



# **Market Economic Impacts and Contributions of Recreating Visitors to the Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 2, 2014**

**U.S. Department of Commerce**  
National Oceanic and Atmospheric Administration  
National Ocean Service  
**Office of National Marine Sanctuaries**



April 2016

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*\* Government contract labor was provided by CSS-Dynamac, Fairfax, VA under NOAA contract number # DG133C11CO0019*



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## Suggested Citation

Leeworthy, V., Schwarzmann, D., Reyes Saade, D., Goedeke, T.L., Gonyo, S. and Bauer, L. 2016. Market Economic Impacts and Contributions of Recreating Visitors to the Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 2, 2014. Marine Sanctuaries Conservation Series ONMS-16-03. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 21 pp.

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## **Abstract**

This report is part of a series of reports that focus on outdoor recreation activities undertaken in 2013-14 on the Outer Coast of Washington by households in the State of Washington. The primary focus was on the entire Outer Coast of Washington to support the State's Marine Spatial Planning Initiative and the Olympic Coast National Marine Sanctuary management plan objectives in socioeconomics. For the OCNMS, the legal boundaries, the boundaries expanded to a two kilometer buffer along the coast, and a small section of the Port Angeles area. In 2014, a survey of recreators on the State of Washington's Outer Coast was conducted by Point97 through an Internet Panel representative of all households in the State of Washington. The Internet Panel was created and the survey implemented by Knowledge Networks, Inc. The Panel included 5,079 responses over two waves of surveys. This report estimates the economic impact of recreation along the Outer Coast of Washington State and the Olympic Coast National Marine Sanctuary. The methodology applies the IMPLAN input-output model to estimates of 2013-14 total annual expenditures derived by taking estimates of person-days by location and multiplying by the person-day expenditure estimates. The IMPLAN model is then used to calculate output, income, value-added (gross regional product), and employment for the study areas. Volume 1 of this series provides a socioeconomic profile of those recreating on the Outer Coast and in OCNMS, including demographic profiles (e.g. age, gender, race-ethnicity, household size, household type, etc.), recreation activities by type of activity and spatial distributions of activity, and expenditure profiles. Volume 3 addresses importance-satisfaction ratings for natural resource attributes, facilities and services. Volume 4 is a Technical Appendix that explains the survey sampling methodology and the methods of estimation for Volumes 1-3. Two other volumes are under development on the non-market economic values and how those values change with changes in natural resource attributes and user characteristics.

## **Key Words**

Olympic Coast, National Marine Sanctuary, Economics, Jobs, Output, Expenditures

## Key Findings

- ***Outer Coast:*** Spending of \$551.6 million by Washington households recreating on the Outer Coast generated \$675.2 million in output, \$410.8 million in value-added (gross regional product), \$245.1 million in income, and 6,531 jobs in the local economies of eight coastal counties.
- ***OCNMS-Legal:*** Spending by those recreating within the legal boundaries of the OCNMS of \$30.85 million generated \$39.7 million in output, \$24.2 million in value-added (gross regional product), \$14.4 million in income and 387 jobs in the local economies of eight coastal counties.
- ***OCNMS-2 km:*** Spending by those recreating within two kilometers inland of the shoreline of the legal boundaries of the OCNMS of \$101.6 million generated \$128.2 million in output, \$77.7 million in value-added (gross regional product), \$46.1 million in income and 1,192 jobs in the local economies of eight coastal counties.
- ***Port Angeles:*** Spending by those recreating in the Port Angeles area near OCNMS Headquarters of \$8.7 million generated \$10.75 million in output, \$6.8 million in value-added (gross regional product), \$4.14 million in income and 106 jobs in the local economies of four coastal counties.

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## **1. Introduction**

In 2013-14, Point97 and the Surfrider Foundation conducted an Internet survey using a Knowledge Networks (KN) Panel, which included a random sample of all State of Washington households. The survey addressed visitation to the Outer Coast of Washington with emphasis on outdoor recreation activities. The survey covered visitation over the past 12 months and included information on detailed recreation activity participation over the past 12 months and on the last trip. The last trip was important for two reasons: 1) trip expenditures and spatial use by activity type were obtained for the last trip. Demographic information was obtained from all panel members and spatial use was obtained from panel members who had visited the Outer Coast for recreational activities in the past 12 months by a tool developed by Ecotrust/Point97. The project was funded by the State of Washington to support their Marine Spatial Planning (MSP) process.

In 2014, two offices in NOAA's National Ocean Service (NOS), (1) the Office of National Marine Sanctuaries (ONMS), Conservation Science Division and (2) the National Centers for Coastal Ocean Sciences (NCCOS), Center for Coastal Monitoring and Assessment (CCMA), Biogeography Branch, partnered to obtain information on the preferences and non-market economic values for natural resource attributes on the Outer Coast of Washington and how these non-market values change with changes in resource attributes and user characteristics. NCCOS provided funding and ONMS issued a request for proposals to provide the information. Through the competitive bidding process, Point97 was awarded the contract and proposed a survey using their existing Internet Panel with Knowledge Networks (KN). Modules were designed for a second wave of surveying to include the NOAA objective to support the Socioeconomic Action Plan for the Olympic Coast National Marine Sanctuary (OCNMS) and the State of Washington MSP process.

NOAA's objectives included collecting information on people's preferences for different marine animals (e.g., seabirds and marine mammals) and ecological worldviews, estimation of non-market economic values for natural resource attributes, and estimation of how those values may change with changes in these attributes and user characteristics. All the data obtained for the second wave of surveys to address NOAA's needs also included all the same information on visitation and recreational use obtained by Point97 in their first wave of surveys. In this report, the non-market economic values are not addressed. Instead, a separate technical appendix will address people's preferences for different marine animals, ecological worldviews, and non-market economic values.

### **Survey Methodology**

The survey methodology is presented in Point97 and Surfrider Foundation (2015), but will be repeated here. The survey was done using the Knowledge Networks, Inc. (KN) panel of the State of Washington households. To accommodate the needs of the State of

Washington and NOAA, KN supplemented their regular panel with additional recruits to expand sample sizes.

The survey was done in two waves. The first wave was conducted from June 13-30, 2014 and included 3,017 households. The second wave was conducted from November 19, 2014 to February 14, 2015 and included 3,112 households. For both waves combined, there were 6,219 households in the panels. KN recruited panel members to obtain a random sample representative of all households in the State of Washington and the sampling frame included those 18 years or older living in State of Washington households.

**Survey Response Rates.** For both waves combined, the response rate was (90.36% (N=5,538). For wave 1, the response rate was 100% (N=3,107), while for wave 2 the response rate was 81% (N=2,521).

**Sample Weighting.** KN provided two sample weights based on age, gender, race/ethnicity, and county of residence for the panel to make them representative of all Washington households. County of residence was done because of the spatial use data. The first sample weight was for the regular KN panel members and the second was for the full panel. In all our estimates we used the second weight since we used the entire panel.

## What was Estimated?

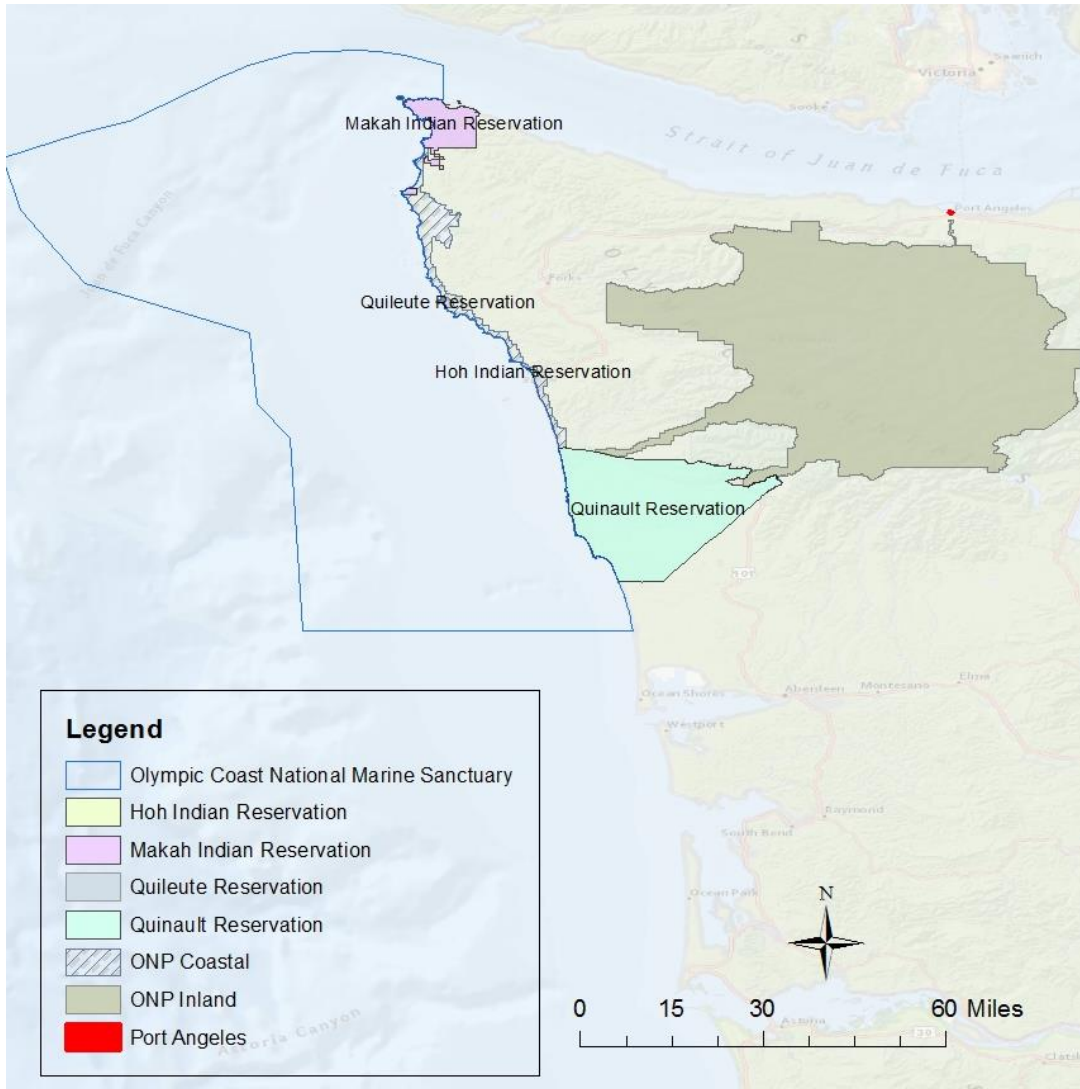
- Demographics – Who are the Users?
- Uses
  1. Percentage of Washington households that visited the Outer Coast in the past 12 months
  2. Number of recreation trips per household to the Outer Coast in the past 12 months
  3. Number of people on last trip per household to the Outer Coast for recreation
  4. Recreation activity participation rates (percent of households) by activity type in the Outer Coast during the past 12 months
  5. Recreation activity participation rates (percent of households) by activity type in the Outer Coast on the last trip
  6. Person-trips and person-days to Outer Coast for recreation past 12 months
  7. Person-trips and person-days by recreation activity/activity group type past 12 months
  8. Spatial distribution of uses by activity type (person-trips and person-days)
- Expenditures by Category of Expenditure
  1. Per household group per trip (last trip)
  2. Per person-trip (last trip)
  3. Per person-day (last trip and annual average)
  4. Total Annual Expenditure

- Economic Impact/contribution to Local Area Economies
  1. Output
  2. Value added
  3. Income
  4. Employment (full and part-time jobs)
- Importance-Satisfaction Ratings for 25 Natural Resource Attributes, Facilities, and Services

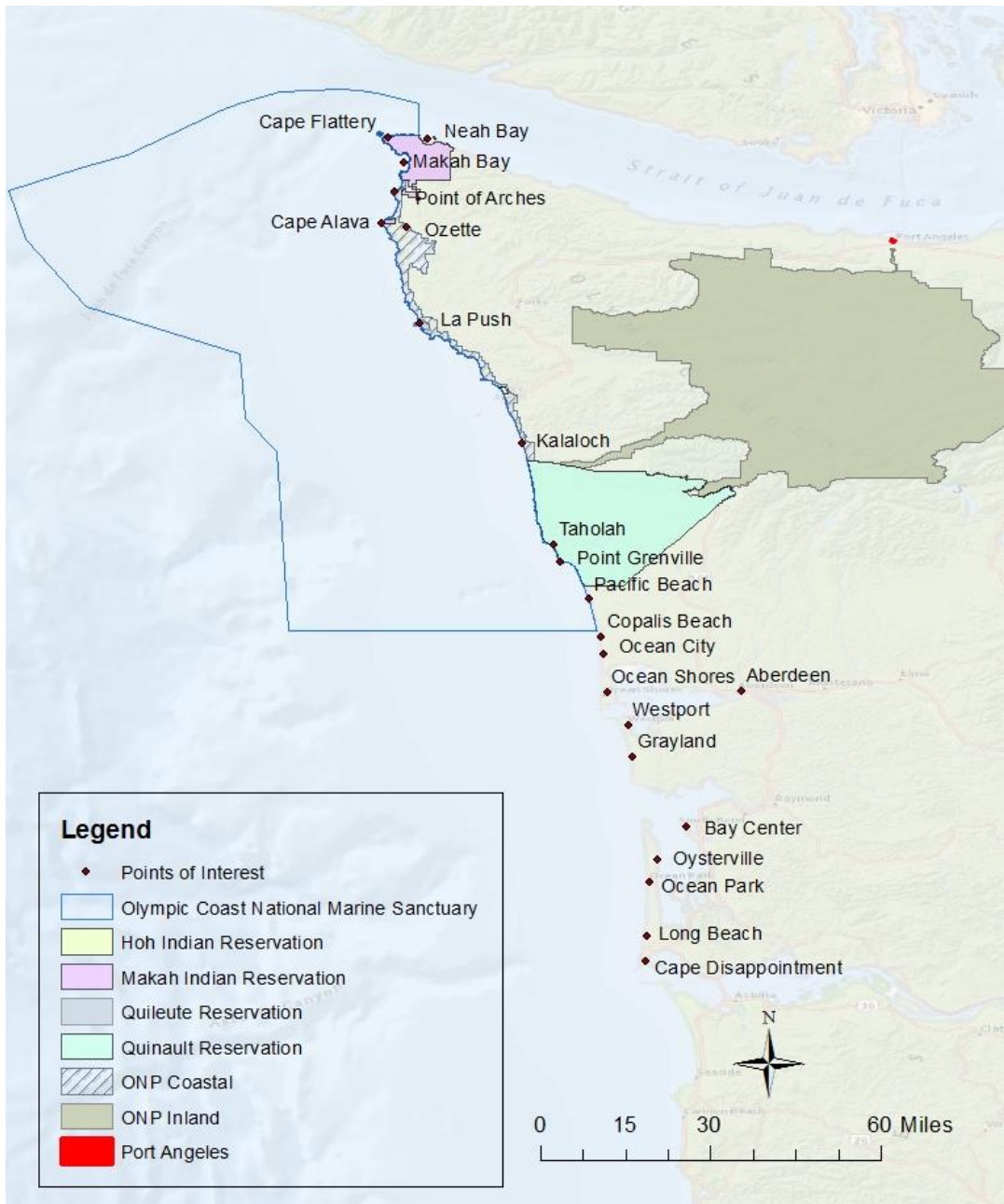
***Jurisdictions/Sub-areas for Estimation.*** For each of the measures above, we made estimates for the following different management jurisdictions or sub-areas. We organized presentations in the main reports that only included results in groups for comparative profiles. The group analyzed here consisted of the following:

1. Outer Coast (entire study area), OCNMS-Legal Definition (actual legal boundaries), OCNMS – 2 km buffer (2 kilometers inland from legal boundary), and Port Angeles (area near the shoreline where the OCNMS Headquarters and Visitor Center and the Fiero Life Center and possible site for a new visitor Center)

The survey was not originally designed to estimate by jurisdiction/sub-areas, except for the Outer Coast and OCNMS. We differentiated OCNMS into two definitions to capture the nature of how people experience OCNMS resources. Figure 1.1 shows the areas for each jurisdiction/sub-area. Figure 1.2 shows points of interest along the Outer Coast of Washington.



**Figure 1.1 Map of the Jurisdictions/sub-areas for the Outer Coast of Washington**



**Figure 1.2 Map of Points of Interest for the Outer Coast of Washington**

### **Sample Sizes for Estimation**

An important limitation of the data was that mapped data and expenditures were only obtained for the last trip. Thus, spatial distributions for the last trip were used to distribute the annual person-days by activity and activity group, which required the assumption that the last trip was representative of all annual trips. The same is true for expenditures.

The spatial distribution of trips on the last trip was also used to derive the proportion of use in each of the jurisdictions/sub-areas. Not all survey respondents completed the

mapping exercise. About 48% (N=2,672) of all survey respondents completed the mapping exercise, so this further limited available sample sizes for identifying where they did their activities.

Table 1.1 shows the sample sizes available to estimate different project measures by jurisdiction or sub-area. Adequate sample sizes were available for most objectives. For expenditures, the samples were relatively weak, but acceptable for Port Angeles, ONP-Inland, the Makah, Quileute and Quinault Nation Reservations.

**Table 1.1 Sample Sizes for Estimation**

Jurisdiction/sub-area	Demographics,		Importance-	Mapped	
	Uses,	% of	Satisfaction	Data	% of
	Expenditures	Sample <sup>1</sup>	Ratings <sup>2</sup>	Points	Sample <sup>1</sup>
1. Outer Coast (entire study area)	2,378	100.00	645 - 1,011	10,980	100.00
2. OCNMS - Legal Definition	112	4.71	30 - 60	554	5.05
3. OCNMS - 2 km buffer	364	15.31	89 - 162	1,756	15.99
4. Port Angeles	31	1.30	14 - 15	125	1.14

1. Unweighted sample percent.

2. Range of number of sample for the 25 items rated.

The mapped uses and expenditure profiles were both used to estimate market economic impacts for the Outer Coast and the subsequent sub regions that were analyzed. Chapter 2 discusses expenditures and Chapter 3 presents the market economic impacts.<sup>1</sup>

<sup>1</sup> For more details on the demographics, use profiles and expenditures please refer to Leeworthy et al, 2016a and Leeworthy et al., 2016b.

## 2. Expenditures

This chapter presents total annual expenditures by study area. Expenditures were derived by determining the person-trip cost. After the person-trip cost was estimated, the total number of person-trips estimates was then multiplied by the average person-trip expenditure to estimate total annual expenditures. Expenditures per person-day were estimated by dividing the total annual expenditures by the total annual number of person-days. For a detailed explanation of how total person-trip expenditures were calculated please see (Leeworthy et al., 2016a).

As discussed above, in addition to analyzing the entire data set for the Outer Coast of Washington State, there were several smaller regions that were analyzed, including the OCNMS-Legal, OCNMS-2 km, and Port Angeles. The results of the person-trip, person-day and total person-day expenditures are reported below.

***Outer Coast.*** For the entire Outer Coast, expenditures are based on resident and non-resident status of the Outer Coast of Washington (see Leeworthy et al, 2016a) for definitions of resident and non-resident visitors). The average resident person-day expenditures were the highest for food and beverages at a restaurant or bar, lodging and campsite fees, and car fuel (Table 2.1). For non-residents, the highest average person-day expenses were lodging/campsite fee, food and beverages at a restaurant or bar and car fuel. Additionally, their person-day trip expenditures were nearly double that of residents (Table 2.2).

**Table 2.1 Outer Coast of Washington Expenditure Profile of Residents (2014 \$)**

Expenditure Category	Expenditures Per Person-trip	Expenditures Per Person-day	Total Expenditures
Other	\$0.29	\$0.14	\$191,296
Parking	\$0.13	\$0.06	\$84,866
Car Fuel	\$10.09	\$4.70	\$6,570,805
Airline Flight	\$0.00	\$0.00	\$0
Bus/Ferry/Train Ticket	\$0.00	\$0.00	\$3,184
Food and Beverages from a Store	\$7.43	\$3.46	\$4,839,009
Food and Beverages at a Restaurant or Bar	\$13.41	\$6.24	\$8,729,648
Shopping and Souvenirs	\$3.13	\$1.46	\$2,036,355
Sundries	\$0.92	\$0.43	\$597,057
Car Rental	\$0.00	\$0.00	\$0
Dive Equipment Rental and Airfills	\$0.00	\$0.00	\$0
Equipment Rental	\$0.00	\$0.00	\$0
Lodging/Campsite Fee	\$12.06	\$5.61	\$7,849,156
Charter Fee	\$0.07	\$0.03	\$42,386
Park Entrance, Museum, Aquarium, or Other Entrance Fee	\$0.43	\$0.20	\$279,973
Lessons, Clinics, Camps	\$0.00	\$0.00	\$0
One-day Fishing License Fee	\$0.11	\$0.05	\$69,714
Bait and Tackle	\$0.11	\$0.05	\$72,433
Boat Fuel	\$0.22	\$0.10	\$141,171
Boat Rental	\$0.00	\$0.00	\$0
Boat Ramp Fees	\$0.01	\$0.01	\$9,621
Casino	\$0.20	\$0.09	\$128,205
<b>Total</b>	<b>\$48.60</b>	<b>\$22.62</b>	<b>\$31,644,878</b>



**Table 2.2 Outer Coast of Washington Expenditure Profile of Non-Residents (2014 \$)**

Expenditure Category	Expenditures Per Person-trip	Expenditures Per Person-day	Total Expenditures
Other	\$0.15	\$0.06	\$685,688
Parking	\$0.97	\$0.38	\$4,437,903
Car Fuel	\$22.23	\$8.64	\$101,294,686
Airline Flight	\$1.15	\$0.45	\$5,256,633
Bus/Ferry/Train Ticket	\$1.45	\$0.56	\$6,598,774
Food and Beverages from a Store	\$15.49	\$6.02	\$70,594,823
Food and Beverages at a Restaurant or Bar	\$23.53	\$9.15	\$107,220,219
Shopping and Souvenirs	\$9.16	\$3.56	\$41,732,262
Sundries	\$1.50	\$0.58	\$6,815,410
Car Rental	\$1.03	\$0.40	\$4,695,077
Dive Equipment Rental and Airfills	\$0.37	\$0.14	\$1,692,013
Equipment Rental	\$0.87	\$0.34	\$3,983,245
Lodging/Campsite Fee	\$28.99	\$11.27	\$132,098,669
Charter Fee	\$2.50	\$0.97	\$11,377,053
Park Entrance, Museum, Aquarium, or Other Entrance Fee	\$1.62	\$0.63	\$7,371,089
Lessons, Clinics, Camps	\$0.18	\$0.07	\$819,925
One-day Fishing License Fee	\$0.38	\$0.15	\$1,752,236
Bait and Tackle	\$0.50	\$0.20	\$2,286,781
Boat Fuel	\$0.81	\$0.31	\$3,680,499
Boat Rental	\$0.93	\$0.36	\$4,226,172
Boat Ramp Fees	\$0.13	\$0.05	\$604,852
Casino	\$0.15	\$0.06	\$690,590
<b>Total</b>	<b>\$114.08</b>	<b>\$44.35</b>	<b>\$519,914,599</b>

***Expenditures by Jurisdiction/sub-area for the OCNMS.*** For the OCNMS jurisdiction/sub-areas, the expenditure profiles do not differentiate between residents and non-residents due to the smaller sample sizes within each jurisdiction/sub-area. The expenditures are simply the average expenditures for all visitors, both residents and non-residents.

**Table 2.3 OCNMS Legal Definition Expenditure Profile (2014 \$)**

Expenditure Category	Expenditures Per Person-trip	Expenditures Per Person-day	Total Expenditures
Parking	\$1.06	\$0.42	\$278,567
Car fuel	\$20.35	\$8.08	\$5,347,960
Airline Flight	\$0.00	\$0.00	\$0
Bus/Ferry/Train	\$2.63	\$1.04	\$691,161
Car rental	\$0.08	\$0.03	\$21,024
Lodging/Campsite fee	\$35.95	\$14.27	\$9,447,624
Food & Beverages from a store	\$12.33	\$4.89	\$3,240,312
Food & Beverages from a restaurant or Bar	\$22.09	\$8.77	\$5,805,230
Shopping and Souvenirs	\$9.62	\$3.82	\$2,528,126
Sundries	\$2.36	\$0.94	\$620,206
Dive equipment rental and air fills	\$2.88	\$1.14	\$756,861
Other Equipment rental	\$0.60	\$0.24	\$157,679
Boat rentals	\$2.04	\$0.81	\$536,110
Charter fees	\$2.32	\$0.92	\$609,694
Entrance fees	\$1.17	\$0.46	\$307,475
One-day fishing license fee	\$0.61	\$0.24	\$160,307
Boat ramp fees	\$0.24	\$0.10	\$63,072
Bait & tackle	\$0.15	\$0.06	\$39,420
Boat fuel	\$0.91	\$0.36	\$239,147
Lessons, Clinics, Camps	\$0.00	\$0.00	\$0
Other	\$0.00	\$0.00	\$0
<b>Total</b>	<b>\$117.39</b>	<b>\$46.60</b>	<b>\$30,849,975</b>

**Table 2.4 OCNMS with 2 Kilometer Buffer Expenditure Profile (2014 \$)**

Expenditure Category	Expenditures Per Person-trip	Expenditures Per Person-day	Total Expenditures
Parking	\$1.22	\$0.48	\$1,016,247
Car fuel	\$23.19	\$9.20	\$19,317,015
Airline Flight	\$0.60	\$0.24	\$499,793
Bus/Ferry/Train	\$2.17	\$0.86	\$1,807,586
Car rental	\$0.89	\$0.35	\$741,360
Lodging/Campsite fee	\$39.27	\$15.59	\$32,711,478
Food & Beverages from a store	\$13.72	\$5.45	\$11,428,609
Food & Beverages from a restaurant or Bar	\$22.33	\$8.86	\$18,600,644
Shopping and Souvenirs	\$8.90	\$3.53	\$7,413,602
Sundries	\$2.54	\$1.01	\$2,115,792
Dive equipment rental and air fills	\$0.68	\$0.27	\$566,433
Other Equipment rental	\$0.47	\$0.19	\$391,505
Boat rentals	\$1.40	\$0.56	\$1,166,185
Charter fees	\$1.43	\$0.57	\$1,191,174
Entrance fees	\$1.35	\$0.54	\$1,124,535
One-day fishing license fee	\$0.39	\$0.15	\$324,866
Boat ramp fees	\$0.08	\$0.03	\$66,639
Bait & tackle	\$0.42	\$0.17	\$349,855
Boat fuel	\$0.90	\$0.36	\$749,690
Lessons, Clinics, Camps	\$0.00	\$0.00	\$1,666
Other	\$0.00	\$0.00	\$0
<b>Total</b>	<b>\$121.95</b>	<b>\$48.41</b>	<b>\$101,584,675</b>

**Table 2.5 Port Angeles Expenditure Profile (2014 \$)**

Expenditure Category	Expenditures Per Person-trip	Expenditures Per Person-day	Total Expenditures
Parking	\$0.57	\$0.02	\$33,799
Car fuel	\$25.55	\$0.72	\$1,515,013
Airline Flight	\$0.00	\$0.00	\$0
Bus/Ferry/Train	\$12.18	\$0.34	\$722,225
Car rental	\$8.22	\$0.23	\$487,413
Lodging/Campsite fee	\$25.33	\$0.72	\$1,501,968
Food & Beverages from a store	\$9.53	\$0.27	\$565,091
Food & Beverages from a restaurant or Bar	\$31.22	\$0.88	\$1,851,221
Shopping and Souvenirs	\$19.03	\$0.54	\$1,128,403
Sundries	\$0.07	\$0.00	\$4,151
Dive equipment rental and air fills	\$0.70	\$0.02	\$41,507
Other Equipment rental	\$0.00	\$0.00	\$0
Boat rentals	\$0.28	\$0.01	\$16,603
Charter fees	\$0.00	\$0.00	\$0
Entrance fees	\$2.38	\$0.07	\$141,124
One-day fishing license fee	\$1.45	\$0.04	\$85,979
Boat ramp fees	\$0.00	\$0.00	\$0
Bait & tackle	\$0.00	\$0.00	\$0
Boat fuel	\$0.00	\$0.00	\$0
Lessons, Clinics, Camps	\$0.00	\$0.00	\$0
Other	\$10.27	\$0.29	\$608,970
<b>Total</b>	<b>\$146.78</b>	<b>\$58.26</b>	<b>\$8,703,467</b>

### 3. Economic Impacts/Contributions to Local Economy

#### Study Areas

When people recreate in an area and spend money their expenditures contribute to the local area economies. This chapter quantifies those economic impacts.

The first step was to determine the study areas by identifying “primary” and “secondary” counties. Primary counties are adjacent to or within the region and secondary counties are ones with roughly 5,000 or more residents that commute to a primary county for work.

Secondary counties are included to prevent leakage, which occurs when money that leaves the study area is not included when calculating impacts. See Leeworthy et al, (2016a) for details of how secondary counties were determined.

The study areas of the Outer Coast and the regions are presented below in Table 2.6.

**Table 2.6 Olympic Coast Study Area Regions**

	<i>Clallam</i>	<i>Grays Harbor</i>	<i>Jefferson</i>	<i>King</i>	<i>Kitsap</i>	<i>Mason</i>	<i>Pierce</i>	<i>Thurston</i>
Outer Coast	Primary	Primary	Primary	Secondary	Secondary	Secondary	Secondary	Secondary
OCNMS Legal	Primary	Primary	Primary	Secondary	Secondary	Secondary	Secondary	Secondary
OCNMS 2KM Buffer	Primary	Primary	Primary	Secondary	Secondary	Secondary	Secondary	Secondary
Port Angeles	Primary	N/A	Secondary	Secondary	N/A	N/A	Secondary	N/A

The economic profiles presented in Table 2.7 show the total income and employment for each county and can be used for comparison purposes to determine what percentage of employment and income recreational activities in the study area contribute to the regional economy (BEA, 2015).

**Table 2.7 Study Area County Profile of Income and Employment**

	<i>Income</i>	<i>Employment</i>
Clallam	\$2,934,859	35,134
Grays Harbor	\$2,337,902	29,931
Jefferson	\$1,416,899	13,896
King	\$128,330,859	1,566,874
Kitsap	\$11,563,863	121,130
Mason	\$2,082,585	20,056
Pierce	\$36,054,002	394,114
Thurston	\$11,671,365	133,739

## IMPLAN

Using the expenditures profiles presented in Chapter 2 of this report, the economic impacts of recreational activities in the OCNMS and along the Outer Coast of Washington was estimated. Table 3.3 provides a more detailed explanation of the terminology used in this report, as defined by IMPLAN.

**Table 2.8 IMPLAN Economic Indicators' Definitions**

<i>Indicator</i>	<i>Definitions and Relationships</i>
<b>Employment</b>	Total annual average jobs. This includes self-employed and wage and salary employees, and all full-time, part-time and seasonal jobs, based on a count of full-time/part-time averages over 12 months
<b>Labor Income</b>	Defines the total value paid to local workers within a region. Labor income is the income source for induced household spending estimations. $\text{Labor Income} = \text{Employee Compensation} + \text{Proprietor Income}$
<b>Value Added</b>	Comprised of Labor Income, Indirect Business Taxes (IBT), and Other Property Type Income (OPTI), Value Added demonstrates an industry's value of production over the cost of its purchasing the goods and services required to make its products. Value Added is often referred to as Gross Regional Product (GRP). $\text{Value Added} = \text{Labor Income} + \text{IBT} + \text{OPTI}$
<b>Output</b>	The total value of an industry's production, comprised of the value of Intermediate Inputs and Value Added. In IMPLAN, this is typically viewed as the value of a change in sales or the value of increased production. However, annual production is not always equal to annual sales. If production levels are higher than sales, surpluses become inventory. Because inventory does not drive additional impacts in the year it was produced, in IMPLAN, Direct industry sales = Direct Output. $\text{Output} = \text{Intermediate Inputs} + \text{Value Added}$

Source: Day, 2011

Impacts/contributions are defined as direct, indirect or induced. In short, direct effects are those that occur within the sector of the expenditure. Indirect effects occur as a result of spending within the primary sector on goods and services from other sectors. Induced impacts result from the wage earners within the study area spending money on goods and services within the region. The indirect plus induced effects make up what is generally referred to as the "multiplier" effects. Table 3.4 explains these types of impacts in more detail.

**Table 2.9 Impact Type Definitions**

<i>Type of Impact</i>	<i>Definition</i>
<b>Direct Effect</b>	The effect of spending by recreators at each business they purchased goods or services from within the study area.
<b>Indirect Effect</b>	The result of a sector purchasing goods and services to produce their product from other industries located within the study area.
<b>Induced Effect</b>	Results from spending of employee wages that stem from both the direct and indirect effects within the study area.

### 3. Economic Contributions by Study Area

The next several tables present the economic contributions resulting from the expenditures explained in Chapter 2. The contributions were estimated using IMPLAN.

Expenditure impacts for the Outer Coast were estimated by resident status. Table 3.5 presents the economic contributions to the Outer Coast of Washington from residents. Their expenditures contribute \$37.8 million in output annually and sustain 373 jobs. Table 3.6 shows the contributions from non-residents. Their expenditures contribute \$637.4 million in output annually and sustain 6,158 jobs. The total impacts of both residents and non-residents are presented in Table 3.7. The expenditures contribute \$675.2 million in output and sustain 6,531 jobs. The majority of the total impacts are derived from non-resident expenditures.

**Table 0.1 Outer Coast Resident Economic Contributions (2015\$)**

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Value Added</i>	<i>Output</i>
Direct Effect	267	\$7,927,090	\$12,801,503	\$21,791,225
Indirect Effect	44	\$2,669,185	\$4,475,678	\$7,281,197
Induced Effect	62	\$3,185,776	\$5,707,453	\$8,753,937
Total Effect	373	\$13,782,051	\$22,984,634	\$37,826,358

**Table 0.2 Outer Coast Non-Resident Economic Contributions (2015\$)**

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Value Added</i>	<i>Output</i>
Direct Effect	4,378	\$132,764,184	\$216,705,542	\$368,408,140
Indirect Effect	747	\$45,118,127	\$75,285,259	\$122,029,894
Induced Effect	1,033	\$53,489,800	\$95,830,844	\$146,980,448
Total Effect	6,158	\$231,372,112	\$387,821,645	\$637,418,482

**Table 0.3 Outer Coast Total Economic Contributions (2015\$)**

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Value Added</i>	<i>Output</i>
Residents	373	\$13,782,051	\$22,984,634	\$37,826,358
Non-Residents	6,158	\$231,372,112	\$387,821,645	\$637,418,482
Total Impacts	6,531	\$245,154,163	\$410,806,279	\$675,244,840

**OCNMS-Legal.** Due to a smaller sample of data points, expenditures for this jurisdiction/sub-areas (and the remaining jurisdiction/sub-areas) are not disaggregated by residential status. Expenditures in the area contributed \$39.7 million in output and 387 jobs (Table 3.8).

**OCNMS-2 km.** The expenditure impacts from activities in the OCNMS-2 km jurisdiction/sub-area contributed \$128.2 million in output and 1,192 jobs (Table 3.9).

**Table 0.4 OCNMS Legal Definition Economic Contributions (2015\$)**

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Value Added</i>	<i>Output</i>
Direct Effect	276	\$8,244,822	\$13,560,184	\$23,029,126
Indirect Effect	47	\$2,814,837	\$4,669,217	\$7,570,606
Induced Effect	64	\$3,325,574	\$5,957,988	\$9,138,083
Total Effect	387	\$14,385,233	\$24,187,389	\$39,737,816

**Table 0.5 OCNMS 2 KM Buffer Economic Contributions (2015\$)**

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Value Added</i>	<i>Output</i>
Direct Effect	834	\$26,257,861	\$43,383,143	\$74,225,122
Indirect Effect	152	\$9,206,855	\$15,188,125	\$24,682,255
Induced Effect	206	\$10,665,737	\$19,108,668	\$29,307,570
Total Effect	1,192	\$46,130,453	\$77,679,936	\$128,214,947

**Port Angeles.** Recreation in Port Angeles resulted in nearly \$11 million in output, about \$6.8 million in value-added, \$4.1 million in income and 106 jobs (Table 3.10).

**Table 0.6 Port Angeles Economic Contributions (2015\$)**

<i>Impact Type</i>	<i>Employment</i>	<i>Labor Income</i>	<i>Value Added</i>	<i>Output</i>
Direct Effect	76	\$2,452,466	\$3,877,242	\$6,252,842
Indirect Effect	12	\$740,054	\$1,218,528	\$1,947,658
Induced Effect	18	\$950,721	\$1,680,638	\$2,554,795
Total Effect	106	\$4,143,241	\$6,776,408	\$10,755,295



## Multiplier Estimates

Chapter 2 presented expenditures for the Olympic Coast broken down into separate estimates for residents and non-residents of the area of economic impact. Using the previous tables in this Chapter, multipliers can be developed. These multipliers tell us how much impact is generated per dollar of spending for labor income, value-added and output. For employment, the multiplier is the number of employees per \$100,000 in spending. Since the dollars in Chapter 3 are in 2015 dollars and expenditure tables in Chapter 2 are in 2014 dollars, we converted the expenditures to 2015 dollars for the multiplier calculations using the Consumer Price Index for All Urban Workers. The factor to multiply 2014 dollars by to get 2015 dollars is 1.006674. See Leeworthy et al, (2016a) for the methods and sources for these calculations.

The multipliers can be used to estimate the economic impact of new spending projected from a project or management action in each jurisdiction/sub-area. For example, suppose a marketing campaign increased spending by recreators in the OC by \$100,000. We would estimate that the spending would generate 1.17 more employees, \$43,000 in labor income, \$72,000 in value-added and \$119,000 in total output in the OC local economy.

**Table 0.7 Multipliers for Resident and Non-Residents Spending in the Outer Coast of Washington**

<i>Type of Visitor</i>	<i>Employment<sup>1</sup></i>	<i>Labor Income<sup>2</sup></i>	<i>Value-Added<sup>2</sup></i>	<i>Output<sup>2</sup></i>
Residents	1.17	0.43	0.72	1.19
Non-residents	1.18	0.44	0.74	1.22
Total	1.18	0.44	0.74	1.22

1. Number of employees per \$100,000 in spending

2. Dollars generated per dollar of spending

**Table 0.8 Multipliers for Spending in OCNMS – Legal, OCNMS 2 KM Buffer and Port Angeles**

<i>Jurisdiction/Sub-area</i>	<i>Employment<sup>1</sup></i>	<i>Labor Income<sup>2</sup></i>	<i>Value-Added<sup>2</sup></i>	<i>Output<sup>2</sup></i>
OCNMS- Legal	1.25	0.46	0.78	1.28
OCNMS - 2 km	1.17	0.45	0.76	1.25
Port Angeles	1.21	0.47	0.77	1.23

1. Number of employees per \$100,000 in spending

2. Dollars generated per dollar of spending

## 4. Conclusions and Future Research

### Partnerships

The scope of the research addressed in this project is beyond the capabilities of any one entity. This project demonstrates the power of partnerships. As part of their MSP efforts, the State of Washington funded Point97 and the Surfrider Foundation to undertake the study of recreation uses on the Outer Coast of Washington. The spatial use component allowed ONMS and NCCOS to evaluate how they could join the study to meet the objectives of OCNMS.

NCCOS in Fiscal Year 2015 initiated a new strategic effort to provide scientific support to national marine sanctuaries. NCCOS's funding and staff support allowed for not only OCNMS to meet their needs, but strengthened the data through expanded sample sizes from the surveys. Samples sizes were doubled for the State of Washington's MSP for recreation uses, increasing the reliability of the data. It also allowed for the development of estimates of use and other profiles of users (e.g., demographics; expenditures and associated impacts of the local area economies; importance-satisfaction ratings for 25 natural resources attributes, facilities and services; and the non-market economic values of the recreation uses and how those values change with the changes in natural resource attributes and user characteristics).

### Limitations

Although the study developed a significant body of socioeconomic information, the information was limited to only the recreation use of the Outer Coast by the State of Washington households, so it only represents an estimate of this proportion of recreation use.

Expenditure estimates for Port Angeles were based on relatively small sample sizes. Although we judge these to be acceptable estimates, the confidence intervals on these estimates would be much wider than for the other jurisdictions.

### Uses of the Information

***OCNMS Management Plan/Condition Reports.*** The study met several objectives of the OCNMS Management Plan's Socioeconomic component by estimating use for recreation, providing important information for understanding the extent of use and its spatial distribution, and understanding how the sanctuary fits in the larger regional context in supplying recreation ecosystem services. The information will also contribute

to the deep research behind the development of socioeconomic indicators necessary for evaluating recreation ecosystem services in future OCNMS Condition Reports.

***MSP/Ecosystem-based Management.*** As noted above, the information developed will also support the State of Washington in their MSP process and other agencies engaged in MSP and/or ecosystem-based management, which requires connecting natural resources with how users use and benefit from the protection and restoration of those resources.

***Damage Assessment/Restoration/Resource Protection.*** The State of Washington, NOAA, and other federal agencies are co-trustees for damage assessments when resources are damaged by a responsible party. As co-trustees they can sue to recover funds for the injuries to compensate those impacted and provide funds for restoration of the resources damaged. The information can also be used in benefit-cost analyses of investments in resource protection and restoration projects where responsible parties for the damage cannot be identified. The non-market economic values support these uses. For private businesses, they can sue for damages for lost income, the market economic measure of income can be used in these cases.

***Education/Outreach.*** Students can benefit by using the information to do Honor's papers, Master's Theses, and Ph.D. Dissertations. This fulfills the NOAA goal of educating the scientists of the future. OCNMS and state and local education and outreach staff can use the information to better understand their users: who are the users, what are they doing, how do they perceive the condition of natural resources they use in doing their activities and how do they value those resources. Further research on the data could explore multiple relationships.

***Business Plans/Marketing.*** Private businesses are often times major users of the type of information developed in this project. The information will support business plans for new businesses or expansion of existing businesses vying to meet the demand for support services recreation users want while undertaking their activities. Bankers or other investors usually want some quantitative information before granting loans to businesses and the information in this study can provide important information for this purpose. Businesses, like agency Education and Outreach staff can develop marketing campaigns by bettering understanding their users. The importance-satisfaction scores will directly support this use.

## **Future Research**

This report covers only user's expenditures and the associated economic impact on local area economies. There are two companion reports: The first is a report on the socioeconomic profiles of the users (Leeworthy et al, 2016b) which includes demographic profiles, use by recreation activity type, and the spatial distribution of activity types. The second report includes importance-satisfaction ratings for 25 natural resource attributes, facilities and services (Leeworthy et al, 2016c). The Technical

Appendix to this report documents all the methods of estimation (Leeworthy et al, 2016a).

Future reports will address the estimation of the non-market economic values of the recreation uses and how those values change with changes in natural resource conditions. One report will just include results and how to use the results and a second report will be a technical appendix documenting the methods of estimation.

As noted above, a major limitation of this study is the inclusion of only State of Washington households. Currently we do not know what portion of the recreation use is accounted for by State of Washington households on the Outer Coast. Given the existence of both the ONP and the OCNMS, we expect this could be a significant component of total recreation use and value. In meetings with the ONP and the four Coastal Treaty Tribes, we discussed how we could supplement our study with a Social Values Mapping survey (Sherrouse et al, 2011) to get a more complete profile of recreational use and value. The current study was based on a random sample of Washington households and done through an Internet Panel survey. Members of the four Coastal Treaty Tribes had a low probability of inclusion and the members of the tribes are not likely represented. The Social Values Mapping survey is an on-site survey and could be designed to make sure we are both meeting the objectives of the ONP and the Coastal Treaty Tribes and ensuring good representation of tribal members use and values. This study would also provide more complete information in assessing the recreation ecosystem service for OCNMS Condition Reports and for all agencies engaged in ecosystem-based management for the resources in the Outer Coast.

## 5. References

Bureau of Economic Analysis. (2015). Regional Data.

<http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=5#reqid=70&step=1&isuri=1>

Day, Francis. 2011. Principles of Impact Analysis & IMPLAN Applications. First Edition. MIG.

Leeworthy, Vernon R., Schwarzmans, Danielle, Reyes Saade, Daniela, Goedeke, Theresa L., Gonyo, Sarah and Bauer, Laurie. 2016a. Technical Appendix: A Socioeconomic Profile of Recreating Visitors to the Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 4, 2014. *Marine Sanctuaries Conservation Series ONMS-16-05*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 211 pp.

Leeworthy, Vernon R., Schwarzmans, Danielle, Reyes Saade, Daniela, Goedeke, Theresa L., Gonyo, Sarah and Bauer, Laurie. 2016b. A Socioeconomic Profile of Recreating Visitors to the Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 1, 2014. *Marine Sanctuaries Conservation Series ONMS-16-02*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 36 pp.

Leeworthy, Vernon R., Schwarzmans, D., Reyes Saade, D., Goedeke, Theresa L., Gonyo, Sarah. and Bauer, Laurie. 2016c. Importance-Satisfaction Ratings for Natural Resource Attributes Facilities and Services in Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 3, 2014. *Marine Sanctuaries Conservation Series ONMS-16-04*. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 35 pp.

Point 97 and Surfrider Foundation (2015). An Economic and Spatial Baseline of Coastal Recreation in Washington. Report to the Washington Department of Natural Resources. Portland, Oregon.

Sherrouse, Benson C., Clement, Jessica M., and Semmens, Darius J. 2011. A GIS application for assessing, mapping, and quantifying the Social Values of ecosystem services. *Applied Geography* 31 (2011) 748-760.

U.S. Department of Commerce, Census Bureau. 2015. 2010 Population for State of Washington, on-line. <http://quickfacts.census.gov/qfd/states/53000.html>