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Special Issue

Recreation Use and Spatial Distribution of Use by Washington Households on the Outer Coast of Washington

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Abstract

Natural resources along the Outer Coast of Washington provide a variety of economic, social, and cultural benefits to the state's residents, including tourism and recreation. Knowledge of the intensity and spatial distribution of recreation use can help inform marine spatial planning (MSP) and management of parks and marine protected areas (MPAs). A survey was funded by the State of Washington to support its MSP process and addressed visitation to the Outer Coast with emphasis on outdoor recreation activities. In 2013 and 2014, Point97 and the Surfrider Foundation conducted an Internet survey using a panel from Knowledge Networks (KN), a marketing research firm. The panel included a random sample of households in the State of Washington. In 2014, the survey was expanded to address management plan objectives of Olympic Coast National Marine Sanctuary (OCNMS). The survey

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covered user visitation to the Outer Coast over the past 12 months. It also solicited information on detailed recreational activities participated in by respondents over the 12-month period and on the last trip. Information on the respondent's last trip to the Outer Coast was collected for two important reasons. First, respondents provided trip expenditure information so that expenditure profiles of visitors and their economic contributions to the local economy could be estimated. Second, respondents provided information on where, spatially, they engaged in particular types of activities during their last trip. This spatial information was used to estimate the spatial intensity of use by types of recreational activities along the Outer Coast (OC) and to estimate use in OCNMS under different spatial definitions of the OCNMS. Demographic information of the users was also collected to build user profiles, and to help understand how population changes may impact use and economic impacts.

Keywords

Recreation, coastal, marine, Washington, spatial use, Internet panel, sanctuary, spatial planning

Introduction

Natural resources along the Outer Coast of Washington provide a variety of economic, social, and cultural benefits to the state's residents, including tourism and recreation. Knowledge of the intensity and spatial distribution of recreation use can help inform marine spatial planning (MSP) and management of parks and marine protected areas (MPAs). A survey was funded by the State of Washington to support its MSP process and addressed visitation to the Outer Coast with emphasis on outdoor recreation activities. In 2013 and 2014, Point97 and the Surfrider Foundation conducted an Internet survey using a panel from Knowledge Networks (KN), a marketing research firm. The panel included a random sample of households in the State of Washington. In 2014, the survey was expanded to address management plan objectives of Olympic Coast National Marine Sanctuary (OCNMS). The survey covered user visitation to the Outer Coast over the past 12 months.

The objectives of this paper were identify the number of Washington household who have been to the coast, the number of person-days and trips of recreation along the Outer Coast and to develop statistically reliable estimates of recreation use by activity. See Figure 1 for the geographic boundary of the Outer Coast and the OCNMS used in this paper.

Survey Methodology

Detailed survey methodology is presented in (Point97 and Surfrider Foundation, 2015 & GFK, 2012), but a summary is provided here. The survey was implemented by Knowledge Networks (KN) using a randomly selected panel of Washington households.

Figure 1. Outer Coast of Washington Boundaries

The sampling frame included residents 18 years or older living in State of Washington households. The survey was administered 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. The two waves resulted in a total of 6,129 households surveyed. KN recruited panel members to obtain a random sample representative of all households in Washington using random digit dialing by telephone, including cell phones. The sample used was created from GFK's probability-based nonvolunteer online panel. Their sample frame includes 97% of U.S. households' residential addresses and is a multi-cohort, continual recruitment sample. The roughly 55,000-member panel includes both cell phone only households and households without access to the Internet. Respondents to this survey were then selected from the panel using a probability proportional to size-weighted sampling approach. If a selected respondent does not have access to the Internet, that respondent is provided a computer and Internet service to complete the survey.

Survey Response Rates

Of the 6,129 panel members across both waves, 5,538 households responded, for a response rate of 90.36%. For wave 1, the response rate was 100% (N=3,017), while for wave 2 the response rate was 81% (N=2,521). The second wave included the survey for recreational use, in addition to a contingent choice survey. Given it was a longer survey, this could account for the lower response rate.

Sample Weighting

Sample weights were calculated to ensure panel members were representative of all Washington households. KN weighted the sample for four factors: age, gender, race/ethnicity, and county of residence. The weights were used to make the panel representative of the population of Washington. County of residence was used since mapping spatial patterns of use was conducted and spatial use would be related. KN provided weights for the full panel.

What Was Estimated?

- Demographics: Who are the Users?
- Recreational Use and Type of Uses
    1. Percent of Washington households that visited the Outer Coast in the past 12 months. (A visit is defined as an intentional trip to the Pacific Coast of Washington outside of your daily routine).
    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).

Jurisdictions/Sub-areas for Estimation

For each of the measures above, separate estimates for the following different management jurisdictions or sub-areas were made. Working with the OCNMS, specific areas of interest to management were identified to meet the needs of our partners who have management responsibilities in these jurisdictions. First was the Outer Coast (all 6,129 households) which included the entire sample. Second was the OCNMS—as defined by the legal definition of the sanctuary. It was included as the most conservative approach for considering recreation dependent upon the sanctuary, sanctuary resources, and the consequential economic contributions to the local economies. Third, was the OCNMS with a 2km inland buffer. This inland buffer accounts for the topography of the land. It is possible that those recreating further inland still derive recreational benefits from the viewscapes and wildlife viewing of marine mammals and sea birds. Management and policies of the sanctuary may affect these benefits. For example, beach clean-ups not only benefit the sanctuary, but the surrounding areas by removing trash and improving user experience. In addition, maintenance of hiking trails will influence user benefits. Lastly, Port Angeles was identified as a study area. Port Angeles, located near the shoreline, is home to OCNMS Headquarters and Visitor

Center, the Fiero Life Center and is the possible site for a new visitor center (defined by George Galasso, OCNMS). People who visit the sanctuary may utilize the visitor center or those who use the visitor center may benefit from sanctuary resources and the educational experience dependent on the sanctuary.

Sample Sizes for Estimation

An important limitation of the data is that mapped data and expenditures were only obtained for the last trip. Thus, spatial distributions of activities during the last trip were used to distribute the annual person-days by activity/activity group and required the assumption that the last trip was representative of all annual trips. Based upon the timing of the two waves, this is a reasonable assumption. The two waves were designed and implemented to be representative of the various seasons. Wave one was conducted in June 2014 and wave two was implemented from November 2014–February 2015.

The spatial distribution of activities during the last trip was also used to derive the proportion of use in each of the jurisdictions/sub-areas. About 48% (2,672/5,538) of all survey respondents completed the mapping exercise, so this further limited available sample sizes for identifying where survey respondents did their activities.

Table 1 shows the sample sizes available to estimate different project measures by jurisdiction or sub-area. Adequate sample sizes were available for most objectives. Objectives included identifying statistically significant differences in demographic comparisons by jurisdiction/sub-areas and, statistically reliable estimates of recreation use by activity. The criterion for statistically reliable estimation was with 95% confidence or the 0.05 level of significance.

Table 1
Sample Sizes for Estimation

Jurisdiction/sub-area	Uses	% of Sample[1]	Mapped Data Points	% of Sample[1]
1. Outer Coast (entire study area)	2,378	100.00	10,980	100.00
2. OCNMS - Legal Definition	112	4.71	554	5.05
3. OCNMS - 2 km buffer	364	15.31	1,756	15.99
4. Port Angeles	31	1.30	125	1.14

1. Unweighted sample percent.

Number of Households that Have Been to the Outer Coast Past 12 Months

Survey respondents in both waves were first screened for whether they had visited the Outer Coast (OC) of Washington during the past 12 months. Based on this screening, it was estimated that 40.7% of Washington households had been to the OC during the past 12 months. There were 2,624,689 households in the State of Washington in 2010

(U.S. Department of Commerce, Bureau of the Census, 2010 Census of Population), this suggests that 1,067,892 Washington households had been to the OC during the past 12 months. The 2013 Washington Statewide Comprehensive Outdoor Recreation Plan (SCORP) found that 83% of residents participated in recreational activities, 81% participated in nature activities and 75% participated in water-based activities. Although, these numbers are not specific to the Outer Coast, the SCORP does show that Washington residents engage in recreational and outdoor activities at high rates.

Annual Number of Person-Trips and Person-Days for Recreation

Two important measures of recreation are the annual number of person-trips and person-days. Person-days is an intensity of use measurement. It helps to provide a metric to understand the use/pressures placed on the natural resources, infrastructure and local businesses. A person-day is defined as one person doing any recreation activity for a whole day or any part of a day, therefore, people could do several person-days of activities in a single day. Estimates of person-days were normalized to account for this double counting across activities when people have multiple activities during their trip (see Number of Person-trips and Person-days by Activity below).

A person-trip is equal to one person who makes a trip and is comprised of one or more person-days. Person-trips are used to estimate expenditures. Calculating a person-trip for each sample respondent requires an estimate of the number of trips made to the OC in which at least one recreation activity was undertaken and the number of people with the household on each trip. The number of people on the last trip was used as the best estimate of the average on each trip.

Two methods were used to estimate total person-trips and total person-days for the Outer Coast of Washington.

Method 1

Method 1 uses the sample means of the person-trips and person-days calculated for each individual in the sample. Sample mean person-trips and person-days are multiplied by the number of Washington households estimated to participate in recreation on the Outer Coast of Washington (Equations Eq. 1 and Eq. 2).

Eq. 1. Person-trips (5,208,522) =Sample Mean Person-trips (4.88) * Number of WA households participating in recreation on Outer Coast (1,067,892).

Eq. 2. Person-days (13,122,070) =Sample Mean Person-days (12.28) * Number of WA households participating in recreation on Outer Coast (1,067,892)

Method 2

Method 2 uses sample means of component parts of calculating sample mean person-trips and person-days (Equations Eq. 3 to Eq. 6).

Eq. 3. Sample Mean Person-trips (4.85) =Sample Mean Number of Annual Trips (1.76) * Sample Mean Number in Household on Trips (2.75).

Eq. 4. Person-trips (5,180,121) =Sample Mean Person-trips (Eq. 3, 4.85) * Number of WA households participating in recreation on Outer Coast (1,067,892)

Eq. 5. Sample Mean Person-days (13.38) =Sample Mean Person-trips (Eq. 3, 4.85) * Sample Mean Length of Trips in Days (2.76)

Eq. 6. Person-days (14,289,672) = Sample Mean Person-days (Eq. 5., 13.38) * Number of WA Households Participating in recreation on Outer Coast (1,067,892).

The sample means used and component means used in equations 1 through 6 are in Table 2.

The estimates in Table 2 were the result of first eliminating outliers. All observations with more than 50 trips per year, all that had lengths of stay greater than 90 days, and all numbers of persons greater than 11 were eliminated. This resulted in five observations being dropped from the analysis. Four respondents reported taking over 80 trips annually and one of the outliers reported their stay lasting 90 days. These observations account for a high percent of the sample sum and therefor have a significant effect on the sample mean. See Leeworthy et al. (2016a), Appendix C for more details on the outlier analysis.

Table 2

Average Number of Trips, Recreation Trips, Number of People on Trips, Length of Stay, Person-Trips and Person-Days for the Outer Coast

Measurement[1]	Mean[2]	Standard Error of the Mean	95% Confidence Interval	N	Min	Max
Number of Recreation Trips to Outer Coast past 12 months (rec_trips)	1.76	0.04	1.68 to 1.84	2,352	1	30
Number of Passengers on last trip (passengers_total)	2.75	0.029	2.69 to 2.81	2,128	1	11
Length of Stay last trip in days (days_stay)	2.76	0.047	2.67 to 2.85	2,346	1	30
Person-trips for recreation during past 12 months (person_trips)	4.88	0.146	4.59 to 5.17	2,128	1	90
Person-days for recreation during past 12 months (person_days)	12.28	0.424	11.45 to 13.11	2,123	1	384

1. Database variable names in parentheses.
2. Sample weighted means.

The differences in the two methods were relatively small for person-trips, with Method 1 yielding an estimate of only about one-half a percent above that for Method 2. For person-days, the difference was more significant, with Method 2 yielding an estimate almost nine percent higher than Method 1. Method 1 was chosen for all further applications because it accounts for the variation across the sample for each component of the calculations.

Number of Person-Trips and Person-Days by Activity

To estimate person-trips and person-days by activity, two methods of calculation mirroring the method of calculations above to total person-trips and person-days were estimated. Method 2 will not be shown here because as explained above, it was decided that Method 1 would be the approach used for final estimates.

Person-Trips by Activity

Estimates of total annual person-trips by activity were normalized to account for double-counting across activities (Table 3). This was done so that person-trips are additive across activities to form activity groups.

Column 2 in Table 3 contains the weighted sample average number of person-trips per household by activity. This number was then multiplied by the number of households to get the total number of person-trips in column 3. Column 3 contains

double counting across activities with the sum across all activities equal to 26,672,300. Normalized estimates were then calculated using the percent distribution of the Column 3 estimates (Column 4). Column 4 was then used to distribute the total annual person-trip estimate by the Column 4 percentages to yield the estimates in Column 5 (Normalized Annual Person-trips).

Table 3

Estimation of Person-Trips by Activity

Activity	Sample Average Person-trips	Person-trips	Percent of Sample	Normalized Annual Person-trips
Shore-based Activities				**2,758,934**
Beach Going	3.54	3,776,847	14.16	737,541
Beach Driving	1.36	1,454,319	5.45	283,999
Hiking/Biking	1.89	2,019,122	7.57	394,293
Horseback Riding	0.25	264,351	0.99	51,622
Camping	1.77	1,888,274	7.08	368,741
Photography	1.75	1,864,267	6.99	364,053
Collecting Non-living resources	1.54	1,641,755	6.16	320,601
Tide Pooling	1.12	1,198,457	4.49	234,034
Hang gliding/Parasailing	0.02	20,739	0.08	4,050
Water-based Sports				**969,927**
Fishing from Shore	0.69	735,200	2.76	143,569
Fishing from Private Boat	0.39	413,124	1.55	80,675
Fishing from Charter Boat	0.29	311,232	1.17	60,777
Collecting Living Resources	1.04	1,107,346	4.15	216,242
Skim Boarding	0.06	67,157	0.25	13,114
Surfing	0.21	226,212	0.85	44,174
Swimming or Body Surfing	0.98	1,045,893	3.92	204,241
Windsurfing	0.05	53,150	0.20	10,379
Snorkeling from Shore	0.03	26,773	0.10	5,228
Snorkeling from Private Boat	0.02	20,420	0.08	3,988
Snorkeling from Charter Boat	0.03	28,462	0.11	5,558
Personal Watercraft	0.11	116,102	0.44	22,672
Kayaking	0.34	368,337	1.38	71,929
Boating	0.35	375,768	1.41	73,380

Table 3 (cont.)

SCUBA from Shore	0.04	37,740	0.14	7,370
SCUBA from Private Boat	0.03	29,587	0.11	5,778
SCUBA from Charter Boat	0.00	4,363	0.02	852
Wildlife & Sightseeing				**1,479,405**
Sightseeing/Scenic Enjoyment	3.15	3,364,317	12.61	656,982
Sitting in Car watching the scene	1.37	1,467,216	5.50	286,517
Watching Wildlife from Shore	2.19	2,338,912	8.77	456,741
Watching Wildlife from Private Boat	0.23	247,383	0.93	48,309
Watching from Charter	0.15	158,008	0.59	30,856
Other	0.00137	1,467	0.01	**286**
Total	4.88	26,672,300	100.00	**5,208,552**

Person-Days by Activity

The same procedures used to estimate person-trips by activity were used for estimating person-days by activity (Table 4).

Table 4

Estimation of Person-Days by Activity

Activity	Sample Average Person-days	Person-days	Percent of Sample	Normalized Annual Person-days
Shore-based Activities				**7,178,555**
Beach Going	9.20	9,829,732	13.77	1,807,380
Beach Driving	3.80	4,057,482	5.69	746,044
Hiking/Biking	5.32	5,676,731	7.95	1,043,773
Horseback Riding	0.75	800,706	1.12	147,225
Camping	5.29	5,646,013	7.91	1,038,125
Photography	4.79	5,110,159	7.16	939,598
Collecting Non-living resources	4.18	4,463,301	6.25	820,662
Tide Pooling	3.21	3,427,036	4.80	630,125
Hang gliding/Parasailing	0.03	30,578	0.04	5,622
Water-based Sports				**2,330,559**
Fishing from Shore	1.99	2,127,970	2.98	391,267
Fishing from Private Boat	0.85	905,512	1.27	166,495
Fishing from Charter Boat	0.63	677,680	0.95	124,604
Collecting Living Resources	2.67	2,847,072	3.99	523,487
Skim Boarding	0.14	154,600	0.22	28,426
Surfing	0.27	291,917	0.41	53,674
Swimming or Body Surfing	2.71	2,893,577	4.05	532,038
Windsurfing	0.16	174,181	0.24	32,027
Snorkeling from Shore	0.06	61,759	0.09	11,355
Snorkeling from Private Boat	0.02	17,496	0.02	3,217

Table 4 (cont.)

Snorkeling from Charter Boat	0.08	81,545	0.11	14,994
Personal Watercraft	0.26	275,355	0.39	50,629
Kayaking	0.91	973,285	1.36	178,957
Boating	1.01	1,078,750	1.51	198,348
SCUBA from Shore	0.06	61,900	0.09	11,381
SCUBA from Private Boat	0.04	44,272	0.06	8,140
SCUBA from Charter Boat	0.01	8,254	0.01	1,518
Wildlife & Sightseeing				**3,612,386**
Sightseeing/Scenic Enjoyment	8.18	8,732,984	12.24	1,605,723
Sitting in Car watching the scene	3.44	3,675,961	5.15	675,894
Watching Wildlife from Shore	5.59	5,965,724	8.36	1,096,910
Watching Wildlife from Private Boat	0.66	708,665	0.99	130,301
Watching Wildlife from Charter Boat	0.53	563,213	0.79	103,557
Other	0.0029	3,101	0.00	570
Total	12.29	71,366,512	100.00	**13,122,070**

Number of Person-Trips and Person-Days by Jurisdiction or Sub-Area

Estimates of the amount of use by jurisdiction or sub-area were derived using the spatial locations of activity point data. Forty-eight percent of the entire sample of survey respondents (5,538) completed the mapping exercise. The sample sizes by jurisdiction or sub-area are provided in Table 1.

To estimate person-trips and person-days by jurisdiction or sub-area and by activity, the proportion of all mapped data points in each jurisdiction or sub-area was used. The percentages of total map points in each jurisdiction were multiplied by the control totals for person-trips (5,208,552) and person-days (13,122,070) for the entire OC study area to get estimates of total person-trips and person-days in each jurisdiction. Table 5 contains the information used in the calculations.

Table 5

Estimation of Person-Trips and Person-Days by Jurisdiction/Sub-Area

Jurisdiction/Sub-area	Number of Map Data Points	% of Map Data Points [1]	Annual Person-trips	Annual Person-days
Outer Coast (entire study area)	10,980	100	5,208,552	13,122,070
OCNMS - Legal Definition	554	5.05	262,799	662,079
OCNMS - 2 km buffer	1,756	15.99	832,989	2,098,575
Port Angeles	125	1.14	59,296	149,386

1. Rounded to two decimal places here, values used in calculation were more precise.

Number of Person-Trips and Person-Days by Activity Type and Jurisdiction or Sub-Area

To ensure that person-trips and person-days were additive across activities for each jurisdiction or sub-area, the control total estimated and shown in Table 5 was distributed by the percentage of map points by activity within each jurisdiction or sub-area. The results of the calculations for each jurisdiction or sub-area are detailed in (Leeworthy et. al, 2016a, Tables 2.5 to 2.11).

Spatial Distribution by Activity

To support the state of Washington's Marine Spatial Planning, the use by activity type was mapped to a one-nautical mile hexagon grid that is used for many planning activities within the state. Maps were created for each of the thirty-one activity types as well as four activity groupings (i.e., shore-based, surface water sports, wildlife viewing and sightseeing, and diving, Tables 3 and 4) (Point97 and Surfrider, 2015). To map the number of person-days for each activity across the hexagonal grid, percentage distributions (i.e., the percent of points that fell within each one-nautical mile hexagon) were calculated for each activity. The summarized weighted person-days for each activity (Table 4) were multiplied by the percentage distribution values for that activity to calculate the estimated person-days within each hexagon. For illustration, Figure 2 shows the spatial distribution for "Sightseeing/Scenic enjoyment" since this was one of the major reasons the 2km inland buffer was used in constructing an alternative definition of the OCNMS. OCNMS management thought that sanctuary resources could be experienced by those hiking up to 2km from the shoreline. For additional maps of activities see (Leeworthy et al., 2016b).

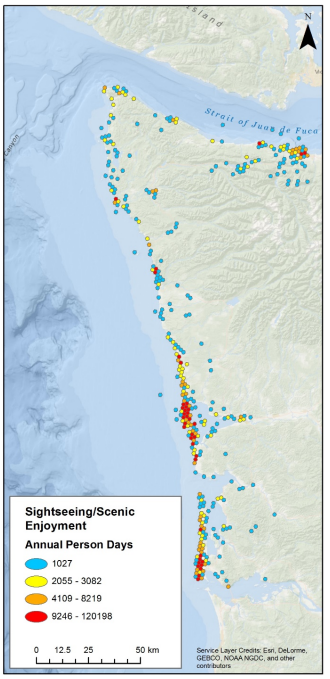

Figure 1. Person-days of Sightseeing/Scenic Enjoyment activities along the Outer Coast of Washington, summarized to the WA state hexagon grid

Limitations and Future Research

Although estimates were produced for other jurisdictions: Olympic National Park –Coastal Area and Olympic National Park-Inland, and for three of the four Coastal Treaty Tribes (Makah, Quileute, and the Quinault Nation) the results need to be further reviewed and approved for distribution by these jurisdiction's leaders. Work will continue with these entities to determine what can be done to serve their needs.

A major limitation of this study was the inclusion of only State of Washington households. Currently, it is unknown what portion of total recreation use is accounted for by the State of Washington households on the OC. Given the existence of both the ONP and the OCNMS, it is expected that this could be a significant component of total recreation use and value. In addition, 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. To get a more complete profile of recreation use and value on the Outer Coast of WA, a "Social Values Mapping Survey" could be implemented in the future. The "Social Values Mapping Survey" is an on-site survey and could be designed to meet the objectives of the ONP and the Coastal Treaty Tribes and ensure good representation of tribal members use and values are being met. This study would also provide more complete information to assess the recreation ecosystem services for OCNMS Condition Reports that evaluate the status and trends in sanctuary resources and the ecosystem services supported by cultural and natural resources and for all agencies engaged in ecosystem-based management for the resources in the OC.

The Internet spatial tool developed by Ecotrust/Point97 has not been tested for accuracy. It is simply not known whether people can accurately provide spatial use information. As noted above, the spatial use mapping tool developed by Ecotrust/Point97 needs to be tested for accuracy. A study that has one group using GPS technology and a journal to record spatial use and a second group using the Internet Panel tool developed by Ecotrust/Point97 should be conducted to test the accuracy of the data.

References

GFK. (2013). Knowledgepanel® Design summary. Retrieved from http://www.knowledgenetworks.com/ganp/docs/KnowledgePanel(R)-Design-Summary.pdf

Leeworthy, V. R., Schwarzmann, D., Reyes S., Daniela, G., Gonyo, S., & Bauer, L. (2016a). *Technical Appendix: Socioeconomic Profiles, Economic Impact, and Importance-Satisfaction Ratings 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. pp 212.

Leeworthy, V. R., Schwarzmann, D., Reyes Saade, D., Goedeke, T. L., Gonyo, S., & Bauer, L. (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. pp 35.

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, May 2015. Retrieved from https://washington.surfrider.org/rec-use/

U.S. Department of Commerce, Census Bureau. (2015). 2010 population for state of Washington, online. Retrieved from http://quickfacts.census.gov/qfd/states/53000.html

Washington State Recreation and Conservation Office. (2013). Outdoor recreation in Washington. The 2013 State Comprehensive Outdoor Recreation Plan. Retrieved from http://www.rco.wa.gov/documents/rec_trends/2013-2018SCORP-FullRpt.pdf