# Importance – Satisfaction Ratings for Natural Resource Attributes Facilities and Services in the Outer Coast of Washington and the Olympic Coast National Marine Sanctuary: Volume 3, 2014

**U.S. Department of Commerce**
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National Ocean Service
**Office of National Marine Sanctuaries**

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Electronic copies of this report may be downloaded from the Office of National Marine Sanctuaries web site at http://sanctuaries.noaa.gov.

## Cover

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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. The importance-satisfaction questions were implemented on the second wave that included 2,537 responses. The survey was originally designed for the Outer Coast of Washington as part of their Marine Spatial Planning Initiative and was expanded in wave two to meet the needs of the Olympic Coast National Marine Sanctuary (OCNMS). Sample sizes supported estimation of importance-satisfaction ratings for the Outer Coast of Washington, OCNMS legal boundaries, and OCNMS with a two kilometer buffer inland. Sample sizes were too small for statistically reliable results for Port Angeles. 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 2 provides estimates of the economic impact/contribution of recreation expenditures on the local economies. 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

# Key Findings

There was consistency in the items rated as relatively high in importance and relatively low in satisfaction across the three jurisdiction/sub-areas for the Outer Coast of Washington. Two items received this classification in all three jurisdiction/sub-areas:

- I. Control of invasive species
- Y. Organization of volunteer efforts to clean beaches and shorelines

Abundance and diversity of fish and sea life also received this classification with abundance being more important than diversity.

Importance and satisfaction ratings represent people's perceptions and people's perceptions drive their behaviors. If they are not satisfied with conditions, they may eventually substitute to other sites for their recreation with a negative impact on local economies.

People's perceptions can sometimes be misinformed or influenced by other outside forces. When ecological monitoring does not correspond to people's perceptions, this is an education/outreach opportunity. Since there is a lag in time between when people form their perceptions and when they change their behavior, there is an opportunity to change people's perceptions before negative impacts are experienced locally.

If people's perceptions and ecological monitoring are in agreement, then this suggests investments have to be made to correct the conditions. Again, because there is a time lag between when people form their perceptions and when they change their behavior, there may be time to correct the conditions before the negative economic impacts are experienced.

## Outer Coast

Of the 25 items rated on importance and satisfaction, five items were rated as relatively high in importance and relatively low in satisfaction, this suggests that these items should receive priority.

*Concentrate Here*- Relatively high importance and relatively low satisfaction
- G. Abundance of fish and sea life
- I. Control of invasive species
- M. Tidal pools with diverse and healthy population of organisms
- T. Public restrooms at trailheads an campgrounds
- Y. Organization of volunteer efforts to clean beaches and shorelines

## OCNMS-Legal

Of the 25 items rated on importance and satisfaction, three items were rated as relatively high in importance and relatively low in satisfaction, this suggests that these items should receive priority.

*Concentrate Here*- Relatively high importance and relatively low satisfaction
- C. Many kinds of fish and sea life to view
- I. Control of invasive species
- Y. Organization of volunteer efforts to clean beaches and shorelines

## OCNMS-2 km

Of the 25 items rated on importance and satisfaction, four items were rated as relatively high in importance and relatively low in satisfaction, this suggests that these items should receive priority.

*Concentrate Here*- Relatively high importance and relatively low satisfaction
- I. Control of invasive species
- G. Abundance of fish and sea life
- T. Public restrooms at trailheads and campgrounds
- Y. Organization of volunteer efforts to clean beaches and shorelines

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# 1. Introduction

**Background**

This is a companion report to three other reports containing results and the methods of estimation for a survey conducted in 2014 on the Outer coast of Washington (Leeworthy et al 2016a, 2016b and 2016c).

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. 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 (Leeworthy et al 2016a and 2016b). Expenditure profiles were obtained and estimates were made of the economic impact of the spending on the local area economies (Leeworthy et al 2016c). 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=3,017), 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.

*Jurisdictions/Sub-areas for Estimation.* For each of the measures above, we made estimates for the following different management jurisdictions or sub-areas.

1. Outer Coast (entire study area), OCNMS-Legal Definition (actual legal boundaries), and OCNMS – 2 km buffer (2 kilometers inland from legal boundary.

Figure 1.1 shows the areas for each jurisdiction/sub-area. Figure 1.2 shows points of interest along the Outer Coast of Washington.
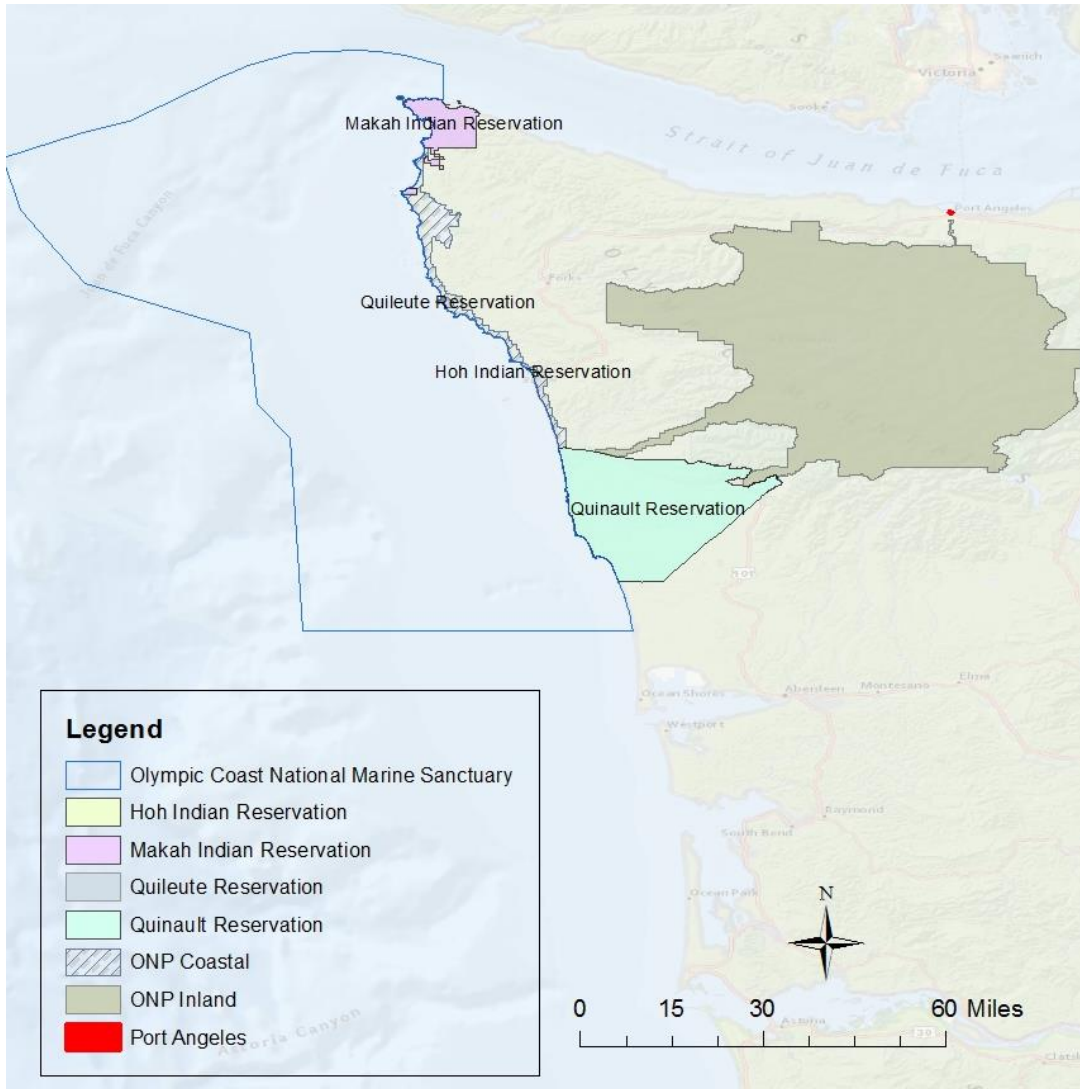
**Figure 1.1 Map of the Jurisdictions/sub-areas for the Outer Coast of Washington**
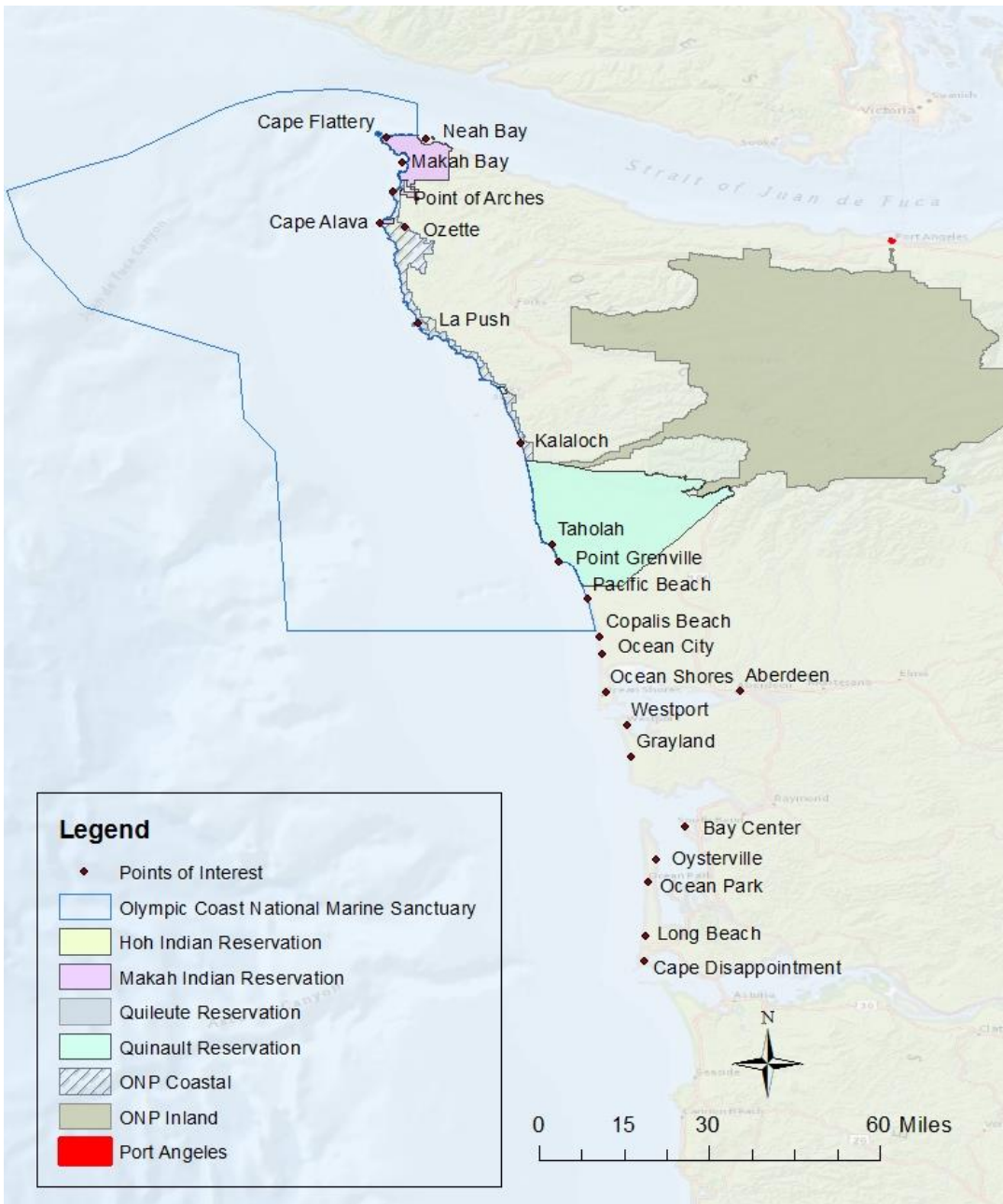
**Figure 1.2 Map of Points of Interest for the Outer Coast of Washington**

**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 At least 30 to 40 observations are needed to generate statistically reliable results for importance-satisfaction ratings, so the results for Port Angles are not presented.

**Table 1.1 Sample Sizes for Estimation**

| Jurisdiction/sub-area | Demographics, Uses, Expenditures | % of Sample[1] | Importance-Satisfaction Ratings[2] | Mapped Data Points | % of Sample[1] |
|---|---|---|---|---|---|
| 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.

# 2. Importance-Satisfaction Analysis

For many years, the U.S. Forest Service and many other federal, state, and local agencies that manage parks and/or other natural resources have used the National Satisfaction Index (NSI) for measuring visitor satisfaction. Satisfaction is a complex feature of the recreation/tourist experience and it is now agreed upon by most researchers that "Importance-Performance" or "Importance- Satisfaction" is a much more complete measure and provides a much simpler interpretation than the NSI, which only looks at satisfaction levels. First described in the marketing literature by Martilla and James (1977), it has been reported and/or used in such studies as Guadgnolo (1985), Richardson (1987), Hollenhorst, Olson, and Fortney (1992), Leeworthy and Wiley (1994), Leeworthy and Wiley (1995), Leeworthy, Wiley and Hospital (2004), Leeworthy and Ehler (2010), and Leeworthy and Morris (2010).

The satisfaction module of questions in the Internet Panel was divided into two sections to obtain the necessary information for the importance-satisfaction analysis. The first section asks the respondent to read each statement and rate the **importance** of each of the 25 items as it contributes to an ideal recreation/tourist setting for the activities they did in the Outer Coast of Washington area. Each item is rated, or scored, on a one to five scale (1-5) with one (1) meaning "Not Important" and five (5) meaning "Extremely Important." The respondent was also given the option to answer either "Not Applicable" or "Don't Know." The second section asks the respondent to consider the same list of items they just rated for importance and to rate them for how **satisfied** they were with each item at the places they did their activities in the Outer Coast of Washington area. Again, a five point scale was used with one (1) meaning "Terrible" and a score of five (5) meaning "Delighted." Respondents were also given the option to answer either "Not Applicable" or "Don't Know."

In this report, the collected data is presented in several ways. First, the means, or average scores, are reported along with the estimated standard errors of the mean, the sample sizes (number of responses), and the percent of respondents that gave a rating. This last measure is important because many respondents provide importance ratings for selected items, but may not have had a chance to use a resource, facility, or service and, therefore, do not provide a satisfaction rating. This might lead to biases in comparing importance and satisfaction. However, in recent applications, we have found that the analysis is robust with respect to this problem (i.e., it has no significant impact on the conclusions (see Leeworthy and Wiley 1994 and 1995)).

The second method of presentation is bar charts showing the mean scores for each item for importance and satisfaction. It is important to note that while both importance and satisfaction are measured on a one to five scale, the scales have different meanings are not directly comparable. They do, however, communicate relative importance-satisfaction relationships across the different items.

The most useful analytical framework provided in importance-satisfaction analysis is the four-quadrant presentation. The four quadrants are formed by first placing the importance measurement on the vertical axis and the satisfaction measurement on the horizontal axis (Figure 2.1). An additional vertical line is placed at the mean score for all 25 items on the satisfaction scale and an additional horizontal line is placed at the mean score for all 25 items on the importance scale. These two lines form a cross hair. The cross hair then separates the importance-satisfaction measurement area into four separate areas or quadrants. This allows for interpretation as to the "***relative importance***" and "***relative satisfaction***" of each item. That is, if everyone gave high scores to all items in the Outer Coast of Washington area, we would still be able to judge the relative importance and satisfaction and establish priorities.

The use of the four quadrants provides a simple but easy-to-interpret summary of results. Scores falling in the upper left quadrant are relatively high on the importance scale and relatively low on the satisfaction scale. This quadrant is labelled "**Concentrate Here**." Scores falling in the upper right quadrant are relatively high on both the importance and satisfaction scales and are labelled "**Keep up the Good Work**." Scores falling in the lower left quadrant are relatively low on both the importance and satisfaction scale and are labelled "**Low Priority**." Finally, scores in the lower right quadrant are relatively low on importance scale, but relatively high on the satisfaction scale and are labelled "**Possible Overkill**."
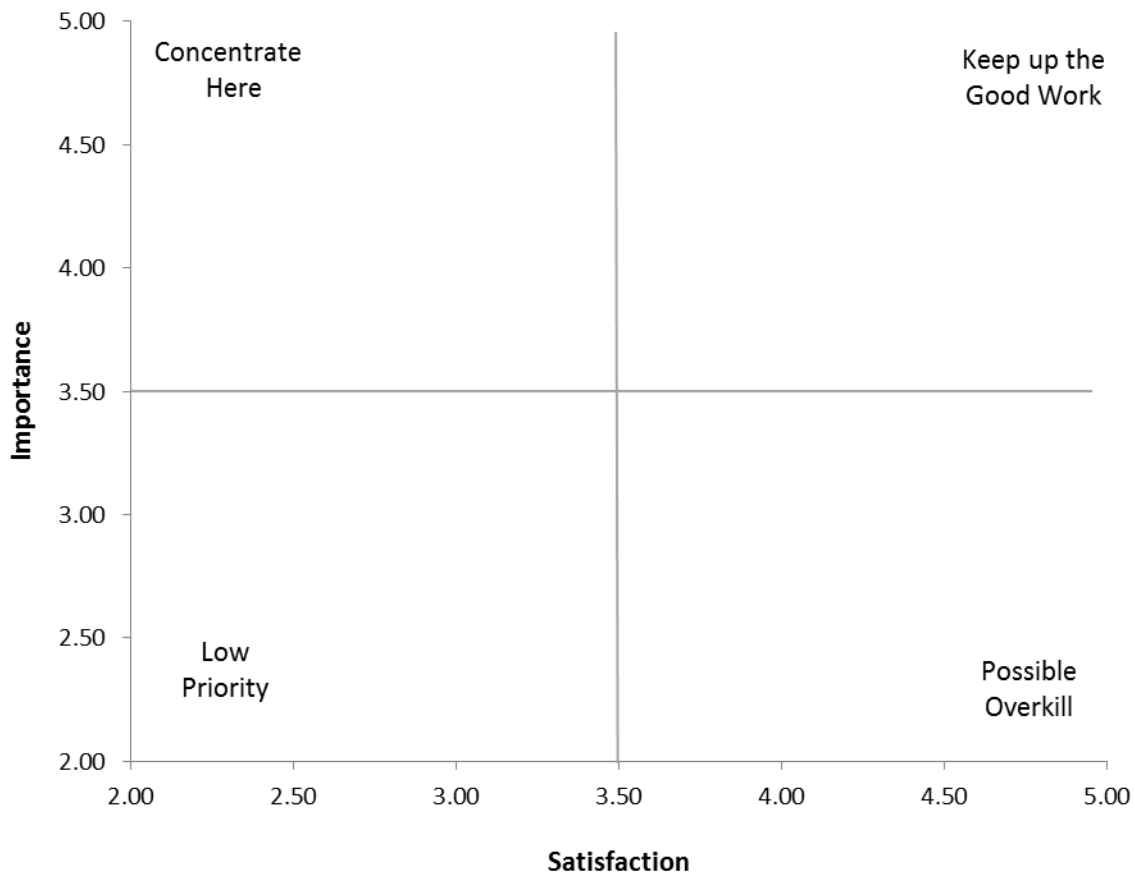
**Figure 2.1 Importance/Satisfaction Matrix**

The next section of this report, section three; the importance-satisfaction analysis is presented for 25 items for all visitors in the Outer Coast of Washington. In section four, information is presented for the 25 items for recreating visitors in two study areas: Olympic Coast National Marine Sanctuary (OCNMS-Legal) and OCNMS with a two kilometer buffer (OCNMS-2 km). Section five has conclusion and future research.

For presentation purposes, the 25 items that visitors were asked to rate are organized into four categories. In the survey, the order of the items was mixed.  Each of the items is given a letter rather than a number and so are labelled A through Y. Items A through L are labelled "**Natural Resources**." These twelve items are either natural resources or attributes of natural resources, such as clear water. Items M through P are labelled "**Natural Resource Facilities**." These four items are either facilities that provide access to natural resources or areas or features that provide public access to natural resources. Items Q through W are labelled "**Other Facilities**." These seven items are either facilities or features of facilities that are not directly related to natural resources, but are indirectly related since they represent items associated with the general infrastructure of the area. Items X and Y are labelled "**Services**." These two items are either services or features of a service provided to visitors. We considered separate analyses for each group, but rejected this approach in favor of establishing the relative importance of each item with

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respect to all items. The organization into four categories was done simply as an aid to those users that have responsibilities in separate areas.

# 3. Importance-Satisfaction Analysis: Outer Coast Of Washington

**Outer Coast of Washington.** There were 645 to 1,011 respondents for the Outer Coast of Washington Region to the importance-satisfaction ratings. In none of the cases did 100% of all respondents give ratings for any one item. Table 3.1 summarizes the importance-satisfaction results for the region with the last column reporting the percentage of respondents that provided a rating. Generally, a lower percent of respondents provided satisfaction ratings for a given item than provided importance ratings.

In summary, the 25 survey items were classified into the four importance-satisfaction quadrants as follows:

*Concentrate Here*- Relatively high importance and relatively low satisfaction
- G. Abundance of fish and sea life
- I. Control of invasive species
- M. Tidal pools with diverse and healthy population of organisms
- T. Public restrooms at trailheads an campgrounds
- Y. Organization of volunteer efforts to clean beaches and shorelines

*Keep up the Good Work*- Relatively high importance and relatively high satisfaction
- B. Clean water (little to no pollution)
- J. Cleanliness of beaches and shorelines
- K. Natural views not obstructed by development on the water (oil & gas platforms, windmills, etc.)
- L. Natural views unobstructed by development on the shore (high rise buildings, industrial facilities, etc.)
- N. Parks and specially protected areas
- O. Beach and shoreline access
- Q. Garbage cans/dumpsters at trailheads, other access points and parking lots
- U. Uncrowded conditions

*Possible Overkill*- Relatively low importance and relatively high satisfaction
- A. Clear water (high visibility)
- H. Presence of starfish/sea stars to see in tidal pools
- R. Historic preservation (historic landmarks, houses, shipwrecks, etc.)
- S. Parking
- W. Signage at trailheads, other access points and parking lots with information on types of natural resources one can experience

*Low Priority*- Relatively low importance and relatively low satisfaction
- C. Many kinds of fish and sea life to view
- D. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from shore

- E. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from boat
- F. Ability to see whales from shore
- P. Underdeveloped campgrounds or areas on beaches suitable for camping
- V. Handicap
- X. Maps, brochures and other tourist information

*Cautionary Note*. The results presented here are not intended as any policy statement about what either business or governments should or should not be doing. The interpretive framework for the importance-satisfaction is simply intended as a helpful guide in organizing the ratings given by visitors.
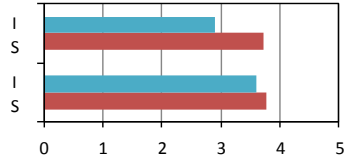
**Table 3.1 Importance/Satisfaction Matrix Code description, Graph of Means, and Descriptive Statistics: Outer Coast of WA**

| Code from Matrix- Description | | Mean | Standard Error | N | % Rated |
|---|---|---|---|---|---|
| **Natural Resources** | | | | | |
| A. Clear water (high visibility) | I | 3.26 | 0.0379 | 993 | 31.91 |
| | S | 3.84 | 0.0232 | 963 | 30.94 |
| B. Clean water (little to no pollution) | I | 3.96 | 0.0321 | 1011 | 32.49 |
| | S | 3.82 | 0.0244 | 983 | 31.59 |
| C. Many kinds of fish and sea life to view | I | 3.42 | 0.0345 | 1007 | 32.36 |
| | S | 3.72 | 0.0258 | 926 | 29.76 |
| D. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from shore | I | 3.20 | 0.0370 | 1011 | 32.49 |
| | S | 3.49 | 0.0317 | 862 | 27.70 |
| E. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from a boat | I | 2.94 | 0.0405 | 976 | 31.36 |
| | S | 3.58 | 0.0341 | 695 | 22.33 |
| F. Ability to see whales from shore | I | 3.05 | 0.0394 | 1002 | 32.20 |
| | S | 3.38 | 0.0365 | 803 | 25.80 |
| G. Abundance of fish and sea life | I | 3.64 | 0.0357 | 1004 | 32.26 |
| | S | 3.65 | 0.0292 | 881 | 28.31 |
| H. Presence of starfish/sea stars to see in tidal pools | I | 3.44 | 0.0362 | 998 | 32.07 |
| | S | 4.04 | 0.0432 | 981 | 31.52 |
| I. Control of invasive species | I | 3.66 | 0.0367 | 930 | 29.88 |
| | S | 3.57 | 0.0297 | 679 | 21.82 |
| J. Cleanliness of beaches and shorelines | I | 4.09 | 0.0292 | 1008 | 32.39 |
| | S | 3.80 | 0.0264 | 1003 | 32.23 |
| K. Natural views unobstructed by development on the water (oil & gas platforms, windmills, etc.) | I | 3.85 | 0.0355 | 998 | 32.07 |
| | S | 4.04 | 0.0240 | 974 | 31.30 |
| L. Natural views unobstructed by development on the shore (high rise buildings, industrial facilities, etc.) | I | 3.89 | 0.0349 | 997 | 32.04 |
| | S | 3.98 | 0.0255 | 985 | 31.65 |
| **Natural Resources Facilities** | | | | | |
| M. Tidal pools with diverse and healthy population of organisms | I | 3.57 | 0.0379 | 987 | 31.72 |
| | S | 3.71 | 0.0284 | 874 | 28.08 |
| N. Parks and specially protected areas | I | 3.91 | 0.0325 | 1010 | 32.46 |
| | S | 3.97 | 0.0220 | 959 | 30.82 |
| O. Beach and shoreline access | I | 4.06 | 0.0297 | 1004 | 32.26 |
| | S | 4.09 | 0.0229 | 984 | 31.62 |
| P. Undeveloped campgrounds or areas on beaches suitable for camping | I | 3.28 | 0.0394 | 978 | 31.43 |
| | S | 3.77 | 0.0274 | 771 | 24.78 |
| **Other Facilities** | | | | | |
| Q. Garbage cans/dumpsters at trailheads, other access points and parking lots | I | 3.88 | 0.0341 | 1004 | 32.26 |
| | S | 3.85 | 0.0235 | 971 | 31.20 |
| R. Historic preservation (historic landmarks, houses, shipwrecks, etc.) | I | 3.46 | 0.0364 | 990 | 31.81 |
| | S | 3.82 | 0.0254 | 785 | 25.22 |
| S. Parking | I | 3.35 | 0.0309 | 1017 | 32.68 |
| | S | 3.82 | 0.0214 | 982 | 31.56 |
| T. Public restrooms at trailheads and campgrounds | I | 3.61 | 0.0315 | 1015 | 32.62 |
| | S | 3.73 | 0.0238 | 954 | 30.66 |
| U. Uncrowded conditions | I | 3.65 | 0.0310 | 1004 | 32.26 |
| | S | 3.91 | 0.0234 | 1000 | 32.13 |
| V. Handicap | I | 3.07 | 0.0407 | 944 | 30.33 |
| | S | 3.68 | 0.0297 | 664 | 21.34 |
| W. Signage at trailheads, other access points and parking lots with information on types of natural resources one can experience | I | 3.34 | 0.0337 | 1008 | 32.39 |
| | S | 3.84 | 0.0232 | 908 | 29.18 |

I-Importance, S-Satisfaction

**Table 3.1 Importance/Satisfaction Matrix Code description, Graph of Means, and Descriptive Statistics: Outer Coast of WA (Continued)**

| Code from Matrix- Description | | Mean | Standard Error | N | % Rated |
|---|---|---|---|---|---|
| **Services** | | | | | |
| X. Maps, brochures and other tourist information | I | 2.89 | 0.0368 | 998 | 32.07 |
| | S | 3.73 | 0.0264 | 814 | 26.16 |
| Y. Organization of volunteer efforts to clean beaches and shorelines | I | 3.61 | 0.0334 | 996 | 32.01 |
| | S | 3.76 | 0.0280 | 663 | 21.30 |

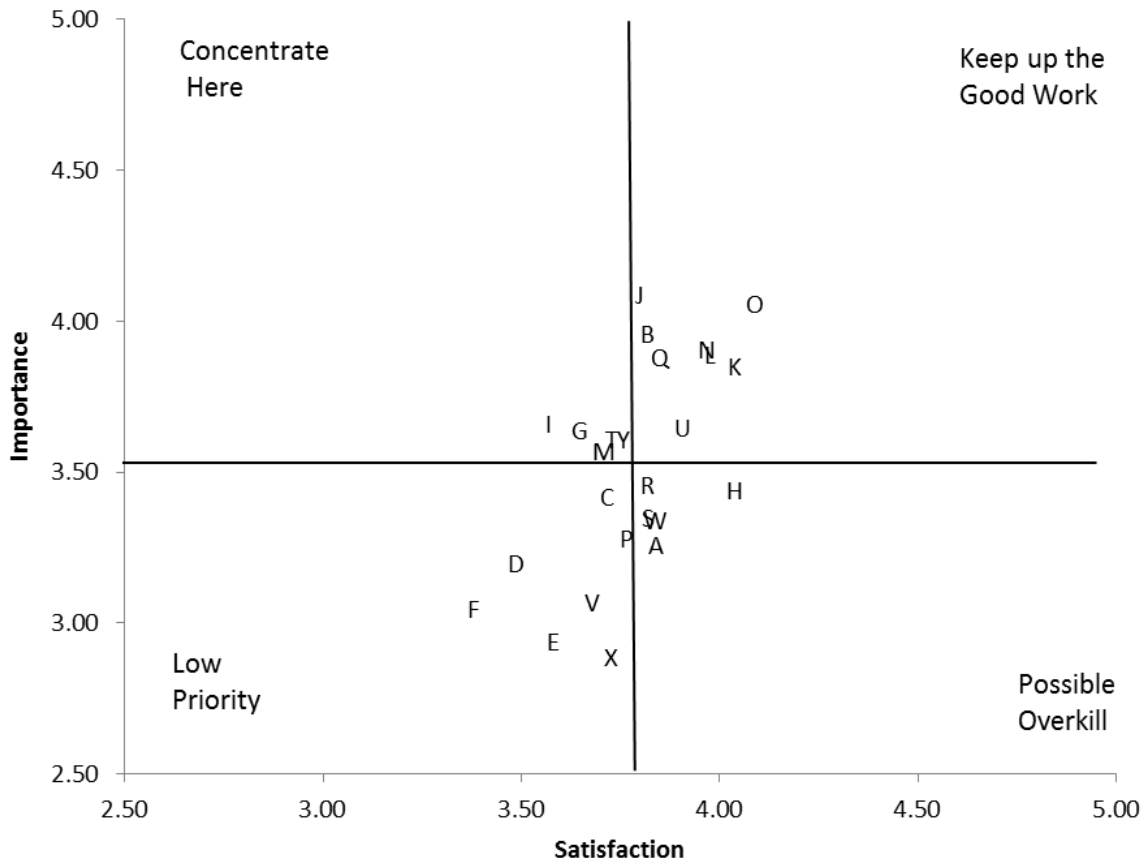I-Importance, S-Satisfaction



**Figure 3.1 Importance/Satisfaction Matrix: Outer Coast of WA**

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# 4. Importance-Satisfaction Analysis: Olympic Coast National Marine Sanctuary

**OCNMS Legal Definition.** There were 30 to 60 respondents for Olympic Coast National Marine Sanctuary importance-satisfaction ratings. In none of the cases did 100% of all respondents give ratings for any one item. This was mostly related to the importance ratings, only one item got satisfaction ratings by 100% of all visitors in the area: presence of starfish/sea stars to see in tidal pools (H). Table 4.1 summarizes the importance-satisfaction results for the region with the last column reporting the percentage of respondents that provided a rating. Generally, a lower percent of respondents provided satisfaction ratings for a given item than provided importance ratings.

*Concentrate Here*- Relatively high importance and relatively low satisfaction
- C. Many kinds of fish and sea life to view
- I. Control of invasive species
- Y. Organization of volunteer efforts to clean beaches and shorelines

*Keep up the Good Work*- Relatively high importance and relatively high satisfaction
- B. Clean water (little to no pollution)
- J. Cleanliness of beaches and shorelines
- K. Natural views not obstructed by development on the water (oil & gas platforms, windmills, etc.)
- L. Natural views unobstructed by development on the shore (high rise buildings, industrial facilities, etc.)
- N. Parks and specially protected areas
- O. Beach and shoreline access
- U. Uncrowded conditions

*Possible Overkill*- Relatively low importance and relatively high satisfaction
- A. Clear water (high visibility)
- H. Presence of starfish/sea stars to see in tidal pools
- P. Underdeveloped campgrounds or areas on beaches suitable for camping
- S. Parking

*Low Priority*- Relatively low importance and relatively low satisfaction
- D. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from shore
- E. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from boat
- F. Ability to see whales from shore
- R. Historic preservation (historic landmarks, houses, shipwrecks, etc.)
- T. Public restrooms at trailheads and campgrounds
- V. Handicap

- W. Signage at trailheads, other access points and parking lots with information on types of natural resources one can experience

** Items (G) Abundance of fish and sea life and (Q) Garbage cans/dumpsters at trailheads, other access points and parking lots are located on the line between "*Concentrate Here*" and "**Keep up the Good Work**."

**Items (M) Tidal pools with diverse and healthy population of organisms and (X) Maps, brochures and other tourist information are on the line between "***Possible Overkill***" and "***Low Priority***." (Figure 4.1).
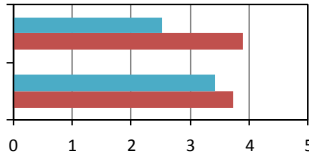
**Table 4.1 Importance/Satisfaction Matrix Code description, Graph of Means, and Descriptive Statistics: OCNMS Legal Definition**

| Code from Matrix- Description | | Mean | Standard Error | N | % Rated |
|---|---|---|---|---|---|
| **Natural Resources** | | | | | |
| A. Clear water (high visibility) | I | 3.00 | 0.1535 | 57 | 95.00 |
| | S | 3.93 | 0.0802 | 55 | 91.67 |
| B. Clean water (little to no pollution) | I | 3.71 | 0.1174 | 60 | 100.00 |
| | S | 3.91 | 0.0989 | 57 | 95.00 |
| C. Many kinds of fish and sea life to view | I | 3.33 | 0.1554 | 60 | 100.00 |
| | S | 3.78 | 0.0979 | 53 | 88.33 |
| D. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from shore | I | 3.07 | 0.1511 | 59 | 98.33 |
| | S | 3.65 | 0.1244 | 50 | 83.33 |
| E. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from a boat | I | 2.55 | 0.1611 | 54 | 90.00 |
| | S | 3.59 | 0.1302 | 36 | 60.00 |
| F. Ability to see whales from shore | I | 2.84 | 0.1686 | 58 | 96.67 |
| | S | 3.67 | 0.1360 | 49 | 81.67 |
| G. Abundance of fish and sea life | I | 3.49 | 0.1513 | 59 | 98.33 |
| | S | 3.87 | 0.0795 | 55 | 91.67 |
| H. Presence of starfish/sea stars to see in tidal pools | I | 3.25 | 0.1462 | 60 | 100.00 |
| | S | 4.47 | 0.1614 | 60 | 100.00 |
| I. Control of invasive species | I | 3.60 | 0.1481 | 52 | 86.67 |
| | S | 3.61 | 0.1052 | 44 | 73.33 |
| J. Cleanliness of beaches and shorelines | I | 3.92 | 0.1404 | 59 | 98.33 |
| | S | 3.88 | 0.1148 | 59 | 98.33 |
| K. Natural views unobstructed by development on the water (oil & gas platforms, windmills, etc.) | I | 3.76 | 0.1338 | 59 | 98.33 |
| | S | 4.17 | 0.1132 | 57 | 95.00 |
| L. Natural views unobstructed by development on the shore (high rise buildings, industrial facilities, etc.) | I | 3.69 | 0.1615 | 60 | 100.00 |
| | S | 4.13 | 0.0928 | 59 | 98.33 |
| **Natural Resources Facilities** | | | | | |
| M. Tidal pools with diverse and healthy population of organisms | I | 3.04 | 0.1728 | 59 | 98.33 |
| | S | 3.89 | 0.1065 | 55 | 91.67 |
| N. Parks and specially protected areas | I | 3.82 | 0.1280 | 58 | 96.67 |
| | S | 3.93 | 0.0925 | 58 | 96.67 |
| O. Beach and shoreline access | I | 3.95 | 0.1106 | 59 | 98.33 |
| | S | 4.14 | 0.0965 | 59 | 98.33 |
| P. Undeveloped campgrounds or areas on beaches suitable for camping | I | 3.20 | 0.1486 | 59 | 98.33 |
| | S | 3.93 | 0.1203 | 47 | 78.33 |
| **Other Facilities** | | | | | |
| Q. Garbage cans/dumpsters at trailheads, other access points and parking lots | I | 3.81 | 0.1000 | 59 | 98.33 |
| | S | 3.88 | 0.0912 | 59 | 98.33 |
| R. Historic preservation (historic landmarks, houses, shipwrecks, etc.) | I | 2.98 | 0.1619 | 59 | 98.33 |
| | S | 3.78 | 0.1393 | 46 | 76.67 |
| S. Parking | I | 2.96 | 0.1337 | 60 | 100.00 |
| | S | 3.96 | 0.0776 | 58 | 96.67 |
| T. Public restrooms at trailheads and campgrounds | I | 3.29 | 0.1164 | 59 | 98.33 |
| | S | 3.80 | 0.0986 | 55 | 91.67 |
| U. Uncrowded conditions | I | 3.63 | 0.1150 | 59 | 98.33 |
| | S | 4.21 | 0.1065 | 59 | 98.33 |
| V. Handicap | I | 2.88 | 0.1716 | 48 | 80.00 |
| | S | 3.58 | 0.1319 | 30 | 50.00 |
| W. Signage at trailheads, other access points and parking lots with information on types of natural resources one can experience | I | 2.82 | 0.1704 | 60 | 100.00 |
| | S | 3.74 | 0.0905 | 54 | 90.00 |

I- Importance, S-Satisfaction

**Table 4.1 Importance/Satisfaction Matrix Code description, Graph of Means, and Descriptive Statistics: OCNMS Legal Definition (Continued)**

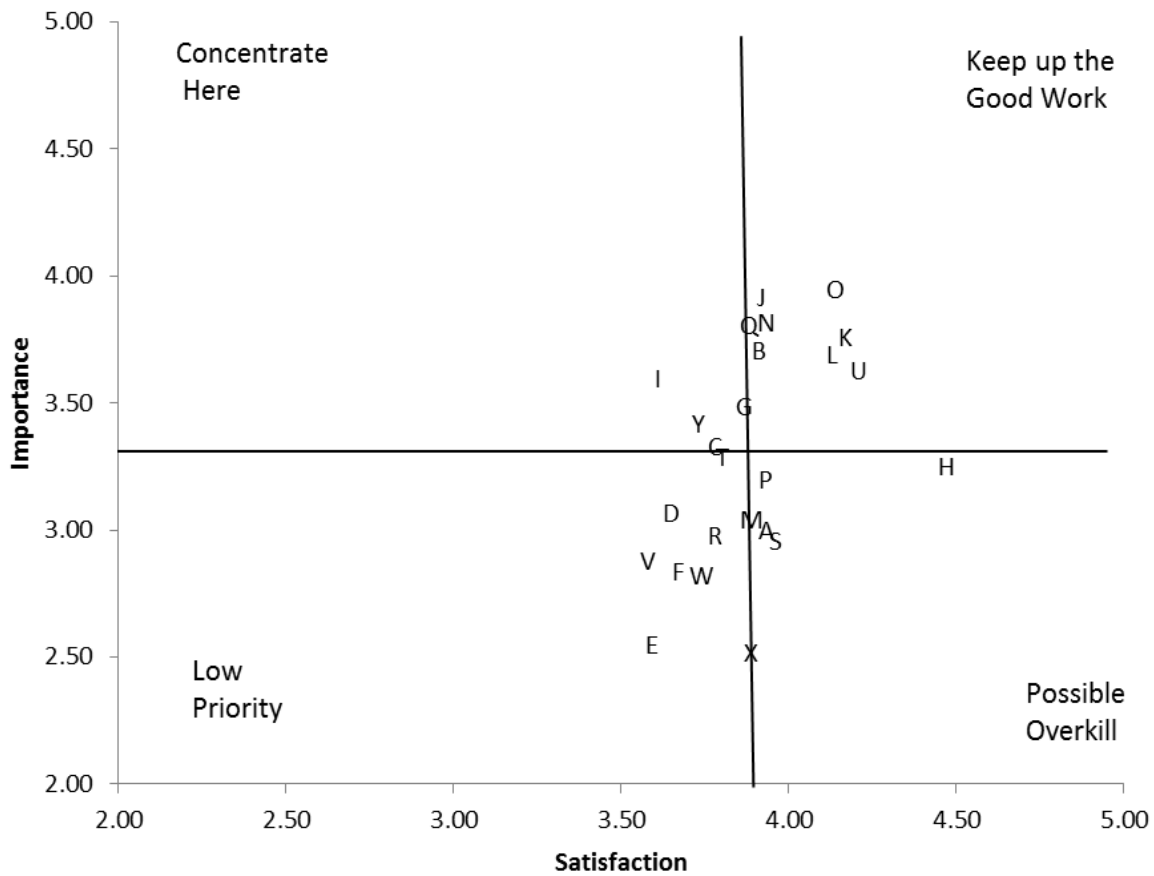| Code from Matrix- Description | | Mean | Standard Error | N | % Rated |
|---|---|---|---|---|---|
| **Services** | | | | | |
| X. Maps, brochures and other tourist information | I | 2.52 | 0.1695 | 59 | 98.33 |
| | S | 3.89 | 0.0924 | 46 | 76.67 |
| Y. Organization of volunteer efforts to clean beaches and shorelines | I | 3.42 | 0.1268 | 58 | 96.67 |
| | S | 3.73 | 0.1088 | 31 | 51.67 |

I-Importance, S-Satisfaction



**Figure 4.1 Importance/Satisfaction Matrix: OCNMS Legal Definition**

**OCNMS 2KM Buffer.** There were 89 to 162 respondents for Olympic Coast National Marine Sanctuary with a 2km inland buffer area that provided importance-satisfaction ratings. In none of the cases did 100% of all respondents give ratings for any one item, but there were a couple of items with a 99.39% importance rating. Table 4.2 summarizes the importance-satisfaction results for the region with the last column reporting the percentage of respondents that provided a rating. Generally, a lower percent of respondents provided satisfaction ratings for a given item than provided importance ratings.

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*Concentrate Here*- Relatively high importance and relatively low satisfaction
- I. Control of invasive species
- G. Abundance of fish and sea life
- T. Public restrooms at trailheads and campgrounds
- Y. Organization of volunteer efforts to clean beaches and shorelines

*Keep up the Good Work*- Relatively high importance and relatively high satisfaction
- B. Clean water (little to no pollution)
- J. Cleanliness of beaches and shorelines
- K. Natural views not obstructed by development on the water (oil & gas platforms, windmills, etc.)
- L. Natural views unobstructed by development on the shore (high rise buildings, industrial facilities, etc.)
- N. Parks and specially protected areas
- O. Beach and shoreline access
- Q. Garbage cans/dumpsters at trailheads, other access points and parking lots
- U. Uncrowded conditions

*Possible Overkill*- Relatively low importance and relatively high satisfaction
- A. Clear water (high visibility)
- H. Presence of starfish/sea stars to see in tidal pools
- S. Parking

*Low Priority*- Relatively low importance and relatively low satisfaction
- C. Many kinds of fish and sea life to view
- D. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from shore
- E. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from boat
- F. Ability to see whales from shore
- M. Tidal pools with diverse and healthy population of organisms
- R. Historic preservation (historic landmarks, houses, shipwrecks, etc.)
- V. Handicap
- W. Signage at trailheads, other access points and parking lots with information on types of natural resources one can experience
- X. Maps, brochures and other tourist information

\*\* Item (P) Underdeveloped campgrounds or areas on beaches suitable for camping is located between all four quadrants but closer to "*Keep up the Good Work*" and "*Possible Overkill*" (Figure 4.2).
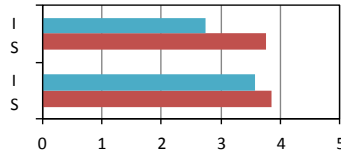
**Table 4.2 Importance/Satisfaction Matrix Code Description, Graph of Means, and Descriptive Statistics: OCNMS 2KM Buffer**

| Code from Matrix- Description | | Mean | Standard Error | N | % Rated |
|---|---|---|---|---|---|
| **Natural Resources** | | | | | |
| A. Clear water (high visibility) | I | 3.08 | 0.0877 | 156 | 95.71 |
| | S | 4.00 | 0.0541 | 147 | 90.18 |
| B. Clean water (little to no pollution) | I | 3.87 | 0.0786 | 162 | 99.39 |
| | S | 4.01 | 0.0580 | 153 | 93.87 |
| C. Many kinds of fish and sea life to view | I | 3.37 | 0.0854 | 162 | 99.39 |
| | S | 3.83 | 0.0625 | 145 | 88.96 |
| D. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from shore | I | 3.17 | 0.0967 | 161 | 98.77 |
| | S | 3.65 | 0.0758 | 130 | 79.75 |
| E. Opportunity to view large wildlife (whales, dolphins, sharks, seals, sea lions, etc.) from a boat | I | 2.79 | 0.1076 | 151 | 92.64 |
| | S | 3.57 | 0.0883 | 90 | 55.21 |
| F. Ability to see whales from shore | I | 2.95 | 0.0995 | 159 | 97.55 |
| | S | 3.48 | 0.0936 | 119 | 73.01 |
| G. Abundance of fish and sea life | I | 3.62 | 0.0869 | 159 | 97.55 |
| | S | 3.73 | 0.0686 | 139 | 85.28 |
| H. Presence of starfish/sea stars to see in tidal pools | I | 3.42 | 0.0901 | 159 | 97.55 |
| | S | 4.32 | 0.1086 | 156 | 95.71 |
| I. Control of invasive species | I | 3.60 | 0.0937 | 148 | 90.80 |
| | S | 3.66 | 0.0627 | 108 | 66.26 |
| J. Cleanliness of beaches and shorelines | I | 4.10 | 0.0749 | 158 | 96.93 |
| | S | 3.98 | 0.0593 | 159 | 97.55 |
| K. Natural views unobstructed by development on the water (oil & gas platforms, windmills, etc.) | I | 3.83 | 0.0796 | 159 | 97.55 |
| | S | 4.29 | 0.0582 | 155 | 95.09 |
| L. Natural views unobstructed by development on the shore (high rise buildings, industrial facilities, etc.) | I | 3.88 | 0.0862 | 161 | 98.77 |
| | S | 4.23 | 0.0557 | 158 | 96.93 |
| **Natural Resources Facilities** | | | | | |
| M. Tidal pools with diverse and healthy population of organisms | I | 3.44 | 0.0970 | 161 | 98.77 |
| | S | 3.85 | 0.0670 | 136 | 83.44 |
| N. Parks and specially protected areas | I | 4.07 | 0.0761 | 158 | 96.93 |
| | S | 4.05 | 0.0542 | 156 | 95.71 |
| O. Beach and shoreline access | I | 4.18 | 0.0683 | 160 | 98.16 |
| | S | 4.17 | 0.0530 | 156 | 95.71 |
| P. Undeveloped campgrounds or areas on beaches suitable for camping | I | 3.50 | 0.0971 | 154 | 94.48 |
| | S | 3.93 | 0.0643 | 125 | 76.69 |
| **Other Facilities** | | | | | |
| Q. Garbage cans/dumpsters at trailheads, other access points and parking lots | I | 3.97 | 0.0686 | 157 | 96.32 |
| | S | 3.97 | 0.0529 | 154 | 94.48 |
| R. Historic preservation (historic landmarks, houses, shipwrecks, etc.) | I | 3.36 | 0.0944 | 158 | 96.93 |
| | S | 3.86 | 0.0678 | 119 | 73.01 |
| S. Parking | I | 3.32 | 0.0890 | 161 | 98.77 |
| | S | 3.92 | 0.0521 | 158 | 96.93 |
| T. Public restrooms at trailheads and campgrounds | I | 3.61 | 0.0744 | 160 | 98.16 |
| | S | 3.76 | 0.0587 | 151 | 92.64 |
| U. Uncrowded conditions | I | 3.67 | 0.0742 | 158 | 96.93 |
| | S | 4.19 | 0.0555 | 160 | 98.16 |
| V. Handicap | I | 2.92 | 0.1006 | 143 | 87.73 |
| | S | 3.81 | 0.0669 | 94 | 57.67 |
| W. Signage at trailheads, other access points and parking lots with information on types of natural resources one can experience | I | 3.26 | 0.0920 | 160 | 98.16 |
| | S | 3.82 | 0.0520 | 147 | 90.18 |

I- Importance, S- Satisafaction

**Table 4.2 Importance/Satisfaction Matrix Code Description, Graph of Means, and Descriptive Statistics: OCNMS 2KM Buffer (Continued)**

| Code from Matrix- Description | | Mean | Standard Error | N | % Rated |
|---|---|---|---|---|---|
| **Services** | | | | | |
| X. Maps, brochures and other tourist information | I | 2.74 | 0.0940 | 158 | 96.93 |
| | S | 3.76 | 0.0650 | 127 | 77.91 |
| Y. Organization of volunteer efforts to clean beaches and shorelines | I | 3.58 | 0.0836 | 158 | 96.93 |
| | S | 3.85 | 0.0546 | 89 | 54.60 |

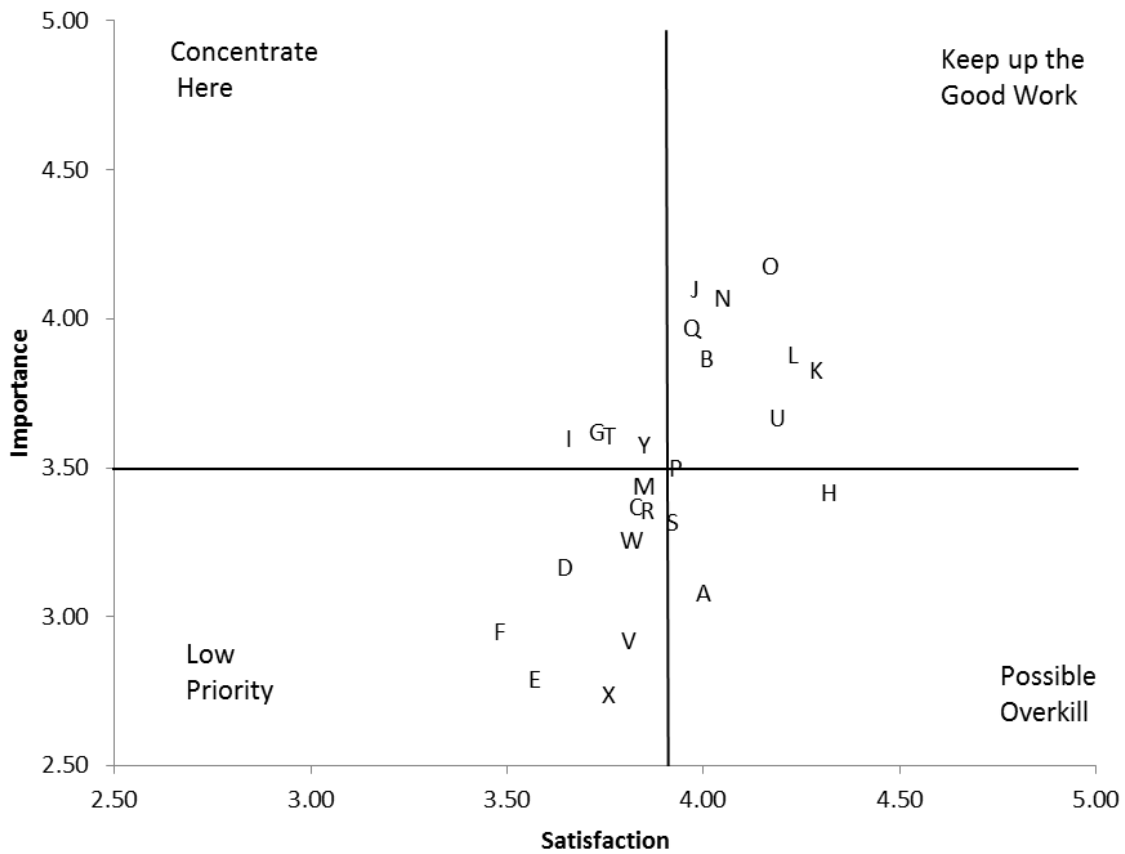I- Importance, S- Satisfaction



**Figure 4.2 Importance/Satisfaction Matrix: OCNMS 2KM Buffer**

# 5. 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.

Importance-satisfaction ratings estimates for Port Angeles were based on relatively small sample sizes and statistically reliable estimates could not be produced.

## 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 importance-satisfaction ratings. 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 expenditures by visitors and the associated impacts on local rea economies (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.

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