one seafood processing plant, nine seafood markets, and no commercial fishing operations for Puerto Rico. Because of the small number of establishments, BLS did not report employment and wage data for most industries in this sector.

Findings from our in-person meetings indicate that Puerto Rico's living resources sector is much larger than the QCEW data indicate. This is likely because most, if not all, fishermen are self-employed, and therefore not captured in the QCEW statistics. In addition, seafood is often sold through informal markets (e.g., fishermen sell directly to individuals or restaurants, or through markets established by local fishing associations).

Based on our discussions with representatives from the Puerto Rico DNER, there are approximately 1,000 commercial fishermen with licenses in the territory, and an unknown number of fishermen operating without licenses. Commercial fishing operations typically include one fisherman and at least one helper, many of whom also have licenses.

Exhibit 5.3. Establishments, employment, and total wages by ocean industry, ENOW living resources sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Fish hatcheries and aquaculture	Finfish farming and fish hatcheries	2	ND ^a	ND
	Shellfish farming	1	ND	ND
	Other aquaculture	1	ND	ND
	<i>Total (ocean industry)</i>	<i>4</i>	<i>ND</i>	<i>ND</i>
Fishing	Finfish fishing	0	0	0
	Shellfish fishing	0	0	0
	Other marine fishing	0	0	0
	<i>Total (ocean industry)</i>	<i>0</i>	<i>0</i>	<i>0</i>
Seafood processing	Seafood product preparation and packaging	1	ND	ND
Seafood markets	Fish and seafood markets	9	10	\$145,331
Sector total		14	10	\$145,331

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

Many fishermen operate and sell their local catch through associations or cooperatives, such as the "Villa del Ojo." Fishing associations provide security for fishermen because they buy most (if not all) of the fish that their members catch. The associations also generate direct economic activity (e.g., the Villa del Ojo Cooperative supports two full-time employees and four part-time employees). There are currently approximately 42 fishing associations in Puerto Rico.

In 2008, NOAA's SFSC and DNER conducted a census of commercial fishermen (Matos-Caraballo and Agar, 2010) in Puerto Rico, finding 868 "active" fishermen, including 638 captains and 230 helpers. According to SFSC, 557 (64%) of the fishermen surveyed for the census self-reported that they had valid licenses, including 394 with full-time licenses, 46 with part-time licenses, and 117 with apprentice (or beginner) licenses. This figure is much lower than the 1,129 licensed fishermen that DNER reported at the time the census was conducted. However, SFSC believes that the census, which was based on extensive fieldwork, provides a better representation of active, rather than licensed, fishermen. In addition, DNER's statistics likely capture a large number of opportunistic fishermen on the main island of Puerto Rico, as well as seasonal fishermen on the island of Vieques who fish for mutton and yellowtail snappers every year between February and April (Matos-Caraballo and Agar, 2010).

Most local catch is sold directly to local residents, markets, and restaurants, as well as through fishing associations. According to DNER personnel, the average wholesale price per pound of fish and seafood is \$3.00. In 2014, the Puerto Rican commercial fleet landed 2.3 million pounds of finfish and shellfish, generating more than \$6.9 million in commercial wholesale value.⁷ This in turn generated approximately \$20.7 million in retail sales for local restaurants and seafood markets (together, approximately 0.05% of non-manufacturing GDP). It is important to note that although many fishermen sell to local restaurants and markets, the local catch accounts for only a

7. Note, this differs slightly from NOAA's SFSC estimates: 1.58 million pounds, and \$6.09 million in gross revenues for 2014.

small percentage of the seafood sold in these retail locations. Most restaurants and grocery stores and many seafood markets rely on imported fish because it provides them with a reliable, consistent, and cheaper source of supply.

The SFSC census (Matos-Caraballo and Agar, 2010) confirms that fishermen use various avenues to sell their catch. The survey indicated that 36% of fishermen sold their catch themselves (e.g., by delivering orders to the homes of regular clients, selling directly from their homes, and/or setting up in strategic locations), while 33% sold their catch to wholesalers and/or fish stores, and 28% sold through fishing associations. A small percentage of fishermen indicated they sold their catch directly to local restaurants (6%) or at their own fish store/market (6%). Again, the census includes active fishermen only (both licensed and non-licensed), and does not include opportunistic fishermen, many of which catch lobster and sell it to local restaurants.

In addition to informal activity not captured by the BLS, it appears that the QCEW data underrepresents employer-based seafood markets because many of these establishments are not classified under the six-digit NAICS code for fish and seafood markets (445220). As noted above, BLS reports nine fish and seafood markets for Puerto Rico; however, many of the 42 fishing associations described above operate as seafood markets. In addition, the website <http://www.manta.com/> lists 32 fish and seafood market establishments in the territory. All of these businesses carry the Standard Industrial Classification (SIC) code for fish and seafood markets (5421),⁸ but only five of them have the corresponding fish and seafood market NAICS code. Instead, most of these establishments are classified as meat markets under NAICS code 445210; this was even true for one establishment named “The Fish Store.” The website also reports 15 separate businesses with an SIC or NAICS code for fish and seafood merchant wholesalers (5146 and 424460, respectively). It is not clear to what extent fish markets and wholesalers are dependent on local vs. imported seafood.

The QCEW data for fish hatcheries and aquaculture seems to capture most relevant activity – by all accounts, there are not many fish hatcheries and aquaculture operations on the island. Further, most of the hatcheries/aquaculture establishments in Puerto Rico deal with freshwater fish, including tilapia and freshwater prawn. For example, McGee (Undated) reports that the University of Puerto Rico has cultured tilapia and freshwater prawns at their Agricultural Experiment Station for over 25 years. The island’s two most well-known establishments, Maricao and Caribe Fisheries, also appear to both focus on freshwater species. Thus, the fish hatchery and aquaculture establishments reported in QCEW data are likely not ocean-dependent.

Finally, although not included in the living resources sector as an ENOW-defined industry, it appears that there are a number of marine-based conservation programs and organizations in Puerto Rico. It is likely that many of these programs and organizations focus on ocean and marine-related conservation issues relevant to living resources. There are also a number of establishments that provide environmental consulting services. Many of these companies undoubtedly specialize in marine sciences and/or the impacts of policies or projects on marine life. Exhibit 5.4 shows the total establishments, employment, and wages for these industries.

8. The SIC is a system for classifying industries by a four-digit code. In the United States, NAICS has largely replaced the older SIC system; however, certain government departments and agencies still use the SIC codes.

Exhibit 5.4. 2012 QCEW data for additional NAICS code industries related to living resources sector

NAICS industry	Establishments	Employment	Total wages (millions)
924120: Public administration of conservation programs	64	2,448	\$82.8
813312: Environment and conservation organizations	8	170	\$5.6
541620: Environmental consulting services	39	267	\$9.65

In addition, the University of Puerto Rico offers a comprehensive marine life sciences program, and is home to the Sea Grant College Program, which operates out of the Mayagüez and Humacao Campuses. Sea Grant is a well-established program that funds scientific research related to conservation and sustainable use of coastal and marine resources in Puerto Rico, the USVI, and the Caribbean region. The program also provides marine extension and outreach services, working with fishermen, scientists, non-profit organizations, and government agencies throughout Puerto Rico and the USVI.

5.4 Marine Construction

As shown in Exhibit 5.5, in 2012 there were 19 establishments and 642 employees within the ENOW marine construction sector, with total wages amounting to approximately \$19.8 million. This ENOW sector comprises one ENOW ocean industry, which is defined by one 6-digit NAICS code industry: other heavy and civil engineering construction (237990).

Exhibit 5.5. Establishments, employment, and total wages by ocean industry, ENOW marine construction sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total average annual wages
Marine-related construction	Other heavy construction	19	642	\$19,816,175

In Puerto Rico, marine construction includes a variety of activities, such as dock building, pier construction, underwater welding, infrastructure maintenance, dredging, hydrographic surveying, coastline mapping, and more. The PRPA is responsible for most marine construction and maintenance at publicly managed seaports, particularly at piers that support tourism-related activities (Section 5.5 provides a description of the seaports managed by PRPA). For example, PRPA recently undertook a major renovation at a main cruise ship pier in Old San Juan to accommodate docking needs for one of the largest cruise ships in the world. PRPA is also currently planning for the development and construction of a “mega marina” on the east side of the island that will house several shipbuilding and maintenance facilities; these types of businesses are currently more common in other Caribbean countries than they are in Puerto Rico.

In the case of commercial docks, PRPA and the private companies that operate the docks often share marine construction and infrastructure maintenance responsibilities. PRPA representatives noted that ports maintenance and renovations are crucial for the economic well-being of Puerto Rico, as the vast majority of commercial cargo and manufacturing inputs come by sea.

Typically, PRPA and private companies contract out marine construction and maintenance needs to specialized contractors, including both local and non-local firms. Based on our in-person

meetings with PRPA, the BLS data for marine construction seem relatively reasonable. Given the specialized nature of marine construction-related activities, there is not likely a large self-employed or informal component to this sector. Further, based on our research, it appears that most of the firms that offer these services are registered under the NAICS code for other heavy construction, as ENOW assumes.

However, given the wide-range of services that marine construction comprises, it is likely that there are also companies that provide marine construction services, particularly related to construction planning, surveying, and/or mapping, which are registered under NAICS codes that OCM does not include in the ENOW classification scheme. Potential examples may include engineering services (NAICS code 541330), other surveying and mapping services (541370), environmental consulting services (541620), and all other support services (561990). There may also be some related activity in the geophysical surveying and mapping services industry (541360), although this NAICS code industry is included in the ENOW offshore mineral resources sector. In addition, as in many other coastal areas of the U.S., there are likely some self-employed individuals that perform construction and repair of docks at private residences.

5.5 Marine Transportation

Marine transportation is the second largest ENOW sector in Puerto Rico, with 123 establishments and more than 3,400 employees. As shown in Exhibit 5.6, marine transportation services and warehousing are the two largest ENOW-defined ocean industries within the marine transportation sector.

Exhibit 5.6. Establishments, employment, and total wages by ocean industry, ENOW marine transportation sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Deep sea freight	Deep sea freight transportation	6	42	\$1,338,030
	Coastal and Great Lakes freight transportation	6	ND ^a	ND
	<i>Total (ocean industry)</i>	<i>12</i>	<i>42</i>	<i>\$1,338,030</i>
Marine passenger transportation	Deep sea passenger transportation	2	ND	ND
	Coastal and Great Lakes passenger transportation	2	ND	ND
	<i>Total (ocean industry)</i>	<i>4</i>	<i>ND</i>	<i>ND</i>
Marine transportation services	Port and harbor operations	8	251	\$3,556,417
	Marine cargo handling	19	1,388	\$48,314,774
	Navigational services to shipping	15	175	\$7,873,131
	Other support activities for water transportation	8	26	\$684,435
	<i>Total (ocean industry)</i>	<i>50</i>	<i>1,840</i>	<i>\$60,428,757</i>
Search and navigation equipment	Search, detection, navigation, guidance, aeronautical and nautical system, and instrument manufacturing	0	0	0
Warehousing	Farm product warehousing and storage	2	ND	ND
	General warehousing and storage	53	1,524	\$41,280,182
	Refrigerated warehousing and storage	2	ND	ND
	<i>Total (ocean industry)</i>	<i>57</i>	<i>1,524</i>	<i>\$41,280,182</i>
Sector total		123	3,406	\$103,046,969

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

Our in-person meetings confirm that marine transportation is a significant component of Puerto Rico’s economy. PRPA and some private companies operate 14 major seaports in the territory (Exhibit 5.7) that support passenger transportation, cargo operations, and cruise ships. Puerto Rico’s largest port facilities include the seaports at San Juan, Ponce, and Mayagüez. There are also many water taxi services and a number of marinas located throughout the island.⁹

Exhibit 5.7. Puerto Rico’s major seaports.



Without further investigation, it is difficult to determine the accuracy of the QCEW data for the ENOW Marine Transportation sector. However, according to both PRPA and the Puerto Rico Marine Transportation Authority (MTA), the QCEW establishment and employment numbers seem a bit low. The representatives we met with from the PRSA also believe that the sector is underrepresented, specifically in terms of the employment data for marine cargo handling, port and harbor operations, and warehousing. As described below, based on our own research, we have also identified some gaps in the ENOW data for this sector.

In the public realm, the two largest agencies within Puerto Rico’s marine transportation sector include PRPA and MTA. PRPA, which has approximately 100 employees in its marine division, owns and manages 9 of the island’s 14 major seaports (main ports that are not under PRPA include Mayaguez, Ponce, Fajardo, Vieques, and Culebra). The agency’s marine-related revenues consist primarily of landing and passenger fees, as well as rental income from concessionaires and other businesses located at the ports. PRPA oversees all facilities at the Port of San Juan, which ranks among the top cruise destinations in the world and is one of the largest centers for commercial exchange in the United States. Facilities at the Port of San Juan include 34 piers that support passenger, cruise ship, and cargo operations around San Juan Bay,¹⁰ and more than 108 acres of container storage (Deleo, 2010).

9. Marinas are included in the ENOW Tourism and Recreation sector.

10. This includes facilities in Old San Juan, Puerta de Tierra, Isla Grande, and Puerto Nuevo areas.

MTA has 210 employees that manage three ferry and cargo operations in Puerto Rico, including passenger transportation (i.e., ferries) and cargo operations with routes between the Municipality of Fajardo to the Island Municipalities of Vieques and Culebra, and passenger transportation from the Municipality of Cataño to Old San Juan through the San Juan Bay. The Fajardo-Vieques-Culebra routes provide service to more than one million passengers each year (including tourists and residents), charging \$1.50 for a one-way trip. The Cataño-Old San Juan route provides service to an average of 800,000 passengers each year. The cost of a one-way trip for passengers on this route is \$0.50. MTA reports that the Fajardo-Vieques-Culebra cargo routes include more than one million items annually (cargo information is not available in tons).

On the private side, our in-person meetings indicate that there is substantial economic activity within the ENOW-defined marine transportation services and warehousing industries. Approximately 98% of Puerto Rico's imported goods come to the island by ship, and Puerto Rico imports most of what it consumes, including foodstuffs, household consumer goods, and inputs for construction and manufacturing, among others. Major shipping companies that operate at the island's seaports include Crowley, Seastar, Trailer Bridge, and Luis Ayala Colon Sucrs., Inc. These companies are mostly headquartered in other areas of the United States but have local operations and facilities.

Mr. Hernán F. Ayala-Rubio, president of PRSA, indicated that the employment data for the marine transportation services and warehousing industries seem particularly low. However, Mr. Ayala-Rubio also indicated that shipping is highly regulated by Federal and State agencies and, thus, informal activity is not common in these industries. It is possible that some companies that provide marine transportation and warehousing services are registered under NAICS codes that are not included in ENOW. For example, BLS reports 58 establishments and 718 employees for Puerto Rico in the freight transportation arrangement (NAICS code 488911). Although many of these companies may deal primarily with truck freight, many also may provide services related to marine cargo.

As another example, Continental Shipping is a large company that coordinates cruise ship activities at the Port of San Juan. The services that Continental Shipping provides include pre- and post-arrival documentation, immigration/customs, passenger logistics, travel agency, security, and more. According to <http://www.manta.com/>, this company has approximately 185 employees and is registered under NAICS code 561311: employment placement agencies (it may also be registered under additional NAICS codes).

In the public realm, PRPA appears to be registered under NAICS code 926120: transportation program administration, and is therefore not reflected in the ENOW dataset. The BLS data indicate that there are 16 state government-run establishments in the transportation program administration NAICS industry, and 3,560 employees. This likely also includes PRPA air operations and Puerto Rico Department of Transportation activities related to road transportation. It is not clear whether MTA, which is within the Department of Transportation and Public Works, is registered under a NAICS code that is included in the ENOW classification scheme. The BLS reports publicly owned establishments in only two of the NAICS industries that make up the ENOW marine transportation sector. This includes three state government-owned establishments in the port and harbor operations industry, and one local government-run establishment in the marine cargo handling industry. BLS does not disclose employment data for

these establishments. Thus, even if MTA is registered under the NAICS code for one of these industries, its 210 employees are not represented in the data.

Our in-person meetings and subsequent research also indicate that the QCEW data underrepresent activity within the marine passenger and deep-sea freight transportation ocean industries. For example, MTA indicated that there are a significant number of small private operations that provide passenger transportation to different cays and other small islands around Puerto Rico. Many of these are likely sole proprietorships or part of the informal economy, and therefore not reflected in the QCEW data. The 2012 Census Public Use Microdata Sample (PUMS) data for the territory also show additional activity associated with these industries. BLS reports 16 establishments within the marine passenger and deep-sea freight industries, and only 42 employees; the PUMS data indicate that there are approximately 2,440 individuals employed in NAICS industries related to water transportation.¹¹

5.6 Offshore Mineral Resources

The offshore mineral resources sector constitutes a relatively small percentage of the ENOW-defined, ocean-dependent economy in Puerto Rico, with only 43 reported establishments in 2012. Puerto Rico supports only two of the NAICS code industries within this sector, including construction sand and gravel mining, and geophysical exploration and mapping services (Exhibit 5.8). The island does not support any offshore drilling operations.

Exhibit 5.8. Establishments, employment, and total wages by ocean industry, ENOW offshore mineral resources sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Limestone, sand, and gravel	Construction sand and gravel mining	36	ND ^a	ND
	Industrial sand mining	0	0	0
	<i>Total (ocean industry)</i>	<i>36</i>	<i>0</i>	<i>0</i>
Oil and gas exploration and production	Crude petroleum and natural gas extraction	0	0	0
	Natural gas liquid extraction	0	0	0
	Drilling oil and gas wells	0	0	0
	Support activities for oil and gas operations	0	0	0
	Geophysical exploration and mapping services	7	17	\$334,582
	<i>Total (ocean industry)</i>	<i>7</i>	<i>17</i>	<i>\$334,582</i>
Sector total		43	17	\$334,582

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

Based on our in-person meetings, there is very little economic activity in this sector. According to DNER personnel, offshore mineral extraction and sand mining on beaches is legally prohibited in Puerto Rico. There are companies that perform sand extraction from rivers, and

11. The PUMS data include employment in the inland water transportation and freight industries in this total, however, we suspect that the data do not account for a large percentage of reported employment (e.g., the BLS only reports two establishments in the inland water transportation and freight industries, NAICS codes 483211 and 483212).

some gravel and rock quarries that are not located in coastal areas. Thus, it appears that the construction sand and gravel mining establishments included in the QCEW summary data are not ocean-dependent. This is not necessarily true of the geophysical exploration and mapping services, which as detailed in Section 5.4, may provide services related to marine construction. However, BLS only reports seven establishments within this industry.

5.7 Ship and Boat Building

As shown in Exhibit 5.9, BLS reports only five establishments in Puerto Rico within the ENOW ship and boat building and repair industry. However, based on our in-person meetings, there are many establishments around the territory that provide repair and maintenance services.

Exhibit 5.9. Establishments, employment, and total wages by ocean industry, ENOW ship and boat building sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Boat building and repair	Boat building and repair	2	ND ^a	ND
Ship building and repair	Ship building and repair	3	ND	ND
Sector total		5	ND	ND

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

A quick Internet search also reveals several boat manufacturing companies and/or boat maintenance and repair shops on the island. The website <http://www.manta.com> lists eight companies in Puerto Rico that are registered under the NAICS code for boat building (336612). Puerto del Rey Marina, which is located on the eastern end of Puerto Rico and is one of the largest marinas in the Caribbean, lists 18 different local businesses on its website that offer boat and/or ship repair, maintenance, and related services. These services are categorized as follows: air conditioning and refrigeration, bottom maintenance and painting; canvas and upholstery; boat cleaning; electrical repair; equipment sales and repair; fiberglass repair and finishing; hydraulics; mechanical repairs and maintenance; outboard engine mechanics; outboard motor repair and maintenance; propulsion systems; refinishing; rigging; towing and salvage; welding and metal fabricators; and woodworking. Many of the businesses listed perform a number of these different services.

It is not clear why the QCEW data do not capture these establishments. However, many of them may be classified under NAICS code industries that are not included in ENOW. For example, it is not difficult to imagine that businesses performing services related to air conditioning, woodworking, or welding may be classified under these more specific categories. Alternatively, many of these establishments may provide multiple services, some of which may not be related to ships or boats. For example, Caterpillar is one of the businesses that the Puerto del Rey Marina lists on its website as providing boat maintenance services; it is likely classified under an unrelated NAICS code. There may also be some self-employed individuals that provide boat repair and maintenance services.

5.8 Tourism and Recreation

Exhibit 5.10 presents total establishments, employment, and total wages for ENOW-defined ocean industries and associated six-digit NAICS code industries within this ENOW sector. As shown, eating and drinking places account for the overwhelming majority of economic activity in this sector, followed by hotels and lodging places. In terms of geographic location, the QCEW data indicate that business establishments within the tourism and recreation sector are well-distributed across the island; however, there is a higher concentration of tourism and recreation industries in San Juan, which serves as the island's tourism hub. In addition, there are a number of small, coastal towns such as Rincón, which are almost entirely dependent on tourism.

Exhibit 5.10. Establishments, employment, and total wages by ocean industry, ENOW tourism and recreation sector, 2012

ENOW-defined ocean industry	Six-digit NAICS code industry	Establishments	Employment	Total wages
Amusement and recreation services	All other amusement and recreation industries	60	323	\$5,923,398
	Recreational goods rental	9	19	\$234,246
	Sports and recreation instruction	18	266	\$3,432,152
	Scenic and sightseeing transportation (non-water-based)	0	0	0
	<i>Total (ocean industry)</i>	<i>87</i>	<i>608</i>	<i>\$9,589,796</i>
Boat dealers	Boat dealers	20	98	\$2,060,685
Eating and drinking places	Cafeterias, grill buffets, and buffets	511	3,124	\$39,926,459
	Full-service restaurants	933	16,018	\$209,024,334
	Limited-service restaurants	2,037	34,760	\$397,770,411
	Snack and nonalcoholic beverage bars	274	2,203	\$22,612,071
	<i>Total (ocean industry)</i>	<i>3,755</i>	<i>56,105</i>	<i>\$669,333,275</i>
Hotels and lodging places	Bed-and-breakfast inns	6	28	\$421,675
	Hotels and motels, except casino hotels	194	5,554	\$111,953,436
	<i>Total (ocean industry)</i>	<i>200</i>	<i>5,582</i>	<i>\$112,375,111</i>
Marinas	Marinas	13	170	\$3,462,467
RV parks and campgrounds	RV parks and campgrounds	5	22	\$275,988
Scenic water tours	Scenic and sightseeing transportation, water	7	60	\$1,398,526
Sporting goods	Sporting and athletic goods manufacturing	1	ND ^a	ND
Zoos and aquaria	Nature parks and other similar institutions	3	ND	ND
	Zoo and botanical gardens	0	0	0
	<i>Total (ocean industry)</i>	<i>3</i>	<i>ND</i>	<i>ND</i>
Sector total		4,091	62,645	\$798,495,848

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

According to the Puerto Rico Planning Board (PRPB), approximately 3.2 million people visited Puerto Rico in 2014 as tourists, and an additional 1.2 million people arrived via cruise ships (for perspective, the resident population of Puerto Rico is approximately 3.6 million). In that year, tourist and cruise-ship passenger expenditures amounted to \$3.26 billion and \$182 million, respectively. Tourists and cruise-ship passengers participate in a variety of activities in Puerto Rico, including boating, fishing, charter boating, snorkeling, surfing, kite sailing, beach

lounging, shopping, visiting historical sites and nature parks, and more. Local residents also enjoy many water-based activities, including surfing, boating, and fishing.

The Puerto Rico National Accounts indicate that the recreation and entertainment and lodging and restaurants sectors¹² make up approximately 2% of the territory's GDP.¹³ The World Travel and Tourism Council (WTTC, 2015) reports similar findings, indicating that in 2014, the direct contribution of travel and tourism amounted to \$2.43 billion,¹⁴ approximately 2.4% of Puerto Rico's GDP. WTTC also reports that when indirect and induced effects are taken into account, the travel and tourism sector contributed \$7.42 billion to the Puerto Rican economy, approximately 7.3% of territory's GDP. Both PRTC and PRHTA agreed that tourism accounts for a larger percentage of the local economy than the 2% to 2.4% that the Planning Board and WTTC report. However, PRTC and PRHTA also stated that the economic impact of tourism is difficult to measure.

Members of the project team met with a number of individuals from tourism-related organizations to gain a better understanding of activity within this sector, including representatives from the PRHTA, the PRTC, and the Tourism Association of Rincón. Representatives from PRPA, MTA, and DNER also provided insights on economic activity within this sector. Our in-person meetings and subsequent research confirmed that tourism is an important sector in Puerto Rico, and the QCEW data do not fully capture tourism-dependent economic activity.

Similar to the USVI, the QCEW data underestimate economic activity associated with tourism and recreation in two ways. First, within the ENOW-defined sectors and associated six-digit NAICS code industries, the QCEW data do not seem to capture all current activity. Second, the ENOW classification scheme does not include several sectors that are heavily reliant on tourism in Puerto Rico, including car rental agencies, airports, travel agencies, and some retail shops (e.g., duty-free shopping in Old San Juan and factory outlet malls).

For example, the PRTC endorses more than 250 lodging establishments in the territory, including hotels, bed and breakfasts, apartment villas, condo hotels, and guesthouses, while BLS only reports 200 establishments in the hotel and lodging places industry. In addition, representatives from PRTC and PRHTA both stated that there are a significant number of lodging establishments that PRTC does not endorse, and that online rental sites, such as Airbnb, VRBO, and HomeAway have also grown significantly in recent years. Data from the PRPB indicate that approximately 50% of the 3.2 million overnight visitors that came to Puerto Rico in 2014 did not stay in hotels. Although there is no comprehensive database of vacation rental properties, a quick search on VRBO returned more than 2,700 rental properties in Puerto Rico. Areas with a significant number of vacation rental properties include the coastal towns of Vieques, Rincón, Dorado, Culebra, Humacao, and Cabo Rojo, as well as the cities of San Juan and Carolina.

12. As defined in the National Accounts.

13. The 2% estimate is based on production by tourism-related industries, not tourism spending.

14. This is based on tourism satellite accounts and does not equate to tourism-related expenditures.

Based on our discussions with representatives from this sector, it also appears that tour operators, charters, and other recreational services (including recreational-goods rental shops) in Puerto Rico greatly exceed the QCEW figures. For example, BLS reports 7 establishments and 60 employees in the ENOW water-based scenic and sightseeing transportation industry, and 87 establishments and 608 employees in the ENOW amusement and recreation services industry (94 establishments and 668 employees total). However, as shown in Exhibit 5.11, the PRTC endorses 135 adventure and nautical tour operators (i.e., establishments) alone. In addition, according to the Census PUMS, there were 572 employees associated with the NAICS codes for scenic and sightseeing transportation (both water and land-based) in 2012. The difference is likely because many establishments in these sectors are sole proprietorships or do not report employment.

Exhibit 5.11. PRTC-endorsed tour operators

Category	Subcategory	Number of operations endorsed
Adventure	Climbing	4
	Scenic flights	12
	Zip lines	11
	Other	11
Nature	Biking	12
	Horseback riding	9
Nautical	Recreational fishing charters	7
	Kayaking	28
	Kiteboarding	2
	Diving	22
	Paddle boarding	6
	Surfing	4
	Catamaran services	7
Total		135

In addition, there are a number of nature parks and historical landmarks that are popular among tourists in Puerto Rico, which the QCEW data do not seem to capture. For example, the Census PUMS data indicate that in 2012, there were 2,664 individuals employed in sectors within the three-digit NAICS code 712, which include museums, historical sites, and nature parks. Although OCM does not include museums in the ENOW classification scheme, BLS reported 258 employees under the six-digit NAICS museum sector for 2012. Thus, a significant percentage of the 2,664 employees are likely working in nature parks or at historical landmarks. Since many of these are government-run, they may be classified under a public administration NAICS code.

There are no recent data on recreational fishing in Puerto Rico, but DNER personnel indicated that it is an important component of the tourism and recreation sector. The representatives we met with from DNER stated that there are approximately 100,000 recreational fishermen in Puerto Rico, fishing in both salt and fresh waters. Of these, only about 20 are recreational fishing charters dedicated to tourism. The overwhelming majority are local residents fishing for their recreational pleasure. In 2011, NOAA published *The Economic Contribution of Marine Angler Expenditures in the United States, 2011* (Lovell et al., 2013). This study stated that total angler expenditures on marine recreational fishing in Puerto Rico amounted to \$72 million in 2011.

There are also many sectors that are dependent on tourism that are not included in the ENOW classification scheme. For example, representatives from both the PRHTA and the PRTC expressed concerns about not including casino hotels in the hotel and lodging places industry. They agreed that access and proximity to the beach are the most important features for visitors when booking a hotel, regardless of whether it has a casino on the premises. In general, visitors do not come to Puerto Rico to gamble but many stay at casino hotels. Based on the QCEW data, there are 25 casino hotels in Puerto Rico, with 7,904 employees. As discussed in Section 6, it may be necessary to include this sector (or at least a portion of this sector) in the ENOW classification scheme for Puerto Rico and the USVI.

Other tourism-dependent sectors include car-rental agencies; taxis; some retail shops and bars; and businesses that organize thematic events, wedding services, and meetings for other destination-management corporations. In addition, tour operators (NAICS code 561520) are not included in ENOW; however, many establishments within this industry are likely ocean-dependent in Puerto Rico. Travel agencies (NAICS code 561510) also rely on tourism, and often provide services to cruise-ship passengers visiting the island. Given Puerto Rico's status as a tourist destination, much of the airline industry is also tourist-dependent. PRPA has 500 employees in its air division and manages 9 airports, not including San Juan Luis Muñoz Marin International Airport, which is managed by a private organization. In Puerto Rico, it is more difficult to determine the percentage of activity that is dependent on tourism in non-ENOW industries than it is in the USVI. This is because many of these industries also cater to local residents or business travelers, providing services that are not directly dependent on the ocean.

The 2015 BREA study described in Section 4.8 for the USVI also provides estimates of the economic impact of cruise-related tourism for Puerto Rico, providing insight on local economic activity that the cruise ship industry supports. Results of the study indicate that cruise-ship passenger and crew expenditures in Puerto Rico, along with additional expenditures by the cruise lines, amounted to \$198.2 million during the 2014–2015 cruise year. Cruise tourism expenditures consisted of a broad range of spending, including:

- Onshore expenditures by passengers, which tend to be concentrated in shore excursions and retail purchases of clothing, jewelry, and local crafts and souvenirs
- Onshore expenditures by crew members, which are generally concentrated in purchases of food and beverages, local transportation, and retail purchases of clothing and electronics
- Expenditures by cruise lines for port services, such as dockage fees and linesmen; and utilities, such as water and power and navigation services
- Purchases of supplies, such as food and other items, by the cruise lines from local businesses.

Exhibits 5.12–5.14 present the breakdown of expenditures for cruise-ship passengers (separately calculated for transit passengers and passengers that left from Puerto Rico) and crew members. Overall, it shows that the cruise ship industry directly supports many non-ENOW sectors, including taxis and retail stores (particularly jewelry and electronic stores, and gift shops). Unfortunately, there is not a similar source of data for expenditures by non-cruise tourists.

Exhibit 5.12. Estimated transit passenger spending, 2014–2015 cruise year

Purchase categories	Average spent per party	Share of all onshore visits	Weighted average spent per party
Shore excursions	\$87.10	24.8%	\$21.61
Restaurants and bars	\$40.00	54.2%	\$21.72
Taxis/ground transportation	\$39.30	14.8%	\$5.82
Watches and jewelry	\$232.00	15.2%	\$35.25
Clothing	\$48.30	40.8%	\$19.69
Entertainment/night clubs/casinos	\$48.80	3.0%	\$1.47
Other purchases	\$80.30	28.8%	\$23.10
Perfumes and cosmetics	\$42.20	2.9%	\$1.22
Local crafts and souvenirs	\$34.10	46.3%	\$15.81
Retail purchases of liquor	\$44.50	9.8%	\$4.36
Electronics	\$55.80	0.6%	\$0.35
Telephone and internet	\$26.60	0.8%	\$0.20
Total spent per cruise party			\$150.60
Average size of a cruise party			2.1
Total spent per cruise passenger			\$71.37
Cruise passenger onshore visits			939,822
Total cruise passenger expenditures			\$67,078,639

Exhibit 5.13. Estimated homeport passenger spending, 2014–2015 cruise year

Purchase categories	Average spent per party	Share of all onshore visits	Weighted average spent per party
Lodging	\$289.20	44.8%	\$129.57
Shore excursions	\$129.80	20.0%	\$43.75
Food and beverage at restaurants and bars	\$87.40	35.4%	\$30.92
Taxis/ground transportation	\$50.90	31.8%	\$16.21
Watches and jewelry	\$177.10	2.6%	\$4.60
Clothing	\$58.20	16.2%	\$9.44
Entertainment/night clubs/casinos	\$73.90	3.9%	\$2.88
Other purchases	\$86.90	12.0%	\$10.44
Perfumes and cosmetics	\$16.80	3.6%	\$0.60
Local crafts and souvenirs	\$29.90	11.7%	\$3.50
Retail purchases of liquor	\$39.70	6.8%	\$2.71
Electronics	\$32.00	1.6%	\$0.52
Telephone and internet	\$31.40	1.6%	\$0.51
Total spent per cruise party			\$255.65
Average size of a cruise party			2.0
Total spent per cruise passenger			\$125.32
Cruise passenger visits			454,099
Total cruise passenger expenditures			\$56,906,929

Exhibit 5.14. Estimated crew member spending, 2014–2015 cruise year

Purchase categories	Average spent per crew member	Share of all onshore visits	Weighted average spent per crew member
Restaurants and bars	\$33.70	59.5%	\$20.03
Taxis/ground transportation	\$17.80	57.0%	\$10.16
Watches and jewelry	\$154.80	7.7%	\$11.89
Clothing	\$93.90	44.5%	\$41.77
Entertainment/night clubs/casinos	\$117.70	2.9%	\$3.39
Other purchases	\$156.90	19.4%	\$30.37
Shore excursions	\$21.20	2.1%	\$0.44
Perfumes and cosmetics	\$60.80	14.4%	\$8.76
Local crafts and souvenirs	\$21.90	8.0%	\$1.75
Retail purchases of liquor	\$339.60	1.0%	\$3.26
Electronics	\$205.00	7.0%	\$14.43
Telephone and internet	\$47.50	6.7%	\$3.19
Total spent per crew			\$149.44
Crew visits			234,437
Total crew expenditures			\$35,034,255

Finally, in addition to the tourism and recreation-related industries described above, the 2012 QCEW indicates that there are 29 establishments and 669 employees in the motion picture and video production industry. Although this likely includes many services that are not ocean dependent, several movies have been filmed in Puerto Rico; likely because of its ocean setting.

5.9 Summary

Our in-person meetings and review of local data confirmed that much of the economic activity in Puerto Rico is linked to the ocean. However, the portion of the economy that is ocean-dependent seems to be much less than it is in the USVI. Similar to the USVI, tourism is the primary driver of ocean-dependent economic activity in Puerto Rico. Activities associated with the ENOW marine transportation (including marine passenger transportation, port and harbor operations, marine cargo handling, and warehousing) and living resources sectors, and to some extent the marine construction sector, also generate meaningful economic activity throughout the territory.

It appears that the QCEW data and the traditional ENOW classification scheme underrepresent the local economy's dependence on the ocean for several reasons: (1) many businesses that provide ocean-related services that OCM intended to capture in ENOW are registered under NAICS codes that are not included in the ENOW classification scheme; (2) ENOW's classification scheme excludes many sectors that are ocean-dependent in Puerto Rico, particularly in the tourism industry; and (3) the ENOW tourism and recreation and living resources sector have a relatively high percentage of self-employed individuals and informal economic activity. This is also true for some marine passenger transportation.

Exhibit 5.15 provides a summary of the ocean dependency of the local economy by ENOW sector, including the QCEW data and additional economic activity that we discovered through our in-person meetings. Section 6 of this report provides recommendations on how OCM can better capture this activity in ENOW, including potential data sources.

Exhibit 5.15. Summary of findings from in-person meetings and additional data sources

ENOW ocean-dependent sector	ENOW establishments (and employment) by ENOW industry	Findings from interviews and local data sources	Additional sectors/activity not included in ENOW
Living resources	4 fish hatcheries/aquaculture 1 seafood processing plant 9 seafood markets	<ul style="list-style-type: none"> • 1,000 commercial fishermen, plus helpers • \$6.9 million in gross revenues for fishermen • 32+ seafood markets • 15 seafood wholesale businesses • Fish hatcheries are likely freshwater, not ocean-dependent • 44 fishing cooperatives 	<ul style="list-style-type: none"> • Marine-based conservation organizations • Government-run, marine-based programs (BLS reports 64 establishments and 2,448 employees) • University of Puerto Rico marine sciences program • Environmental consulting services
Marine construction	19 privately owned establishments (642 employees)	<ul style="list-style-type: none"> • ENOW data seem reasonable • Marine construction companies perform a variety of marine-related activities • PRPA and other agencies contract out most marine activities 	<ul style="list-style-type: none"> • Companies that provide ocean-related construction activities may be registered under: engineering services, other surveying and mapping services, environmental consulting services, all other support services, or other
Marine transportation	12 deep sea freight (42 employees, plus ND ^a) 4 marine passenger transportation 50 marine transportation services (1,840 employees) 57 warehousing (1,524 employees, plus ND)	<ul style="list-style-type: none"> • ENOW data appear to underrepresent sector • 100 employees in PRPA marine division not represented in ENOW • 210 MTA employees that may not be represented in ENOW • 185 employees at Continental Shipping, major support company for cruise ships, not represented in ENOW • Many cargo/freight companies, most of which have operations in Puerto Rico but headquartered elsewhere • Informal activity/self-employment relatively low, except in marine passenger transportation • 2,440 individuals employed in water transportation, including inland waters 	<ul style="list-style-type: none"> • Some marine cargo/freight companies may be registered under freight transportation arrangement (BLS reports 58 establishments and 718 employees in this industry)
Offshore mineral resources	36 construction sand and gravel mining establishments 7 geophysical exploration and mapping services	<ul style="list-style-type: none"> • Extraction of offshore resources is prohibited in Puerto Rico • Very little economic activity in this sector • Construction sand and gravel mining establishments in ENOW dataset likely not ocean-dependent • Geophysical exploration and mapping establishments may be related to marine construction 	

Exhibit 5.15. Summary of findings from in-person meetings and additional data sources

ENOW ocean-dependent sector	ENOW establishments (and employment) by ENOW industry	Findings from interviews and local data sources	Additional sectors/activity not included in ENOW
Ship and boat building	5 ship building establishment in St. Croix	<ul style="list-style-type: none"> • 18 boat repair and maintenance-related establishments just at Puerto del Rey Marina • At least 8 boat/ship-building companies 	Boat maintenance and repair shops may be registered under alternative NAICS codes related to their specific service (e.g., woodworking) or a broader industry, or registered under boat dealers (captured in ENOW tourism and recreation sector)
Tourism and recreation	87 (608 employees) amusement and recreation services 20 (98 employees) boat dealers 3,755 (56,105 employees) eating and drinking places 200 (5,582 employees) hotels and lodging places 13 (170 employees) marinas 5 (22 employees) RV park and campgrounds 7 (60 employees) scenic water tours 1 (ND) sporting and athletic goods manufacturing 3 (ND) nature parks and similar institutions	<ul style="list-style-type: none"> • Tourists include 3.2 million overnight visitors, and 1.2 million cruise-ship passengers (2014) • Tourist and cruise-ship passenger expenditures equal \$3.26 billion and \$182 million, respectively (2014) • Many self-employed individuals and small businesses in this sector • 250+ PRTC-endorsed lodging establishments • 135+ PRTC-endorsed tour operators • 2,700+ vacation rentals • 572 employees in scenic and sightseeing transportation sector (water- and land-based) • 20 recreational charter fishing operations • \$72 million in expenditures for recreational fishing (2011) 	Tourism sector is much larger than defined in ENOW; it also includes retail shops, taxis, car rental agencies, air transportation, tour operators, real estate/vacation rentals, bars, and likely portions of other sectors Seems unlikely that all restaurants are dependent on tourism or the ocean

a. For industries below a certain size, BLS does not disclose employment and wage data for privacy purposes. These occurrences are noted using "ND" for non-disclosed.

6. Conclusions and Recommendations

The QCEW data for ENOW sectors in the USVI and Puerto Rico serves as a good first step in capturing ocean-dependent economic activity. However, based on our in-person meetings and subsequent research, it is clear that the QCEW data and existing ENOW classification scheme underestimate the ocean-dependency of the islands' local economies for several reasons:

- There are a large number of self-employed individuals in some ENOW-defined sectors, particularly the tourism and recreation and living resources sectors. NES are not available for the USVI or Puerto Rico, and the BLS QCEW data does not capture information on sole proprietorships.
- There is also a relatively high percentage of informal economic activity in the USVI and Puerto Rico. This typically includes small businesses that do not report employment to the federal government.
- The ENOW classification scheme does not include many industries that are ocean-dependent in the USVI and Puerto Rico because of their unique nature as islands and tourist destinations. For example, the tourism industry supports a significant portion of activity in the retail trade and the airline industries. In addition, many nonprofit organizations and government-run conservation organizations also focus on marine resources.
- Many companies that ENOW intends to capture are registered under NAICS codes that OCM does not include in the ENOW classification scheme. For example, it appears that VIPA and PRPA are not represented in the ENOW data because they are (likely) registered under public administration NAICS codes. These agencies are important contributors to the marine transportation sector in their respective territories.
- BEA does not develop industry-level GDP data for U.S. territories. Thus, the pilot ENOW dataset only captures establishments, employment, and total annual wages. Further, BLS does not disclose employment and wage data for many NAICS industries because of the small number of establishments.

Neither territory has a comprehensive database that will address all of these issues. However, there are some local data sources and potential changes to the ENOW methodology for the USVI and Puerto Rico that will allow OCM to better capture ocean-dependent economic activity. In the following sections, we outline these data sources and alternative methods and provide recommendations for further research.

6.1 Additional Data Sources

There are a few potential data sources that agencies in the USVI and Puerto Rico publish on an annual basis, and that OCM could potentially draw upon to develop a more comprehensive accounting of ocean-dependent activity. For the USVI, these data sources include:

- Business registration data from the Department of Licensing and Consumer Affairs (DLCA). According to many of the people we met with in the USVI, all businesses within the territory, including sole proprietorships, must register with the DLCA. Based on its website, DLCA maintains a database of all businesses, by business type. Despite multiple attempts to contact

DLCA, we were not able to obtain these data. However, OCM could work with DLCA to potentially enhance the QCEW data, at least in terms of total establishments. It is not clear whether DLCA has data on the number of employees by business type or how industry categories are defined.

- DPNR commercial fishermen registration data. Commercial fishermen must file a monthly commercial catch report with DNER.¹⁵ Based on the registration data, DNER should be able to provide the number of registered (and active) commercial fishermen to the NOAA OCM. DNER should also be able to provide annual data on the number of employees associated with the three government-run fish markets on St. Thomas and St. Croix. This data could be used as an alternative to the QCEW data for reporting total establishments and employment in the USVI living resources sector.
- USVI BER Annual Tourism Indicators. This includes information and data on the number of visitors, hotel room occupancy, visitor spending, and other data related to the economic importance of the tourism industry. BER also conducts visitor exit surveys; however, it has not been able to conduct these on an annual basis due to inadequate funding. As discussed in more detail below, OCM could potentially use some of this data to help determine the percentage of a sector that should be included in ENOW because it is partially dependent on tourism. For example, visitor spending data may provide insights on the percentage of the retail industry that can be attributed to tourism.
- The local BLS also produces data on the tourism industry. OCM should compare the local BLS data to the federal QCEW data to capture data that is not disclosed at the federal level and to evaluate whether the local BLS includes additional sectors in its definition of the tourism industry.
- Most VIPA data, including marine and aviation landings, employment, revenues from wharfage/pilotage fees, and marine construction contractors are available in VIPA's annual financial reports and or directly from VIPA staff. Since VIPA seems to be registered under a NAICS code that is not included in the ENOW classification scheme, the VIPA employment data can be directly added to the ENOW marine transportation sector. Revenue data may also help to augment GDP estimates for the marine transportation industry. Additionally, OCM may also be able to use the data to determine if there are any additional establishments in the marine construction sector.

For Puerto Rico, potential data sources include:

- Tourism data from the PRPB and PRTC. PRPB publishes annual data on overnight visitors and cruise-ship passengers, including expenditure data. PRTC produces statistics on a monthly basis and has a yearly publication, "The Selected Statistics." This publication includes information and data on hotel room occupancy, average daily rate (ADR), room

15. At our in-person meeting, DNER stated that it provides this information to NOAA. However, according to the NOAA SFSC, NOAA only has annual commercial fishing data related to landings and dockside revenues. This process could be coordinated; OCM should be able to obtain the number of registered, active fishermen directly from NOAA or DNER.

inventory, employment in the hotel industry, hotel registrations by origin, length of stay, and other data related to local hotels. The PRTC data are also available from the Puerto Rico Statistics Institute. PRTC is trying to obtain funding to develop tourism satellite accounts in order to measure the impact of tourism. OCM could potentially use some of this data to help determine the percentage of a sector that should be included in ENOW because it is partially dependent on tourism.

- PRPA statistics. Most Ports Authority data, including passenger and cargo data (marine and aviation), can be obtained from the Puerto Rico Statistics Institute. Similar to the VIPA data, OCM may be able to use the PRPA statistics to estimate and/or compare GDP and employment in the marine transportation sector.
- Census PUMS data provide some information on the number of employed individuals in specific NAICS industries. In most cases, the PUMS dataset would serve as supplemental information in the QCEW. However, it should capture sole proprietorships and can be directly compared to the QCEW employment data for some NAICS industries (PUMS combines some industries, and will therefore not always provide a direct comparison).

We have analyzed and incorporated findings from many of these data sources into this report. However, we recommend that as a next step, OCM undertake a more comprehensive review of these various sources (and others) to better understand how it might be more systematically incorporated into the ENOW dataset. Some of these sources are particularly important for capturing sole proprietorships.

6.2 Additional NAICS Industries to Include in ENOW

As documented throughout this report, there are many industries in the USVI and Puerto Rico that are at least partially dependent on the ocean but that are not represented in ENOW. In some cases, and especially for the USVI, OCM can simply add these industries to the ENOW classification scheme because the entire industry is ocean-dependent. For example, based on our in-person meetings in the USVI, it is clear that gift shops and tour operators in the USVI are almost entirely dependent on ocean-related tourism. Exhibit 6.1 presents the NAICS code industries that we recommend OCM consider including in the ENOW classification scheme for the USVI, and in some cases, for Puerto Rico.

6.3 NAICS Industries that Are Partially Dependent on the Ocean in USVI and Puerto Rico

Throughout this report we have also identified a number of industries that are only partially dependent on the ocean. For example, in both the USVI and Puerto Rico, some portion of the retail sector is dependent on duty free shopping by tourists, but not the entire industry. Similarly, many of the environmental organizations and consulting firms located on the islands likely specialize in marine-related science and conservation, while others may focus on land-based activities. To develop a more comprehensive ENOW dataset for the USVI and Puerto Rico, we recommend that OCM explore methodologies for capturing the portion of economic activity within these industries that is related to the ocean.

Exhibit 6.1. Additional NAICS code industries that are entirely ocean-dependent in the USVI and Puerto Rico

ENOW sector	NAICS code	NAICS industry	Relevant territory	Rationale/Notes
Marine transportation	483212	Inland water passenger transportation	USVI and Puerto Rico	BLS reports data in this sector for USVI and Puerto Rico. However, inland water transportation is non-existent on the islands. These are likely water taxis or other companies that provide ocean-related transport.
Tourism and recreation	453220	Gift, novelty, and souvenir stores	USVI only	Based on our in-person meetings and subsequent research, these sectors are almost entirely dependent on ocean-related tourism in the USVI
	485310	Taxi service	USVI only	
	487110	Scenic and sightseeing transportation, land	USVI only	
	532111	Passenger car rental	USVI only	
	561520	Tour operators	USVI only	
	721199	All other traveler accommodation	USVI only	
	722410	Drinking places, alcoholic beverages	USVI only	Bars in the USVI are heavily tourist-dependent. Including them in ENOW would be consistent with how ENOW treats eating establishments.
	721120	Casino hotels	USVI and Puerto Rico	In-person meetings in Puerto Rico indicate that these hotels are dependent on ocean-related tourism.

For many tourism-related sectors, one approach may be to use industry location quotients to determine the average number of establishments that would be located in a non-tourist region, and attribute any additional activity to the ocean. For example, in the USVI, the location quotient for NAICS industry 531311 (residential property managers) is 136.9. This means that this industry is 136.9 times more concentrated in the USVI compared to the nation as a whole. This is likely because of the large number of tourists and seasonal visitors that demand services from this industry. The use of location quotients may be more applicable in the USVI where so much of the economy is supported by tourism.

For other tourism-related industries, such as the retail industry, OCM may also be able to use tourist expenditure data to estimate the percentage of a given industry that is dependent on tourism (and therefore the ocean). For example, OCM could compare the ratio of retail sales to resident personal income in the USVI and Puerto Rico, and measure that ratio compared to reference regions with similar levels of personal income. This would allow us to measure the excess of retail supply to locally induced demand, which could then be attributed to tourism.

Another potential option for tourism-related industries is to use the tourism data collected by USVI BER and/or PRPB and PRTC. For example, in the past, USVI BER has conducted visitor exit surveys at airports. OCM may be able to use the results of this survey to determine the number of airline tickets purchased by tourists, and compare that number to the total number of tickets purchased in a given year. This would result in a percentage of tourism-related travel that OCM could apply to the airline industry to estimate the portion of economic activity that should be included in ENOW.

In most cases, determining the percentage of non-tourism-related industries that is dependent on the ocean will require further investigation. Location quotients and expenditure data will not provide insights into the number of environmental consulting firms that provide marine-related services, or the percentage of conservation organizations that focus on marine issues. For these industries, OCM may be able to use private databases, such as Lexis Nexus, to conduct a more thorough inventory of ocean-dependent businesses. Additional on-the-ground research with local stakeholders, or surveys of specific industries, may also be necessary.

Exhibits 6.2 and 6.3 present a list of NAICS industries and associated establishments, and employment, which are likely ocean-dependent, at least to some extent, in the USVI and Puerto Rico, respectively. As shown, in both territories, the majority of industries that are partially dependent on the ocean are within the tourism and recreation sector.

Exhibit 6.2. Non-ENOW NAICS code industries that are at least partially ocean-dependent in the USVI

	NAICS code	NAICS industry	Establishments.	Employment
Living resources	424460	Fish and seafood merchant wholesalers	1	ND ^a
	813312	Environment and conservation organizations	8	39
	924120	Administration of conservation programs	9	97
Marine construction	541330	Engineering services	19	37
	541370	Other surveying and mapping services	8	26
Marine transportation	488510	Freight transportation arrangement	15	ND
	493190	Other warehousing and storage	2	ND
Tourism and recreation	448110	Men's clothing stores	8	10
	448120	Women's clothing stores	41	211
	448310	Jewelry stores	140	ND
	448320	Luggage and leather goods stores	3	ND
	481111	Scheduled passenger air transportation	13	ND
	481211	Nonscheduled air passenger chartering	1	ND
	481219	Other nonscheduled air transportation	2	ND
	488111	Air traffic control	2	ND
	488119	Other airport operations	4	ND
	488190	Other support activities for air transport.	2	ND
	531110	Lessors of residential buildings	22	68
	531210	Offices of real estate agents and brokers	30	51
	531311	Residential property managers	39	168
	531312	Nonresidential property managers	12	86
	541922	Commercial photography	1	ND
	561311	Employment placement agencies	3	ND
	561320	Temporary help services	31	322
	561510	Travel agencies	5	ND
	561599	All other travel arrangement services	2	ND
	712120	Historical sites	2	ND

Exhibit 6.3. Non-ENOW NAICS code industries that are at least partially ocean-dependent in Puerto Rico

	NAICS code	NAICS industry	Establishments	Employment
Living resources	424460	Fish and seafood merchant wholesalers	3	ND
	445210	Meat markets	15	57
	541620	Environmental consulting services	39	267
	813312	Environment and conservation organizations	8	170
	924120	Administration of conservation programs	64	2,448
Marine construction	541330	Engineering services	435	3,300
	541370	Other surveying and mapping services	21	64
Marine transportation	488510	Freight transportation arrangement	58	718
	493190	Other warehousing and storage	8	80
Tourism and recreation	453220	Gift, novelty, and souvenir stores ^a	109	666
	481111	Scheduled passenger air transportation	23	1,628
	481211	Nonscheduled air passenger chartering	6	ND ^a
	481219	Other nonscheduled air transportation	1	ND
	485310	Taxi service	14	48
	487110	Scenic and sightseeing transportation, land	8	110
	488119	Other airport operations	7	ND
	488190	Other support activities for air transport.	14	66
	531110	Lessors of residential buildings	209	2,166
	531210	Offices of real estate agents and brokers	290	1466
	531311	Residential property managers	171	3392
	532111	Passenger car rental	81	757
	561311	Employment placement agencies	27	ND
	561320	Temporary help services	99	19,048
	561510	Travel agencies	122	550
	561520	Tour operators	14	141
	561599	All other travel arrangement services	11	166
	712120	Historical sites	2	ND
	721199	All other traveler accommodation	20	193
	722410	Drinking places, alcoholic beverages	129	713
512110	Motion picture and video production	29	669	

a. Other than gift, novelty, and souvenir stores, we did not include specific retail sectors for Puerto Rico that are supported by tourism because no sectors stand out as having particularly high location quotients, except hardware stores, which likely are not heavily supported by tourism. Tourist expenditure data will likely provide insights into which sectors should potentially be partially included in ENOW for Puerto Rico.

Finally, as also documented throughout this report, there are several large companies and organizations that are registered under NAICS codes that should not necessarily be included in ENOW; however, the individual company or organization is ocean-dependent. For example, based on our research, PRPA appears to be registered under NAICS code 926120: transportation program administration, which is not included in ENOW because activity in this sector is most often associated with road transportation. We have identified several of these companies and organizations throughout this report; however, further investigation would be required in order to understand and characterize the full extent of this issue.

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A. In-Person Meeting Schedule and Participants, USVI and Puerto Rico

Meeting date	Organization/business	Meeting participant
USVI		
November 16, 2015	USVI Department of Natural Resources, Fish and Wildlife Division	Ruth Gomez, Director
	USVI Port Authority	Kelvin Industrious, Marine Manager, St. Thomas and St. John Eric Mollah, Chief Wharfinger
	USVI Department of Tourism	Joyce Dore, Assistant Commissioner
	USVI Game Fishing Club	Lori Bailey, Manager
November 17, 2015	USVI HTA	Lisa Hamilton, President
	USVI BER	Donnie Dorsett, Senior Economist
	USVI Charter Yacht League	Brianne Beatty, Director
	St. Thomas Diving Club	Pamela Balash, Owner
November 18, 2015	Gold Coast Yachts, St. Croix	Richard A. Difede, Owner, Chair of State Workforce Development Committee
	Independent Commercial Fisherman, St. Croix	Eddie Schuster
	WICO	Mark Sabino, Director of Marine and Cruise Services Jerome Cox (financial consultant)
November 19, 2015	USVI NPS	Janice Williams, Acting Administrative Director
Puerto Rico		
November 20, 2015	Puerto Rico Maritime Authority, Department of Transportation, San Juan	José A. Ruiz-García, Executive Director
November 23, 2015	PRPA, San Juan	Cristina Rivera-Estrada, Executive Director of Economic Development and Finance Jorge A. Miró-López, Economist
December 3, 2015	"Villa del Ojo," Commercial Fishery, Aguadilla	Manuel Román-Soto, President
	Tourism Association of Rincón	Monty Smith, Spokesperson (also the president of Legends Surf Classic)
December 10, 2015	PRHTA, San Juan	Roberto Valera, Government Affairs Director
December 14, 2015	PRSA, San Juan	Hernán F. Ayala-Rubio, President
December 17, 2015	Puerto Rico DNER, Mayagüez	Ricardo López-Ortiz, Director The Fisheries Research Laboratory Daniel Matos-Caraballo, Supervisor of Fishing Statistics Yamitza Rodríguez, Biologist
December 21, 2015	PRTC	Annette M. Reyes, Marketing and Promotions Director José Terraza, Special Assistant to the Marketing and Promotions Director
December 21, 2015	Puerto Rico DNER, San Juan	Craig Lilyestrom, Director of Marine Resources

B. Summary of Findings from In-Person Meetings: USVI

1. Introduction

During the week of November 16, 2015 Janet Clements (Abt Associates) and Vicente Feliciano (Advantage Business Consulting) met with representatives from 11 organizations and businesses in the U.S. Virgin Islands (USVI) as part of the National Oceanic and Atmospheric Administration (NOAA) Office of Coastal Management's (OCM's) ongoing project, *Describing the Ocean Economy of Puerto Rico and the U.S. Virgin Islands* (EA-133C-14-BA-0039/C-003). The purpose of these meetings was to:

- Discuss the ocean-dependency of the local USVI economy
- Assess the accuracy of the *Economics: National Ocean Watch* (ENOW) data that NOAA OCM developed for the territory
- Identify local data sources to help NOAA OCM better capture the ocean-dependency of different economic sectors within the USVI.

The following sections provide an overview of key findings from these meetings, including a summary of contacts and local data sources that may provide additional insights.

2. Meeting Participants

Eight of our eleven meetings took place in St. Thomas; we met with representatives from two businesses in St. Croix, and one organization in St. John. Exhibit B.1 shows our meeting schedule, including the individuals we met with, and the organization they represent.

Exhibit B.1. USVI meeting schedule and participants

Meeting date	Organization/business	Meeting participant
November 16, 2015	USVI Department of Natural Resources, Fish and Wildlife Division	Ruth Gomez, Director
	USVI Port Authority	Kelvin Industrious, Marine Manager, St. Thomas and St. John
		Eric Mollah, Chief Wharfinger
	USVI Department of Tourism	Joyce Dore, Assistant Commissioner
	USVI Game Fishing Club	Lori Bailey, Manager
November 17, 2015	USVI Hotel and Tourism Association (HTA)	Lisa Hamilton, President
	USVI Bureau of Economic Research (BER)	Donnie Dorsett, Senior Economist
	USVI Charter Yacht League	Brianne Beatty, Director
November 18, 2015	Gold Coast Yachts, St. Croix	Richard A. Difede, Owner, Chair of State Workforce Development Committee
	Independent Commercial Fisherman, St. Croix	Eddie Schuster
	West Indian Company Limited (WICO)	Mark Sabino, Director of Marine and Cruise Services
Jerome Cox (financial consultant)		
November 19, 2015	USVI National Park Service	Janice Williams, Acting Administrative Director

3. Summary of Key Findings

This section presents the key findings from our meetings, organized by ENOW sector. Overall, our general findings are as follows:

- The Bureau of Labor Statistics (BLS)-based ENOW data does not fully capture total establishments, employment, or wages for most ENOW sectors. This seems to be especially true for the tourism and recreation, living resources, and ship and boat building and repair sectors. The reason for this may be because many businesses in the USVI are small, independently owned businesses, or potentially, because they are classified under the North American Industrial Classification System (NAICS) codes that are not included in ENOW dataset.
- In the USVI, most economic sectors are in some way linked to tourism, either directly or indirectly. Based on our discussions with local representatives, the tourism sector likely accounts for 70 to 80% of the territory's Gross Domestic Product (GDP). This is because many sectors that are not largely dependent on tourism in other areas of the United States are dependent on tourism in the USVI. Examples of these sectors include retail, taxis, and car rental agencies.
- The ENOW marine transportation and living resources sectors are also important sectors in the territory. There is very little activity related to offshore mineral resources and marine construction.
- There are a few potential sources of data that agencies within the USVI collect on an annual basis, and that OCM could therefore potentially incorporate into the USVI ENOW dataset. These include business registration data from the USVI Department of Licensing and Consumer Affairs (DLCA), Department of Planning and Natural Resources (DPNR) commercial fishing registration data, and BER annual economic tourism-related indicators. In addition, there are several studies and sources of information that while not collected every year, help to tell the story of the USVI's dependency on the ocean. Section 3 provides a summary of specific contacts and potential data sources that we can use for this purpose.

3.1 Tourism and Recreation

We met with individuals from several tourist-related organizations to get a better idea of activity within this sector. Specifically, we met with representatives from USVI Department of Tourism, USVI HTA, USVI Game Fishing Club, USVI Charter Yacht League, and USVI National Park. The USVI BER also provided us with a dataset of annual economic tourism-related indicators. Our interviews confirmed that tourism drives the local economy, and that the ENOW dataset does not fully capture tourist-dependent economic activity.

According to BER, approximately 570,000 overnight visitors came to the USVI in 2013, and an additional 2.1 million people came in on cruise ships or air excursions from other islands (this compares to a resident population of approximately 104,700). In that year, tourist and cruise ship passenger expenditures amounted to \$851 million and \$381 million, respectively. BER estimates that tourism accounts for approximately 60% of USVI's GDP, which totaled \$3.79 billion in 2013. However, the USVI HTA thinks the tourism sector accounts for closer to 80% of

economic activity, noting that since the loss of 2,000+ jobs and \$1.5 billion in GDP associated with the HOVENSA closing in 2012, the island's share of non-tourism related activity has been very small. In addition, BER obtains much of its' data from the BLS, and therefore may be missing some data or underrepresenting key tourism sectors.

The BLS and ENOW dataset underrepresent economic activity associated with the tourism sector in two ways. First, within the ENOW-defined sectors and associated 6-digit NAICS code industries, the BLS data does not seem to fully capture current activity. For example, the USVI HTA has 63 members that are hotels, yet the ENOW dataset reports a total of 44 hotel and lodging establishments in the territory, including bed and breakfast inns. Similarly, a representative from the Charter Yacht League estimates that there are 150+ charter yachts operating in the USVI, not including charter boats that run day trips from the island, all of which are registered businesses in the territory. However, the BLS-based ENOW data only reports 19 and 39 establishments in the Scenic Water Tours and Amusement and Recreation Services ENOW industries, respectively. Based on our meetings, it appears that tour operators, charter yachts, and other recreational businesses greatly exceed these numbers.

Second, the ENOW classification scheme does not include several sectors that are heavily reliant on tourism in the USVI, including taxis, car rental agencies, airports, and retail shops. For example, duty free shopping is an important part of the industry, and visiting USVI's many jewelry stores is a popular tourist activity. Online house rental sites, such as Air B&B and Vacation Rental By Owner (VRBO), are also an important part of the local tourism economy. Two or three years ago, the USVI HTA conducted an inventory of vacation home rentals available on these sites. At the time there were approximately 500 rentals; the Association estimates that there are now likely 1,500 to 2,000. There is not a comprehensive data source on the number of rentals available because only a small percentage of renters go through the proper channels to register as a business or pay taxes.

3.2 Marine Transportation

Marine transportation is another important sector in the USVI. The Virgin Islands Port Authority (VIPA) operates 13 major seaports in the territory, including 5 in St. Thomas, 5 in St. Croix, and 3 in St. John. WICO operates St. Thomas' major cruise ship port, Yacht Haven Grande, and there are a number of marinas located on the islands. USVI's seaports are used for passenger transportation (e.g., ferries between islands), cargo operations and storage, seaplanes, and cruise ships. There are also two water taxi services in the USVI – one takes passengers from Caneel Bay Resort in St. John to Charlotte Amalie, St. Thomas; the other from the Marriott in St. Thomas to the Charlotte Amalie waterfront.

Without further investigation, it is difficult to determine the accuracy of the BLS data for the ENOW marine transportation sector, although it does seem a bit understated. ENOW reports 22 establishments and 214 employees in this sector. VIPA itself has 51 employees in the marine division that oversees St. Thomas and St. John, with additional employment in St. Croix. Large cargo businesses, such as Crowley, Seastar, and Tropical, also have local operations, but are mostly headquartered in Florida. There is a lot of activity surrounding the seaports, and VIPA rents out space at all of its ports to concessionaires and commercial businesses.

In addition, all ships over 100 tons (including cruise ships) must pay wharfage and user fees to VIPA, which serve as VIPA's primary marine transportation revenue sources. In 2014, VIPA collected \$7.65 million in wharfage fees and \$14.7 million in user fees.

3.3 Living Resources

The ENOW data underreports commercial fishing and related activity. Ms. Ruth Gomez, Director of the Fish and Wildlife Division of the USVI DPNR stated that there are approximately 120 fishermen in St. Thomas, 150+ fishermen in St. Croix, and about 10 fishermen in St. John. Mr. Eddie Schuster, a commercial fisherman in St. Croix, estimated that there are 280 fishermen registered in St. Croix, but that only 50 of them are active. He also stated that there are likely another 50 fisherman that actively fish, but are not registered. Commercial fishing operations typically include one fishermen and one helper. Depending on the type of gear used and the size of the boat, some operations require two or three helpers. All commercial fishing operations must register and file a monthly Commercial Catch Report with DPNR. DPNR in turn provides this data to NOAA.

Most of the local catch is sold to restaurants, supermarkets, or at one of eight fish markets across the territory, including: Fort Milliner, Smith Bay, The Ballpark, Frenchtown (St. Thomas), Frederiksted, La Reine, Christiansted (St. Croix), and Cruz Bay (St. John). Seafood is the number one staple in the diet of local residents. Although restaurants purchase local seafood, particularly lobster, larger hotels import most of the seafood they sell. Imported fish provides these establishments with a more reliable, consistent source of supply. The Nature Conservancy is currently leading an effort to work with hotels and resorts to increase their purchase of local seafood.

Overall, commercial fishing, although not a huge component of the economy in terms of overall employment and wages, plays a larger role than we initially thought. The BLS data reports that there is only one establishment within the ENOW living resources sector in USVI: a seafood market located in St. Thomas. Based on our discussions, it appears that there are likely 200 to 300 active commercial fishermen in the territory, which likely each employ at least one helper. In addition, commercial fishermen support several local seafood markets, and provide fish to many local restaurants, and some hotels.

3.4 Ship and Boat Building and Repair

The ENOW dataset reports only one establishment in the USVI within the ENOW ship and boat building and repair sector – a boat building and repair establishment located on St. Croix. However, as we suspected, many of the people we met with indicated that there are a number of ship and boat building/repair shops in the territory. It is not yet clear why the BLS-based ENOW data does not capture these businesses.

We met with the owner and president of Gold Coast Yachts, a world renowned ship/yacht building company located on St. Croix, which is likely the business establishment that is reflected in the ENOW data. The company currently employs about 38 people, but typically employs closer to 45. Gold Coast Yachts does about \$5 million in sales annually; their total annual payroll is approximately \$1.8 million.

Richard Difede, owner and president of Gold Coast Yachts, identified 4 boat building companies in the territory as well as 8 repair companies. Representatives from the USVI Port Authority, USVI Game Fishing Club, and the Charter Yacht League also identified 15 to 20 ship/boat repair shops, which are mostly located in St. Thomas. This includes two large operations, Independent Boat Yard and the Subbase Dry Dock, both of which employ 50+ people. Most repair shops are smaller, with between 2 and 4 employees.

Mr. Difede noted that shipbuilding has a relatively high multiplier effect. For example, Gold Coast Yachts relies on heavy equipment operators, workshops for parts (some of them informal operations), and transportation of cargo by both air and ship, among others. However, Gold Coast has to import the majority of materials that they use to build their boats.

3.5 Offshore Mineral Resources and Marine Construction

Based on our meetings, there is very little economic activity within either of these sectors. In relation to offshore mineral resources, DPNR's Office of Coastal Zone Management (CZM) manages all sand mining and beach re-nourishment activities. There is one sand company in the USVI: TNT. TNT imports sand and uses it to "pretty up the beaches." Hotels and other private property owners interested in rebuilding their coast line must receive a permit from CZM. CZM conducts an analysis of the imported sand to make sure it is compatible with local sand.

VIPA is responsible for construction at most of USVI's seaports. VIPA's accounting office can provide us with information on the different contractors the agency has employed.

4. Local Data Sources and Contacts

Based on recommendations from our in-person meetings, Exhibit B.2 summarizes several data sources that might provide us with additional insights on ocean-dependent economic activity within the USVI. Perhaps the most promising of these sources is the DLCA data for all registered businesses. Although we are not yet sure if this data includes employment information (we have reached out to DLCA but have not yet heard back), it would likely allow us to inventory the number of establishments in different sectors. Based on our conversations with local representatives, a high percentage of independently-owned businesses register with the DLCA.

Another important source of information is the commercial fishermen data that DPNR collects on a monthly basis. This information will allow us to gain a better understanding of the number of registered fishermen within the territory. However, our meeting with Eddie Schuster, a commercial fisherman from St. Croix, indicates that there is some informal activity in this sector (i.e., fishermen that are not registered). Further, not all fishermen that are registered actively fish.

The USVI BER also collects information and data on tourism and other ocean-dependent sectors. Some of this information is based on BLS-data and therefore may not provide additional insights. However, BER does collect data from other sources, and has conducted visitor exit surveys to gain additional information on tourist activities and spending. The agency does not conduct this survey every year because the funding is not always available.

Exhibit B.2. Local sources of information and data on the ocean-dependency of USVI economy

Sector	Data/information source	Contact
Tourism and Recreation	BER produces a series of USVI Annual Tourism Indicators . This includes information and data on number of visitors, hotel room occupancy, visitor spending, and other data related to the economic importance of the tourism industry. BER also conducts visitor exit surveys.	Donnie Dorsett, USVI BER USVI BER website: http://www.usviber.org
	The local BLS also produces data on the tourism industry. This is based on standard BLS data collection procedures, but the local office seems to include additional sectors in their definition of the tourism industry.	Gary Haleyard, BLS, St. Croix
	The World Ocean Council, in partnership with governments of USVI and Puerto Rico, initiated the Caribbean Regional Ocean Partnership (CROP) in an effort to develop a comprehensive database to facilitate marine spatial planning in the two territories. The CROP website has some information on ports, recreational marinas, and other ocean-based resources; however, it contains little economic data.	Information available on CROP website: http://caribbean-mp.org/en/
	The Billfish Foundation conducted a study of the economic importance of pelagic species in USVI and Puerto Rico , mostly related to impacts associated with tourism and recreation. The study is undated but seems to have been completed in 2013 or 2014.	The Billfish Foundation (project team has obtained study)
	There is no recent data on recreational fishing, but the U.S. Fish and Wildlife Service may have some slightly dated information.	Rafael González, rafaelgonzalez@fws.gov
	Business Research and Economic Advisors completed a study in 2015 on the economic impact of the cruise ship industry in Caribbean destinations , including the USVI. The study serves as an update to similar studies undertaken in 2006, 2009, and 2012.	WICO
	USVI National Park issues permits to all concessionaires/business that operate on Park beaches in St. John . This includes concessionaires that rent equipment (e.g., snorkel, paddle boards), sell food or souvenirs, and operate tours. We can obtain a list of concessionaires from the Park.	Elba Richardson, Concession Specialist USVI National Park
	The Friends of Virgin Islands National Park collects data on park visitors and potentially has other relevant economic data.	Joe Kessler, President, Friends of Virgin Islands National Park.
Marine Transportation/Construction	Most VIPA data, including marine and aviation landings, employment , revenues from wharfage/pilotage fees, and marine construction contractors.	Marcia Penn (seaports) Joe Nazario (airports)
Living Resources	NOAA Cooperative statistics Program, USVI Commercial Catch Report . All commercial fishermen must register and file a monthly Commercial Catch Report with DPNR. DPNR in turn submits this data to NOAA. This data contains information on the number of registered fishermen within the territory.	Roy Crabtree and Nancy Cummings (NOAA) in St. Petersburg, Florida
All sectors/other	DLCA. All businesses within the USVI must register with DLCA to obtain a license.	Website: http://dlca.vi.gov/
	Eastern Caribbean Center of the University of the USVI collects some information published as part of the American Community Survey. This may include information on vacation homes and other occupational data.	Dr. Mills, University of the USVI

C. Summary of Findings from In-Person Meetings: Puerto Rico

1. Introduction

During the months of November and December 2015, Brenda Almodóvar and Vicente Feliciano from Advantage Business Consulting met with representatives from eight organizations and businesses in Puerto Rico as part of the National Oceanic and Atmospheric Administration (NOAA) Office of Coastal Management's (OCM's) ongoing project, *Describing the Ocean Economy of Puerto Rico and the U.S. Virgin Islands* (EA-133C-14-BA-0039/C-003). The purpose of these meetings was to:

- Discuss the ocean-dependency of the Puerto Rico economy
- Assess the accuracy of the *Economics: National Ocean Watch* (ENOW) data that NOAA OCM developed for the territory
- Identify local data sources to help NOAA OCM better capture the ocean-dependency of different economic sectors within Puerto Rico.

The following sections provide a summary of key findings from Advantage's discussions in Puerto Rico, including an overview of potential contacts and local data sources that may be able to provide additional insights.

2. Meeting Participants

As noted above, Advantage met with representatives from eight different organizations and businesses in Puerto Rico. Exhibit C.1 shows our meeting schedule, including the name of the organization/business and the person with whom we met.

Exhibit C.1. Puerto Rico meeting schedule and participants

Meeting date	Organization/business	Meeting participant
November 20, 2015	Puerto Rico Maritime Authority- Puerto Rico Department of Transportation, San Juan	José A. Ruiz-García, Executive Director
November 23, 2015	Puerto Rico Ports Authority (PRPA), San Juan, Puerto Rico	Cristina Rivera-Estrada, Executive Director of Economic Development and Finance Jorge A. Miró-López Economist
December 3, 2015	"Villa del Ojo," Commercial Fishery, Aguadilla, Puerto Rico	Manuel Román-Soto, President
	Tourism Association of Rincón, Rincón, Puerto Rico	Monty Smith, Spokesperson. He is also the president of Legends Surf Classic
December 10, 2015	Puerto Rico Hotel & Tourism Association (PRHTA), San Juan,	Roberto Valera, Government Affairs Director
December 14, 2015	Puerto Rico Shipping Association (PRSA), San Juan	Hernán F. Ayala-Rubio, President
December 17, 2015	Puerto Rico Department of Natural & Environmental Resources (DNER), Mayagüez, Puerto Rico	Ricardo López-Ortiz, Director The Fisheries Research Laboratory Daniel Matos-Caraballo, Supervisor of Fishing Statistics Yamitza Rodríguez, Biologist -

Exhibit C.1. Puerto Rico meeting schedule and participants

Meeting date	Organization/business	Meeting participant
December 21, 2015	Puerto Rico Tourism Company (PRTC)	Annette M. Reyes, Marketing and Promotions Director José Terraza Special Assistant to the Marketing and Promotions Director
December 21, 2015	Puerto Rico DNER, San Juan	Craig Lilyestrom Director of Marine Resources

3. Summary of Key Findings

This section provides a summary of key findings from our meetings, organized by ENOW sector. In general, our overall findings are as follows:

- The Bureau of Labor Statistics (BLS) data does not fully capture total establishments, employment or wages in most ENOW sectors of Puerto Rico. This seems to be especially true for the Tourism and Recreation sector and the Living Resources sector. In the Living Resources sector, the “Villas Pesqueras” are organized as cooperatives or non-profit organizations comprised of self-employed fishermen. The informality in the Tourism and Recreation sector has to do with lodging programs in private homes and second homes and a large number of self-employed tour guides and operators. In addition, some businesses could be related to sectors classified as ocean-dependent but they are classified under NAICS (North American Industry Classification System) codes that are not included in the ENOW dataset.
- The biggest sector classified as ocean-dependent in the Puerto Rico economy is Tourism and Recreation. According to the Puerto Rico National Accounts System, Tourism Expenditure accounts for about the 5% of the territory’s Gross Domestic Product (GDP). The production of the Recreation and Entertainment sector and Lodging and Restaurants sector (as defined in the National Accounts) represents about the 2% of the territory’s GDP. Many sectors that are not traditionally linked to tourism also are impacted by tourism in Puerto Rico. Examples of these sectors include transportation, car rental and destination management agencies, among others. A Tourism Satellite Account, which is a measurement of the direct economic contributions of tourism to an economy, would capture all this economic impact, but at present this data unavailable.
- The ENOW Marine Transportation is also an important sector in the territory. As a percentage of the total economy, there is very little activity related to offshore mineral resources, living resources, marine construction, and ship and boat building in Puerto Rico. Nevertheless, the interviews show that there is a lot of self-employment in some of these sectors as well as informal economic activity.
- There are a few potential sources of data that agencies within Puerto Rico collect on a monthly and/or annually basis, and could therefore help to inform or potentially be incorporated into the Puerto Rico ENOW dataset. These include data from the Puerto Rico Planning Board (PRPB), the Puerto Rico Statistics Institute, PRPA, and the PRTC. In addition, several studies and sources of information are available that while not collected

every year, help to assess Puerto Rico's dependency on the ocean. Section 3 provides a summary of specific contacts and potential data sources that could be used for this purpose.

- Some of the entities that we interviewed had linkages with several ENOW sectors. For example, the PRPA was mainly classified in the Marine Construction sector but has linkages to the Marine Transportation and Tourism and Recreation sectors. The PRSA, on the other hand, has to do with Marine Transportation and Marine Construction. The PRTC and PRHTA deal with a transportation component under the Tourism and Recreational sector and DNER was mainly classified under the Living Resources and Offshore Mineral Resources sectors, but is also heavily related to Tourism and Recreation. On the other hand, marinas are pertinent to Marine Transportation, Marine Construction, Tourism and Recreation, and Ship and Boat Building (considering the maintenance element included in this sector).

3.1 Tourism and Recreation

Advantage met with a number of individuals from tourism-related organizations to gain a better understanding of activity within this sector, including representatives from PRHTA, PRTC, and Tourism Association of Rincón. We also interviewed officials from maritime authorities, while representatives of commercial fisheries and DNER contributed to better assess this sector.

The PRPB and the PRTC also provided us with a dataset of annual economic tourism-related indicators. Our interviews confirmed that tourism is the most important ocean-dependent sector of the local economy. Thus, the BLS-based ENOW dataset does not fully capture tourism-dependent economic activity.

According to the Planning Board, approximately 3.2 million people visited Puerto Rico in 2014 as tourists (i.e., overnight visitors), and an additional 1.2 million people arrived via cruise ships. In that year, tourist and cruise-ship passenger expenditures amounted to \$3.255 billion and \$182 million, respectively.

The Puerto Rico National Accounts published by the Planning Board establishes that Tourism Expenditure accounts for about the 5% of the territory's GDP, while the production of the Recreation and Entertainment sector and Lodging and Restaurants sector (as defined in the National Accounts) represents about 2% of the territory's GDP. Both the PRTC and the PRHTA agreed that tourism accounts for a bigger percentage of the local economy than the 2% reported, but said the data is difficult to measure. The PRTC stated that the development of a Tourism Satellite Account is crucial to measure all the economic activity that is generated by tourism-related activities.

It is important to note that the Planning Board obtains much of its data from local surveys. Therefore, these surveys could be used to supplement the ENOW database.

The BLS and ENOW dataset under-represent economic activity associated with the tourism sector in two ways. First, within the ENOW-defined sectors and associated six-digit NAICS code industries, the BLS data does not seem to capture all current activity. For example, the PRTC endorses around 250 lodging properties, yet the ENOW dataset reports a total of 200 hotel and lodging establishments in the territory, including bed & breakfast inns. Moreover, both the PRTC and the PRHTA stated that a significant number of bed & breakfasts are not endorsed by the PRTC, some of which are formal and others are part of the informal economy. Also, online

house rental sites, such as Airbnb, Vacation Rental By Owner (VRBO), and HomeAway have grown significantly in recent years and are becoming a huge part of the local tourism economy.

Similarly, the PRTC endorses around 132 tour guide operations in Puerto Rico, and the BLS-based ENOW data reports seven establishments in the Scenic Water Tours sector. Based on our meetings, it appears that tour operators, charters and other recreational services (including recreational-goods rental shops) greatly exceed the ENOW figures.

Second, the ENOW classification scheme does not include several sectors that are heavily reliant on tourism in Puerto Rico, including taxis, car rental agencies, airports and some retail shops (duty-free shopping in Old San Juan and factory outlet malls).

In Puerto Rico, there is no real comprehensive data source as to the number of vacation rentals available because an indeterminate percentage of renters do not go through the proper channels to register as a business and pay taxes.

3.2 Marine Transportation and Marine Construction

Marine transportation is the second largest ocean-dependent sector in Puerto Rico. The Ports Authority and some private companies operate 14 seaports in the territory. Continental Shipping coordinates the operations of the San Juan major cruise-ship port. There are a number of marinas located throughout the island (although based on ENOW classification, marinas fall under the Tourism and Recreation sector). Puerto Rico's seaports are used for passenger transportation (e.g., ferries), cargo operations and cruise ships. There are also available water taxi services, catamarans and a lot of boat operations. On the other hand, most of the Marine Construction is carried out by the Ports Authority, at least for the tourism docks. In the case of commercial docks, the investments are sometimes shared by the Ports Authority and the private companies that operate the dock.

Without further investigation, it is difficult to determine the accuracy of the BLS data for the ENOW Marine Transportation sector, although according to the both, the Ports Authority and Marine Transportation Authority, these numbers seem reasonable. ENOW reports 123 establishments and 3,406 employees in this sector. The Ports Authority, which is the biggest employer in the sector, has around 400 employees in the marine division. The Marine Construction sector accounts for 19 establishments and 642 jobs. In addition, the Ports Authority rents out space at all of its ports to concessionaires and commercial businesses.

Moreover, all ships over 100 tons (including cruise ships) must pay wharfage and user fees to the Ports Authority, which serve as the agency's revenue sources.

3.3 Living Resources

The BLS-based ENOW data under-reports commercial fishing and related activities. Interviewees from the DNER and a commercial fishery stated that there are approximately 1,000 commercial fishermen with licenses in the territory and an unknown number of fishermen without licenses or not registered. Commercial fishing operations typically include one fisherman and one helper. All commercial fishing operations must register with the Puerto Rico Agriculture Department and they are regulated by the DNER.

Most of the local catch is sold to local restaurants and individuals. The catch is a small percentage of all the seafood and fish sold in restaurants in the territory. Imported fish provides local residents with a reliable, consistent and cheaper source of supply.

Overall, commercial fishing, although it is not a large component of the local economy in terms of overall employment and wages, plays a larger role than initially thought. The BLS data reports that there are only 14 establishments within the ENOW living resources sector in Puerto Rico. Based on our discussions, it appears that there are more than 1,000 active commercial fishermen (self-employed) in the territory, which likely each employ at least one helper each.

According to DNER personnel, the average price per pound of fish and seafood is \$3.00 for wholesale. In 2014, the total commercial catch represented 2.3 million pounds in Puerto Rico, generating an average of \$6.9 million in commercial wholesale value. This catch represented around \$20.7 million in retail prices in local restaurants. On the other hand, the estimated expenses of commercial fishing in the local economy are, in average, \$6 million yearly in trip expenditures and the purchase of durable goods.

An interesting fact is that according to the study “The Economic Contribution of Marine Angler Expenditures in the U.S. Gulf of Mexico and Puerto Rico, 2011,” angler expenditures on marine recreational fishing in Puerto Rico during that year totaled \$72 million. This amount was for trip expenditures and the purchase of durable goods. This compares dramatically with the amount spent by commercial fishermen.

This economic impact is not considered in the Living Resources sector, but is considered in the Retail sector of the local economy.

3.4 Ship and Boat Building and Repair

The ENOW dataset reports only five establishments in Puerto Rico within the ENOW ship and boat building and repair industry. According to the interviews conducted, there are some stores around the territory (in coastal municipalities) that give maintenance to fishers’ boats. Sometimes marinas also provide maintenance services. However, from the interviews it is not clear whether the BLS data captures these businesses. Those interviewed guessed that it did not.

3.5 Offshore Mineral Resources

Based on our meetings, there is very little economic activity in this sector. According to the BLS data, there are 43 establishments in this sector. DNER personnel stated that offshore mineral extraction and beach sand mining is legally prohibited. There are companies that perform sand extraction from rivers, while some gravel and rock quarries are not located on the coastal areas. Any activity or development on the beaches is regulated by the DNER.

4. Summary of Additional Contacts and Potential Data Sources

Exhibit C.2. Local sources of information and data on the ocean-dependency of USVI economy

Sector	Data/information source	Contact
Tourism and Recreation	The PRPB estimates the annual regular and cruise-ship visitors and their expenditures on a yearly basis. The PRTC produces statistics on a monthly basis and has a yearly publication named "The Selected Statistics." This publication includes information and data on hotel room occupancy, average daily rate, room inventory, employment in the hotel industry, hotel registrations by origin, length of stay of the visitors and other data related to local hotels. The PRTC data is also available from the Puerto Rico Statistics Institute.	PRPB: http://www.jp.gobierno.pr/ Puerto Rico Statistics Institute: http://www.estadisticas.gobierno.pr/i.e.pr/ PRTC: http://puertoricotourism.pr.gov Statistics Area Supervisor: Michelle Bauzá, 787-721-2400 Ext. 2219
	The World Ocean Council, in partnership with the governments of the USVI and Puerto Rico, initiated the Caribbean Regional Ocean Partnership (CROP) in an effort to develop a comprehensive database to facilitate marine spatial planning in the two territories. The CROP website has some information on ports, recreational marinas and other ocean-based resources; however, it contains little economic data.	
	The Billfish Foundation conducted a study of the economic importance of pelagic species in the USVI and Puerto Rico, mostly related to impacts associated with tourism and recreation. The study is undated, but seems to have been completed in 2013 or 2014.	The Billfish Foundation (Project team has obtained a copy of the study)
	Publications such as: "The Economic Contribution of Marine Angler Expenditures in the U.S. Gulf of Mexico and Puerto Rico, 2011," and "The Economic Value of U.S. Coral Reefs, 2008." These studies are not published on a regular basis. Data from the U.S. Fish & Wildlife Service, the Marine Recreational Fishing Program (NOAA) and the Puerto Rico Marine Recreational Fisheries Statistical Program Reports.	Project team has obtained copies of these studies
Marine Transportation/Construction	PRPA statistics. Most Ports Authority data, including passenger and cargo data (marine and aviation), can be obtained from the Puerto Rico Statistics Institute.	Puerto Rico Statistics Institute website: http://www.estadisticas.gobierno.pr/i.e.pr/ Ports Authority: Contact: Jorge A. Miró-López Email: JAMiro@prpa.pr.gov
	Other trade data can be obtained by using the U.S. Census Bureau, PRPB and the Port Import Export Reporting Service Data Base (private).	
Living Resources	"The Economic Contribution of Marine Angler Expenditures in the U.S. Gulf of Mexico and Puerto Rico, 2011" and "The Economic Value of U.S. Coral Reefs, 2008." Data from the U.S. Fish & Wildlife Service, the Marine Recreational Fishing Program (NOAA) and the Puerto Rico Marine Recreational Fisheries Statistical Program Reports. The Puerto Rico Marine Recreational Fisheries Statistical Program Reports are published in timeframes of two or three years.	DNER contact: Craig Lilyestrom Email: Craig.Lilyestrom@drna.gobierno.pr
	Puerto Rico Agriculture Department: All commercial fishermen must register with this agency.	

Exhibit C.2. Local sources of information and data on the ocean-dependency of USVI economy

Sector	Data/information source	Contact
All sectors/other	PRPB.	http://www.jp.gobierno.pr/
	U.S. Decennial Census, Economic Census and the American Community Survey.	http://www.census.gov