

*Preliminary Draft – Not for Public Release*

## Economic Analysis to Support Marine Spatial Planning in Washington

*Prepared for:*

WASHINGTON COAST MARINE ADVISORY COUNCIL

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## Acronyms and Abbreviations

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ACS	American Community Survey
ANA	Administration for Native Americans
BIA	Bureau of Indian Affairs
CCIEA	California Current Integrated Ecosystem Assessment
CLME	Current Large Marine Ecosystem
CDP	Census Designated Place
CEDS	Comprehensive Economic Development Strategies
CPS	coastal pelagic species
DNR	Washington Department of Natural Resources
EBM	ecosystem-based management
EDA	Economic Development Administration
FMP	Fishery Management Plan
GDP	Gross Domestic Product
H.R.	House Resolution
IHS	Indian Health Services
IEA	Integrated Ecosystem Assessment
IEC	Industrial Economics, Inc.
IFQ	individual fisheries quota
I-O	input/output
IPHC	International Pacific Halibut Commission
MRC	Coastal Voices Marine Resources Committee
MSP	Marine Spatial Plan
NEI	Northern Economics, Inc.
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOEP	National Ocean Economics Program
NWFSC	Northwest Fisheries Science Center
OBA	ocean beach approach
OHV	off-highway vehicle
PacFIN	Pacific Fisheries Information Network
PCC	Pacific Coast Council
PFMC	Pacific Fishery Management Council
PSI	Pacific Shellfish Institute
QHA	Quileute Housing Authority
QIN	Quinault Indian Nation

QNFH	Quinault National Fish Hatchery
QTE	Quinault Tribal Enterprises
RFQ	Request for Qualifications
RV	recreational vehicle
SR	State Route
SWIMM	Social Well-being Indicators for Marine Management
US 101	U.S. Highway 101
TAC	total allowable catch
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UW	University of Washington
WCMAC	Washington Coast Marine Advisory Council
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WGHOGA	Willapa Grays Harbor Oyster Growers Association
WSG	Washington Sea Grant
WSPRC	Washington State Parks and Recreation Commission



## CHAPTER 1.

# Introduction

### 1.1 MARINE SPATIAL PLANNING AND ECONOMIC ANALYSIS

The Pacific Coast of Washington provides a diverse array of historic and existing activities and resource uses. As the population increases, demographics change, and resource demands and uses evolve, conflicts among users are inevitable; however, coordinated planning can greatly minimize these conflicts. In addition, federal, state, local, and tribal governments have many overlapping missions and responsibilities that require expanded integration to provide more certainty in decision-making and to maintain protection of resources. The state recognized the need for a non-regulatory framework to be established to share information and provide a mechanism for planning and decision making, which included development of a Marine Spatial Plan (MSP).

An MSP involves identifying current and potential future activities for the coastal marine area, their priority locations where these activities take place, as well as the recognition of cultural and aesthetic values. The planning process itself is, by state law, a “public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives” (RCW 43.372). Other aspects of the overall planning process are addressing both ecological and social objectives; a new effort is intended to address economic objectives as part of the ecosystem assessment.

With an emphasis on characterizing existing economic activities, the planning process to date has included the development of information related to five categories: non-tribal commercial and recreational fishing, recreation and tourism, transportation, renewable energy, and aquaculture. These “sector analyses” provide contextual and background information needed for the MSP process to move forward to an economic analysis of existing and potential future uses and activities. As an overriding

mission, the economic analysis is intended to “foster and encourage sustainable uses that provide economic opportunity without significant adverse environmental impacts” (RCW 43.372.040). This requires that the economic analysis consider not only baseline conditions for ocean uses and the important relationships to coastal communities, but also an analytical ability to evaluate the economic consequences of proposals or planning options. The ultimate product of the economic analysis effort is a report detailing these conditions and relationships, and an operating regional impacts model supported by an updatable data base. A key element of the economic model should be that it is *dynamic*, allowing for feedback responses to individual or combinations of proposed uses, while considering and incorporating changing demographics and economic conditions.

## 1.2 PURPOSE

The purpose of this project is to develop the tools and data to characterize existing conditions on the Washington coast, and to evaluate the economic consequences of new proposed uses or planning options. In combination with social, ecological, and cultural considerations within the MSP process, the economic analysis contributes to providing a way to determine the most appropriate locations for new uses while giving consideration to, and protecting, existing uses.

## 1.3 DESIGN OF THE ECONOMIC ANALYSIS: SCOPING PROCESS

In general, the components that make up an economic analysis will vary by the identified needs of the study, proposed initiatives being considered or investigated, required precision of output, industry sectors or affected groups of particular interest or emphasis, geographic locations being examined, data availability and delivery, timeline, and budget available. Because so many elements must be balanced in order to frame an appropriate economic analysis, a scoping process was built into formulating the design of the study. This process involved the economics consultant team, the Washington Coast Marine Advisory Council (WCMAC), Washington Departments of Natural Resources (DNR) and Ecology, and the Science Advisory Panel to the WCMAC.

The steps below summarize the process used to develop the scope for the Marine Spatial Planning Economic Analysis.

1. **WCMAC Technical Committee Suggestions:** The Technical Committee prepared an initial list of concepts, ideas, and components that they recommend be addressed and included in an economic analysis.
2. **Washington Department of Natural Resources selects Consultant:** DNR advertised for and requested proposals to scope and conduct an economic analysis. Representatives from DNR, Ecology, and WCMAC reviewed proposals, conducted interviews, and selected a consultant team.
3. **Initial Menu of Approaches:** The consultant team prepared a menu of approaches to organizing and completing an economic analysis. Their menu included three “levels of study” reflecting differing degrees of investigation, precision and accuracy, and involvement of local affected entities. Details are included as **Appendix A** to this report.

4. **Public Scoping Workshop:** The consultant team conducted an “Economic Analysis Scoping Workshop” on October 7, 2014, where they presented information about approaches to the economic analysis to WCMAC members and other interested parties. Participants were invited to ask questions and discuss their interests and needs in the study. The presentation was video-recorded and made available on-line for those unable to attend, and the presentation slides were made be available as a pdf file after the workshop.
5. **Written Comments:** In addition to set periods for discussion, comments, and recommendations during the Workshop, there was an opportunity made for WCMAC members and other interested individuals to provide written comments or suggestions to the economics team after the Workshop.
6. **Proposed Scope of Work:** The economics consultant team developed a proposed scope of work that incorporated suggestions and recommendations from the scoping workshop and written comments, and considered their knowledge of available information, previous and ongoing studies, and Marine Spatial Planning needs.
7. **Science Panel Review:** The team presented the proposed scope of work to the Science Advisory Panel in mid-October, then revised and refine the scope of work based upon comments and input from the Panel.
8. **Consultant presented recommended Scope of Work:** The economic consultant team leader presented the resulting scope of work, based on the process outlined above, to the WCMAC at the October 22, 2014 meeting. Additional refinements based on comments from the WCMAC were incorporated, and the final scope of work was approved by the Department of Ecology and Department of Natural Resources.

Based upon the scoping process, the consultants developed a scope for the study that addresses data collection, organization, and topical issues, and in some cases quantitative modeling, within the following subject areas:

- ◆ Economic Profile of the Washington Coast
- ◆ Economic Profile of Tribal Communities
- ◆ Washington Coast Commerical Fisheries
- ◆ Recreational Fishing
- ◆ Shellfish Aquaculture
- ◆ Recreation and Tourism
- ◆ Ecosystem Services
- ◆ Social Assessment
- ◆ Risk and Industry Vulnerability Assessment

In the remainder of this chapter, the methodology and approach used to address each of these topic areas is discussed. This is followed by a description of the economic impact modeling approach and construction.

## 1.4 METHODOLOGY FOR TOPIC AREA INVESTIGATIONS

### 1.4.1 Economic Profile of the Washington Coast

#### Current Conditions

An earlier effort in the MSP process developed reports focused on five significant industry sectors. While these sector reports provide useful details about five important sectors on the Washington coast – shipping fishing, aquaculture, recreation and marine energy – the total economy on the coast includes more than just those five sectors. The goal of this economic profile will be to draw from those sector reports, as well as other existing documents, and add in other socioeconomic data, pulling all the information together in a cohesive fashion that will provide a broad view of the coastal economic environment as it currently exists.

The initial step was to identify and review all relevant existing as well as ongoing economic research related to the Washington coast. This review included ongoing as well as completed MSP projects, plus research conducted outside the MSP process, such as port-sponsored studies and city and economic development plans. In addition, much of the primary data for the profiles come from published government sources. These include:

- ◆ U.S. Census Bureau, including the American Community Survey (ACS), for data on housing, population by age class, employment, ethnicity for the county.
- ◆ Bureau of Economic Analysis, Regional Economic Information System (REIS) data on sector-based production and personal income.
- ◆ City, county or state level updates to the Census data or more localized estimates of demographics or other social economic statistics.
- ◆ County Business Patterns data
- ◆ Washington Department of Revenue data on tax receipts for study area businesses.

New research conducted as part of this study, in particular economic data for commercial (non-tribal and tribal) fisheries, recreation and tourism, and aquaculture, also contributes to the economic profile.

#### Trends Affecting the Coastal Economy

Given that the MSP period covers a 20 year planning horizon, additional information is needed about economic and demographic trends for the Washington coast. Data on economic trends in key parts of the coastal economy are developed in part from the original sector reports, other published reports as well as new sector research conducted in other parts of this study. Trends in population, age distribution, and

income come from historical data and projections by respective national and state agencies involved in collecting and analyzing these statistics.

Published information is supplemented by a series of interviews with key players in different parts of the coastal economy, including port officials, representatives in the fishing and aquaculture industries, and natural resource and economic development department staff at federal, state and county agencies. This is supplemented by examination of broader trends – demographic, technological, economic, and climate change – in the State of Washington and the U.S. as a whole that are likely to affect conditions in the coastal communities, beyond what communities themselves can impact. In addition, planned capital improvements are identified for projected changes in public and private infrastructure that would result in additional revenue and employment on the coast.

#### **1.4.2 Economic Profile of Tribal Communities**

There are five Indian reservations on the Washington coast: Quinault, Quileute, Hoh, Makah, and Shoalwater Bay. There is considerable economic interaction among the Tribes, tribal members, and the non-Indian communities, through shared commerce and employment, and co-management of natural resources by federal, state, and tribal entities. However, there are important distinctions about tribal communities that merit developing a profile separate from the non-tribal communities of the coast.

As a first step existing, available data and literature are used to prepare a socioeconomic profile of each of the five tribes. The U.S. Census provides information presented on a reservation-wide basis; ACS data were available for each of the five tribes. Additional demographic and economic information was obtained to this process voluntarily by the Tribes. This involved direct contact by the consultants with tribal staff that have been assigned to monitor and participate in the MSP. The consultants participated in a number of meetings on Reservation, along with follow up phone calls. In some cases, the Tribes provided Comprehensive Economic Development Strategies (CEDS) reports that they prepare and provide to the Department of Commerce on a periodic basis.

#### **1.4.3 Commercial Fisheries**

##### **Non-Tribal Fisheries**

Commercial fishing is an important and historical component of the Coastal Washington economy, and warrants a detailed analysis. Landings and processing by commercial fisheries supply markets in the U.S., Canada and overseas and provide income and employment in harvesting, processing and support industry sectors in the region and elsewhere in the state. Published data sources such as PacFIN (for shorebased fisheries) and Norpac (for at-sea Pacific whiting) provide some idea of the scale of landings and exvessel revenue in these fisheries, but publicly available data underestimate activity for certain species and ports due to confidentiality constraints which limit the ability to disclose business information for fisheries aggregations with fewer than three participating harvesters or buyers/processors.

Consequently more detailed, vessel-level landings and ex-vessel revenue data, including activity in at-sea Pacific whiting fisheries operating off the Washington Coast, are required in order to adequately analyze contributions from all components of commercial fisheries operated off the Washington Coast.

## **Tribal Fisheries**

Vessel-level data may not be recorded with public agencies for tribal fisheries since vessels need not be registered with state or federal authorities. The data may also exclude ex-vessel revenue estimates associated with the landings. The consultants worked directly with the Tribes to obtain release of fisheries data, including activity in tribal at-sea Pacific whiting fisheries, in order to adequately analyze contributions from all components of Washington Coast tribal fisheries.

## **Available Fisheries Data**

The PacFIN fisheries database is a comprehensive repository of landings and exvessel revenue data for vessels and fish buyers operating in commercial fisheries on the Pacific coast (including Washington inland waters and the Columbia River). PacFIN also includes data for landings made to Washington state-licensed fish buyers from distant ocean areas and from commercial-scale tribal fisheries conducted on the coast and in the Columbia River. Detailed data on landings and vessel participation in Washington Coast ports were obtained from the Washington Department of Fish and Wildlife (WDFW).

The Northwest Indian Fisheries Commission maintains a comprehensive database of landings made and in tribal fisheries. Data on Pacific whiting catch by catcher-processor vessels and deliveries to mothership floating processors participating in the at-sea Pacific whiting fishery, including deliveries made in the at-sea tribal fishery, are maintained in the Norpac fishery observer database.

While direct data on the ex-processor (or “first wholesale”) sales of fisheries products in Washington are not generally available, these values were estimated from landings and revenue data and information from industry key informants using some fairly standard assumptions about the value of inputs used in seafood processing.

In addition to reviewing existing officially-collected data, extant literature on relevant economic activities and reports produced by earlier-phase project contractors, government regulators, industry sources and other experts was canvassed to gather additional information and identify emerging trends. For example, any available data from the NMFS’s IOPAC fisheries economic analysis models and Economic Data Collection reports for participants in West Coast groundfish trawl individual quota fisheries was consulted to glean relevant information.

## **Data Confidentiality**

Commercial fishing annual vessel summary data for recent years (2004-2013) for vessels landing in ports in Clallam, Jefferson, Grays Harbor, Pacific and Wahkiakum counties were needed in order to analyze economic contributions and impacts of commercial fisheries at the port level. Variables needed include: year, area of catch, PacFIN port code, state port code, gear, species, vessel ID (or proxy), processor ID (or proxy), round weight, landed weight and ex-vessel revenue. Unfortunately, publicly-available data reporting is heavily constrained by confidentiality concerns due to the limited number of participants in certain ports. Therefore it was necessary to obtain clearance from WDFW to view confidential data.

## Primary Data Collection

A “key-informant” approach to industry data collection was used to collect primary data on tribal and non-tribal fisheries harvesting, processing, and distribution activities. Data collected from key informants was used to supplement data obtained from published sources in order to calibrate the economic contributions and impacts of fisheries-related activities.

Key informant contacts included government agency personnel at WDFW, representatives of industry groups including commercial fishermen’s and processors’ associations, tribal fisheries representatives, and other regional industry support and advocacy groups. The approach used included having industry key informants or focus groups of several persons review and comment on estimates of economic data related to commercial fish harvesting and processing. These data, combined with official data on landings were adapted for incorporation in analytical models.

### 1.4.4 Recreational Fishing

Recreational fishing opportunities for salmon, Pacific halibut, groundfish, tuna and sturgeon attract anglers from nearby urban areas in Washington and Oregon and also from across the U.S. Recreational fishing in coastal waters off Washington includes participation in seasonal fisheries for finfish species such as salmon, albacore, groundfish (lingcod and rockfish spp.) and Pacific halibut. The primary originating ports for Washington ocean anglers include Ilwaco and Chinook in Pacific County, Westport in Grays Harbor County, and La Push in Clallam County. A number of coastal Washington angler trips also originate from Neah Bay and, possibly, Port Angeles on the Strait of Juan de Fuca. In addition to finfish, recreational collection of shellfish is also a popular activity along the Washington Coast. The principal species collected is razor clam and the primary areas for clam digging are sand beaches located

## GLOSSARY OF TERMS

**Direct Effects:** The expenditures, employment levels, and activities of the industry in question.

For example, the direct employment in the shellfish aquaculture industry includes all of the employees of the aquaculture firms.

**Economic Contribution:** The economic contribution of an industry or sector describes the portion of a region’s economy in terms of employment and income that can be attributed to that sector’s activities.

**Economic Impact:** An economic impact, in contrast, examines the discrete effects of a marginal change in the level of activity of a particular industry or sector.

**Economic Output:** The economic output of an industry is generally represented by the total value of goods sold. For example, the economic output of the commercial fish processing sector is typically the wholesale value of the processed products produced. This includes all of the expenditures made to produce the product, including all of the fish purchased from vessels (i.e. the ex-vessel value of the harvest), as well as expenditures for energy and processing labor, packaging materials, and other costs of goods sold. Economic output also includes returns to owners in excess of variable costs.

**I-O model (or Input-Output model):** A mathematical representation of linkages between industries, households and other institutions in an economy. I-O models are typically used to estimate industry economic contributions or economic impacts of defined scenarios using calculated multiplier effects.

**Indirect Effects:** These are the expenditures, employment levels and activities of firms that supply inputs to the industry in question. Expenditures by the makers of nylon cord used to make pens in the aquaculture industry and nets in the commercial fishing industry are examples of indirect expenditures.

**Induced Effects:** These are the additional expenditures, employment and activities of firms that supply goods and services to employees and owners of the firms involved in the direct and indirect activities. Induced expenditures include expenditures at movie theaters and restaurants by employees of fishing vessels, fish processing plants, and firms that manufacture, distribute and sell nylon cordage.

**Leakage:** Funds that leave the regional spending stream to pay for goods, services and labor that are “imported” from outside the region. Indirect and induced spending rounds are limited due to the leakage of funds from the regional spending stream to pay for goods and services that may not be available locally.

**Regional I-O model:** An I-O model constructed to capture economic linkages and identify leakages in a defined local economy. Regional I-O models are used to measure economic contributions or impacts accruing in a specific place or “region”.

between the Columbia River north jetty and Quinault River mouth.

The key analytical objectives for the recreation fishing component are to construct an economic baseline that characterizes existing recreation fishing levels and associated angler spending in the coastal study area, and to develop impact mechanisms to assess the effects of future uses in the coastal study area that could affect recreation fishing activities. This included developing a database that characterizes marine fishing activities, associated fishing-related expenditure profiles, and important economic impact mechanisms (e.g., angler catch per unit of effort) for assessing effects of potential changes in coastal uses.

The characterization of marine fishing activities involved the following tasks:

- ◆ Researching and developing profiles of recreational fishing activity by species group, ports/marinas of fishing activity, and mode of fishing (shore, charter-boat, and private boat), using NMFS' marine fishing statistical survey; USFWS surveys of fishing, hunting and wildlife-associated activities; and WDFW's annual angler surveys for the Catch Record Card program. This was supplemented with information from the Surfrider Foundation recreation study for the MSP.
- ◆ Researching and developing profiles of trip-related expenditures and expenditures on durable goods used for marine recreation fishing using the NMFS and USFWS survey results identified above, as well as special studies commissioned by the NMFS, WDFW and other state agencies and private consultants on the economics of marine recreational fishing in Washington State (ICF 1988, TCW Economics 2008).

Data on the estimated number of recreational angler trips by port or region, the stated target of the trips, and resulting catch by species group is generated and maintained by WDFW; this data was requested and obtained from WDFW. This information was used to provide localized characterization of fishing participation.

Estimates of recreational angler trip expenditures were available from multiple sources, including regulatory impact documents produced by PFMC and NMFS for periodic groundfish and salmon fisheries management actions. In addition, key informant interviews of charter boat operators were conducted in both Ilwaco and Westport. During these interviews participants reviewed and commented on the expenditure patterns of their operations, and in the economic models (discussed below in 1.5), these data were incorporated to reflect the actual behavior of the charter boat fleet.

#### **1.4.5 Shellfish Aquaculture**

Commercial shellfish production features prominently on the Washington coast, but is a relatively uncommon industry from a national perspective. That means that expenditure data are not generally available in published sources and that grower interviews are extremely important in properly characterizing their relationship to revenue, employment, and their role in the coast economy.

In 2011-2013, Northern Economics Inc. (NEI) and the Pacific Shellfish Institute (PSI) developed an input/output (I-O) model of the shellfish aquaculture industry in Washington, Oregon and California

using 2010 data. As a first step, the data obtained and developed in the NEI/PSI study was revisited, with emphasis on oyster aquaculture on the Washington Coast. Using a focus group format involving representatives of the coastal Washington shellfish aquaculture industry, data were reviewed on the numbers of acres in production, revenue, employment, expenditures, and economic impact estimates in the relevant two counties of Grays Harbor and Pacific.

In addition, eight key informant interviews were conducted with members of the oyster processing and distribution sectors to collect relevant data on their production levels, sales, revenues and expenditures. This data was used to enhance the existing model parameters by accounting for the impact of these subsidiary producers in the aquaculture industry of Pacific and Grays Harbor counties.

#### **1.4.6 Recreation and Tourism**

The key analytical objectives for the recreation and tourism assessment are to construct an economic baseline that characterizes existing recreation and tourism in the coastal study area, and to develop impact mechanisms to assess the effects of future uses in the coastal study area that could affect recreation and tourism activities. Additionally, the assessment would establish the relative importance of the recreation and tourism industry at the sub-county, community level along the coast.

A baseline was developed that details recreation and tourism activities, activity levels, and associated expenditures. First, activities were grouped by outdoor recreation (e.g., boating, hiking, sightseeing), non-outdoor recreation (e.g., bowling), and other tourism activities (e.g., shopping, visiting museums). Estimates of existing activity days (in numbers of visitors, visitor-days, or trips) were compiled at the county and sub-county level for each activity or activity group using data on outdoor recreation activities from the Surfrider Foundation survey of Washington coastal recreation and tourism, and from other sources identified in the Recreation and Tourism Sector Report. For non-outdoor recreation and other tourist activities, Internet-based research and informant interviews were conducted to identify participation rates and activity levels. Additionally, information on regional and national trends designed to forecast near term and longer term changes in recreation participation and tourist activities was collected.

Expenditure profiles were developed based on information provided by the Surfrider Foundation survey, and augmented with relevant expenditure data from other published sources. The spending profiles provide sector-level detail (e.g., lodging, food and restaurant) that can be “mapped” to IMPLAN sectors for purposes of modeling the direct effects generated by the spending of recreationists and tourists in the coastal area.

Of particular importance to the modeling of economic effects is information on the proportion of overall recreation and tourism activity that is attributable to residents and non-residents of the coastal counties. While the spending of non-residents generates new economic activity within each county, the spending of residents generally does not, as it represents a shift of spending from one good or service to another within the county economy. Percentages of resident versus non-resident spending were developed based on information collected as part of the Surfrider Foundation study and from other published sources (e.g.,

intercept survey information). (Note that the Surfrider Foundation survey is collecting data from Washington residents only.)

Characterizing the recreation and tourism business community in coastal counties was conducted in conjunction with other study team efforts. Business and employment data was compiled from the Bureau of Economic Analysis and Regional Economic Information System, the Census Bureau's County Business Patterns Reports, and the Washington Employment Security Department.

#### **1.4.7 Ecosystem Services**

Natural resource planning requires an understanding of tradeoffs among resource uses that includes recognition of the services provided by a natural landscape, as well as a full understanding of its role in the economic environment of the region. This reflects acknowledgement that the highest economic value for a natural or cultural resource base may be to maintain it in its undisturbed condition. This contemporary perspective and economic approach is referred to as "ecosystem services valuation."

A number of studies have attempted to estimate the value of ecosystem services in watersheds, small regions, or even particular land parcels. These studies have utilized a wide variety of site-specific physical and biological data to derive estimates. Such information is not generally available in uniform measure or degree of detail at the full scale that can be applicable to all counties.

For this study, the concepts of ecosystem services are provided on a qualitative basis of the types and forms of ecosystem services that are associated with the area, with examples drawn from individual locations on the coast. This includes additional research on valuations from representative locations, and the identification of sites in the planning area that are likely to carry relatively high ecosystem service values.

#### **1.4.8 Social Impact Assessment**

To date, there has been limited information gathered regarding the social and cultural systems of Washington Coastal communities. Basic economic and demographic profiles of Coastal Washington counties were prepared as part of the "Economic Profile" sections of this report (see Sections 1.4.1 and 1.4.2). The purpose of this section is to address, at a minimum, the remainder of the basic social and cultural profiles information listed in the NMFS Guidelines and Principals for Social Impacts Analysis. In order to maintain some consistency of information collection and reporting, coordination took place with the several on-going social and cultural assessments and human-wellbeing indicator development efforts. Those efforts include:

- ◆ Human Well-being Framework for Environmental Management – University of Washington Tacoma, Puget Sound Institute and The Nature Conservancy
- ◆ Social Well-being Indicators for Marine Management – NOAA, NW Fisheries Science Center
- ◆ IEA for Washington Marine Spatial Planning: Social Indicator Development Process – Washington Sea Grant

- ◆ Community Profiles for West Coast and North Pacific Fisheries – NOAA, NW Fisheries Science Center

In this report, the research efforts described above are first summarized. Next, a “social impact survey” was developed that was orientated towards obtaining socioeconomic perspectives on several topics. The survey was designed to expand the information base generated by the Sea Grant “social indicators” project noted above. Thus, the survey attempted to elicit qualitative views on the perceived effects (positive, negative, neutral, or not applicable) of the proposed new resource uses on a number of socioeconomic indicators.

The web-based survey was sent to a list of 30 key informants, or persons with particular knowledge of communities, community functions, and businesses, and with an interest in the MSP process. Key informants were identified by WCMAC members, agency personnel, and Sea Grant researchers. Results from the survey were then compiled and summarized.

#### **1.4.9 Risk and Vulnerability Assessment**

Industries such as commercial fishing, aquaculture, and recreational fishing experience vulnerability to a varying degree to events beyond the industry’s control. Examples include events leading to a closure of a fishing area or prohibition on harvest of certain species, or a temporary (season-long) or multi-year loss of an aquaculture farming area. A qualitative assessment is made of the relative vulnerability of each of the three industries (commercial fishing, aquaculture, and recreational fishing), with a goal of discussing how the industry would cope with such losses, and the extent to which the industry and its support infrastructure are able to bridge a loss period.

Two components are included in this effort. The first incorporates key informant interviews in each industry to find out what actions they might take if faced with certain closures, including temporary or permanent shifts to other target species, or other locations, if available to them. The second effort includes research to identify sources of financial relief at both the state and federal level, including rules and restrictions associated with those options.

### **1.5 ECONOMIC IMPACT MODELING APPROACHES AND MEASURES**

#### **1.5.1 IMPLAN Models**

To estimate the economic contribution of specific industries, and the economic impact of proposed uses, the centerpiece model will rely upon the IMPLAN input-output (I-O) modeling system. IMPLAN is a proprietary data and modeling software system, originally designed by the U.S. Forest Service that enables users to construct input-output type economic impact models for virtually any defined region in the U.S. In addition to being comprehensive and widely used and accepted, IMPLAN models can be revised and adjusted to account for local conditions and characteristics by modelers.

Two separate regional economic models will be constructed:

- ◆ Coastwide Model: includes Clallam, Jefferson, Grays Harbor, Pacific, and Wahkiakum counties

- ◆ Statewide Model: includes the State of Washington

The first model will provide estimates of the economic contribution of identified industries to the coastal-region economy. It can also be used to estimate the economic impact of proposed uses. The second model can provide estimates of contributions to the economy of the state as a whole.

Much of the effort in building, verifying and modifying regional economic models will involve calibrating components for the commercial fisheries, tribal fisheries, recreational fisheries and aquaculture sectors. These models will be used to estimate economic contributions and impacts of alternative use scenarios involving Shipping, Renewable Energy and other affected industry sectors.

All impact multipliers used are derived from economic models specifically constructed from recent economic data and calibrated to represent economies in the study region. IMPLAN data for the Washington coastal counties were purchased and models of a Coastal Region consisting of the five counties were constructed. Some basic verification of the data in the models was done by checking industry employment and/or payroll totals underlying the IMPLAN models with other county-level employment and payroll estimates. Spending levels associated with current or projected activity levels in the key sectors were estimated and distributed among receiving industries according to expenditure profiles (percentage distributions) adapted from other relevant economic impact studies. The resulting expenditure distributions for each activity were applied to the corresponding regional economic models to generate estimates of the economic contribution or total impact of the activity on the of the study area and state-level economies.

Additional time and effort was applied to validating and calibrating data in the basic models so as to more accurately reflect actual economic conditions. Enhanced data on local supply, demand and purchasing patterns were gathered from interviews with key industry informants in the study area communities. For example, participants in the key industry sectors were interviewed to identify the locations of their input suppliers and places of residence of their workforce. These factors are a key consideration in determining the magnitude of local economic multiplier effects. Information from these contacts and interviews were used to adjust underlying industry purchasing patterns in the economic models, including industry purchases of goods, services and labor inputs. This process improves the depth and accuracy of economic impact estimates.

In addition to these expenditure questions, industry participants were asked for any information they may have on the place of residence of those participating in local recreational activities, including fishing. Of key interest is what proportions of recreational participants are local residents, in which case expenditures on recreational activities may be substituting for other spending in the local economy, versus what share are visitors from outside the region, in which case spending is more like “new” money entering the local economy. Another important information collection effort entails querying processors and distributors of aquaculture products and seafood caught in commercial and tribal fisheries for information regarding the end markets for their products. The proportions of seafood sales that are directly exported as opposed to flowing to secondary processors and/or consumer markets located locally or in neighboring regions may affect the magnitude and distribution of local multiplier effects.

### 1.5.2 Estimating Industry Economic Contributions and Economic Impacts

This study includes estimates of economic contributions and incremental economic impacts of the key marine resource-related industries or sectors and several defined hypothetical scenarios affecting the Washington Coast economy. As noted above, models of the economic relationships between industries, households and other institutions were constructed using IMPLAN and ground-truthed using available published data and information gleaned from interviews with key informants.

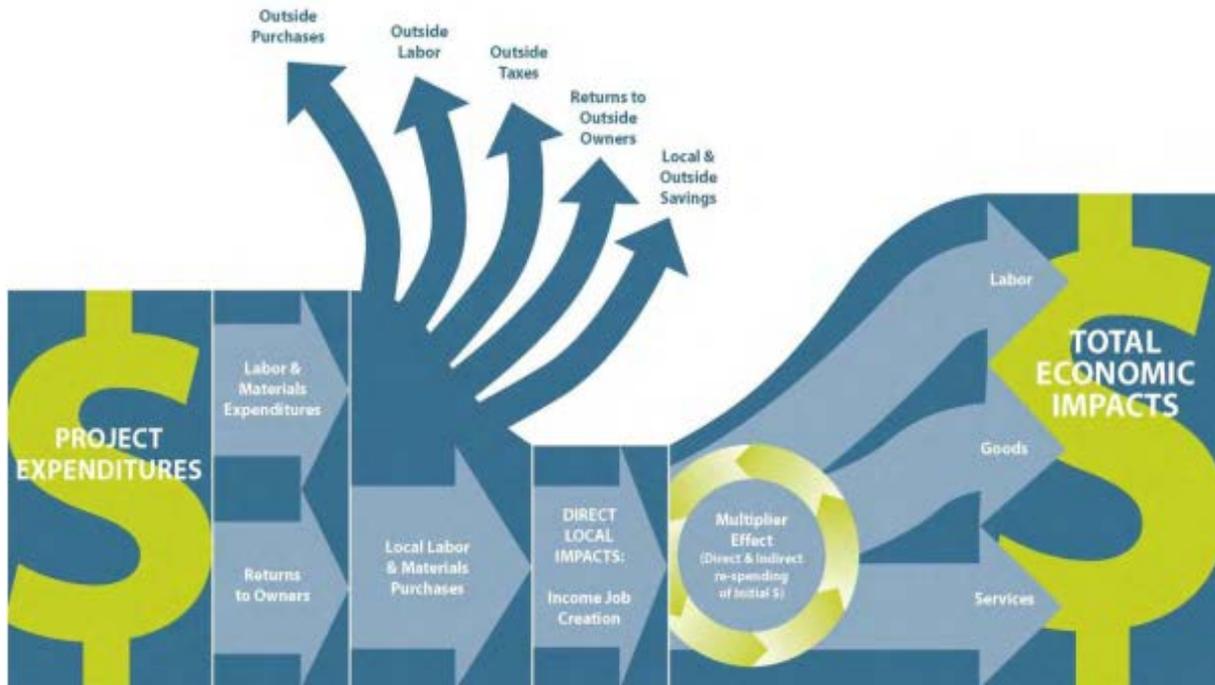
Economic models were tailored specially for analysis of each sectors' economic contributions and also for the analyses of each economic impact or new alternative use scenario. Certain scenarios may entail a projected increase in activity in a given sector while simultaneously contributing to a reduction in activity in other sectors.

Once the necessary regional economic data were collected and estimated for each Washington Coast marine resource sector, the models were used to (1) estimate the economic contributions of each marine resource-related sector to the five-county Washington Coast region economy; and (2) estimate economic contributions of each resource-related sector to the total State of Washington economy.

### 1.5.3 Regional Input-Output Analysis

Figure 1 illustrates conceptually how a regional I-O analysis calculates economic contributions of an economic sector in a specific region. The dollar sign on the left represents a sector's expenditures; in this case, the total economic output (gross revenue) that is received by the sector. This money is either spent on labor and materials or distributed as returns to the owners. Only a portion of this spending is retained within the I-O framework; as indicated by the upward arrows, money distributed outside the region becomes a leakage from the regional spending stream. The IMPLAN I-O model includes estimates (specific to each industry sector and region) that indicate how this spending affects other businesses within the regional economy. Like a rock tossed into a pond, the direct expenditures produce rings of additional activity, referred to as indirect and induced impacts. Indirect impacts quantify the effect of spending within the study region on supplies, services, labor, and taxes. Induced impacts measure the effects of spending in the region of wages, salaries and profits earned by employees and owners of the directly and indirectly affected businesses.

Direct, indirect, and induced impacts sum to the total economic impact or contribution of a particular project, industry or study scenario.



**Figure 1-1** Illustration of regional economic impacts, leakage and multiplier effects.

Source: Northern Economics, Inc. *The Economic Impact of Shellfish Aquaculture in Washington, Oregon and California*  
[http://www.pacshell.org/pdf/Economic\\_Impact\\_of\\_Shellfish\\_Aquaculture\\_2013.pdf](http://www.pacshell.org/pdf/Economic_Impact_of_Shellfish_Aquaculture_2013.pdf)

There are several important caveats relevant to the interpretation of IMPLAN model estimates, and more generally in the interpretation of all I-O model results. The first is that the I-O models are static in nature and measure only the contribution effects of an industry at a point in time. Thus, I-O models do not account for subsequent adjustments that may occur, such as the reemployment of laid-off workers in other industries, or the increase in prices for housing as an industry increases in size. A second caveat relates to the underlying data. The models rely upon I-O relationships derived from data in a certain year. The results do not reflect changes in the regional economy that may have occurred since the time of data development, nor do they necessarily reflect technological changes that may have occurred since model relationships were last updated.

There are additional caveats that are particular to IMPLAN. IMPLAN defines fairly detailed industry sectors (440 sectors in the 2012 data version), although not all may be represented in a given region. For each industry sector, IMPLAN has developed a cost of production function that utilizes, to varying degrees, the outputs of other sectors in the region. While an IMPLAN model includes a vast amount of economic information specific to the region in which an industry exists, a single average cost of production function for each industry sector is used across all regions of the US. In other words, the cost of production function used to capture the economic effects of the fish harvesting industry is essentially the same, regardless of whether the sector is harvesting lobster in Maine, jigging for cod in Alaska, or trawling for Pacific whiting off the Washington Coast. This concern in turn drives the need to collect data

that represents local fishing and seafood processing industries' actual spending patterns in the study area in order to improve the accuracy and reliability of model results.

It also should be noted that while the estimates of economic contribution or impact will be generally reliable enough for descriptive purposes, we do not recommend they be used as decision variables to compare trade-offs between alternatives or between industry sectors.

The sidebar in this chapter contains a glossary of regional economic impact modeling terms and concepts.

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## CHAPTER 2.

# Economic Profile of the Washington Coast

## 2.1 INTRODUCTION

The economic base of the counties on the Washington coast are centered on natural resource industries - commercial fishing, aquaculture, and recreation and tourism. However, the counties are individually diverse. Pacific and Grays Harbor counties function as integrated economic units with the majority of the populations residing in coastal areas. In contrast, the Pacific coastal areas of Clallam and Jefferson counties are geographically isolated from the larger population and economic centers of their respective counties. The population of the Pacific coastal areas of Clallam County (i.e. the communities of Forks, Neah Bay, Beaver, La Push and Clallam Bay) make up only about 12 percent of the 71,000 total population in 2010. Similarly, the western portion of Jefferson County is very sparsely populated with only two census designated places (Queets and Clearwater) with an estimated population of less than 1,100. This area, which comprises less than 4 percent of the Jefferson County total population, is officially designated by the US Census as the West End Census County Division (CCD). The Olympic National Park creates a physical separation between the populated areas of the West End CCD and the much more densely populated regions on the Eastern reaches of the County that lie on Puget Sound.

This chapter provides a demographic and economic profile of the counties of the Washington coast, and serve as the foundation for the economic analysis of the Marine Spatial Plan (MSP) and proposed new uses. The profile also supports the determinaton of where geographically any impacts from new uses would fall.

## 2.2 CLALLAM COUNTY

Clallam County is a long narrow county that stretches along the north part of the Olympic Peninsula west to the most northwestern corner of the state. It covers 1,739 square miles (1.12 million acres). Annual precipitation ranges from 17 inches in Sequim to over ten feet in Forks.

Much of Clallam County is under public ownership. Federal lands, primarily the Olympic National Park and the Olympic National Forest, make up 46 percent of the county’s acreage. Both the Makah and Quileute Indian Reservations are located in Clallam County. The state owns another 14 percent and county and local governments have a 1 percent share. The remaining 39 percent is private lands. Only a little under 33 acres have been identified as Urban Growth Areas.

### 2.2.1 Population

In the ten years between the 2000 and 2010 Federal census, Clallam County population grew 11.3 percent more than any of the other MSP counties. In 2014 Clallam County had an estimated population of 72,500 people, up 1.53 percent since the 2010 census figure (Washington Office of Financial Management, November 2014).

The population in Clallam County is skewed toward the older age classes. Twenty-six percent of the county’s population was in the 65 and plus category compared to less than 14 percent for state as a whole. In the state overall almost 23 percent of the population is under the age of 18 but in Clallam County only 17.9 are under that age.

### 2.2.2 Employment and Income

Employment in Clallam County is shown in Table 2-1. The data present is 2012 data for covered employment.

**Table 2-1** Employment by Industry – Clallam County 2012

Industry	Number	Percent
Agriculture, forestry, fishing and hunting	551	2.5
Mining	-	-
Utilities	-	-
Construction	869	4.0
Manufacturing	1,533	7.1
Wholesale/Retail Trade	3,578	17.0
Transportation and warehousing, and utilities	385	1.8
Information	160	0.7
Finance and insurance, and real estate and rental and leasing	628	2.9
Professional and technical services	504	2.3
Management of companies and enterprises	147	0.7
Administrative and waste management services	379	1.8
Educational services	52	0.2
Health care and social assistance	2,309	10.7

Industry	Number	Percent
Arts, entertainment, and recreation	132	0.6
Accommodation and food services	2178	10.1
Other services, except public administration	1,133	5.2
Government	7,061	32.7
Not elsewhere classified	24	0.1
Total Employed	21,621	100.0

Source: Washington Office of Financial Management

The Washington’s Working Coast report looked at location quotients<sup>1</sup> to compare concentrations of jobs in the coastal counties relative to the state as whole. Jobs in the accommodation and food service sector and in the government sector were more concentrated in Clallam County relative to the state. In the other five industry groups used in that study (Agriculture, Forestry and Fishing; Manufacturing; Wholesale Trade; Transportation and Warehousing; and Arts, Entertainment and Recreation) Clallam County jobs were less concentrated than Washington as a whole. (University of Washington, 2013)

In 2013, the average annual wage for jobs in Clallam County was \$35,340 which is significantly below the state average annual wage of \$53,029 in that year. (Washington Employment Security Department, September 2014)

In 2012 per capita personal income, which includes earned income, investment income and government payments (Social Security, Veterans Benefits, etc.) was \$38,545 for Clallam County, again less than the state average of \$46,045. (Washington Employment Security Department, September 2014)

### 2.2.3 Economic Development Goals and Plans

Clallam County has several different economic development organizations. One is the Peninsula Development District (PDD), a non-profit corporation formed in 1984 that includes representatives of Clallam and Jefferson Counties, tribes, cities, chamber of commerces, ports, and other economic development organizations. The other group is the Clallam County Economic Development Council. Documents from both of these groups were reviewed for this section of the report.

The Peninsula Development District’s stated vision is:

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<sup>1</sup> An economic measure which is particularly useful for quantifying the concentration of a specific job or industry in a geographic region is called a location quotient. Specifically, the location quotient calculates how concentrated jobs are with respect to a larger representative area. The data is presented in percentage concentration a 100 percent location quotient would mean the industry job concentration is equal to that of the comparison area. A percentage greater than 100 percent indicates the industry is more concentrated than the comparison area (in this case the comparison area is the state of Washington).

*The North Olympic Peninsula will become a region noted for its highly –educated and trained workforce, healthy cities who are positively engaged with their communities, a sound physical infrastructure, a diverse and dynamic economic base, and the local and regional capacity to be economically self-sustaining. [Peninsula Development District, no date)*

The PDD developed a Comprehensive Economic Development Strategy 2011-2015 (CEDS) that analyzes potential economic development strategies for the Olympic Peninsula. The report discusses the transition from the historical economy of this part of the Olympic Peninsula – one with a heavy reliance on the forestry, wood products and fishing – to a more diverse economy. For Clallam County the focus for the future economy is on these industry clusters:

- ◆ Innovative Manufacturing
- ◆ Marine Services
- ◆ Natural Resources (Forestry and Agriculture)
- ◆ Renewable Energy
- ◆ Tourism
- ◆ Education
- ◆ Healthcare
- ◆ Building and Construction.

In analyzing the economic strengths of the region they highlighted the following:

- ◆ Strong and growing infrastructure including expansion of broadband.
- ◆ Higher education and workforce training which is considered a necessity to keep the local workforce employed in a changing economy. One example is the composite manufacturing program at Peninsula College.
- ◆ Job retention and expansion by looking a new ways to use resources. One example was a biomass project using timber slash which previously would have been left in the forest or burned. While this was actually a Jefferson County project, it could have potential application to other counties in the MSP area.
- ◆ Innovative and diverse workforce across the region.

Some of the challenges to economic development were also identified in the CEDS document. These include:

- ◆ It has become more difficult for the small business sector to obtain loans. To help small business funding, the Olympic Finance Development Authority was formed; this organization uses micro funding resources and partners with local banks.

- ◆ Transportation issues were also identified as challenges to economic development. The region has limited access via roads, with Highway 101 being the only highway in the area. Seattle tourists are also dependent on the ferry service. Mudslides, bridge closures and cancelled ferries were identified as barriers to development of the region's economic resources. Various alternative transportation options (e.g., water transportation for supplies) are being explored by the PDD.

The Clallam County Economic Development Council describes its mission statement

*The Clallam EDC's mission is to 'set the table' for economic growth; to identify, understand and align the economic drivers throughout the County; and to be the advocate for Clallam County commerce. (Clallam Economic Development Council, August 2014)*

In their strategy report they identified what they considered to be the county's assets and advantages. Some of these assets are:

- ◆ Location and condition of the Port Angeles Harbor
- ◆ Well established commercial and sport fishing industries
- ◆ Proximity to the Olympic National Park and other tourism sites
- ◆ Climate and location are a draw for retirement population
- ◆ Good telecommunications infrastructure which will improve with a project to extend better broadband service to the west side of the county.

The challenges to economic development identified in their strategy document echoed many of those identified in the CEDS document (limitation of having a single highway, lack of financing) but also included lack of natural gas service and lack of rail service.

The Council focuses on business retention and expansion. In their 2014 Annual Report they provided examples of accomplishments in 2014. While the bulk of the examples were in Port Angeles and Sequim, there were a few examples in the more western part of the county. One was helping a company in Forks build a brewery that would use water from the Hoh Rain Forest.

*[More extensive discussion of the future direction of Clallam County and specific development projects will be included after interviews with county economic development staff]*

## 2.3 GRAYS HARBOR COUNTY

Grays Harbor County covers a land area a little over 1900 square miles, the largest of the five MSP counties. The county has a diverse topography with the Olympic Mountains on the northern border, the coastline on the west, steep foothills in much of the rest of the area except for six river valleys – the Chehalis, Satsop, Wynoochee, Wishkah, Hoquiam and Humptulips Rivers. At the mouth of the Chehalis River, the Grays Harbor Estuary covers 58,000 acres and extends inland about 25 miles.

The Washington Department of Natural Resources manages about 31,300 acres of state forest lands in Grays Harbor County that provide some revenue to the county. (Washington Department of Natural Resources, January 2015)

Portions of two Indian reservations, the Quinault and the Chehalis, are part of Grays Harbor County. Except for a small part in Jefferson County, the Quinault Reservation is part of Grays Harbor County. The reservation covers a little over ten percent of the total county land area. The Chehalis, a small reservation, is in Grays Harbor, Lewis and Thurston Counties.

A little over 60 percent of the Grays Harbor County population lives in the incorporated parts of the county. There are nine municipalities – Aberdeen, Cosmopolis, Elma, Hoquiam, McCleary, Montesano, Oakville, Ocean Shores, and Westport.

### 2.3.1 Population

In the ten years between the 2000 and 2010 Federal census, Grays Harbor County population grew 8.3 percent. In 2014 Gray Harbor County had an estimated population of 73,300 people, up less than a percent since the 2010 census figure (Washington Office of Financial Management, November 2014).

The population in Grays Harbor is somewhat skewed toward the older age classes, but not as much as other MSP counties. A little over 18 percent of the county’s population was in the 65 and plus category compared to less than 14 percent for state as a whole. In the state overall almost 23 percent of the population is under the age of 18. Grays Harbor County comes close to mirroring the state profile with 21 percent of the population under 18 of age.

### 2.3.2 Employment and Income

Employment in Grays Harbor County is shown in Table 2-2. The data present is 2012 data for covered employment.

**Table 2-2** Employment by Industry – Grays Harbor County 2012

Industry	Number	Percent
Agriculture, forestry, fishing and hunting	685	3.1
Mining	-	-
Utilities	34	0.2
Construction	793	3.6
Manufacturing	2,791	12.7
Wholesale/Retail Trade	3,139	14.0

Industry	Number	Percent
Transportation and warehousing, and utilities	532	2.4
Information	215	1.0
Finance and insurance, and real estate and rental and leasing	753	3.4
Professional and technical services	431	2.0
Management of companies and enterprises	88	0.4
Administrative and waste management services	536	2.4
Educational services	-	-
Health care and social assistance	2,375	10.8
Arts, entertainment, and recreation	176	0.8
Accommodation and food services	1,966	8.9
Other services, except public administration	1,421	6.5
Government	6,028	27.4
Not elsewhere classified	44	0.2
Total Employed	22,007	100.0

Source: Washington Office of Financial Management

As discussed above the Washington’s Working Coast report looked at location quotients to compare concentrations of jobs in the coastal counties relative to the state as whole. Jobs in Grays Harbor County had higher concentrations relative to the state in all but three sectors. Wholesale Trade and Arts, Entertainment and Recreation were significantly less concentrated in Grays Harbor County. The Transportation & Warehousing sector was slightly less concentrated relative to state levels. (University of Washington, 2013).

In 2013, the average annual wage for jobs in Grays Harbor County was \$35,884 which is significantly below the state average annual wage of \$53,029 in that year. (Washington Employment Security Department, September 2014)

In 2012 per capita personal income, which includes earned income, investment income and government payments (Social Security, Veterans Benefits, etc.) was \$31,848 for Grays Harbor County, again less than the state average of \$46,045. (Washington Employment Security Department, September 2014)

### 2.3.3 Economic Development Goals and Plans

In 1996 an economic analysis was conducted for Grays Harbor, Mason, Pacific, and Wahkiakum Counties, all members of the Columbia Pacific Resource Conservation and Economic Development District (COLPAC). Following that report, the Economic Development District (EDD), which includes those same four counties, was created. The stated mission of that the Columbia-Pacific Resource Conservation and Development District is:

*The Columbia-Pacific Resource Conservation and Economic Development District promotes and engages regional partnerships to preserve and enhance our communities by creating economic opportunity and advocating sustainability and revitalization of the*

*diverse area we serve. Grays Harbor County benefits from a well-established history of multi-jurisdictional collaborative efforts. This cooperative environment has fostered the development of a countywide economic development team to jointly participate in a wide variety of projects.*

A critical output of the EDD Planning Program is the Comprehensive Economic Development Strategy (CEDS) document. Since 1998 the Columbia-Pacific Resource Conservation and Development District has become the lead agency for developing the CEDS document for the region.

In the 2009 CEDS, four natural resource-related industrial clusters considered integral to the Columbia-Pacific's economy were analyzed. These four clusters were:

- ◆ Forest products
- ◆ Fishing, fish processing and related aquaculture (including clams and oysters)
- ◆ Agriculture
- ◆ Food products.

Three other industry clusters were also identified in the CEDS document:

- ◆ High technology and light industry
- ◆ Tourism
- ◆ Healthcare and retirement clusters.

Grays Harbor and the other counties included in COLPAC continue to develop projects in these respective clusters.

Grays Harbor County highlighted its success in the tourism cluster with its year end review for 2014, documenting increased hotel/motel tax revenues and taxable retail sales (Greater Grays Harbor, 2014 - Economic Vitality Index and Year in Review).

The Port of Grays Harbor is the only deep water port on the west coast of Washington and is two days closer to Asia than Puget Sound ports. This locational advantage and other advantages have enabled the Port to expand beyond traditional commodity shipments. Because the Port of Grays Harbor has economic implications beyond the boundaries of Grays Harbor County, a separate section on economic impacts from the Port is included at the end of this chapter.

*[Interviews with Grays Harbor County and port staff will be necessary to enhance this section of the report]*

## 2.4 JEFFERSON COUNTY

Jefferson County is located in the Olympic Peninsula south of Clallam County. The county is a little over 1800 square miles which much of that is in public ownership. About 60 percent of the county is in the Olympic National Park and the Olympic National Forest. The Hoh Reservation and a small corner of the Quinalt Reservation are also in Jefferson County.

### 2.4.1 Population

In the ten years between the 2000 and 2010 Federal census, Jefferson County population grew 13.6 percent, the fastest growth during that time period for the five MSP counties. In 2014 the county had an estimated population of 30,700, up 2.8 percent since the 2010 census figure. Again this was the fastest growing of the five counties during this four year period. (Washington Office of Financial Management, November 2014).

The population in Jefferson County is skewed toward the older age classes, more than any of the other four counties. Over 30 percent of the county’s population was in the 65 and plus category compared to less than 14 percent for state as a whole. In the state overall almost 23 percent of the population is under the age of 18 but in in Jefferson County less than 14 percent are under that age.

### 2.4.2 -Employment and Income

Table 2-3 shows employment in Jefferson County with 2012 data for covered employment.

**Table 2-3** Employment by Industry – Jefferson County 2012

Industry	Number	Percent
Agriculture, forestry, fishing and hunting	128	1.7
Mining	-	-
Utilities	46	.6
Construction	378	4.9
Manufacturing	624	8.1
Wholesale/Retail Trade	1,113	14.0
Transportation and warehousing, and utilities	-	-
Information	131	1.7
Finance and insurance, and real estate and rental and leasing	286	7.7
Professional and technical services	238	3.1
Management of companies and enterprises	-	-
Administrative and waste management services	139	1.8
Educational services	147	1.9
Health care and social assistance	832	10.7
Arts, entertainment, and recreation	87	1.1
Accommodation and food services	993	12.8
Other services, except public administration	462	6.0
Government	2,096	27.1
Not elsewhere classified	47	0.6
Total Employed	7,746	100.0

Source: Washington Office of Financial Management

Looking again at the Washington’s Working Coast location quotients to compare concentrations of jobs in Jefferson County relative to the state as whole, all but two sectors were less concentrated than the state.

The Accommodations and Food Services sector and the Government sector were significantly more concentrated in Jefferson County. (University of Washington, 2013)

In 2013, the average annual wage for jobs in Jefferson County was \$34,497 which is far below the state average annual wage of \$53,029 in that year. (Washington Employment Security Department, September 2014)

In 2012 per capita personal income, which includes earned income, investment income and government payments (Social Security, Veterans Benefits, etc.) was \$44,946 for Jefferson County, not far below the state average of \$46,045. . (Washington Employment Security Department, September 2014)

### **2.4.3 Economic Development Goals and Plans**

Jefferson County is part of the PDD, a non-profit corporation formed in 1984 that includes representatives of Clallam and Jefferson Counties, tribes, cities, chamber of commerces, ports, and other economic development organizations

In the PDD Comprehensive Economic Development Strategy 2011-2015, for Jefferson County the focus for the future economy is on these industry clusters:

- ◆ Innovative Manufacturing
- ◆ Arts and Culture
- ◆ Education
- ◆ Food and Farm
- ◆ Forest Industries
- ◆ Healthcare
- ◆ Marine Trades
- ◆ Building and Construction
- ◆ Tourism
- ◆ Advanced Technology and Manufacturing

As discussed above in the Clallam County section, the perceived strengths of the two county region are a strong infrastructure, good education and workforce training designed to meet the needs of local industries, potential for biomass projects, and diversity and skills of the local workforce.

As discussed previously, the challenges to economic development in this region tend to be lack of financing and transportation issues.

Jefferson County also has a volunteer organization called Team Jefferson that plays a role in economic development. Team Jefferson is the state-designated economic development council (EDC) for Jefferson County. This group was involved in the \$55 million green energy (biomass) Project at Port Townsend Paper. (EDC Team Jefferson, 2015)

Team Jefferson is working to increase access to investment capital. The Local Investment Opportunities Network has invested nearly two million into local projects. Another group, Landworks, invests in forest and farmland. Team Jefferson also set up the new Olympic Finance Development Authority as another means to funnel investment to the local economy.

## 2.5 PACIFIC COUNTY

Pacific County is 594,860 acres or about 930 square miles, bordered by the Pacific Ocean to the west and the Columbia River on the south. It borders Grays Harbor County to the north, Lewis County to the south and Wahkiakum County to the southeast. Pacific County includes the Long Beach Peninsula which wraps around Willapa Bay, a highly productive shellfish farming area. Cape Shoalwater on the northwest part of the bay is the west coast’s most active erosion area. The eastern part of the county is predominately timberlands (Pacific County, 2010).

Nearly all of the county (98.8 percent) is unincorporated. There are four incorporated cities in the county: Ilwaco, Long Beach, Raymond and South Bend

Over 70 percent or close to 420,000 acres of the Pacific County is forested. Roughly 85 percent of this forestland is managed as commercial timberland by a few private companies including Weyerhaeuser. The other 15 percent is managed by the Washington State Department of Natural Resources. (Pacific County, 2010). There are no federal forest lands in Pacific County.

In addition to the timber industry, aquaculture, farming and tourism are sources of employment.

### 2.5.1 Population

In the ten years between the 2000 and 2010 Federal census, the population of Pacific County declined by 0.3 percent, the only one of the five MSP counties to see a decline during that ten year period. In 2014 Pacific County had estimated population of 21,100, up a little under 1 percent since the 2010 census figure (Washington Office of Financial Management, November 2014).

Like many of the coastal counties, the population in Pacific County is skewed toward the older age classes. Over 27 percent of the county’s population was in the 65 and plus category compared to less than 14 percent for state as a whole. In the state overall almost 23 percent of the population is under the age of 18 but in in Pacific County only 17.3 are under that age.

### 2.5.2 Employment and Income

Employment in Pacific County is shown in Table 2-4. The data present is 2012 data for covered employment.

**Table 2-4** Employment by Industry – Pacific County 2012

Industry	Number	Percent
Agriculture, forestry, fishing and hunting	540	9.2
Mining	-	-
Utilities	-	-

Industry	Number	Percent
Construction	259	4.4
Manufacturing	722	12.3
Wholesale/Retail Trade	589	10.0
Transportation and warehousing, and utilities	34	0.6
Information	46	0.8
Finance and insurance, and real estate and rental and leasing	255	4.3
Professional and technical services	68	1.2
Management of companies and enterprises	-	-
Administrative and waste management services	54	0.9
Educational services	-	-
Health care and social assistance	319	5.4
Arts, entertainment, and recreation	43	0.7
Accommodation and food services	699	11.9
Other services, except public administration	434	7.4
Government	1,758	29.9
Not elsewhere classified	54	0.9
Total Employed	5,873	100.0

Source: Washington Office of Financial Management

In the Washington’s Working Coast location quotient discussion, Pacific County had the second highest location quotient for the Agriculture, Forestry and Fishing sector, more than 2.7 times as concentrated relative to the state. (Note that the number of fishing-related jobs is understated in Washington Office of Financial Management (OFM) statistics, because many participants are self-employed and not counted by OFM.) Other job sectors more concentrated than state levels in Pacific County were the Manufacturing sector, Accommodations and Food Services sector and the Government sector. (University of Washington, 2013)

In 2013, the average annual wage for jobs in Pacific County was \$32,734 which is far below the state average annual wage of \$53,029 in that year. (Washington Employment Security Department, September 2014)

In 2012 per capita personal income, which includes earned income, investment income and government payments (Social Security, Veterans Benefits, etc.) was \$35,786 for Pacific County, below the state average of \$46,045. (Washington Employment Security Department, September 2014)

### 2.5.3 Economic Development Goals and Plans

In Pacific County’s Comprehensive Plan Update 2010 to 2030, the county presented a vision statement that was developed through public workshops. The vision statement is:

*Pacific County seeks to maintain and enhance a rural life-style by promoting long-term development of commercially viable agricultural, aquaculture, forest and fisheries resources; by reducing conflicts between residential, commercial, industrial, and farming activities; by*

*conserving economic resources and promoting economic development that is compatible with the area's resources; and by promoting the safety, health and general welfare of all the residents. [Pacific County, 2010]*

*[No recent economic development plans were found for Pacific County. Interviews will be conducted with county or other economic development entities to identify development strategy and future projects.]*

## 2.6 WAHAKIACUM COUNTY

Wahkiakum County is small in size relative to the other MSP counties, encompassing only 263 square miles. The county, which is roughly fifteen miles from the Pacific Ocean, is heavily forested, and logging is the major industry.

The town of Cathlamet is not only the county seat but also the only incorporated community in the county.

### 2.6.1 Population

In the ten years between the 2000 and 2010 Federal census, the population of Wahkiakum County grew 4 percent. In 2014 Wahkiakum County had an estimated population of 4,010, up a little under 1 percent since the 2010 census figure but still the least populated county in the state. About 500 people live in Cathlamet; the remainder live in the unincorporated parts of the county. (Washington Office of Financial Management, November 2014)

Wahkiakum County population is also skewed toward the older age classes. Almost 30 percent of the county's population was in the 65 and plus category compared to less than 14 percent for state as a whole. In the state overall almost 23 percent of the population is under the age of 18 but in Pacific County only about 18 percent are under that age.

### 2.6.2 Employment and Income

Employment in Wahkiakum County is shown in Table 2-5. The data present is 2012 data for covered employment.

**Table 2-5** Employment by Industry – Wahkiakum County 2012

Industry	Number	Percent
Agriculture, forestry, fishing and hunting	144	20.9
Mining	-	-
Utilities	-	-
Construction	42	6.1
Manufacturing	28	4.1
Wholesale/Retail Trade	54	9.0
Transportation and warehousing, and utilities	-	-
Information	19	2.8
Finance and insurance, and real estate and rental and leasing	18	2.6
Professional and technical services	10	1.4

Industry	Number	Percent
Management of companies and enterprises	-	-
Administrative and waste management services	24	3.5
Educational services	-	-
Health care and social assistance	4	6.4
Arts, entertainment, and recreation	-	-
Accommodation and food services	28	4.1
Other services, except public administration	24	3.5
Government	247	35.8
Not elsewhere classified	9	1.3
Total Employed	690	100.0

Source: Washington Office of Financial Management

In the Washington’s Working Coast location quotient discussion, Wahkiakum County had the highest location quotient for the Agriculture, Forestry and Fishing sector, more than five times as concentrated as the state. The only other job sector in Wahkiakum County more concentrated than state levels was the Government sector. (University of Washington, 2013)

In 2013, the average annual wage for jobs in Wahkiakum County was \$33,690 which is far below the state average annual wage of \$53,029 in that year. (Washington Employment Security Department, September 2014)

In 2012 per capita personal income, which includes earned income, investment income and government payments (Social Security, Veterans Benefits, etc.) was \$33,374 for Wahkiakum County, below the state average of \$46,045. (Washington Employment Security Department, January 2015)

### 2.6.3 Economic Development Goals and Plans

*[Except for small projects within Cathlamet, no information was found on economic development plans. County staff will be contacted to discuss any plans.]*

## 2.7 ECONOMIC IMPACTS ASSOCIATED WITH SHIPPING FROM GRAYS HARBOR

The Port of Grays Harbor and activities associated with that port play a major role in the economy of the coast. It also has economic impacts for non-coastal parts of Washington.

This summary of the economic impacts associated with the Port of Grays Harbor draws primarily from two recently completed port and shipping studies. The first study is the ‘The 2013 Economic Impact of the Port of Grays Harbor’ completed by Martin Associates in October 2014. The second study is ‘Washington Coast Marine Spatial Planning Assessment of Shipping Sector’ completed by BST Associates in August 2014.

A third recently completed study, ‘Washington State Maritime Cluster’, prepared by Community Attributes Inc. was also reviewed for this section. Their study was focused more broadly on the importance of the maritime industry across Washington without many specifics about the Port of Grays

Harbor. However the report demonstrates the interdependencies of companies within the marine cluster and the broad range of occupations required to support this cluster. (Community Attributes, Inc., 2013)

The 2014 report by Martin Associates focuses specifically on the Port of Grays Harbor. For the Port of Grays Harbor, the goal of the report was to measure economic impacts associated with three types of waterborne activity at the port. The report defined these three areas:

- ◆ Marine cargo activity, which includes waterborne cargo moving via the Port of Grays Harbor facilities (i.e., facilities owned and operated by the Port of Grays Harbor and facilities leased to private operators).
- ◆ Fishing activity at the Port of Grays Harbor Westport Marina, which includes the impacts generated by purchases of supplies, shipyard services, equipment and fishing gear, insurance and legal services by fishing vessels using the Port of Grays Harbor Westport Marina.
- ◆ Marina activity, which includes recreational boats that are moored at Westport Marina, as well as transient recreational boating activity and charter fishing activity operated at Westport Marina. (Martin Associates, 2014)

For purposes of the economic analysis to support MSP, only the economic impacts associated with marine cargo activities will be presented from the Martin Associates report. Economic impacts associated with commercial fishing and recreational fishing are addressed elsewhere in this report.

The BST Associates' report provides an overview of Pacific Northwest (PNW) trade patterns as well as changes expected in these trade patterns. It also presents cargo forecasts for container cargo, neobulk/breakbulk, grain, dry bulks and liquid bulks for the PNW ports as a whole, with limited details about the Port of Grays Harbor. The report was developed to consider the potential conflicts between shipping along the coast of Washington and development of offshore energy in this same area. As such it focuses on vessels shipping to and from a number of ports, not only Grays Harbor.

### **2.7.1 Marine Cargo Impacts from the Port of Grays Harbor**

In the Martin Associates model, cargo moving through the Port of Grays Harbor generates state and local economic impacts in four business sectors:

- ◆ Surface Transportation Sector: Includes railroads and trucking. Railroads are particularly important in moving grain and autos from the Midwest to the port for export. Trucks are used for moving wood products (logs and chips) and for liquid bulk commodities. Trucks are also used for moving imported autos to California for auctions.
- ◆ Maritime Service Sector: this sector includes a wide variety of services including:
  - Cargo Marine Transportation: firms that provide the logistics of overland and water transportation, e.g., freight forwarders.

- Vessel Operations: Includes pilots to assist vessels, chandlers to provide supplies to the ships, towing firms for tug assist, bunkering firms that provide fuel, marine surveyors, shipyard repair companies and construction firms.
- Cargo handling: Includes longshoremen, stevedoring firms and terminal operators.
- Government agencies (federal, state and local) that provides services to the port.
- ♦ Port of Grays Harbor: employees of the port itself.
- ♦ Shippers/Consignees: Shippers and consignees that use the port for import and export of cargo from their businesses. Because this business category can use other ports in lieu of Grays Harbor, employment in this sector is considered to be 'port-related' but not 'port-generated' in the model developed by Associates.

The Martin Associates methodology was in part designed to help with port development planning. Results from the model can help a port decide on the best allocation of port land and port facilities. Different commodities require different port facilities. Port planners need to understand the economic impacts associated with shipping different commodities to make decisions about future development of their port.

In 2013, 2.38 million metric tons of cargo moved through the Port of Grays Harbor owned facilities.<sup>2</sup> Of that tonnage 1.36 million tons or about 57 percent was soy meal and other bulk commodities.

Automobiles accounted for 177,529 metric tons or 92,270 auto units (each auto unit is about 1.9 tons). Another 412,122 metric tons of forest products (log exports and chips) moved through the port in 2013. The two liquid bulk terminals (Westway Terminal and Imperium Renewables) handled 433,981 tons in 2013.

For the Port of Grays Harbor Martin Associates modelled five commodities.

- ♦ Chips
- ♦ Grain
- ♦ Autos
- ♦ Logs
- ♦ Liquid bulk

Based on 2013 cargo levels they estimated total employment, personal income, business revenue, local purchases and state and local taxes resulting from activity at the Port of Grays Harbor. Their results are shown in Table 2-6.

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<sup>2</sup> The Martin Associates model uses 2013 data. More recent data on cargo tonnage from the Port of Grays Harbor is available now but the 2013 data from their report is presented here to maintain consistency with their results.

**Table 2-6** Economic Impacts Generated by the Port of Grays Harbor Marine Cargo Activities

Category	
Jobs (number)	
Direct	574
Indirect	645
Induced	305
Total Jobs	1,524
Personal Income (\$1,000)	
Direct	\$36,239
Indirect	\$79,654
Induced	\$14,860
Total Income	\$130,754
Business Revenue (\$1,000)	\$143,488
Local Purchases (\$1,000)	\$31,513
State and Local Taxes (\$1,000)	\$12,291

Source: Martin Associate 2014

The 574 direct jobs shown in Table 2-6, were broken down future into the business sector categories discussed above. These are show in Table 2-7.

**Table 2-7** Direct Jobs for the Port of Grays Harbor Cargo Activities

Job Category	Direct Jobs
Surface Transportation	
Rail	128
Truck	57
Maritime Services	
Terminal Employees	212
ILWU/Dockworkers	87
Towing	17
Pilots	3
Agents	5
Maritime Services	5
Government	12
Construction	15
Port of Grays Harbor	33
Totals	574

Source: Martin Associate 2014

Of those 574 direct jobs, 94 percent were held by Grays Harbor residents. Another 3.6 percent were from Pacific, Mason, and Thurston combined. Around 2 percent were from other parts of Washington.

In Table 2-6, the \$143.5 million of direct business revenue generated is defined as “direct business revenue as received by the firms directly dependent on the Port and providing maritime services and inland transportation services to the cargo handled at the marine terminals and the vessels calling the port.” The biggest share of this direct business revenue is received by railroads. The Port of Grays Harbor, the terminal services and the trucking companies get the next biggest share.

Martin and Associates was able to allocate most of the direct revenues to specific commodity groups. This revenue distribution by commodity is shown in Table 2-8.

**Table 2-8** Distribution of Revenues by Commodity

Commodity	Direct Revenue (\$1000)	Tonnage Metric Tons	Revenue/1,000 tons
Chips	\$1,130	94,732	\$11.93
Grain	\$69,186	1,360,611	\$50.85
Autos (units)	\$32,513	92,790	\$350.39
Logs	\$5,165	317,390	\$16.27
Liquid Bulk	\$10,241	433,981	\$23.60
Revenue not allocated to specific commodity	\$25,253		
Total	\$143,488		

Source: Martin Associate 2014

The highest revenue per ton is generated by autos and grain. The high revenue per ton associated with autos is in part because of the labor intensive handling and processing required for auto shipments. For grains and autos there are also significant surface transportation costs which is reflected in the higher revenue per ton figures.

### 2.7.2 Projections for Future Cargo

The BST report gives some limited information about potential growth of cargo shipments via the Port of Grays Harbor and the uncertainties associated with this forecast

BST provided an overview of the PNW Gateway (defined to be Washington and Oregon) trade. The Gateway includes 11 seaports, airports, and two land crossings at Blaine and Sumas, Washington.

The report attributes about 10 percent (by value) of total U.S. trade with Asia to the PNW Gateway. China is the most important trade partner for PNW ports accounting for 31 percent of these ports’ waterborne trade in 2013. Alaska and Hawaii combined accounted for 23 percent, Japan 18 percent South Korea 6 percent, with the remaining 22 percent spread across many other trading partners.

Overall, the report projects waterborne cargo volumes in the Pacific Northwest will grow a modest 1.3 percent per year from 2013 to 2035. This growth projection is an aggregate projection, i.e., it includes all

cargo types. While volumes are expected to grow during this time period, the number of vessels is expected to decrease in part due to increased size of vessels.

BST identified some uncertainties that could impact PNW cargo flow forecasts. The first is potential changes in trade patterns with China. After 30 years averaging 10 percent per year growth in GNP, China's GNR is now expected to grow at a 7 percent annual rate. Another change in China is increasing wages which is causing multinational firms to consider shifting production from coastal China to less expensive regions in Asia including western China or other parts of Asia, reshoring (shifting production back to the U.S.) or nearshoring (shifting production to Mexico, Canada or Latin America or South America).

Shifting production to other parts of Asia could shift vessel traffic to the Suez Canal. Reshoring and nearshoring would eliminate waterborne shipments from China. All of these have potential negative impacts on container trade through the PNW ports although so far there has been only limited impacts on trade.

Also the BST report notes rising incomes in Asia is creating demand for U.S. products which would be an offsetting factor as more exports of container and non-containerized products would move to China and other parts of Asia.

Another area of uncertainty in forecasting cargo movements to and from PNW ports is the ever changing energy sector. The BST report addressed the growth of oil production in the Bakken region of North Dakota and Montana which increased faster than expected. This growth happened in tandem with declining production in Alaska. Ten year forecasts from the Alaska Department of Revenue show continued decline in oil production. (Alaska Department of Revenue, 2013)

Recent changes in oil prices and production around the world has thrown even more uncertainty into even these recent forecasts.

BST does provide PNW cargo forecasts by commodity handling group. Groups most relevant to the Port of Grays Harbor are summarized briefly in the next sections.

## **Grain and Oilseed**

BST reported exports of grain and oilseeds through PNW ports doubled between 2002 and 2010. Several factors account for this increase. Demand has increased in Asia, the Columbia River navigation channel was deepened to 43 feet, inland agricultural products of grains and oilseeds increased and there are more favorable ocean freight rates.

BST noted the significant increase in soybean exports from the PNW ports as the demand for vegetable oil for foods, protein meal for animals, and biodiesel use increased. Soybeans are a relatively new export for the Port of Grays Harbor.

Overall BST forecasts a 2.2 increase in grain/oilseeds exports between 2013 and 2035.

## Liquid Bulk

The largest volumes of liquid bulk trade in the PNW are in crude oil and refined products. As changing crude oil production shifted from Alaska to supply from Canada and the US Bakken region, Puget Sound refineries are receiving more crude via rail versus water.

This trend of declining waterborne shipments of petroleum products (mostly refined products) is projected to continue in the short term, then stabilize. BST forecasts a negative 0.4 percent growth rate from 2013 to 2035. However proposed oil transfer (rail to vessel) projects in Portland, Vancouver and Grays Harbor could impact this forecast for those specific areas. *[Detailed analysis of proposed oil transfer projects at the Port of Grays Harbor is beyond the scope of this study.]*

## Neobulk/Breakbulk

Neobulk which includes autos and logs is an important part of the Gray Harbor trade. Auto exports is a recent trade activity for the port while log exports has a long tradition at the port.

Neobulk/breakbulk trade from PNW ports hit a bottom in 2008 but is now above pre-recession levels. BST projects an annual growth rate of 0.7 percent through 2035.

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## CHAPTER 3.

# Economic Profiles of Washington Coast Tribes

### 3.1 INTRODUCTION

The Washington Marine Spatial Planning (MSP) Project planning area includes five Indian reservations.

- ◆ Hoh
- ◆ Makah
- ◆ Quileute
- ◆ Quinault
- ◆ Shoalwater Bay

In many respects, there is considerable economic interaction among the Tribes, tribal members, and the non-Indian communities on the coast. Commerce and employment are often co-mingled, as tribal members work and shop off-Reservation, non-Indians are employed by the Tribes, and many tourists and local residents alike visit tribally owned businesses. Furthermore, many natural resources are co-managed by federal, state, and tribal entities through sovereign government agreements. Yet, there are important distinctions about tribal communities that merit developing a profile separate from the non-tribal communities of the coast.

Tribal members and the communities in which they live are connected through culture and background. Many tribal communities are organized around a structure and value system that focuses on the strength of its common culture and the benefits of community. This means that on most reservations, tribal government tends to be the largest employer, engaged in the well-being of tribal members through health, education, and governance, and support and enhancement of culture as well as economic opportunity.

For the coastal tribes, this includes, for example, considerable investment in fish propagation facilities and fishery management programs.

This chapter presents tribal profiles, economic development goals, plans and challenges for each of the five reservations. While there are some common themes – tribes are capitalizing on their scenic coastal environments to expand tourism business, many are focused on matching education programs to local employer needs to increase employment of tribal members, and many facing flooding risks --each tribe has its unique resources and economic challenges.

Information presented in this chapter comes from a number of sources – published reports, personal interviews with tribal staff, and census data. With respect to the census data, population and housing figures are from the 2010 Census (U.S. Census Bureau 2012). However the American Community Survey (ACS) is used for information on employment by industry (U.S. Census Bureau 2014). The ACS data includes people over the age of sixteen who are employed in civilian occupations on the respective reservation. **Because of the small size of the reservations, annual employment estimates do not provide a reliable perspective on long-term employment.** Instead of providing annual data for small communities, the American Community Survey uses 60 months (five years) of data. The 2009-2013 five year figures are used for presenting employment by industry on the respective reservations.

## 3.2 HOH

The Hoh reservation is located on the Olympic Peninsula in Jefferson County, about 25 miles south of Forks and 80 miles north of Aberdeen. Until recently, the size of the reservation was about one square mile. The reservation land is bounded on the south by the Olympic Natural Park and on the north by the Hoh River. East of the reservation are private and state lands. The west side includes about a mile of ocean frontage from the mouth of the Hoh River south to Ruby Beach.

Over time, a changing course of the Hoh River eroded the usable area of the Hoh reservation. Given the limited size of the original reservation, there were no alternatives to move homes and tribal facilities to higher ground to avoid annual flooding that resulted with the changed river course. Because of this, the tribe purchased 260 acres of private land between 2008 and 2009. Another 160 acres were transferred from the Washington Department of Natural Resources. This left a missing link between the original reservation land and these acquired lands; the missing link was a 37 acre parcel held by the National Park Service. In late 2010 House Resolution (H.R.) 1061, a bill to transfer these 37 acres to the Hoh Tribe, was signed by the President. With these additional land purchases and land transfers, the reservation today is over 900 acres (Mapes 2010; Pacific Forest Management 2015).

### 3.2.1 Population and Housing

According to the 2010 Census, the total population for the Hoh Tribe in Washington was 151 individuals. The 2010 population living on the reservation was 116 (U.S. Census Bureau 2012).

Table 3-1 shows the age distribution of the Hoh reservation population. The median age for the population on the reservation was 25.7 years in 2010, the youngest median age of any of the five reservations on the coast.

**Table 3-1** Hoh Indian Reservation Age Distribution

Age Group	Number	Percent
Under 5 years	7	6.0
5 to 19 years	38	32.8
19 to 64 years	63	54.3
65 and older	8	6.9
Total	116	100.0

Source: U.S. Census Bureau 2012.

The 2010 census reports a total of 28 occupied housing units on the reservation. Of these 21 or 75% were identified as owner occupied housing units. The average household size for owner occupied housing was 4.0, compared to 4.6 for the rental units.

Most tribal housing is more than 20 years old and is badly in need of repairs. Because the existing housing stock is in the Hoh River floodplain, it has been difficult to get financing for repairs (Pacific Forest Management 2015).

### 3.2.2 Employment and Income

Employment of Hoh reservation residents is shown in Table 3-2. The data, from the American Community Survey is the most current available. The isolated location of the reservation lands limits employment opportunities primarily to commercial fishing or to jobs directly with the Tribe.

**Table 3-2** Employment by Industry – Hoh Reservation Residents, 2009-2013

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	14	21.2
Construction	0	0
Manufacturing	0	0
Wholesale Trade	0	0
Retail Trade	0	0
Transportation and warehousing, and utilities	0	0
Information	0	0
Finance and insurance, and real estate and rental and leasing	0	0
Professional, scientific, and management, and administrative and waste management services	0	0
Educational services, and health care and social assistance	0	0
Arts, entertainment, and recreation, and accommodation and food services	0	0

Industry	Number	Percent
Other services, except public administration	2	3.0
Public administration	50	75.8
Total Employed	66	100

Source: U.S. Census Bureau 2014

The American Community Survey reports the median earnings for workers on the Hoh reservation during that same 2009-2013 period was \$38,462. Current Reservation Businesses

*[This will be filled in after tribal interviews]*

### Natural Resources

With the additional land acquired through purchases and transfers, the reservation now includes about 650 acres of forestland. Western hemlock, Sitka spruce and red alder are the primary forest species, with minor amounts of pacific silver fir, big leaf maple and red cedar. The tribe and the BIA recently completed a draft Forest Management Plan which includes the new lands (Pacific Forest Management 2015).

In this draft plan, the authors state:

*Located at the mouth of the Hoh River, the Hoh Indian Tribe is dependent on the fish and wildlife of the Hoh River for their subsistence and commercial economy. The protection of the watershed’s function is key to preserving these important resources. (Hoh Natural Resources newsletter 2014).*

*With this in mind it is contemplated that Hoh Tribal forestlands will be managed in a way that provides for a safe, healthy environment for Tribal members and protects basic watershed functions for the cultural and economic needs of the Tribe. Emphasis will be placed on maintenance and development of forestlands that provides clean water and habitat conditions that allow fish and wildlife species to thrive.*

*Direct economic benefits through timber harvesting will be minimal and infrequent. Harvest methods that will be employed include individual trees, commercial thinnings or small patch cuts (< 10 acres). Clear cut harvest methods will generally not be used but may be considered in cases where clearing is needed for housing or other Tribal infrastructure or in the case of a large scale disaster such as wind throw or fire.*

The draft forest management plan does not address the end use market for these small timber harvests.

### 3.2.3 Plans for the Future

The additional lands added to the reservation not only will provide higher grounds for housing and government facilities, it also open up opportunities for economic development.

One recently completed project is a fire station which is operated as part of the Jefferson County Fire Protection District. The Tribe reportedly also has plans to build a store and gas station on Highway 101. (Walker, 2011)

[More details about economic development after we meet with the Tribe.]

### 3.3 MAKAH

The Makah reservation is approximately 48 square miles totaling 31,355 acres. All but the 80 acres on Tatoosh and Waadah islands, and the 740 acre Ozette Reservation, are in one contiguous area at the Northwest tip of the Olympic Peninsula.

The reservation is physically isolated from the rest of Washington and even other parts of Clallam County. The reservation has only been accessible by road since 1931. Neah Bay is the main community on the reservation. Forks, the closest full service town, is 60 miles from Neah Bay. Port Angeles is 75 miles away and Seattle is 150 miles (Northwest Portland Area Indian Health Board 2015b).

The area has harsh natural conditions. It receives over 100 inches of rain a year and high winds and over 40% of the reservation is on slopes exceeding 30%. The basic infrastructure for water and electricity is mostly within five miles of the main community, Neah Bay, and only about 6% of the roads are paved (Wolf 2012).

#### 3.3.1 Population and Housing

According to the 2010 Census, the total population for the Makah Tribe in Washington was 2,303 individuals. The 2010 population living on the reservation was 1,414 (U.S. Census Bureau 2012).

Table 3-3 shows the age distribution of the Makah reservation population. The median age for the population on the reservation was 30.4 years in 2010.

**Table 3-3** Makah Indian Reservation Age Distribution

Age Group	Number	Percent
Under 5 years	128	9.1
5 to 19 years	363	25.7
19 to 64 years	790	55.9
65 and older	133	9.4
Total	1,414	100.00

Source: U.S. Census Bureau 2012.

Neah Bay is the only community with separate reported census data on the Makah reservation. In the 2010 census the Neah Bay Census Designated Place (CDP) had a population of 865 people, up almost 9% from 794 in the 2000 census, but still below the 919 reported in the 1990 census (U.S. Census Bureau 2012).

The 2010 census reports a total of 497 occupied housing units on the reservation. Of these 347 or almost 70% were identified as owner occupied housing units. The average household size for owner occupied housing was 2.87, slightly higher than that for the rental units.

Since the census the Tribe has increased its housing stock. In 2014 the Makah Tribal Housing Department completed the Sail River Longhouse, a 21 unit housing project targeting very low income families. The Longhouse Apartments, located in Neah Bay provides housing to a population earning 30 percent of less of the median income in the area. Many in this population have had addiction problems in the past. After going through treatment they had no good housing situation to return to, which led to repeat addiction issues. According to the tribal housing director, a desire to break this link between addiction and homelessness was a major reason for developing the apartments (Serlin 2015).

The longhouse project is part of Sail River Heights, a larger mixed income project that began construction in 2010. The overall project covers 51 acres. The basic infrastructure for this acreage was completed in 2012 using funds from 13 different sources (Lawrence 2014).

In addition to the longhouse, the larger project has 16 market rate apartments and 72 lots for houses to be owned by occupants. As of July 2014, about twenty families were in the process of building or had completed building, houses on this property. Overall when the Sail River Heights project is completed it will increase the housing stock on the reservation by 25 percent.

### 3.3.2 Employment and Income

Table 3-4 provides the latest employment estimates for reservation employment by industry sectors. The figures are estimated from 60 months of data collected during the 2009-2013 period.

**Table 3-4** Employment of Makah Reservation Residents, 2009-2013

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	100	18.6
Construction	12	2.2
Manufacturing	27	5.0
Wholesale Trade	0	0.0
Retail Trade	31	5.8
Transportation and warehousing, and utilities	17	3.2
Information	9	1.7
Finance and insurance, and real estate and rental and leasing	11	2.0
Professional, scientific, and management, and administrative and waste management services	25	4.6
Educational services, and health care and social assistance	95	17.7
Arts, entertainment, and recreation, and accommodation and food services	37	6.9
Other services, except public administration	9	1.7
Public administration	165	30.7
<i>Total</i>	<i>538</i>	<i>100</i>

*Source: U.S. Census Bureau 2014.*

On the Makah reservation the majority of jobs are with the Makah tribal government and Indian health services. Commercial fishing, which falls into the first category in Table 3-4 is mostly seasonal employment and it is likely underestimated in the table because many of these jobs are self-employment (technically not “employees”) and therefore not included in Washington Employment Security statistics. The Makah Forestry Enterprise is another employer in this first category.

The American Community Survey reports the median earnings for workers on the Makah reservation during that same 2009-2013 period was \$27,102.

While Table 3-4 provides information in a standard format similar to that provided for other tribes on the coast and for the county profiles, a better understanding of the Makah’s economy is found by looking at their current businesses and economic development goals for the future.

### **3.3.3 Current Reservation Businesses**

Mike Rainey, Business Enterprise Manager for the Makah Tribe, described the economy of the Makah reservation as very dependent on two sectors – tourism and fishing. The current state of these two industries is discussed in the next sections.

#### **Tourism**

The Makah reservation offers diverse opportunities to tourists. Neah Bay is said to offer some of the best saltwater fishing in the U.S. It is also Washington’s most important charter halibut fishery. In 1995 a reported 85,000 people came to the Makah reservation for sport fishing (Norman et al. 2007).

Other visitors come to hike the Cape Flattery Trail, a short 1.5 mile trail that takes hikers to the most northwestern point in the continental United States and offers dramatic views of headlands, sea stacks and narrow coves. (Washington Trail Association, 2015)

The coastal waters around the reservation offer surfing, kayaking and diving opportunities. On their website, Emerald Sea Photography describes diving in Neah Bay: “While diving in Neah Bay is not for the faint of heart due to the serious currents and ocean swell it is without a doubt, some of the best diving in the Pacific Northwest. The visibility is usually fantastic and the diversity of life beneath the azure waters is simply stunning.”

The following sections discuss businesses associated with tourism, both tribal enterprises and other businesses on the reservation, and the opportunities to grow these businesses.

#### **Tourist-Related Tribal Enterprises**

There currently are four tourism-related tribal enterprises on the Makah reservations:

- ◆ Warmhouse Restaurant in Neah Bay
- ◆ Cape Resort: The resort includes an RV park and campground. There are 39 RV sites, 30 with electric hookups and tent campsites. In addition there are two bunkhouses that can each sleep 8 people and cabins.

- ◆ Hobuck Beach Resort: The resort is at the west end of the reservation at the end of Highway 112. On the north end of the beach there is a large meadow with an undesignated campsite; that area can accommodate 500 tents. There are also ten cabins on the north end. On the south end of the beach there are 10 RV sites with full hookups. The resort also rents surfboards, paddleboards, kayak, bikes, etc.
- ◆ Makah Mini-Mart: The tribe owns this market in Neah Bay. In addition to groceries, the market has a deli and serves pizza.

According to Rainey, these four tribal enterprises currently employ 55 people but many are laid off during the winter when the tourism business slows down. Many of the staff members need to find second or third jobs to survive the off season.

The tribe's goal is to offer tourists more reasons to come to the reservation in the off season and broaden the tourist attractions to encourage longer duration visits. Not only would this increase business revenues, it would create year round job opportunities and enable the tribe to attract better employees for the tribal enterprise (Rainey, pers. comm., 2015).

The tribe is particularly interested in attracting more kayakers and divers as participants in these sports tend to spend more dollars on the reservation relative to surfers. In the fall of 2014, the tribe purchased kayaks and wetsuits for the resorts, hoping to attract more winter kayakers.

They are also trying to attract more diverse kinds of tourists, e.g., birders during the off season. The Audubon Society's Great Washington State Bird Trail, Olympic Loop, includes two sites on the Makah reservation – Hobuck Beach and Cape Flattery. The guide to this loop discusses birds that can be seen in the winter as well as birds that are there other times of the year (Audubon Society 2012).

The tribe is having some success with its efforts to expand tourism year round. The four tribal enterprises are generating 36% more revenue now compared to revenues three years ago. Occupancy rates at the two resorts are 100% from April to September. From October through March they are 30% booked. Cape Resort used to be closed seven months of the year; now it is open year round. They have visitors coming every weekend – birders, surfers, kayakers and divers.

If the tribe could get year round business at the tribal resort oriented enterprises they could grow revenues an estimated 30-40% from current levels (Rainey, pers. comm., 2015).

### **Other Tourist Businesses**

In addition to the four tribal enterprises, there are a number of other visitor attractions and services located on the reservation. One, the Makah Museum which is part of the Makah Cultural and Research Center, is another attraction for people visiting the Makah reservation. The research center is funded by various public and private grants, museum ticket sales, and museum store sales; only about 4% of the operating revenues come from the tribal council budget. The museum has 300-500 year old artifacts from the Ozette archaeological site as well as other pieces and photographs relating to tribal history. The museum drew in 14,000 visitors in 2010 (Wolf 2012).

Chartered fishing trips are another tourist draw for the reservation. On the Makah Marina website there are three charter services listed for the marina:

- ◆ Big Salmon Resort
- ◆ Snow Creek Resort
- ◆ Excel Fishing Charters.

Washington Department of Fish and Game reports charter boat angler days for Neah Bay which are shown below in Table 3-5.

**Table 3-5** Charter Boat Angler Days – Neah Bay

Year	Halibut	Bottomfish	Salmon	Dive	Total
2009	1,091	388	503	41	1,023
2010	744	420	434	0	1,599
2011	714	484	501	4	1,703
2012	358	481	765	18	1,621
2013	131	576	970	0	1,677

Charter boat fishing clients come from national and international markets. Rainey estimated the following distribution:

- ◆ Local (from the Olympic Peninsula): 40%
- ◆ Seattle and rest of Washington: 40%
- ◆ Rest of the U.S.: 15%
- ◆ International (includes Canada) 5%

### Commercial Fishing

According to a presentation by Dr. Wolf, a consultant to the Tribe, commercial fishing employees about half the working age population on the reservation (Wolf 2012).

There are about 70 commercial fishing vessels (including three charter boats) operating out of Neah Bay. These vessels are owned by individual tribal members, i.e., they are not part of the tribal enterprises (Rainey, pers. comm., 2015).

While the tribe owns the marina property, they lease out slips but this is not counted as a tribal enterprise.

The economic benefits of commercial fishing are described in Chapter 4 of this report.

### Cape Flattery Fishermen's Co Op

At the coop they recently set up a small processing plant. Many years ago they had processing plant that failed. Most of the tribal population remembers this failure and were resistant to trying processing again but they are trying it again on a small scale (Rainey, pers. comm., 2015).

## Other Industries

### Commercial Film Industry

Recently a new economic opportunity has emerged for the Makah tribe– attracting film producers for TV shows and movies who want to film their shows on the reservation. In 2014 there were eight films made on the Makah reservation.

The state media office fielded 22 requests for filming made to the State in 2014 but only nine films were actually produced in other parts of Washington; in other words, these figures do not include the filming on the Makah reservation. One stated advantage for filming on Makah reservation lands versus elsewhere is the relatively fewer regulatory restrictions. For example, if a film crew wants to film in a national park or on state lands, it can take years to get all the necessary permits. The Makah tribe has procedures for filming but the film industry does not have to go through the Washington state permit process. A producer can contact the tribal business manager directly and then the request goes to Council for permission to film (Rainey, pers. comm., 2015).

The film industry spends approximately \$10,000-\$20,000 a week when filming on the reservation. In 2014 the eight films brought in a total of \$100,000. In addition to lodging and meals, the film industry uses hired scouts and other support people. Given many of the tribal members have a background in fishing and forestry, they have the skills needed to be scouts for the producers (Rainey, pers. comm., 2015).

### Makah Forestry Enterprises

*[Will complete the description of this enterprise after in after in-person interviews with state at the Forestry office.]*

The Makah are expanding their forestry resources using funds from the buy-back program. The Interior Department's Land Buy-Back Program for Tribal Nations came about from the Cobell case, a class action lawsuit about mismanagement of tribal trust assets. After the case was settled in 2009, part of the settlement was distributed to tribal plaintiffs and part allocated to repurchase lands allocated under the Dawes Act. Over a ten year period, which started in 2014, Interior will use \$1.9 billion to buy back allotted lands that became fractionated over time, i.e., owned by multiple heirs of the original owner of the allotted parcel (U.S. Department of Interior 2014).

The Makah reservation was the second Indian reservation in the U.S. to be part of the buy-back program. As part of that program, the Makah have been allocated \$2.55 million to buy back parcels within their 30,000 acre reservation.

The Makah decided to use the buyback program to purchase lands to enhance timber management opportunities as well as other economic development opportunities. They also want to purchase sacred grounds at Tsooes, south of Cape Flattery.

### Port of Neah Bay - Commercial Fish Buyer Business

The tribe owns the commercial fishing dock in Neah Bay and recently completed major upgrades to this facility. In the EDA grant application, which provided part of the funds for the project, the tribe said the upgrades would be used to retain 420 jobs. In addition to saving fishing related jobs, the dock

improvements are expected to improve oil response capabilities for the North Olympic Peninsula by providing a safe dock for response vessels (Gottlieb 2012).

In 2014 the old dock was demolished and a new concrete dock was built. In addition to the new dock, the new dock facility includes two offices, a hoist, and an ice plant capable of making 52 tons a day of ice and ice storage capacity of 110 tons. There are two icing stations, one on the north face of the dock, one on the east face. Each can deliver 30 tons of flake ice per hour (Fisherman News, 2015).

Prior to completion of the new fish dock and associated facilities at Neah Bay, the tribe issued an RFP requesting proposals for use of the fish buying stations with office space (Walker 2014).

### 3.3.4 Plans for the Future

The tribe has some short term plans to expand the four tourist-oriented enterprises:

- ◆ Plan to add five more cabins to the Hobuck Beach Resort. This project will be done over the next three years.
- ◆ Add a camp store
- ◆ Add five more units to the Cape Resort. This project is targeted for the five to ten year time frame.

In the longer term, ten to fifteen years, there has been some discussion about building a golf course. The tribe has a parcel that could be used to build a 9-hole course which could employ two people. The goal for development of a golf course would be less about generating revenues from that facility and more about broadening the tourism opportunities on the reservation to encourage visitors to stay longer, hence generating more revenues from the other enterprises.

Another possible venture for the long term would be a high end resort or retreat center. Again this kind of development could create more year-round demand which would increase tribal tourism-related revenues and create year round employment opportunities.

There has been some discussion about using Tatoosh Island for a higher end tourist development. Previously the island was used by the Navy but they are no longer using it. However, some tribal members do not want it to be developed for tourism as it is sacred ground.

In addition to consideration of facilities to develop, the tribe is also looking at personnel requirements associated with growing the tourism opportunities on the reservation. One concern noted by Rainey is the risk of not having sufficient employees to meet the growing demand for tourism on the reservation. A local community college is considering adding a hospitality degree as there is a need not only on the reservation but across the Olympic Peninsula for people with this kind of training (Rainey, pers. comm., 2015).

Overall there is a goal of creating jobs for younger tribal members who want to live on the reservation. Currently the tribe has about 60 people enrolled in college programs but not many of them will return to reservation in part because there is a lack of opportunities to use skills acquired from their college degrees. The business manager has been directed to create middle management job opportunities for tribal members with college degrees.

### 3.4 QUILEUTE

The Quileute Reservation includes 880 acres around La Push, the community center of the reservation. La Push is approximately 15 miles west of Forks, Washington, the nearest full service town. La Push itself is a fishing village known for its dramatic scenery with cliffs, sea stacks and beaches. James Island, a sea stack off the coast of the reservation is one of the most photographed landmarks on the north part of the Pacific Coast.

The reservation is bounded by the Quillayute River, the ocean, and the Olympic National Park. Much of the reservation is surrounded by wilderness areas managed by the National Park Service and the National Olympic Marine Sanctuary. The Quillayute River system which includes three navigable rivers --Sol Duc, Calawah and Bogaciel- and the Dickey River tributary is a major wildlife corridor that links to the reservation lands.

#### 3.4.1 Population and Housing

According to the 2010 Census, the total population for the Quileute Tribe in Washington was 684 individuals. The 2010 population living on the reservation was 460..According to the tribal enrollment committee, the Quileute Tribe’s current enrollment is 777 members. (Krueger, pers. comm., 2015).

Table 3-6 shows the age distribution of the Quileute reservation population. The median age for the population on the reservations was 30.4 years in 2010.

**Table 3-6** Quileute Indian Reservation Age Distribution

Age Group	Number	Percent
Under 5 years	44	9.6
5 to 19 years	117	18.3
19 to 64 years	270	58.7
65 and older	29	6.3
<i>Total</i>	<i>460</i>	<i>100.00</i>

Source: U.S. Census Bureau 2012.

The 2010 census reports a total of 142 occupied housing units on the Quileute reservation. Of these 75 or almost 53% were identified as owner occupied housing units. The average household size for owner occupied housing was 2.84, quite a bit lower than the 3.3 household size for the rental units (U.S. Census Bureau 2012).

### 3.4.2 Employment and Income

Table 3-7 provides the latest employment estimates for reservation employment by industry sectors. The figures are estimated from 60 months of data collected during the 2009-2013 period

The Quileute Tribe’s Comprehensive Economic Development Strategy (CEDS) document (Burtness 2013) completed in the fall of 2013 presents additional details about employment on the reservation.

*The primary sources of employment are provided by government services (Tribal and Federal); commercial ocean fisheries, subsistence river fisheries, and the Quileute Ocean Park... The Quileute Tribe also has a Bureau of Indian Affairs (BIA) Tribal School, an Indian Health Services (IHS) Health Clinic and a Quileute Housing Authority (QHA). Current Reservation businesses are underdeveloped with limited full-time, regular employment. Fishing and the tourism industry are both seasonal.*

*Meanwhile, annual surveys show that many households derive some proportion of their income from fishing. In addition to vessel owners and crew, approximately ten Tribal members are employed annually by the High Tide Seafood Company in Fish processing, and another dozen Tribal member are employed seasonally by the Natural Resource Department as Fish clippers or in other capacities.*

**Table 3-7** Employment of Quileute Reservation Residents, 2009-2013

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	21	13.8
Construction	1	0.7
Manufacturing	2	1.3
Wholesale Trade	2	1.3
Retail Trade	2	1.3
Transportation and warehousing, and utilities	0	0.0
Information	0	0.0
Finance and insurance, and real estate and rental and leasing	0	0.0
Professional, scientific, and management, and administrative and waste management services	0	0.0
Educational services, and health care and social assistance	70	46.1
Arts, entertainment, and recreation, and accommodation and food services	10	6.6
Other services, except public administration	0	0.0
Public administration	44	28.9
<b>Total</b>	<b>152</b>	<b>100</b>

Source: U.S. Census Bureau 2014.

The American Community Survey reports the median earnings for workers on the Quileute reservation during that same 2009-2013 period was \$24,205.

### 3.4.3 Current Reservation Businesses

#### Tourism

The remote location of La Push combined with the natural beauty of the area has allowed the tribe to develop tourism as a source of employment and income.

The Quileute reservation offer a wide range of recreational activities for visitors: wildlife viewing including whale watching, bird watching, nature photography, coastal hiking, boating, fishing, kayaking, surfing on First Beach, camping, swimming and storm watching (Quileute 2014).

The Audubon Society’s Great Washington State Bird Trail, Olympic Loop, (mentioned above in the Makah profile) also includes La Push. The Audubon Society identified birds that can be seen in La Push in all four seasons. There are also two other bird watching stops on the Olympic Loop trail that are close to the reservation, one to the north and one near Forks.

There are also a number of Quileute tribal events. The tribe has a full-time Events Director assisted by 5-7 persons. While some events are only for tribal members, many are open to the public and are posted on the tribes’ website. The tribe provided information about these events to Industrial Economics, Incorporated for its Phase I Recreation and Tourism report. A table from their report is reproduced as Table 3-8 below:

**Table 3-8** Quileute Events

Event	Description	Estimated Attendance
Wednesday Night Drum Group	While the main attraction is the cultural aspect, this event is held one block from the beach and many people come for the joint benefit of beach and culture. Quileute welcomes the public to watch traditional drumming/singing and dancing. People can bring their own drum and participate in the drumming part, whether or not Quileute. This draws visitors from all over the world.	50-200
La Push Pummel (January/February) <sup>(1)</sup>	A Seattle group comes out each year to surf the high waves of the winter storms at First Beach. This group used to come out in January but switched in 2009 to February because January weather was often too severe.	About 30 paddlers plus friends and family
Welcome the Whales (mid-April)	While designed to have the tribal school make offers to the whales, this is also a cultural event for the community and the public can attend. There are prayers, singing/drumming, and a meal later at Akakat Center.	200-300 people (varies with weather)
Halibut Opener (early May)	The marina draws a huge crowd of recreational anglers for the halibut season.	200 people
Surf Camp (June)	A Youth and Traditions Surf Camp is held at First Beach at the end of June, sponsored by Quileute Housing authority Youth Programs, Surf rider Foundation, and USCG.	Not available.
July 4 fireworks	Fireworks display on the night of July 4th, on the beach.	100 visitors.

Event	Description	Estimated Attendance
Quileute Days (3rd weekend in July)	This includes the canoe races, the Royalty parade, stick games, fish bake, adult and youth co-ed softball, street vendors, bingo, and an Elders Dance. People from around the area come to the reservation to buy from vendors, play games, watch canoe races, engage in the street dances, or just enjoy the scenery.	Several hundred at parade and over three days perhaps 2,000 total.
Last Chance Coho Fishing Derby <sup>1</sup>	The fishing is offshore (ocean, not river) so people bring their boats. There are vendors on the reservation. It is a judged event with small prize money for the catches.	300 people a day for three days.
The Paddle	This is an event shared by Washington and Canadian Tribes and has a different destination/host each year. Depending on distances, canoes travel 2-4 weeks in late July-early August. While only tribal members paddle, the event draws the attention of the public. When a local coastal Tribe is hosting, it can draw a lot of public attention. For example, in 2013, Quinault was a final destination, and Quileute was a mini-stop before the final one. The event includes dancing/singing/drumming and food. Many people show up to see the painted canoes as well. Over 100 drums were counted during the Quileute Hosting celebration of the Paddle to Quinault.	Forks Chamber of Commerce and area businesses helped to host several thousand people from July 27-August 1. Our kitchen estimated serving 7,000 people.

**Notes:**

1. See [www.canoekayak.com/photos/pummel-la-push-washington](http://www.canoekayak.com/photos/pummel-la-push-washington) for more details.

Sources: *Industrial Economics 2014, Quileute Tribe 2014*

The following sections discuss businesses associated with tourism activities on the Quileute reservation and opportunities to expand tourism.

**Tourism-Related Businesses**

***Oceanside Resort***

The Quileute Oceanside Resort, is a complex of facilities, which is owned and operated as a tribal enterprise. Based on information from the tribe the resort includes:

- ◆ Motel units: total of 28 units in two buildings. Peak season prices are \$134-\$189; off peak prices are \$79-\$109.
- ◆ Individual units:
  - 10 A-Frame cabins providing limited amenities. Peak season prices are \$99-\$129; off peak prices are \$69-\$89.

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<sup>1</sup> In the Phase I report, this was identified as the “Labor Day Coho Fishing Derby” but it is actually called the Last Chance Coho Fishing Derby according to the Tribe.

- 33 cabins with other amenities (15 have hot tubs and kitchens). Peak season prices are \$139-\$299; off peak prices are \$99-\$199.
- 42 RV/tent sites with hookups. Peak season price is \$40; off peak price is \$27.
- 26 tent sites without hookups (20 are in Lonesome Creek) Peak season price is \$20; off peak is \$15.
- The resort also includes the Lonesome Creek store and a gas stations. The building housing the store also includes three furnished apartments on the second level (Burtness 2013).

In addition to tourists coming for tribal events, visitors come to the Quileute Oceanside Resort year-round for other recreational opportunities. The Tribe indicates that rooms are generally sold out during peak periods including: Christmas/New Years, Spring Break (March), and July through September.

According to the IEC report, the resort employs 31 people. FY2013 revenues for the resort were \$2.6 million with about \$2.3 of that from motel and cabin rentals. The remaining \$0.3 million was from RV and tent site rentals (Industrial Economics 2014).

#### ***River's Edge Restaurant***

The tribe also owns and operates the River's Edge restaurant in La Push. The restaurant occupies a former Coast Guard boat house. Prior to the re-opening of the restaurant in July 2014, the tribe leased out the management of the restaurant and the managers struggled to keep the restaurant open year round. A conclusion was reached by the tribe that the restaurant offered more potential for economic development purposes if it were managed as a tribal enterprise. In 2014 the tribe hired its own manager and re-opened the restaurant in July. The goal is to stay open year round. (Talking Raven, 2014b)

#### ***Charter Boat Fishing***

Charter boat fishing trips are a highlight for many recreationists on the Washington coast. Several charter companies offer trips from the tribal marina at La Push including Hooked on Fishing Ocean Charters LLC, Top Notch Ocean Charters and Always Fishing (Always Fishing 2015; Brux, pers. comm. 2015; Top Notch Ocean Charters, 2015). All the charter vessels are privately owned. Some charter companies also offer whale watching trips.

Data obtained from the Washington Department of Fish & Wildlife provide information on the number of angler days for charter boat fishing from La Push. A five year history of angler days by trip target species is shown in Table 3-9 (Washington Fish & Wildlife 2015).

**Table 3-9** Charter Boat Angler Days – La Push

Year	Halibut	Albacore	Bottomfish	Salmon	Total
2009	355	48	337	683	1,422
2010	296	92	408	630	1,425
2011	266		253	666	1,189
2012	181		240	664	1,101
2013	128		239	691	1,096

### Quileute Harbor Marina

The Quileute owns and operates the marina, which is the only port between Neah Bay and Westport. According to the IEC’s Marine Sector Analysis Report (Phase I report for the MSP Project), there are 95 slips at the marina. Some are leased to commercial fisherman and some to sport fisherman.

The marina is also the home port for the Quillayute River Station of the Coast Guard, one of 21 Coast Guard Surf Stations. This station is the only search and rescue station for the 100 miles between Grays Harbor and Neah Bay. It also plays a role in marine spill response to oil spills on the coast. The station employs about 30 people (Leach 2014; U.S. Coast Guard Quillayute River Station 2015).

The marina employs two full time employees and two part time employees. Rates for use of the marina are:

- ◆ Daily moorage rates: \$15 for vessels under 30 feet and \$15 plus \$1 per foot for vessels over 30 feet.
- ◆ Monthly rates: \$190 (under 30 feet) and \$290 (over 30 feet)
- ◆ Boat ramp fee: \$15

The above rates reflect higher rates implemented in 2014 after no increase in fees for over a decade. These improvements including plank replacement for docks A, B, C and D; this refurbishment of the docks cost the tribe about \$130,000 over a two year period. All labor used in this project were from local Quileute families.

In addition to replacement of the planks, a new boat ramp was also completed in 2014. The new boat ramp design will allow for removal of larger vessels. There are also plans to build a new, wider, ramp dock.

In additional to improvements to the marina made by the tribe, in the fall the Army Corps of Engineers performed some dredging of the Quillayute River at the harbor. This dredging was originally scheduled for 2013 but was put on hold because of the sequestration budget deal. (Hagen 2015)

FY13 (October 2012 – September 2013) gross revenues from the marina operation totaled \$417,000. Of this diesel and gasoline sales contributed approximately \$359,000, moorage and ramp fees were about \$53,500 and the remaining \$3,500 was from bait, tackle, oil and miscellaneous retail sales (Industrial Economics 2014).

## Commercial Fishing

*[This will be covered in a different part of the MSP report but we would like to gather information about the number of tribal members involved in commercial fishing and the number of vessels owned by tribal members or the tribe]*

## Hatcheries

The Quileute are involved in several fish hatchery operations. The tribe owns the Lonesome Creek hatchery and co-owns the Bachachiel hatchery. They also lease Bear Springs hatchery from the state. For this hatchery the state hatches the fish and the tribe raise them. (Moon, pers. comm., 2015)

The tribes are now helping to fund the state hatchery operations. When state budget issues threatened closure of some hatcheries, several groups, including the Quileute Tribe provided funds to subsidize the state hatchery program.

The tribe, in cooperation with the Washington State Department of Fish and Wildlife, raises summer Chinook and winter steelhead stock. The reservation hatchery employs a full time hatchery manager and support staff (Quileute Tribe 2015).

The hatcheries are considered 'supplemental', i.e., they add the hatchery raised fish to boost harvest levels (Moon, pers. comm., 2015).

## Forest Products

*[To be filled in later after interviews with forestry staff]*

### 3.4.4 Plans for the Future

The 2013-2018 CEDS document identified creation of jobs as a major priority for the tribe. The population of the reservation is young; 44% are under the age of 24 and the median age is only 30. The tribe and the tribal enterprises are currently the major employers. New opportunities will need to be pursued to provide employment for the next generation.

Some of the plans for expanding and improving existing enterprises as well as new ventures are discussed in the next sections.

#### Improvement to the Oceanside Resort

The 2013-2018 CEDS report (Burtness 2013) noted how crucial the resort is to the reservation economy. Plans to expand and enhance the resort are expected to increase its value to the Tribe as an economic driver. The CEDS mentions additional lodging, enhanced guest services, improved retail support and the ability to host small conference or other events as ways to grow the resort operation, but the plan did not identify specific timeframes for these investments.

For the Lonesome Creek store, the CEDS document includes plans to expand the floor space, enhance the fuel services, and expand the grocery offerings to include more healthy alternatives but again these are not scheduled projects.

Other resort improvements are proposed for the Lonesome Creek resort which is separated from the other resort facilities and attracts surfers and other beach-oriented visitors. These include developing a Fish and Chips take-out bar using an existing clubhouse facility that is currently underutilized. Employment for this new bar would be four to six employees. A proposed open air market adjacent to the take out bar would provide a place for tribal member to sell baskets, art, jewelry and other crafts. The market would provide self-employment to an estimated one to ten local tribal members.

Plans for enhancing the Lonesome Creek resort also include infrastructure improvements such as restrooms and shower facilities.

### **Cultural Center/Museum**

Although two of the annual cultural events, Elder's Week in May and Quileute Days in July, include traditional singing and dancing and offer meals of smoked fish and elk, there is a desire have a permanent facility to display the Tribe's artifacts. A few artifacts and photos are on display in tribal offices and at the resort but most are in storage. Other artifacts are in other museum collections including the Smithsonian Museum of the American Indian or are in private collections (Burtness 2013).

Three grants (two from ANA and one National Park Service Historic Preservation grants) have been used for this project including preliminary design work. Unfortunately the plan was to locate the facility on Harley's Island which after the 1995-96 storms is not a viable site. In their 2013 CEDS document the Tribe says they may now consider a cultural center/museum in combination with a small conference center within the resort or within a senior center that would be developed near the resort.

The tribe received an economic development grant to do a feasibility study and business plan for the proposed conference facility. There is some potential for converting the existing school in La Push into a conference facility when the school is moved to higher ground.

### **110 Business Park in Forks**

In late 2014 the Quileute Tribe purchased the 110 Business Park in Forks from Bill Sperry. This was once the site of the Rosmond Brothers sawmill, which opened in the 1940s and operated under multiple owners until the 1980s. Sperry bought the site in 2008 and made improvements to the buildings. The wooden structure known as the Roundhouse has been used for event rentals. According to an article in the Forks, Forum, Sperry said the tribe plans to hold its drum group and other ceremonies in the Roundhouse. Sperry also said the tribe will continue to operate the U-Haul business and propane sales which are also part of the property purchased (Forks Forum 2014a).

Another Forks Forum article (2014b) reported the tribe said it was developing a ten year business plan for the property. While giving no specifics, the tribe indicated the purchase was part of its overall economic development plan to create jobs for tribal members.

### **Commercial Fisheries Projects**

Given the importance of commercial fisheries to the economy of the tribe, their CEDS plan includes proposals to expand this industry. Proposals include development of a cooperative fishing operations, new processing facilities, and improved transportation capacity to more catch to new markets.

### **Composite Construction**

Clallam County considers advanced composite manufacturing as a one of its main economic development clusters with a focus on aircraft and related industries. Composite construction is used by the Quileute in construction of cedar strip canoes. The tribe is considering a commercial enterprise to build canoes and other related products. Workforce development would be available through Peninsula College and the Advanced Composites Center in Port Angeles.

### **Broadband Internet Service**

The Quileute is one of several coastal tribes working to get broadband internet service as key component for economic development. The tribes have met with the governor and state representatives to strategize on how to make this happen (Talking Raven 2014a).

### **Move to Higher Ground**

The Quileute occupy a small piece of land that sits between the Pacific Ocean and the Olympic National Park and this land is threatened by rising sea levels.

For many years the tribe wanted to move their schools and other buildings in the village to higher ground to get out of the tsunami flood zone. One key piece of land is a plateau above La Push which was part of the park. The proposal was to return this land to the tribe. These returned lands would provide a safe location for the tribe to rebuild facilities.

In February 2014, President Obama signed into law H.R. 1162. The bill returns to the tribe 785 acres from the Olympic National Park. Of this, 275 acres will be used as a site for the Quileute Tribal Council's headquarters, the tribal School, a pre-school, a senior center, and other facilities. The other 510 acres, which is north of La Push, was part of the traditional hunting grounds for the tribe (Forks Forum 2014c

Currently the focus is on the 275 acres which will provide tsunami protection for the tribe. Some of the other 510 acres could provide some timber harvesting opportunities but is not a major focus at this time.

## **3.5 QUINAULT**

The 208,150 acre, mostly forested Quinault Indian Reservation is in the southwestern corner of the Olympic Peninsula with the Pacific Ocean as its western boundary, Queets village to the north, Lake Quinault on the east side and Moclips on the south end. Most of the reservation is low elevation except for the northeast part which rises to almost 2800 feet elevation. Some major rivers cross the reservation – Queets River, Raft River and the Quinault River. The rainforest climate brings 80 inches of precipitation on the coastal end and up to 150 inches of precipitation in the higher elevation northeast part (Quinault Indian Nation 2008).

There are a total of 173,000 acres of tribal and BIA managed forestland; this includes both trust and tribally owned fee land. The Quinault Reservation is the only majorly timbered reservation in the U.S. that was completely divided into 80-acre allotments. Over the course of time, the allotments were distributed to individuals and families from many different tribes. Land ownership on the Reservation has become more complex as the land is fractionated due to inheritance by even more members of succeeding generations. Any development, road-building, timber harvest, restoration or other land management activity requires agreement from the majority of affected landowners. The Quinault Natural Resource Division is helping to consolidate the Nation's holdings by purchasing trust and fee lands. Consolidation will enable the Quinault Indian Nation (QIN) to manage the forestlands on a more holistic basis.

### 3.5.1 Population and Housing

According to the 2010 Census, the total population for QIN in Washington was 2,781 individuals. The 2010 population living on the reservation was 1,408 (U.S. Census Bureau 2012).

Table 3-10 shows the age distribution of the Quinault reservation population. The median age for the population on the reservation was 28.7 years in 2010.

**Table 3-10** Quinault Indian Reservation Age Distribution

Age Group	Number	Percent
Under 5 years	128	9.1
5 to 19 years	371	26.3
19 to 64 years	789	56.0
65 and older	120	8.5
Total	1,408	100.0

Source: U.S. Census Bureau 2012.

Individual community populations reported in the 2010 census are as follow:

Amanda Park	152
Queets	174
Qui-nai-elt Village	54
Santiago	42
Taholah	840

The 2010 census reports a total of 418 occupied housing units on the Quinault Reservation. Of these 265 or a little over 63% were identified as owner occupied housing units. The average household size for owner occupied housing was 3.46 a little higher than the 3.16 household size for the rental units (U.S. Census Bureau 2012).

The Quinault have an online housing authority survey that is ongoing. The housing authority will be contacted for possible use of the survey results in the final MSP report.

### 3.5.2 Employment and Income

**Table 3-11** Employment by Industry – Quinault Reservation Residents, 2013

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	20	5.2
Construction	20	5.2
Manufacturing	17	4.5
Wholesale Trade	0	0.0
Retail Trade	9	2.4
Transportation and warehousing, and utilities	13	3.4
Information	2	0.5
Finance and insurance, and real estate and rental and leasing	7	1.8
Professional, scientific, and management, and administrative and waste management services	11	2.9
Educational services, and health care and social assistance	127	33.2
Arts, entertainment, and recreation, and accommodation and food services	42	11.0
Other services, except public administration	7	1.8
Public administration	107	28
<b>Total</b>	<b>382</b>	<b>100</b>

Source: U.S. Census Bureau 2014.

The American Community Survey reports the median earnings for workers on the Quinault reservation during that same 2009-2013 period was \$24,375. Current Reservation Businesses

The Quinault’s 2008 Comprehensive Economic Development Strategies (CEDS) report “represents the Nation’s current long-term strategy for developing its economy... [and] serves as a roadmap for the future economic prosperity of the Quinault Indian Nation while reflecting the values and beliefs of the Quinault people” (QIN 2008).

The CEDS provides a discussion of the economic environment surrounding the Tribe, while also identifying specific projects and opportunities for the Tribe to implement. These projects and activities met a defined set of criteria related to the Tribe’s development strategy and assumptions associated with the Tribe’s goals and objectives.

The 2008 CEDS highlights some important aspects of the QIN economy, and their influence on defining the high priority projects. Three primary industry “clusters” are introduced as central to QIN: Forestry, Fisheries, and Hospitality and Tourism. Within each cluster are interrelated businesses that have a comparative advantage from their proximity to its resource base; this is complemented by a skilled local workforce, and specialized support businesses and suppliers. In addition, the high priority projects listed in the 2008 CEDS were dominated by those that would directly impact these primary sectors.

Information from the CEDS document and other sources provide detail for the following existing and planned projects.

## **Tourism-Related Businesses**

### ***Quinault Beach Resort and Casino***

Opened in 2000, the hotel and casino are on 200 acres of trust property located off the reservation in Ocean Shores. According to the resort's website it includes three restaurants, a spa, and 500 slot machines and 12 table games. According to the 2008 CEDS document the resort employs about 350 people, with about half non-tribal (QIN 2008).

### ***Quinault Sweet Grass Hotel (formerly the Ramada)***

Recently the QIN acquired the Ocean Shores Ramada from the Swinomish Tribe and re-opened it under the name, Quinault Sweet Grass Hotel. The property includes 54 hotel rooms. A shuttle runs to the Beach Resort and Casino allowing the QIN to increase utilization of those facilities by visitors staying at the Sweet Grass Hotel.

A radio report when the acquisition was made in late 2014 said, the QIN Council has "made it clear that federal grants and program money are not likely to keep pace with current and future community needs. It is surplus cash from the enterprises that will greatly improve the Nation's ability to serve the people" (KXRO Radio 2014).

### ***Quinault Marina and RV Park***

In 1996 the QIN purchased the marina property in Ocean Shores. The purchase included approximately 40 acres of uplands and a marina infrastructure with an asset value of \$6 million. The marina includes a dock, RV Park and campground, and store. According to the 2008 CEDS, "the Nation purchased the Ocean Shores Marina and surrounding properties to 1) create a functioning marina for the benefit of both Indian and Non-Indian fishers; and 2) develop the surrounding properties to attract more visitors to the area, generate revenues, and create jobs."

Recently, the QIN temporarily closed the marina reportedly due to insurance issues. The marina decking is in poor condition; the QIN's insurance company is concerned about liability given the poor condition of the facility. The QIN also closed the RV Park, although the boat launch remains open. It appears the city of Ocean Shores is committed to working with the QIN to repair the facility (Brucas 2015).

### ***Guided Fishing Trips***

In the 2008 CEDS, the authors noted there were approximately 50 guides at that time leading day trips and longer trips to clients from all over the world. The Quinault Fish and Game Commission regulates this activity, setting limits for catch. Reportedly the demand for guided trips was growing.

### ***Quinault Tribal Museum***

The Quinault Tribal Museum, in Taholah, is dedicated to protecting the material cultural heritage of the nation's people, and to preserving traditional ceremonial and subsistence activities.

*[Will pursue getting visitation figures from QIN]*

### **Quinault Pride Seafood Processing Plant**

Quinault Pride Seafood is a QIN tribal enterprise established in 1963 as the result of an EDA grant. The objective of creating a seafood company was to give Quinault fishermen an outlet to sell their catch at fair market prices. During Quinault Pride's history there have been ups and downs in profitability depending on the size of the fish runs and other factors (QIN 2008).

### **Quinault National Fish Hatchery**

The Quinault National Fish Hatchery (QNFH) is location 15 miles from the ocean on Cook Creek, a tributary of the Quinault River. Working with the U.S. Fish and Wildlife Service and the BIA, the Tribe selected the site in 1963 and production of fall Chinook and coho salmon began in late 1968 (U.S. Fish and Wildlife Service 2015).

The U.S. Fish and Wildlife reports the hatchery releases 660,000 Coho salmon, 1.5 million Chum salmon, 400,000 Fall Chinook, and 190,000 Steelhead trout every year.

### **Firecracker Point Facility**

In 2014, Quinault Tribal Enterprises (QTE) made an off reservation investment when they purchased a marina, mooring and fishing support facility in Westport owned by RPMM, LLC. The Port of Grays Harbor originally leased uplands at Firecracker Point from RPMM, LLC in 2005. RPMM improved the site adding docks, a hoist, ice equipment, storage and fueling service. The QTE assumed all terms of the RPMM, LLC lease with the Port. QTE said the purchase would add jobs for tribal members as well as non-tribal members (Water4fish 2014).

### **Miscellaneous and Small Retail**

Prior to 2105 the QIN owned two convenience stores/gas stations and a community cable company. One tribal member operates a metal fabrication shop. Many artists and carvers sell their artwork to the general public.

In 2015 the Tribe opened a new convenience store, Q Mart II, in Aberdeen. In 2014 the Tribe purchased five parcels, added to trust land they already owned in Aberdeen.

### **Forest Products**

*[This will be addressed after tribal interviews]*

## **3.5.3 Plans for the Future**

*[The following sections were written from public sources; additional information will be added after interviews with the QIN.]*

### **Upgrades to Queets Fish Processing Plant**

In mid-2014 the U.S. Secretary of Commerce announced the QIN was awarded a \$1.5 million dollar Economic Development Administration (EDA) grant to upgrade the fish processing plant in Queets. Improvements to the fish processing plants are expected to add 30 full-time positions at the plant (U.S. Department of Commerce 2014).

## **Proposed Development of Sand and Gravel Resources**

According to a document prepared by the BIA and Quinault Indian Nation, the QIN own “the only remaining uncommitted large near-shore sand and gravel source on the West Coast of the lower United States.” The Tribe is looking for a partner to either lease or participate in a joint venture to mine this resource. This report identified potential local markets for the aggregate – the reservation itself, US Highway 101, and the Aberdeen Hoquiam metro area – but also noted major non-local domestic markets stretching from Seattle to San Diego. Japan, China, Korea, Pacific Islands were also identified as potential off shore markets (QIN and BIA, no date).

Reconnaissance testing in 2005 showed high quality deposits which would meet WSDOT standards. The aggregate resources cover a major part of the reservation but the QIN identified an 80 acre tract on the east side of the reservation as the preferred location for initial development. This site is preferred because there has been other commercial grade production in the vicinity and infrastructure requirements – power, water and transportation – already exist.

This preferred parcel is estimated to have 214,000 tons of aggregate per foot of depth. Given the site is estimated to be at least 40 feet deep, the minimum estimated total volume is 8.4 million tons.

## **Biomass Project**

The Quinault believe use of renewable energy must be pursued because it is consistent with their cultural beliefs in living in harmony with nature. In 2006 DOE funded a renewable energy plan but financial difficulties have precluded implementation of that plan. The plan showed the best opportunities for better energy management were energy efficiency upgrades and use of biomass.

The tribe used a USDA Rural Business Opportunity Grant to start the process to pursue a biomass option. This project focused on assessing the volume and kind of biomass occurring on Quinault lands. Another grant, through the US Forest Service Woody Biomass Utilization Grant Program funded an engineering and design plan for QIN’s biomass project.

In 2014, the Quinault Indian Nation in partnership with American Community Enrichment, presented their findings on energy opportunities and strategies associated with a potential biomass project. Given the availability of wood and wood products on the reservation, the proposed biomass project would primarily use wood chips as fuel for heat energy. The tribe has partnered with ColPac for this project. The project schedule from this document is shown below QIN in partnership with American Community Enrichment(2014).

### **QIN Pellet Manufacturing Feasibility Study Project Task Timeline**

- ◆ Assessment of Bio-fuel available: 02/1/14-04/1/14
- ◆ Assessment of Biomass Components: 02/1/14-08/1/14
- ◆ Development of Operational Processes and Storage Requirements: 02/1/14-06/1/14
- ◆ Analysis of Pellet Market: 04/1/14-07/1/14

- ◆ Project Community Outreach: 02/1/14-08/1/14
- ◆ Develop Business Model: 07/1/14-08/1/14
- ◆ Progress Reports: Midpoint 05/1/14 & Final 09/22/14

### **Taholah Relocation Project**

Taholah, the ancestral home of the Quinault people, is in the official tsunami hazard zone, as classified by the Washington Emergency Management Division. The village currently has over 1,000 residents as well as the Taholah Mercantile, the jail, courthouse, daycare, Head Start and a K through 12 school (Montreuil 2014).

The increased risk of flooding has been known for some time by the tribe. The QIN did their own assessment of the coastline flooding risks. On March 25, 2014 the deteriorating seawall, built in the 1970s to protect the lower village, was breached and flooded the village. While the Corps of Engineers provided temporary reinforcement of the seawall, relocation of Taholah to higher ground is the long term plan (Esser 2014).

The Quinault Indian Nation has a federal grant to develop a master plan for the relocation of the Taholah village. It is anticipated development of this plan will occur over a three-year time period. The tribe issued a Request for Qualifications (RFQ) for this work in January 2014; the project was awarded to Kaul Design Associates.

Another RFQ was issued in 2015 to design a recreation center which would be part of the relocated community. The RFP states: “The Quinault Indian Nation (QIN) is seeking an Architectural/Engineering Design firm or team to prepare a feasibility study for recreation building to house a swimming pool, gymnasium, exercise/fitness rooms, showers and changing rooms, staff offices, and meeting rooms. This is one of the first of many projects to relocate the Village of Taholah beyond the tsunami zone” (QIN 2015).

## **3.6 SHOALWATER BAY**

The Shoalwater Bay reservation is located in Pacific County on the north shore of Willapa Bay. The original reservation consisted of 335 acres of uplands but subsequent legal decisions added some 700 acres of tidelands. The tribe also acquired another 105 acres of uplands to be held in trust. Today the reservation is a little more than one mile square with 440 acres of uplands and 700 acres of salt marsh and tidal flats. Within the tidal portion of the reservation there are small bays and intertidal marsh communities (Shoalwater Bay Indian Tribe 2008).

The upland portion of the reservation is mostly a steep ridge, leaving only a narrow piece of developable land along the shoreline. State Route 105 runs along this narrow strip. The Shoalwater Tribe has well maintained tribal facilities and housing along this strip but much of it is at risk for tsunami flooding.

### 3.6.1 Population and Housing

According to the 2010 Census, the total population for the Shoalwater Bay Tribe in Washington was 112 individuals (U.S. Census Bureau 2012). The 2010 population living on the reservation was 82.

Table 3-12 shows the age distribution of the Shoalwater Bay reservation population. The median age for the population on the reservation was 28.5 years in 2010.

**Table 3-12** Shoalwater Bay Indian Reservation Age Distribution

Age Group	Number	Percent
Under 5 years	5	6.1
5 to 19 years	22	26.8
19 to 64 years	50	60.1
65 and older	5	6.1
Total	82	100.0

Source: U.S. Census Bureau 2012

The 2010 census reports a total of 30 occupied housing units on the reservation. Of these 19 or 56% were identified as owner occupied housing units. The average household size for owner occupied housing was 2.6, compared to 2.9 for the rental units.

### 3.6.2 Employment and Income

**Table 3-13** Employment by Industry – Shoalwater Bay Reservation Residents, 2009-2013

Industry	Number	Percent
Agriculture, forestry, fishing and hunting, and mining	2	1.8
Construction	4	5.6
Manufacturing	0	0.0
Wholesale Trade	0	0.0
Retail Trade	0	0.0
Transportation and warehousing, and utilities	0	0.0
Information	0	0.0
Finance and insurance, and real estate and rental and leasing	10	13.9
Professional, scientific, and management, and administrative and waste management services	0	0.0
Educational services, and health care and social assistance	19	26.4
Arts, entertainment, and recreation, and accommodation and food services	24	33.3
Other services, except public administration	0	0.0
Public administration	13	18.1
<b>Total</b>	<b>72</b>	<b>100</b>

Source: U.S. Census Bureau 2014.

The American Community Survey reports the median earnings for workers on the Shoalwater Bay reservation during that same 2009-2013 period was \$23,958.

### 3.6.3 Current Reservation Businesses

The Shoalwater Tribe owns a number of businesses grouped under the tribal corporation name, Willapa Bay Enterprises. These businesses include:

- ◆ Shoalwater Bay Casino
- ◆ Sand Verbena Seafood & Grill. Located across the street from the Shoalwater Bay Casino
- ◆ Tradewinds on the Bay –17 one bedroom/one bath condos for rent, nightly, weekly or monthly.
- ◆ Georgetown Station in Tokeland on SR 105. Convenience and Chevron gas station. Also it is a WDFW licensing station.
- ◆ Willapa Bay Construction in South Bend, Washington
- ◆ Willapa Bay Technologies, LLC. Full service IT solutions provider focused on client side support, server side support, infrastructure support, project management, and technology services management.

*[More details about these tribal enterprises businesses, as well as other businesses will be provided after tribal interviews]*

### 3.6.4 Plans for the Future

In late 2014 the Shoalwater Bay Tribe bought several hundred acres which included a former golf course and some agricultural land that was no longer being farmed. This newest land purchase also adds about 300 acres of wetlands and tideland to the reservation which already includes some tideland.

According to a recent news article, at least 10 acres of this purchase may be developed for housing. Another potential development on this new property is a wastewater treatment plant (Williams 2015).

In this same article Tribal Chairman Douglas David said the tribe has more than 300 enrolled members and is growing, in part due to declines in infant mortality in the past 10 to 15 years. He said, ‘we’ve had such growth on or near the reservation; the next logical step is to increase our land.’ (Williams 2015).

The tribe is also adding to its timberland holdings outside of the tsunami zone. A planned acquisition of 200 acres will bring the total to 1,000 acres of timberland. Some of this land may be used for housing since an estimated 86% of the Shoalwater reservation population lives in the inundation zone identified by a recent assessment of tsunami risks to coastal communities (U.S. Geological Survey and Washington Military Department Emergency Management Division 2013).

*[Please note, these acreage figures have not yet been confirmed with tribal interviews]*

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## CHAPTER 4.

# Washington Coast Commercial Fisheries

### 4.1 OVERVIEW

Fishing is an important and historical component of the Washington Coast economy. Commercial fisheries landings and seafood processing supply markets in the U.S., Canada and overseas and provide income and employment in the region. Important commercial fisheries operating on the Washington Coast include those for groundfish (including sablefish and Pacific whiting), Dungeness crab, Pacific sardines, pink shrimp, albacore tuna, Pacific salmon, Pacific halibut and shellfish such as razor clams. There are also commercial net fisheries for salmon that are conducted in inside waters in the Columbia River and tributaries of Willapa Bay and Grays Harbor. Large-scale fisheries for Pacific whiting are also conducted in offshore waters by catcher-processors, floating processors and associated catcher vessels.

Tribal fisheries for whiting, groundfish and salmon, among others, are also conducted in the region's waters, although descriptions of those important fisheries are not included in the following discussion.

Published data provide some idea of the scale of landings and exvessel revenue involved, but these data may underestimate activity for certain species and ports due to confidentiality constraints which limit disclosure of business information for aggregations with fewer than three participants.

For this project, non-tribal commercial fisheries landings and revenue data during 2004-2014 were obtained on request from the Washington Department of Fish and Wildlife (WDFW). In the data set, landings were identified at the county, vessel, buyer and PacFIN port code level. Coastal region ports where the majority of commercial fisheries landings are made include La Push and Neah Bay in Clallam County, Westport and other ports in Grays Harbor County, Ilwaco and Willapa Bay ports in Pacific County, and Cathlamet and Skamokawa in Wahkiakum County. Table 4-1 lists PacFIN port codes that

received Washington Coast non-tribal commercial fisheries landings during 2004-2014 by county along with the list of underlying ports or communities.

**Table 4-1** Pacfin Landings Ports and Associated Communities in the Washington Coast Commercial Fisheries Landings Data

County	Port Identifiers	Ports / Communities Included
Clallam	SEQ	Sequim
	PAG	Port Angeles
	NEA	Neah Bay
	LAP	La Push
Jefferson (West)	OWC	Queets, Quillayute, Kalaloch, Hoh
Grays Harbor	GRH	Aberdeen, Bay City, Hoquiam, Oakville
	WPT	Westport
	OWC	Grayland, Grayland Beach, Taholah, Moclips
Pacific	WLB	Tokeland, South Bend, Raymond, Naselle, Nacotta, Bay Center
	LWC	Ilwaco, Chinook
	OWC	Long Beach
	OCR	Megler, Frankfort, Other Pacific County
Wahkiakum	LWC	Skamokawa
	OCR	Gray's Bay, Cathlamet

Source: PacFIN ([pacfin.psmfc.org/pacfin\\_pub/data\\_rpts\\_pub/code\\_lists/agency\\_ports\\_pcid.txt](http://pacfin.psmfc.org/pacfin_pub/data_rpts_pub/code_lists/agency_ports_pcid.txt))

While this level of data aggregation was more than adequate for describing activity in the major the Washington Coast ports, it was not sufficient to differentiate landings occurring in, e.g., the individual ports associated with Willapa Bay (WLB), the smaller ports in Pacific County (OCR), or ports in the Grays Harbor County OWC port grouping.

Table 4-2 shows non-tribal commercial landings, revenue and participation by coastal county during the most recent complete year (2014) for key fisheries management groups. The table indicates that the Washington Coast non-tribal commercial fisheries shown generated approximately \$93 million in total exvessel revenue in 2014. The largest portion was landed in Grays Harbor County ports (\$60 million), followed by Pacific County (\$29 million). Together these total landings contributed jobs and income to local communities and also provided economic opportunities for suppliers and support businesses located in coastal ports and elsewhere.

**Table 4-2** Landings, Exvessel Revenues and Participation by County for Washington Coast Commercial Fisheries in 2014

County	Management Group	Round weight (thous. lbs)	Exvessel Revenue (thous. \$)	Number of Dealers	Number of Vessels	
					All Identified Vessels	Vessels >\$1,000
Clallam	Crab	13	72			
	Groundfish	202	544			
	Highly Migratory	46	59			
	Salmon	219	853			
	Shrimp	1,077	865			
	Other	463	583			
	<b>Clallam Totals:</b>		<b>2,020</b>	<b>2,975</b>	<b>20</b>	<b>88</b>
Grays Harbor	Coastal Pelagic	12,370	2,137			
	Crab	4,941	22,481			
	Groundfish	38,615	4,433			
	Highly Migratory	12,070	13,835			
	Salmon	268	988			
	Shrimp	28,133	14,796			
	Shellfish	29	79			
	Other	929	993			
	<b>Grays Harbor Totals:</b>		<b>97,355</b>	<b>59,742</b>	<b>45</b>	<b>354</b>
Pacific	Coastal Pelagic	5,296	1,071			
	Crab	3,661	14,014			
	Groundfish	12,365	4,347			
	Highly Migratory	5,068	6,322			
	Salmon	1,304	2,347			
	Shrimp	1,333	738			
	Shellfish	128	253			
	Other	51	193			
	<b>Pacific Totals:</b>		<b>29,206</b>	<b>29,285</b>	<b>30</b>	<b>364</b>
Wahkiakum	Salmon	778	965			
	Other	1	1			
<b>Wahkiakum Totals:</b>		<b>779</b>	<b>966</b>	<b>7</b>	<b>80</b>	<b>72</b>

County	Management Group	Round weight (thous. lbs)	Exvessel Revenue (thous. \$)	Number of Dealers	Number of Vessels	
					All Identified Vessels	Vessels >\$1,000
WA Coast Totals:	Coastal Pelagic	17,666	3,208			
	Crab	8,615	36,567			
	Groundfish	51,182	9,324			
	Highly Migratory	17,184	20,216			
	Salmon	2,568	5,152			
	Shrimp	30,543	16,398			
	Shellfish	157	332			
	Other	1,444	1,769			
<b>Grand Total</b>		<b>129,360</b>	<b>92,967</b>	<b>98</b>	<b>700</b>	<b>672</b>

Table 4-2 also shows participation by identified vessels and dealers in the non-tribal commercial fishery. Coastwide there were 98 registered dealers who took commercial deliveries in 2014. By county, the largest portion of them operated in Grays Harbor County (45), followed by Pacific County (30). Of the 700 identified commercial vessels making landings in Washington Coast ports, the greatest number (364) landed in Pacific County ports, followed by Grays Harbor County ports (354). However if filtered to exclude vessels landing less than \$1,000 exvessel revenue during the year, Grays Harbor County ports had the greatest number of vessels (349) followed closely by Pacific County (342).

In terms of exvessel revenue, the table shows coastwide landings of Crab (\$37 million), Highly Migratory species (albacore) (\$20 million), and pink shrimp (\$16 million) were the largest by species management group. Crab made up the largest portion of landings revenue in Grays Harbor County (\$22 million) and Pacific County (\$14 million), while in Clallam County, shrimp was the largest component followed closely by salmon (both about \$0.9 million). In Wahkiakum County ports, salmon was by far the largest portion of exvessel revenue (\$1 million). In terms of coastwide total volume (round weight) landed, Groundfish comprised the largest portion (51 million lbs., largely because Pacific whiting is included in this grouping), followed by Shrimp (31 million lbs.), Coastal Pelagic species (18 million lbs., mostly sardines), and Highly Migratory species (18 million lbs., albacore).

Another piece of the picture is the geographic distribution of ownership of vessels making deliveries in Washington Coast ports. Table 4-3 shows counts by region of owners' residences for vessels recording commercial fisheries landings in the five-county Washington Coast region during 2014, along with the associated amounts of exvessel revenues. The table shows that about 43 percent (299) of the 700 vessels making deliveries in 2014 were owned by Washington Coast residents. These vessels accounted for approximately that same share of total exvessel revenue. The 33 percent of vessels that were owned by residents of other places in Washington State (232) accounted for about 25 percent of total exvessel revenue. About 10 percent (72) of vessels making landings were owned by Oregon residents. These vessels accounted for about 14 percent of total exvessel revenue landed in Washington Coast ports.

**Table 4-3** Counts and Total Exvessel Revenue Landed in 2014 by Vessel Owners’ Address

Vessel Owners’ Region	No. of Vessels	Exvessel Revenue (thous. \$)
Washington Coast*	299	40,439
Other Washington	232	23,657
Oregon	72	13,143
Elsewhere	90	13,326
Unknown	7	1,058
No vessel ID	-	1,344
<b>Total</b>	<b>700</b>	<b>92,967</b>

\*Vessel owner’s address is in one of the five Washington Coast counties.

## 4.2 NON-TRIBAL COMMERCIAL FISHERIES

Historically the mix of commercial fisheries species landed on the Washington Coast has varied according to the availability of the resource as well as vessels, processing capacity and markets to catch, process and sell the fish. For example, the more than tripling of Shrimp landings on the Washington Coast in the past two years has been driven at least partly by a shifting of shrimp processing capacity northward into Washington.

Tables 4-4 and 4-5 show annual landings in Washington Coast commercial fisheries for the seven main species management groups during 2004-2014. Table 4-4 shows total landings volumes in terms of round weight lbs delivered to Washington Coast ports each year during the period. Table 4-5 shows the total inflation-adjusted exvessel revenue earned by the vessels making those deliveries.

**Table 4-4** Annual Landings in Washington Coast Ports by Species Management Group 2004-2014 (thousands of round weight lbs.)

Management Group	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Groundfish	60,451	80,517	70,492	63,811	43,307	26,702	67,403	54,911	45,591	51,904	51,182
Salmon	2,202	1,843	1,415	799	827	1,578	1,612	2,363	1,572	1,577	2,568
Crab	5,615	19,540	14,125	11,861	11,029	8,961	10,812	14,253	6,336	15,118	8,615
Shrimp	5,495	6,096	6,204	3,382	6,327	7,133	9,622	9,629	9,396	13,584	30,543
Coastal Pelagic	19,910	13,464	9,759	10,512	14,338	19,290	27,492	17,962	78,936	65,477	17,666
Highly Migratory	16,591	10,084	18,223	12,885	14,523	15,783	13,173	12,660	18,600	16,895	17,184
Shellfish	406	273	303	188	355	480	414	239	224	270	157
Other	281	268	378	601	2,261	1,367	1,594	1,654	2,833	2,209	1,444
<b>Grand Total</b>	<b>110,952</b>	<b>132,085</b>	<b>120,899</b>	<b>104,039</b>	<b>92,968</b>	<b>81,294</b>	<b>132,123</b>	<b>113,670</b>	<b>163,489</b>	<b>167,033</b>	<b>129,360</b>

**Table 4-5** Annual Exvessel Revenue Landed in Washington Coast Ports by Species Management Group 2004-2014 (in thousands of 2014 inflation-adjusted dollars)\*

Management Group	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Groundfish	5,819	8,823	8,310	7,972	7,723	5,866	9,525	13,703	11,508	9,669	9,324
Salmon	3,009	3,116	2,965	2,022	2,188	3,154	5,071	4,605	3,997	4,656	5,152
Crab	12,503	33,075	26,154	29,664	29,923	21,072	26,483	43,511	23,778	42,554	36,567
Shrimp	2,625	3,032	2,371	1,868	3,740	2,776	4,145	5,220	4,764	5,928	16,398
Coastal Pelagic	1,525	844	521	566	1,489	1,926	2,934	2,299	8,212	6,771	3,208
Highly Migratory	16,349	11,625	16,045	11,333	18,403	17,320	15,570	22,091	28,216	24,086	20,216
Shellfish	349	252	238	170	326	1,204	2,145	570	513	388	332
Other	527	512	626	711	1,053	1,229	1,603	1,748	2,832	2,470	1,769
<b>Grand Total</b>	<b>42,706</b>	<b>61,278</b>	<b>57,231</b>	<b>54,305</b>	<b>64,845</b>	<b>54,547</b>	<b>67,475</b>	<b>93,746</b>	<b>83,821</b>	<b>96,521</b>	<b>92,967</b>

\*Inflation-adjusted using the December 2014 Gross Domestic Product (GDP) deflator series [www.bea.gov/national/xls/gdplev.xls](http://www.bea.gov/national/xls/gdplev.xls).

Table 4-4 shows total landings volume reached a high point during the period of approximately 167 million lbs in 2013, dropping to approximately 129 million lbs in 2014. Although landings of Shrimp and Salmon were higher in 2014 than in 2013, these were more than offset by lower volumes of Crab and Coastal Pelagic (sardines) species landed.

The highest total exvessel value during the period (in terms of inflation-adjusted 2014 dollars) was approximately \$97 million in 2013, falling to approximately \$93 million in 2014. The 2014 value was the third highest total in inflation-adjusted terms during the period shown, after the 2013 value and also the 2011 inflation-adjusted total of approximately \$94 million.

Table 4-6 displays average annual inflation-adjusted exvessel value per lb for fisheries species Management Groups landed on the Washington Coast. Interesting trends indicated in the table include historic high average prices in 2014 for Crab, and also recent above-average values for Groundfish (although the average price in the groundfish fishery is largely determined by the relative volume of Pacific whiting landings), Shrimp, Coastal Pelagic species, Shellfish and Other species (which include Pacific halibut and hagfish, among others). In contrast, in 2014, average exvessel values per lb were below the 11-year average for landings of Salmon and Highly Migratory species Management Groups.

**Table 4-6** Average Annual Exvessel Revenue per Round Weight Pounds Landed in Washington Coast Ports by Species Management Group (in 2014 inflation-adjusted dollars\*)

Management Group	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	11-yr Average
Groundfish	0.10	0.11	0.12	0.12	0.18	0.22	0.14	0.25	0.25	0.19	0.18	0.16
Salmon	1.37	1.69	2.10	2.53	2.65	2.00	3.15	1.95	2.54	2.95	2.01	2.18
Crab	2.23	1.69	1.85	2.50	2.71	2.35	2.45	3.05	3.75	2.81	4.24	2.58
Shrimp	0.48	0.50	0.38	0.55	0.59	0.39	0.43	0.54	0.51	0.44	0.54	0.49
Coastal Pelagic	0.08	0.06	0.05	0.05	0.10	0.10	0.11	0.13	0.10	0.10	0.18	0.10
Highly Migratory	0.99	1.15	0.88	0.88	1.27	1.10	1.18	1.74	1.52	1.43	1.18	1.21
Shellfish	0.86	0.92	0.79	0.90	0.92	2.51	5.18	2.39	2.29	1.43	2.12	1.96
Other	1.87	1.91	1.66	1.18	0.47	0.90	1.01	1.06	1.00	1.12	1.23	1.01

\*Inflation-adjusted using the December 2014 GDP deflator series [www.bea.gov/national/xls/gdplev.xls](http://www.bea.gov/national/xls/gdplev.xls).

#### 4.2.1 Trawl Groundfish Fisheries

Large-scale trawl fisheries for groundfish species, including Pacific whiting, are conducted off the Washington Coast. Shorebased buyers in regional ports receive and process groundfish products. There is also an at sea fishery for Pacific whiting conducted offshore by trawl vessels that deliver to floating processors or “motherships”, and by catcher-processor vessels that are authorized to catch and process whiting at sea.

Washington Coast trawl groundfish fisheries are a subset of those conducted along the West Coast from Southern California to the mouth of the Strait of Juan de Fuca. Beginning in 2011 the shorebased

portion of the trawl fishery, including shorebased Pacific whiting, was rationalized under a transferrable individual fisheries quota (IFQ) system, where Federal permit holders were allocated individual quotas for the main trawl-caught species based on their historic participation in the groundfish fishery. Shorebased buyers were also allocated individual quota portions for Pacific whiting based on their buying history for that species. While participants in the at sea Pacific whiting fisheries weren't directly incorporated into the individual quota system, catcher vessels delivering to motherships were formed into coops and granted "catch history assignments" based on their historic participation, which could be assigned to another vessel to harvest within a coop. Pacific whiting catcher-processors have been organized as a coop since the 1990s.

Since 2011, the numbers of vessels and buyers participating in the West Coast shorebased groundfish trawl fisheries have tended to become fewer and more concentrated among a smaller number of ports, continuing a trend that began well before the trawl rationalization program.

### At-sea Pacific Whiting Fisheries

The annual at-sea fishery for Pacific whiting is conducted offshore along the West Coast, moving during the season as the fishery resource migrates northward from Northern California toward Canada. The two sectors comprising the at sea fishery are organized as coops to help control total catch and effort. Annual total catch allowances and geographic areas where catch occurs can vary significantly from year to year. Table 4-7 summarizes estimated historical catch occurring off the Washington Coast in the two sectors of the at-sea Pacific whiting fishery.

**Table 4-7** Total Annual Catch and Estimated Catch off Washington\* by Vessels Operating in the At-sea Pacific Whiting Sectors

Year	Catcher-Processors			Motherships		
	Sector Total	Washington Portion	Washington Share	Sector Total	Washington Portion	Washington Share
2005	78,890	14,211	18%	48,571	8,855	18%
2006	78,864	4,238	5%	55,355	22,808	41%
2007	73,263	28,078	38%	47,809	12,153	25%
2008	108,121	48,205	45%	57,432	18,767	33%
2009	34,620	9,229	27%	24,091	22,038	91%
2010	54,285	12,833	24%	35,714	19,497	55%
2011	71,679	37,187	52%	50,051	22,608	45%
2012	55,263	23,344	42%	38,434	7,960	21%
2013	77,950	8,410	11%	52,450	6,976	13%
2014	103,486	29	0%	62,109	8,593	14%

\*All whiting catch recorded on trips that began or ended in Washington waters.

Table 4-7 shows both the amounts and share of sector total catches of Pacific whiting taken in Washington waters have varied substantially over time. In the Catcher-Processor sector, a high of 52 percent of total sector catch was taken in Washington waters in 2011, whereas in 2006 and 2014 the

amounts caught off Washington were less than 10 percent of the sector total. In the Mothership sector the range is even more dramatic, with a high of 91 percent of the sector total taken in 2009 and a low of 13 percent taken in 2013. The table indicates some of the lowest catch shares from Washington waters occurred in both sectors in the last two years.

Since the at sea sectors do not deliver their catch to local ports for processing, where they also would be likely to reprovision and refuel, activities by these sectors do not necessarily have a large direct effect on the Washington Coast economy. One mechanism whereby economic effects of the fishery may be conferred to local areas is via the residence location of vessel owners and crew. Owners and crew members are likely to bring at least a portion of their fishery earnings back to be spent in the local economy where they live.

Table 4-8 summarizes information on the registration address for vessels participating in the at sea whiting sectors. The address of registration for vessel owners is assumed to indicate where vessel owners and the majority of hired crew members reside. While this assumption may not hold for the 14-15 very large vessels engaged as Catcher-Processors or Motherships, since these vessels require large processing crews that may be recruited nationally or internationally, it is reasonable to expect that the two-to-six crew members working on the catcher vessels operating in this and in other Washington Coast fisheries are likely to reside in areas nearby where the vessel is home ported.

**Table 4-8** State of Registration by Year (2005-2014) for Vessels Operating in the at-sea Pacific Whiting Sectors

YEAR	Catcher Processor and Mothership Vessels				Mothership Sector Catcher Vessels			
	AK	OR	WA	Total	AK	OR	WA	Total
2005	-	-	11	11	1	7	10	18
2006	-	-	15	15	-	10	10	20
2007	-	-	15	15	-	10	10	20
2008	-	-	13	13	-	8	11	19
2009	-	1	11	12	1	9	9	19
2010	-	1	12	13	2	10	10	22
2011	-	-	14	14	-	9	9	18
2012	-	-	14	14	-	8	8	16
2013	-	-	14	14	-	10	8	18
2014	-	-	14	14	-	11	8	19

Practically all of the vessels engaged as Catcher Processors or Motherships were registered in Washington State, along with about half of the Mothership sector catcher vessels. All of the Washington State addresses for these vessels' registrations were in the Puget Sound area. While there is at least one

Washington Coast-based catcher vessel with a permit and catch history allowance to participate in the Mothership sector, apparently it didn't participate in that fishery during the 2005-2014 period.

### Shorebased Fisheries

Annual landings, exvessel revenues and average exvessel revenues per lb recorded by vessels engaged in the major shorebased fisheries sectors operating off the Washington Coast in recent years are summarized in Tables 4-9 through 4-11. These tables are used to illustrate the following descriptions of Washington Coast shorebased fishery sectors.

**Table 4-9** Annual Landings in Washington Coast Ports by Shorebased Fishery Sector 2004-2014 (thousands of round weight lbs.)

Fishery sector	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Whiting Trawl	57,302	71,922	67,740	61,406	41,073	22,282	63,998	50,355	37,948	48,902	49,010
Nonwhiting Trawl	1,835	1,891	1,357	1,578	1,990	3,098	1,933	2,587	2,972	2,047	1,472
Other Groundfish	1,216	1,429	1,355	924	1,322	1,309	1,587	1,721	1,293	1,095	967
Coastal Pelagic	19,895	13,429	9,730	10,505	14,311	18,898	27,358	17,902	77,565	64,168	17,430
Crab	5,352	19,292	13,982	11,697	10,979	8,953	10,756	14,190	6,312	15,104	8,575
Shrimp	5,380	6,039	6,183	3,345	6,290	7,011	9,470	9,524	9,353	13,511	30,527
Tuna	16,428	9,965	18,219	12,868	14,522	15,751	12,582	12,654	18,543	16,612	17,036
SalmonTroll	584	475	223	236	125	312	591	323	449	516	553
Salmon Net	1,503	1,287	1,157	544	695	1,245	969	1,981	1,064	1,022	1,954
Other	1,456	6,356	952	936	1,661	2,434	2,878	2,433	7,990	4,057	1,835
<b>Grand Total</b>	<b>110,952</b>	<b>132,085</b>	<b>120,899</b>	<b>104,039</b>	<b>92,968</b>	<b>81,294</b>	<b>132,123</b>	<b>113,670</b>	<b>163,489</b>	<b>167,033</b>	<b>129,360</b>

**Table 4-10** Annual Exvessel Revenue Landed in Washington Coast Ports by Shorebased Fishery Sector 2004-2014 (in thousands of 2014 inflation-adjusted dollars)\*

Fishery sector	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Whiting Trawl	2,440	4,513	4,635	5,128	4,081	1,526	4,284	5,948	6,054	6,381	5,531
Nonwhiting Trawl	1,160	1,044	747	788	965	1,318	600	1,925	1,571	1,246	1,075
Other Groundfish	2,260	2,842	2,929	2,093	2,692	2,991	4,623	5,782	3,217	2,079	2,766
Coastal Pelagic	1,523	841	521	565	1,477	1,858	2,878	2,274	8,093	6,629	3,162
Crab	11,867	32,491	25,784	29,182	29,790	21,045	26,330	43,247	23,685	42,499	36,397
Shrimp	2,381	2,913	2,311	1,718	3,599	2,339	3,357	4,811	4,552	5,808	16,333
Tuna	16,159	11,439	16,041	11,321	18,401	17,281	14,759	22,079	28,136	23,478	20,005
SalmonTroll	1,232	1,307	988	973	716	1,142	3,069	1,410	2,025	2,670	2,378

Fishery sector	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Salmon Net	1,572	1,620	1,837	1,007	1,445	1,916	1,805	2,994	1,694	1,801	2,560
Other	2,112	2,268	1,437	1,529	1,678	3,133	5,771	3,274	4,794	3,931	2,761
<b>Grand Total</b>	<b>42,706</b>	<b>61,278</b>	<b>57,231</b>	<b>54,305</b>	<b>64,845</b>	<b>54,547</b>	<b>67,475</b>	<b>93,746</b>	<b>83,821</b>	<b>96,521</b>	<b>92,967</b>

\*Inflation-adjusted using the December 2014 GDP deflator series [www.bea.gov/national/xls/gdplev.xls](http://www.bea.gov/national/xls/gdplev.xls).

**Table 4-11** Average Annual Exvessel Revenue per Round Weight Pound Landed in Washington Coast Ports 2004-2014 by Shorebased Fishery Sector (in 2014 inflation-adjusted dollars)\*

Fishery sector	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	11-yr Average
Whiting Trawl	0.04	0.06	0.07	0.08	0.10	0.07	0.07	0.12	0.16	0.13	0.11	0.09
Nonwhiting Trawl	0.63	0.55	0.55	0.50	0.48	0.43	0.31	0.74	0.53	0.61	0.73	0.55
Other Groundfish	1.86	1.99	2.16	2.27	2.04	2.28	2.91	3.36	2.49	1.90	2.86	2.41
Coastal Pelagic	0.08	0.06	0.05	0.05	0.10	0.10	0.11	0.13	0.10	0.10	0.18	0.10
Crab	2.22	1.68	1.84	2.49	2.71	2.35	2.45	3.05	3.75	2.81	4.24	2.57
Shrimp	0.44	0.48	0.37	0.51	0.57	0.33	0.35	0.51	0.49	0.43	0.54	0.47
Tuna	0.98	1.15	0.88	0.88	1.27	1.10	1.17	1.74	1.52	1.41	1.17	1.21
SalmonTroll	2.11	2.75	4.42	4.12	5.71	3.66	5.19	4.36	4.51	5.17	4.30	4.08
Salmon Net	1.05	1.26	1.59	1.85	2.08	1.54	1.86	1.51	1.59	1.76	1.31	1.51
Other	1.45	0.36	1.51	1.63	1.01	1.29	2.00	1.35	0.60	0.97	1.50	0.99

\*Inflation-adjusted using the December 2014 GDP deflator series [www.bea.gov/national/xls/gdplev.xls](http://www.bea.gov/national/xls/gdplev.xls).

Recreational charters are also an important component of the commercial fishing vessel industry.

Table 4-12 shows the estimated numbers of recreational angler-trips by type of trip conducted by Washington Coast recreational charter vessels.

**Table 4-12** Estimated Total Annual Number of Recreational Angler Trips Taken on Charter Vessels from Washington Coast Ports 2004-2014 by Type of Trip (thousands)

Trip Type	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Salmon	37.1	31.8	25.0	27.5	15.0	29.9	26.7	22.6	25.2	24.8	34.8
Bottomfish	11.8	13.8	16.7	15.1	15.1	11.9	11.3	13.8	15.2	14.2	13.7
Albacore	1.2	1.0	1.8	1.7	1.5	1.6	2.1	1.6	2.0	2.4	3.0
Halibut	8.1	6.7	7.0	6.9	4.8	3.9	3.3	3.4	2.9	2.8	2.7
Sturgeon	5.6	8.4	6.7	7.6	6.9	5.5	5.4	2.7	2.2	1.3	0.1
Miscellaneous	0.1	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	-	0.1
<b>TOTAL</b>	<b>63.9</b>	<b>61.9</b>	<b>57.2</b>	<b>58.9</b>	<b>43.4</b>	<b>53.0</b>	<b>48.7</b>	<b>44.2</b>	<b>47.7</b>	<b>45.5</b>	<b>54.4</b>

Source: WDFW statistics.

### **Shorebased Pacific Whiting Fishery**

The shorebased Pacific whiting fishery is essentially a single-species fishery prosecuted offshore using midwater or pelagic trawl gear. The shorebased sector receives an annual allocation along with the at sea Mothership and Catcher-Processor sectors. Participants in the shorebased whiting fishery use individual fisheries quotas to account for their Pacific whiting catch as well as bycatch of several groundfish species.

Tables 4-9 through 4-12 show Washington Coast landings in the shorebased whiting fishery during 2004-2014 ranged from a low of approximately 22 million lbs in 2009 to a high of approximately 72 million lbs recorded in 2005. With the exceptions of 2012 and 2013 when landings of Coastal Pelagic species (mostly sardines) were at an all-time high, Pacific whiting landings have consistently been the largest component of total landings volume by weight.

In terms of exvessel revenue, Pacific whiting landings ranged from an inflation-adjusted low of approximately \$1.5 million in 2009 to a high of approximately \$6.4 million in 2013. The 2014 value of \$5.5 million was the fourth highest during the period in inflation-adjusted terms. The annual average exvessel price for shorebased Pacific whiting in 2014 was about \$0.11 per round-weight lb, above the 11-year inflation-adjusted average of \$0.09 but the lowest since an inflation-adjusted \$0.07 was recorded in 2007.

In 2014 10 vessels recorded Pacific whiting fishery landings on the Washington Coast, of which five received at least \$250,000 in exvessel revenue from those landings.

### **Nonwhiting Trawl**

The shorebased nonwhiting trawl fishery pursues an array of bottomfish species, some of which co-occur during certain times of the year. The main groundfish landed in nonwhiting trawl fisheries include sablefish, Dover sole, thornyheads, petrale sole, arrowtooth flounder, English sole, Pacific cod, lingcod, and several species of rockfish. Sablefish has the highest per-lb exvessel value among trawl fishery species, although an increasing portion of the trawl sector sablefish allocation is being landed by vessels using nontrawl gear.

Tables 4-9 through 4-12 show Washington Coast landings in the shorebased nonwhiting trawl fishery during 2004-2014 ranged from a low of approximately 1.4 million lbs in 2006 to a high of approximately 3.1 million lbs in 2009. In terms of volume landed, the nonwhiting trawl fishery accounted for between 1.1 percent and 3.8 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, nonwhiting trawl fishery landings ranged from an inflation-adjusted low of approximately \$0.6 million in 2010 to a high of approximately \$1.9 million in 2011. The 2014 value of \$1.1 million was the sixth highest during the period in inflation-adjusted terms but the lowest since 2010. The annual average exvessel price for nonwhiting trawl fishery landings in 2014 was about \$0.73 per round weight lb, well above the 11-year inflation-adjusted average of \$0.55 and the second highest during the period.

In 2014 only three vessels recorded nonwhiting fishery landings using trawl gear on the Washington Coast. Of these two received at least \$100,000 in exvessel revenue from those landings.

### **Nontrawl Groundfish**

The nontrawl groundfish fishery is conducted off the Washington Coast primarily by vessels using fixed gear such as longlines and fishpots. The primary species sought is sablefish which comprises about 86 percent of total landings by weight and about 95 percent of the total exvessel value landed in this sector. For purposes of this analysis, this sector consists of a mix of vessels operating in the Federal limited entry and open access groundfish fisheries. Beginning in 2011, this fishery also includes participation by as many as seven vessels fishing trawl sablefish IFQ using fixed gear.

Tables 4-9 through 4-12 show Washington Coast landings in the nontrawl groundfish fishery during 2004-2014 ranged from a low of approximately 0.9 million lbs in 2007 to a high of approximately 1.7 million lbs in 2011. In terms of volume landed, the nontrawl groundfish fishery accounted for between 0.7 percent and 1.6 percent of total annual Washington coast landings by weight during the period.

In terms of exvessel revenue, nontrawl groundfish landings ranged from an inflation-adjusted low of approximately \$2.1 million in 2013 and 2007 to a high of approximately \$5.8 million in 2011. The 2014 value of approximately \$2.8 million was the fifth lowest during the period in inflation-adjusted terms and the second lowest since 2008. The annual average exvessel price for nonwhiting trawl fishery landings in 2014 was about \$2.86 per round weight lb, above the 11-year inflation-adjusted average of \$2.41 and the third highest during the period.

In 2014 at least 37 vessels recorded at least \$1,000 of nontrawl groundfish landings on the Washington Coast, including seven vessels fishing trawl sablefish IFQ using fixed gear. Twenty nine vessels received at least \$10,000 from nontrawl groundfish landings on the Washington Coast.

### **Salmon Troll**

The salmon troll fishery is conducted off the Washington Coast mostly by smaller vessels trailing natural bait or artificial lures and targeting Chinook and coho salmon. The troll fishery is somewhat unique among West Coast fisheries in that salmon are usually landed already gutted and bled, i.e., partially processed. In 2014 Chinook salmon constituted about 84 percent of landings by weight and about 94 percent of exvessel revenue in this sector.

Tables 4-9 through 4-12 show Washington Coast landings in the salmon troll fishery during 2004-2014 ranged from a low of approximately 125 thousand lbs in 2008 to a high of approximately 590 thousand lbs in 2010. In terms of volume landed, the salmon troll fishery accounted for less than one percent of total annual Washington coast landings by weight each year during the period.

In terms of exvessel revenue, salmon troll landings ranged from an inflation-adjusted low of approximately \$0.7 million in 2008 to a high of approximately \$3.1 million in 2010. The 2014 value of approximately \$2.4 million was the third highest during the period in inflation-adjusted terms. The annual average exvessel price for salmon troll fishery landings in 2014 was about \$4.30 per lb, above the 11-year inflation-adjusted average of \$4.08 but the lowest since 2009.

In 2014 at least 111 vessels recorded at least \$1,000 of salmon troll landings on the Washington Coast, including 79 vessels that received at least \$10,000 in exvessel revenue from those landings.

## **Salmon Net**

The salmon net fishery is unique among West Coast commercial fisheries in that it is not conducted in the ocean but rather in the inside waters of the Columbia River and tributaries of Willapa Bay and Grays Harbor. The main target species in this fishery include Chinook, coho and chum salmon. In 2014 coho constituted about 57 percent of landings by weight and about 50 percent of exvessel revenue for this sector, although that proportion can vary greatly from year to year depending on the species' relative availabilities. In most years Willapa Bay accounts for the largest portion: about 50 percent of total landings and exvessel revenue in this sector.

Recent policies enacted to phase out use of tangle net gear on the main stem of the Columbia River have caused a considerable amount of uncertainty regarding the future of a major portion of this fishery. A number of participants in the Columbia River fishery reportedly participate in the Willapa Bay and Grays Harbor fishery as well as in the major salmon gillnet fisheries in Alaska.

Tables 4-9 through 4-12 show Washington Coast landings in the salmon net fishery during 2004-2014 ranged from a low of approximately 0.5 million lbs in 2007 to a high of approximately 2 million lbs in 2011. In terms of volume landed, the salmon net fishery accounted for between 0.5 percent and 1.7 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, salmon net landings ranged from an inflation-adjusted low of approximately \$1 million in 2007 to a high of approximately \$3 million in 2011. The 2014 value of approximately \$2.6 million was the second highest during the period in inflation-adjusted terms. The annual average exvessel price for salmon troll fishery landings in 2014 was about \$1.31 per round weight lb, below the 11-year inflation-adjusted average of \$1.51 and the lowest since 2005.

In 2014, 138 vessels recorded at least \$1,000 of salmon net landings on the Washington Coast, including 72 vessels that received at least \$10,000 in exvessel revenue from those landings.

## **Dungeness Crab**

Dungeness crab is harvested using pot gear off the Washington Coast by a large number and wide variety of vessels. Crab harvests are notoriously volatile from year to year for largely unexplained reasons. Recently an increasing portion of total crab harvest has been directed to live markets, including overseas, thereby raising the overall average exvessel value per lb reported for crab landings.

Commercial fishery regulations and the compressed nature of the crab market cycle push a majority of effort and catch into the opening few weeks of the season (between Thanksgiving and Chinese New Year),

fueling intense competition for the limited crabbing grounds off the southern Washington Coast, especially during the early part of the season.<sup>1</sup>

Tables 4-9 through 4-12 show Washington Coast landings by Dungeness crab vessels during 2004-2014 ranged from a low of approximately 5.4 million lbs in 2004 to a high of approximately 19.3 million lbs in 2005, illustrating the volatile and somewhat cyclical nature of annual crab harvests. In terms of volume landed, the crab fishery accounted for between 3.9 percent and 14.6 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, crab vessel landings ranged from an inflation-adjusted low of approximately \$11.9 million in 2004 to a high of approximately \$43.2 million in 2011. The 2014 value of approximately \$36.4 million was the third highest during the period in inflation-adjusted terms. The three highest exvessel revenue values have all occurred since 2010. The annual average exvessel price for crab fishery landings in 2014 was about \$4.24 per round weight lb, 65 percent above the 11-year inflation-adjusted average of \$2.57 and the highest value in the series.

In 2014, 192 vessels recorded at least \$1,000 of Dungeness crab landings on the Washington Coast. This is the second-highest participation level among the Washington Coast fishery sectors. 117 of those vessels received at least \$100,000 in exvessel revenue from Washington Coast Dungeness crab landings.

### **Pink Shrimp**

The fishery for pink shrimp is conducted by vessels towing trawl nets similar to the nets used in some groundfish trawl fisheries. Relatively high resource abundance, the use of excluder devices to reduce bycatch of overfished rockfish species, development of markets, and migration of processing capacity have allowed this fishery to expand in Washington in recent years.<sup>2</sup>

Tables 4-9 through 4-12 show Washington Coast landings by pink shrimp vessels during 2004-2014 ranged from a low of approximately 3.3 million lbs in 2007 to a high of approximately 30.5 million lbs in 2014, illustrating the recent surge in Washington Coast pink shrimp landings. In terms of volume landed, the pink shrimp fishery accounted for between 3.2 percent and 23.6 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, shrimp landings ranged from an inflation-adjusted low of approximately \$1.7 million in 2007 to a high of approximately \$16.3 million in 2014. The 2014 value was nearly triple the

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<sup>1</sup> Anecdotal evidence suggests that during the early portion of the Washington Coast crab season, as you move southward along the southern Washington Coast from near Grays Harbor toward the Columbia River mouth, the density of deployed crab pots increases by a factor of more than 20, i.e., from less than 100 pots per mile in the north to more than 2,300 pots per mile near the Columbia River.

<sup>2</sup> A fire at an Oregon processing plant two years ago likely contributed to the recent increase in the volume of pink shrimp landings and processing in Washington Coast ports.

next highest annual value during the period (2013) in inflation-adjusted terms. The four highest exvessel revenue values have all occurred since 2010. The annual average exvessel price for shrimp landings in 2014 was about \$0.54 per round weight lb, above the 11-year inflation-adjusted average of \$0.47 and the second highest value in the series.

In 2014, 32 vessels recorded at least \$1,000 of pink shrimp landings on the Washington Coast, including 26 vessels that received at least \$100,000 in exvessel revenue from those landings.

### **Coastal Pelagic Species**

Coastal pelagic species (CPS) landed on the Washington Coast consist overwhelmingly of Pacific sardines with relatively small amounts of northern anchovy and mackerel. Coastal pelagic species delivered to the Washington Coast are caught in a relatively high volume but low value per lb fishery mostly by vessels using purse seine gear. Recent concerns over a projected low and possibly declining Pacific sardine biomass of have placed this fishery in considerable doubt over the next few years.

Tables 4-9 through 4-12 show Washington Coast landings by CPS vessels during 2004-2014 ranged from a low of approximately 9.7 million lbs in 2006 to a high of approximately 77.6 million lbs in 2012. By 2014 landings were down to 17.4 million lbs, illustrating the volatility of this fishery. In terms of volume, the CPS fishery accounted for between 8 percent and 47.4 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, CPS vessel landings ranged from an inflation-adjusted low of approximately \$0.5 million in 2006 to a high of approximately \$8.1 million in 2012. The 2014 value of \$3.2 million was the third highest during the period but also the lowest recorded since 2011 in inflation-adjusted terms. (The three highest exvessel values have all occurred since 2011). The annual average exvessel price for CPS fishery landings in 2014 was about \$0.18 per round weight lb, 77 percent above the 11-year inflation-adjusted average of \$0.10 and the highest value by far in the series.

In 2014, 10 vessels recorded at least \$1,000 of CPS landings on the Washington Coast, including 7 vessels that received at least \$100,000 in exvessel revenue from those landings.

### **Tuna**

The tuna fishery on the Washington Coast is exclusively an albacore fishery. It is conducted in ocean waters, sometimes far offshore, by vessels using troll gear somewhat similar to the gear used by salmon trollers. Many vessels that participate in the salmon troll fishery also fish for albacore.

Tables 4-9 through 4-12 show Washington Coast landings by tuna vessels during 2004-2014 ranged from a low of approximately 10 million lbs in 2005 to a high of approximately 18.5 million lbs in 2012. 2014 landings of 17 million lbs were the third highest in the series. In terms of volume, the tuna fishery accounted for between 7.5 percent and 19.4 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, tuna vessel landings ranged from an inflation-adjusted low of approximately \$11.3 million in 2007 to a high of approximately \$28.1 million in 2012. The 2014 value of \$20 million was the fourth highest during the period but also the lowest recorded since 2010 in inflation-adjusted terms.

(The four highest exvessel values have all occurred since 2010). The annual average exvessel price for tuna fishery landings in 2014 was about \$1.17 per round-weight lb, below the 11-year inflation-adjusted average of \$1.21 and the lowest value since \$1.17 in 2010.

In 2014, 264 vessels recorded at least \$1,000 of tuna landings on the Washington Coast. This is highest participation level among the Washington Coast fishery sectors. 210 of these vessels received at least \$10,000 in exvessel revenue from tuna landings on the Washington Coast. There were 54 vessels that landed at least \$1,000 of troll salmon and \$1,000 of albacore on the Washington Coast.

### **Other Species**

“Other species” is a miscellaneous vessel category rather than a fisheries sector *per se*. It consists of landings of miscellaneous species caught off the Washington Coast such as spotted prawn and razor clams, landings by unidentified vessels (virtually all razor clams landings were associated with “unidentified” vessels IDs), and catch from Canadian waters delivered to Washington Coast ports. In recent years, approximately half of the round weight and revenue totals associated with other species were provided by the hagfish (slime eel) fishery.

Tables 4-9 through 4-12 show Washington Coast landings of other species during 2004-2014 ranged from a low of approximately 0.9 million lbs in 2007 to a high of approximately 8 million lbs in 2012. In terms of volume, the other species fisheries accounted for between 0.8 percent and 4.9 percent of total annual Washington Coast landings by weight during the period.

In terms of exvessel revenue, landings of other species ranged from an inflation-adjusted low of approximately \$1.4 million in 2006 to a high of approximately \$5.8 million in 2010. The 2014 value of approximately \$2.8 million was the sixth highest during the period in inflation-adjusted terms. The annual average exvessel price for landings of other species in 2014 was about \$1.50 per round weight lb, well above the 11-year inflation-adjusted average of \$0.99.

In 2014, 52 vessels recorded at least \$1,000 of other species landings on the Washington Coast, 32 of which received at least \$10,000 in exvessel revenue from those landings. Note that landings and revenue totals may include landings by unidentified vessels, so vessel counts are less meaningful for this fishery category.

### **Recreational Charters**

Recreational charters are an important component of the commercial fishing vessel industry on the Washington Coast. In 2014 an estimated total of approximately 54,400 recreational charter trips (angler-trip-days) originated from Washington Coast ports, the highest total since 2007. Sixty four percent (34,800) of the trips made in 2014 were salmon trips, with a quarter of total trips targeting bottomfish (13,700). Trips to catch albacore tuna have been a relatively small but increasing component of the total. Halibut trips appear to be on a reverse trajectory, with the number of estimated trips in 2014 (2,700) the lowest observed during the time series.

The number of charter vessels operating from Washington Coast ports has varied. A number of vessels migrate into the region from elsewhere during the peak season, and some vessels operate in more than

one Washington Coast port. Recent WDFW estimates put the total number of recreational charter vessels that operated from all Washington Coast ports at approximately 60.

### 4.3 TRIBAL FISHERIES

[This section will be completed when tribal fisheries data has been received.]

### 4.4 COMMERCIAL FISHERIES LANDINGS AND REVENUES BY PORT

Tables 4-13 through 4-15 show counts of identified non-tribal commercial fishing vessels and fish buyers by Washington Coast port during 2004-2014, and total exvessel revenues paid by fish buyers in those ports during the period. Data in these tables are used in the following discussion of commercial fishing activities by port.

Note that values in cells representing activity levels by fewer than three fish buyers or three non-tribal commercial fishing vessels have been suppressed for data confidentiality reasons. Attempting to increase the level of detail in these displays by including breakouts of vessel types and/or species landed by port will result in even greater limitations due to data confidentiality restrictions.

**Table 4-13** Number of Fish Buyers Operating in Washington Coast Ports Who Purchased at Least \$10,000 from Vessels Delivering to the Port During Each Year 2004-2014

County	Port Code	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Clallam	Sequim	c/	4	4	3	3	3	3	c/	c/	c/	c/
	Port Angeles	3	3	c/	c/	c/	c/	5	4	3	4	5
	Neah Bay	3	5	4	6	4	5	5	7	7	7	7
	La Push	c/	3	c/	3	c/	c/	3	3	4	5	6
Jefferson	Jefferson Co. Coast Ports	c/										
Grays Harbor	Grays Harbor	c/	c/	c/	c/	3	c/	c/	c/	c/	c/	c/
	Westport	30	29	29	30	33	29	31	25	26	27	30
	Other Grays Harbor Ports	c/										
Pacific	Willapa Bay	9	10	11	8	8	9	9	8	6	9	10
	Ilwaco	10	10	12	11	11	15	12	14	11	15	13
	Other Pacific Co.-Coast	c/										
	Other Pacific Co.-Col. River	c/										
Wahkiakum	Wahkiakum Co. Ports	6	7	8	5	5	6	8	8	5	6	7

c/ Counts in cells representing fewer than three buyers are not disclosed for confidentiality reasons.

**Table 4-14** Number of Commercial Vessels Making Deliveries to Buyers in Washington Coast Ports of at Least \$1,000 in the Port During Each Year 2004-2014

County	Port Code	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Clallam	Sequim	8	8	19	12	5	c/	c/	c/	c/	4	4
	Port Angeles	52	27	14	7	11	11	7	9	11	15	24
	Neah Bay	57	60	57	50	33	29	40	40	45	37	40
	La Push	29	28	35	33	31	38	29	26	35	44	33
Jefferson	Jefferson Co. Coast Ports	5	5	5	3	c/						
Grays Harbor	Grays Harbor	15	26	22	22	19	28	c/	4	4	6	3
	Westport	291	284	275	274	248	278	301	309	324	306	346
	Other Grays Harbor Ports	c/										
Pacific	Willapa Bay	106	115	116	99	111	131	117	139	109	114	126
	Ilwaco	235	168	277	186	212	225	237	234	241	198	234
	Other Pacific Co.- Coast	c/	5	11	11							
	Other Pacific Co.- Col. River	c/	9	14	16	17	c/	17	c/	c/	c/	c/
Wahkiakum	Wahkiakum Co. Ports	65	55	40	23	23	29	38	69	41	56	72

c/ Counts in cells representing fewer than three vessels are not disclosed for confidentiality reasons.

**Table 4-15** Total Fish Purchases (thousands of current dollars) by Fish Buyers Operating in Washington Coast Ports Who Purchased at Least \$10,000 from Vessels Delivering to the Port During Each Year 2004-2014

County	Port Code	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Clallam	Sequim	c/	268	405	266	210	c/	c/	c/	c/	c/	c/
	Port Angeles	738	307	c/	c/	c/	c/	1,255	410	56	122	904
	Neah Bay	928	1,486	1,677	1,170	891	860	1,054	1,237	1,499	1,514	1,094
	La Push	c/	1,058	c/	737	c/	c/	1,021	1,814	1,243	1,447	924
Jefferson	Jefferson Co. Coast Ports	c/										
Grays Harbor	Grays Harbor	c/	c/	c/	c/	579	c/	c/	c/	c/	c/	c/
	Westport	18,132	32,526	22,335	28,219	37,857	27,484	36,552	53,567	53,335	58,351	59,674
	Other Grays Harbor Ports	c/										

County	Port Code	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pacific	Willapa Bay	1,851	3,863	4,096	3,283	3,427	3,308	4,408	4,340	2,841	3,624	4,828
	Ilwaco	11,521	11,423	18,894	13,661	14,796	15,881	17,489	26,572	21,788	28,955	24,331
	Other Pacific Co.- Coast	c/										
	Other Pacific Co.- Col. River	c/										
Wahkiakum	Wahkiakum Co. Ports	748	532	584	301	270	233	416	947	306	563	966

c/ Data in cells representing fewer than three buyers or vessels are not disclosed for confidentiality reasons.

Tables 4-16 and 4-17 show total numbers of charter trips taken by recreational anglers (angler-trips) from Washington Coast ports during 2004-2014, and estimates of the number of charter vessels operating from those ports.

**Table 4-16** Estimated Annual Number of Recreational Angler Trips Taken on Charter Vessels from Washington Coast Ports 2004-2014 (thousands)

Port	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Neah Bay	5.5	4.8	4.9	4.9	2.7	2.0	1.6	1.7	1.6	1.7	1.9
La Push	1.0	1.1	0.9	0.9	1.3	1.4	1.4	1.2	1.1	1.1	1.6
Westport	38.3	36.8	34.4	33.0	26.3	32.6	31.6	29.0	33.0	31.9	38.5
Ilwaco-Chinook	19.1	19.2	17.0	20.0	13.2	16.9	14.1	12.2	12.0	10.9	12.5
<b>TOTALS</b>	<b>63.9</b>	<b>61.9</b>	<b>57.2</b>	<b>58.9</b>	<b>43.4</b>	<b>53.0</b>	<b>48.7</b>	<b>44.2</b>	<b>47.7</b>	<b>45.5</b>	<b>54.4</b>

Source: WDFW statistics. Includes Columbia River salmon and sturgeon trips.

**Table 4-17** Average Annual Number of Charter Vessels by Washington Coast Area

Ports	Number
Neah Bay/La Push	10
Westport	35
Ilwaco/Chinook	21

Source: WDFW statistics.

#### 4.4.1 Clallam County Ports

Clallam County ports involved in commercial fisheries include Sequim, Port Angeles, Neah Bay and La Push. Although not technically within the Washington Coast Marine Spatial Planning region, the relatively small Clallam County commercial fishing ports of Sequim and Port Angeles have been included in this discussion for completeness.

### **Sequim**

Data confidentiality issues limit what can be reported regarding commercial fisheries activity in Sequim. Tables 4-13 through 4-15 show relatively small numbers of buyers and vessels operating in the port each year. Since 2010 the number of buyers has remained below the reporting disclosure threshold.

### **Port Angeles**

Data confidentiality limits what can be reported regarding commercial fisheries activity in Port Angeles in some years. Tables 4-13 through 4-15 show about five buyers and 24 vessels operating in the port recently. Total exvessel revenues from landings in the port exceeded \$0.9 million in 2014, a large increase over the prior year.

### **Neah Bay**

Neah Bay has been the largest commercial fisheries port in Clallam County in terms of buyer participation, vessel participation and landed exvessel revenues in most years. Tables 4-13 through 4-15 show about seven buyers and 40 vessels operating in the port recently. Total exvessel revenues from landings in the port in 2014 were approximately were \$1.1 million, the fourth largest in terms of exvessel revenues landed in Washington Coast ports.

Approximately 1,900 recreational anglers took charter trips from Neah Bay in 2014. This number was more than in with the recent past, but less than half the levels in Neah Bay prior to 2008. An estimated 10 charter vessels operated from Neah Bay and La Push in recent years.

### **La Push**

La Push is the only major port in Clallam County that's actually located on the Pacific Ocean coast. Data confidentiality limits what can be reported regarding commercial fisheries activity in La Push in some years. Tables 4-13 through 4-15 show about six buyers and 33 vessels operating in the port recently. Total exvessel revenues from landings in the port in 2014 were approximately were \$0.9 million, the second largest in Clallam County and the fifth largest in terms of exvessel revenues landed on Washington Coast.

Approximately 1,600 recreational charter angler trips originated from La Push in 2014. This was the largest number observed for La Push during the 2004-2014 period. An estimated 10 charter vessels operated from Neah Bay and La Push in recent years.

## **4.4.2 Jefferson County (West) Ports**

There have been no non-tribal commercial fisheries landings recorded in Jefferson County (West) ports (PCID = "OWC") since 2007. In years prior to then there were fewer than three buyers and fewer than six vessels operating in these ports.

## **4.4.3 Grays Harbor County Ports**

Grays Harbor County ports that reported commercial fisheries landings during 2004-2014 include Grays Harbor, Westport and Other Grays Harbor Ports (PCID = "OWC").

### **Grays Harbor**

There have been fewer than three buyers operating in Grays Harbor every year except 2008. The number of identified vessels operating in the port has fallen significantly from more than 20 prior to 2010. In 2014 only three vessels earned at least \$1,000 in exvessel revenue from landings in the port.

### **Westport**

Westport is the largest port on the Washington Coast in terms of number of buyers, number of vessels, and total exvessel revenues generated from landings in the port. Approximately 30 buyers and 300 vessels have been operating in the port in recent years. Total exvessel revenues paid for landings in the port in 2014 of \$59.7 million were more than twice the level recorded in the next largest port, Ilwaco.

In addition to commercial fisheries there is also a large recreational fishing charter industry in Westport. Approximately 35 vessels operated from the port in recent years taking passengers fishing for salmon, groundfish and tuna. In 2014 there were approximately 38,500 charter angler trips originating from Westport, the most among Washington Coast ports and the highest annual total reported in Westport during the 2004-2014 period.

### **Other Grays Harbor Ports**

Data confidentiality issues limit what can be reported regarding commercial fisheries activity in the other Grays Harbor County ports. Tables 4-13 through 4-15 show both the number of buyers and number of vessels remained below the reporting disclosure threshold every year during the 2004-2014 period.

## **4.4.4 Pacific County Ports**

Pacific County ports that reported commercial fishing landings during 2004-2014 include Willapa Bay, Ilwaco, and “Other Pacific County ports – Coast” (PCID = OWC), and “Other Pacific County ports - Columbia River” (PCID = OCR).

### **Willapa Bay**

Willapa Bay ports include South Bend, Tokeland and Bay Center, among others. Approximately 10 buyers and more than 100 vessels were operating in Willapa Bay ports in recent years. Total exvessel revenues from landings in the Willapa Bay ports in 2014 were approximately \$4.8 million, the third largest in terms of exvessel revenues landed among Washington Coast ports behind Ilwaco and Westport.

### **Ilwaco**

Ilwaco is the largest port in Pacific County and the second largest port on the Washington Coast in terms of number of buyers, number of vessels, and total exvessel revenues generated from landings delivered to the port. Approximately 13 buyers and more than 200 vessels have been operating in the port in recent years. Total exvessel revenue paid for landings in the port in 2014 were \$24.3 million, less than half the amount reported in Westport but more than five times greater than the amount recorded in the next largest port, Willapa Bay.

In addition to commercial fisheries, there is also a large recreational fishing charter industry in Ilwaco and neighboring Chinook, Washington. Up to 16 vessels operated from Ilwaco-Chinook in recent years during the recreational fishing seasons for salmon, groundfish, tuna and sturgeon. Including trips conducted on the lower Columbia River, in 2014 there were approximately 12,500 charter angler trips that originated from Ilwaco-Chinook, the second-most among Washington Coast ports and the highest annual number of charter trips reported in the port since 14,100 in 2010.

### **Other Pacific County Ports**

This category includes two port codes: “Other Pacific County ports – Coast” (PCID = OWC), and “Other Pacific County ports - Columbia River” (PCID = OCR). Data confidentiality issues restrict what can be reported regarding commercial fisheries activity in these ports. Tables 4-13 through 4-15 show the number of buyers remained below the reporting disclosure threshold every year during the 2004-2014 period in both port codes. In the most recent two years the number of vessels landing in “Other Pacific County ports – Coast” was the highest it has been during the period (11), but prior to 2012 it fewer than three. The number of vessels landing in “Other Pacific County ports – Columbia River” was as high as 17 as recently as 2010, but has been below the reporting disclosure threshold in every year since then.

#### **4.4.5 Wahkiakum County Ports**

Landings and participation in the individual ports in Wahkiakum County were not available. The data show between 5 and 8 buyers have been operating in these ports in recent years. The 72 vessels making landings in these ports in 2014 was the largest number during the time series, as was the nearly \$1 million in total reported exvessel revenue.

### **4.5 ECONOMIC CONTRIBUTIONS OF COMMERCIAL FISHING**

#### **4.5.1 Introduction**

The total economic contribution of commercial fisheries to the Washington Coast region includes the effects of fish landings and processing in the region’s ports, fish harvested off the Washington Coast that are landed elsewhere (e.g., in Oregon or processed at-sea), plus income earned by Washington Coast residents involved in other regions’ fisheries.

The economic contribution of harvesting and primary processing serve as an indicator of the total level of jobs and income in a region that are attributable to a “basic” economic activity. For this analysis, commercial harvesting of the fisheries resource and associated primary seafood processing include the effects of all measurable economic linkages associated with direct expenditures by the commercial fishing and primary seafood processing industries, plus all indirect effects (jobs and income generated by business supplying inputs to the commercial fishing and seafood processing industries), and induced effects (jobs and income generated when employees and owners of directly affected and indirectly affected businesses spend their disposable income). The combined direct, indirect and induced effects are termed “total effects”, and the process whereby direct expenditures are translated into total effects is known as the

“economic multiplier”. Results of the analysis of the economic contribution of commercial fisheries harvests and landings to Washington Coast shorebased processors are discussed below.

In addition to these measurable contributions there are also other effects that are less easily quantifiable. Fish harvested off the Washington Coast may not necessarily be landed there, for example landings delivered to Oregon ports, or harvests in the at-sea Pacific whiting fisheries. While we have been unable to acquire data on landings made outside Washington State, the effects of the at-sea whiting fisheries are discussed below.

Many owners and crew of fishing vessels operating on the Washington Coast are also involved in commercial fisheries elsewhere, including other fisheries on the West Coast, in Puget Sound, or in Alaska. Since most regional fisheries are very seasonal, participation in fisheries in different regions is a means of economic diversification, helping to spread the inherent risk associated with involvement in any single fishery from year to year. While it is difficult to acquire sufficient information to perform a detailed economic analysis of the local effects of participation in so-called “distant water” fisheries, an example based on permit ownership in the Bristol Bay salmon fishery is presented below. It has also been pointed out by fisheries participants that the viability of many local fishing businesses would be threatened if key components of their Washington Coast fishing portfolios such as Columbia River or Willapa Bay salmon, Pacific Ocean albacore or Dungeness crab, or complementary opportunities in distant water fisheries such as Bristol Bay or Prince William Sound salmon, were no longer available to them.

The economic contribution of recreational charters to the Washington Coast are included in the chapter on Recreation and Tourism impacts.

#### **4.5.2 Contributions from Commercial Fisheries Harvesting and Primary Processing**

Tables 4-18 and 4-19 show estimated economic contributions of Washington Coast non-tribal commercial fisheries landings and associated primary seafood processing by county based on 2014 exvessel revenues reported in a database provided by WDFW. Table 4-18 shows estimated total income and employment contributions confined to the five-county Washington Coast region. Table 4-19 shows estimated total income and employment effects occurring in the State of Washington as a whole.

Totals in these tables include estimates of all income (employee compensation, crew shares, non-employee compensation and proprietors’ income) and employment (total number of jobs) occurring in a given region (Washington Coast or State of Washington) attributable to economic linkages associated with non-tribal commercial fisheries landings by identified vessels and primary processing by shorebased processors. For simplicity, state-level industry average income per job estimates were used to translate income effects into employment contributions in both the Coastal region and State-level analyses. To the extent these state-level average income measures overstate the average earnings of Coastal region jobs, the

associated employment effects in Coastal region industries may be underestimated<sup>3</sup>. However the total income measures reported in Tables 4-18 and 4-19 are not affected by this assumption.

These totals do not include any additional impacts of secondary processing activities, include production of fishmeal or fish oil from primary-processing byproducts, secondary processing occurring inside or outside the five-county region, or effects from the downstream distribution and retailing of seafood products. It was beyond the scope of this project to collect sufficient information to estimate economic effects from downstream distribution, secondary processing and retailing (although some of the impacts of local retailing of seafood products are included in the Recreation and Tourism effects).

**Table 4-18** Contributions to the Five-County Coastal Region Economy from Washington Coast Non-tribal Commercial Fishing and Seafood Processing by County of the Activity

Activity	Coastwide	Clallam County	Grays Harbor County	Pacific County	Wahkiakum County
<b>Harvesting</b>					
Income (\$ thousands)	35,574	1,200	21,497	12,339	537
Employment (jobs)	1,222	55	669	448	50
<b>Processing</b>					
Income (\$ thousands)	41,615	1,095	28,759	11,365	396
Employment (jobs)	594	16	411	162	6
<b>Combined Harvesting and Processing</b>					
Income (\$ thousands)	77,189	2,295	50,256	23,705	933
Employment (jobs)	1,817	71	1,080	611	56

<sup>3</sup> For example, \$1 million income could support either twenty \$50 thousand per year jobs or forty \$25 thousand per year jobs.

**Table 4-19** Contributions to the State of Washington Economy from Washington Coast Non-tribal Commercial Fishing and Seafood Processing by County of the Activity

Activity	Coastwide	Clallam County	Grays Harbor County	Pacific County	Wahkiakum County
<b>Harvesting</b>					
Income (\$ thousands)	65,623	2,112	40,223	22,573	715
Employment (jobs)	2,063	101	1,171	739	52
<b>Processing</b>					
Income (\$ thousands)	51,415	1,333	35,588	14,018	477
Employment (jobs)	764	20	530	208	7
<b>Combined Harvesting and Processing</b>					
Income (\$ thousands)	117,038	3,445	75,810	36,591	1,193
Employment (jobs)	2,828	121	1,701	947	59

Tables 4-18 and 4-19 show the total economic contribution to the five-county Washington Coast region from non-tribal commercial fishing and processing activities based on 2014 landings was estimated to be approximately \$77.2 million in income and 1,800 jobs. Nearly two-thirds of the total was attributable to activity in Grays Harbor County, with most of the remainder (31 percent) attributable to Pacific County. Approximately three percent and one percent, respectively, of the total economic contributions were attributable to harvesting and processing activities in Clallam County and Wahkiakum County. An estimated 46 percent of total income and two-thirds of the total jobs contributed in the region are attributed to effects of the harvesting sector’s activities.

The total economic contribution to the State of Washington from non-tribal commercial fishing and processing activities in the five-county Coastal region in 2014 was estimated to be approximately \$117 million in income and 2,800 jobs. These estimates incorporate additional direct and indirect spending effects resulting from economic linkages between the Washington Coast economy and businesses elsewhere in Washington State outside the five-county Coastal region. The combined contribution of Washington Coast harvesting and processing activities to the entire State of Washington economy is more than 50 percent larger, both in terms of income and employment effects, than the total economic contribution of those activities to the Coastal region alone. Much of the difference is attributable to the effects of direct expenditures by vessels operating in Washington Coast fisheries that are based in Puget Sound ports.

### 4.5.3 Contributions from Distant Water Fisheries

Contributions from distant water fisheries are derived from participation in that are not directly associated with Washington Coast ports, landings or vessels. Table 4-7 illustrated that the share of the at-sea sectors’ Pacific whiting catch taken in Washington waters has varied substantially over time, with some of the lowest catch shares from Washington waters occurring most recently. Since the at-sea Pacific whiting sectors do not deliver catch to local ports, their activities do not necessarily have a large direct

effect on the Washington Coast economy. Also the apparent lack of participation by Washington Coast-based vessels in the at-sea whiting fisheries indicates that spending of any earnings from these fisheries in local economies is likely to be small. For these reasons it is difficult to attribute a significant economic contribution to the five-county Washington Coast region from activities of the non-tribal at-sea whiting fisheries.

There are currently more than 18,000 permits that have been issued for participation in fisheries regulated by the State of Alaska (Table 4-20)<sup>4</sup>. The table shows there are 239 current permits that are owned by Washington Coast residents. The vast majority (152, or 64 percent) of these permits are salmon fishery permits. Table 4-21 details the distribution of ownership of those permits by individual salmon fishery<sup>5</sup>.

**Table 4-20** Counts of Alaska Commercial Fisheries Permits by Species Group Showing Current (2015) Owners Residing in the State of Washington and on the Washington Coast<sup>1</sup>

	Clams	Crab	Halibut	Herring	Sablefish	Salmon	Shrimp	Misc	Total
Total Current Permits	112	878	1,705	1,882	696	10,924	415	1,837	8,449
Number Owned by WA State Residents	36	114	199	196	134	1,478	18	304	2,479
Number Owned by WA Coast Residents	11	12	17	18	11	152	4	14	239
% of Total Current Permits Owned by WA Coast Residents	9.8%	1.4%	1.0%	1.0%	1.6%	1.4%	1.0%	0.8%	1.3%

<sup>1</sup> Owners' addresses in Clallam, Pacific, Grays Harbor or Wahkiakum counties, or the Coastal portion of Jefferson County.

Source: Commercial Fisheries Entry Commission (CFEC).

<sup>4</sup> This total does not include permits issued for Federally-managed groundfish and crab fisheries conducted in the North Pacific.

<sup>5</sup> Only those Alaska salmon fisheries that have current permit owners residing on the Washington Coast are included in the table.

**Table 4-21** Counts of Alaska Commercial Salmon Fisheries Permits<sup>1</sup> with Current (2015) Owners Residing in the State of Washington and on the Washington Coast<sup>2</sup>

	Purse Seine, South-East	Purse Seine, Prince William Sound	Purse Seine, Kodiak	Purse Seine, Chignik	Beach Seine, Kodiak	Drift Gillnet, South-East	Drift Gillnet, Prince William Sound	Drift Gillnet, Cook Inlet	Drift Gillnet, AK Penin-sula
Total Current Permits	317	268	373	92	31	475	538	570	164
Number Owned by WA State Residents	115	48	53	12	2	69	46	51	52
Number Owned by WA Coast Residents	3	1	2	1	1	3	7	24	3
% of Total Current Permits Owned by WA Coast Residents	0.9%	0.4%	0.5%	1.1%	3.2%	0.6%	1.3%	4.2%	1.8%

Table 4-21 (continued)

	Drift Gillnet, Bristol Bay	Set Gillnet, Yakutat	Set Gillnet, Cook Inlet	Set Gillnet, Kodiak	Set Gillnet, Bristol Bay	Hand Troll, State-wide	Power Troll, State-wide	Total Alaska Salmon Permits <sup>3</sup>
Total Current Permits	1,867	168	735	189	975	983	962	10,924
Number Owned by WA State Residents	644	11	40	22	125	53	92	1,478
Number Owned by WA Coast Residents	60	1	2	3	21	4	16	152
% of Total Current Permits Owned by WA Coast Residents	3.2%	0.6%	0.3%	1.6%	2.2%	0.4%	1.7%	1.4%

<sup>1</sup> Only those salmon fisheries with permit owners residing on the Washington Coast.

<sup>2</sup> Owners' addresses in Clallam, Pacific, Grays Harbor or Wahkiakum counties, or the Coastal portion of Jefferson County.

<sup>3</sup> Permit counts for all Alaska salmon fisheries.

Source: Commercial Fisheries Entry Commission (CFEC).

By far the largest number of permits owned by Washington Coast residents in any one fishery is the 60 permits in the Bristol Bay drift gillnet salmon fishery, representing 3.2 percent of the 1,867 total permits in the fishery. The next largest numbers of permits owned by Washington Coast residents are 24 (4.2 percent

of 570 permits) in the Cook Inlet drift gillnet fishery, 21 (2.2 percent of 975 permits) in the Bristol Bay set gillnet fishery, and 16 (1.7 percent of 962 permits) in the statewide power troll fishery.

A recent study<sup>6</sup> estimated that in 2010 the Bristol Bay sockeye salmon fishery (drift gillnet and set gillnet) provided \$72.7 million in net income to permit owners and \$37.1 million in total payments to the fishing crews. If we assume the proportion of this income accruing to Washington Coast residents is the same as their ownership share of Bristol Bay gillnet permits, and that Washington Coast permit owners utilize crews who are also Washington Coast residents, then the 81 (60 drift gillnet plus 21 set gillnet) of 2,842 (1,867 drift gillnet plus 975 set gillnet) total Bristol Bay gillnet permits that are owned by Washington Coast residents would claim approximately 2.9 percent of total income earned by permit owners and vessel crews. In 2010 this amounted to approximately \$3.2 million. Local spending in Washington Coast communities of the disposable income portion of \$3.2 million (adjusted for inflation) in 2014 is estimated to generate up to an additional \$1.4 million income in the State of Washington as a whole including \$0.5 million income in Washington Coast communities.

Ownership of permits and participation by Washington Coast residents in the other Alaska fisheries are expected to similarly generate economic effects for Washington Coast communities, albeit presumably on a much smaller scale than the economic contribution of participation in Bristol Bay salmon fisheries.

#### **4.5.4 Other Economic Contributions from Commercial Fisheries**

As the average age of participants in many West Coast fisheries increases over time, the need for “new blood” becomes ever more apparent. However the increasingly high cost of entry into commercial fisheries was cited by participants as a significant impediment to new entrants. Most entrants need time and experience to learn the ropes and acquire the capital needed to purchase a boat and gear plus the requisite permits and quota. Participation in Washington Coast fisheries serves as valuable source of training, experience and income for those looking to operate in commercial fisheries. The onboard skills and business experience necessary to operate successfully in modern commercial fisheries, including larger-scale West Coast groundfish and North Pacific fisheries, can be efficiently learned working on vessels operating in the variety of fisheries conducted off the Washington Coast.

Finally, the unique nature of regional fisheries fosters a non-conventional source of savings and investment. There are anecdotal examples of participants in commercial fisheries insurance pools (an alternative to purchasing coverage from insurance companies) who were able to accumulate substantial savings from contributions to their insurance pools and subsequent growth in value over time, and who upon retirement from the fishery were able to use their savings to reinvest in the local fishing industry. The ability to accumulate these type of savings from participating in locally-based insurance pools is fairly

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<sup>6</sup> Knapp, G., M. Guettabi and S. Goldsmith. 2013. *The Economic Importance of the Bristol Bay Salmon Industry*, ISER, University of Alaska Anchorage. April.  
[www.iser.uaa.alaska.edu/Publications/2013\\_04-TheEconomicImportanceOfTheBristolBaySalmonIndustry.pdf](http://www.iser.uaa.alaska.edu/Publications/2013_04-TheEconomicImportanceOfTheBristolBaySalmonIndustry.pdf)

unique to the commercial fishing industry. Insurance coverage acquired by paying premiums to companies in far-away places doesn't afford this type of opportunity to accumulate savings.



## CHAPTER 5.

# Shellfish Aquaculture

## 5.1 INTRODUCTION

As was outlined in the Marine Sector Analysis Report on Aquaculture (Industrial Economics, Inc. 2014), the aquaculture industry on the Pacific coast of Washington is concentrated primarily within Willapa Bay (Pacific County) and Grays Harbor (Grays Harbor County). Therefore, our analysis focuses solely on those two coastal counties. The communities of South Bend and Nahcotta, as well as Bay Center (all on Willapa Bay) serve as the primary centers of the industry's activities. All but one of the shellfish farms operating within this region are family-owned businesses. They range in size from small operations that farm relatively small parcels of aquatic lands to vertically integrated industrial complexes, engaged in production, processing, distribution and marketing with thousands of acres of productive land. According to the Willapa Grays Harbor Oyster Growers Association (WGHOA), there are approximately 28 farms in Pacific County and 8 in Grays Harbor County. These numbers are confirmed by the Washington Department of Health Licensed Shellfish Company listing.

Data provided by Washington Department of Fish and Wildlife (WDFW) indicate that 20 farms in Pacific County and 6 farms in Grays Harbor County reported sales of shellfish products in 2012. Hudson and Wellman (2012) and local growers report that the WDFW numbers are underestimates of true levels of participation. According to local growers, this number fluctuates on a regular basis as firms enter and exit the industry on a fairly regular basis and some operate at such a small scale that their production levels are of too insignificant a percentage of the total to be counted. All of the reported shellfish farms are operated on privately owned tidelands or on tidelands that are owned by the state and leased through Washington Department of Natural Resources (WDNR) to shellfish growers. WDNR reports that in 2010 shellfish farmers held a total of 82 leases on the coast with 1,714 acres of leased tideland being actually farmed (Industrial Economics, Inc. [IEC] 2014, p. 9). Northern Economics, Inc. (2013) reports that in 2010 there

were a total of 17,288 commercially farmed acres in Pacific County and 2,288 in Grays Harbor. Growers suggest that these numbers may be overestimates (Wilson 2015; Sheldon 2015). There is great uncertainty about the actual number of acres in aquaculture production as acres are continually being rotated and some percentage of each tract may or may not be usable ground (Dick Wilson 2015). Growers report that they typically farm between two-thirds to one-half of the acres they own (Dick Wilson 2015; Eric Hall 2015).

Most of the shellfish growers in Pacific and Grays Harbor counties raise and produce Pacific Oysters—about 82 percent of total production with a farm gate value of \$16,235,388, and Manila clams—11 percent of total production with a farm gate value of \$2,058,998. Small amounts of other species are grown by some growers (e.g., Eastern Oysters, 2 percent) and there is some experimentation going on with geoduck and Kumomoto oysters. The majority of the oysters harvested are shucked and canned or sold in-shell (singles). Clams are typically sold in the shell. More details relative to processing and distribution are reported in Section 3 of this report. According to IEC (2014) using U.S. Department of Agriculture (USDA) estimates (USDA 2014a) Pacific County ranked second among all Washington counties in shellfish aquaculture production, with sales of \$21,304,000 in 2012. Grays Harbor County ranked fourth statewide with shellfish aquaculture sales of \$5,559,000.

The IEC Aquaculture Sector Analysis (2014) provides a number of figures and tables that outline relative harvest (pounds and value) of farmed shellfish products in Pacific and Grays Harbor counties, total annual harvest and value of pacific oysters and Manila clams from 2004 through 2013, a summary of harvest and value of aquaculture products in Grays Harbor and Pacific Counties for 2004 through 2013, and results of a WGHOGA survey (Powell, Seiler & Co. 2002, 2010). Rather than reproduce them here we direct the reader to IEC (2014, pp. 17-22).

In the next section of this report we provide a very brief review of literature relevant to the economic impacts of shellfish aquaculture on the Pacific coast of Washington. The most relevant piece of work is provided by Northern Economics, Inc. (2013) and the Pacific Shellfish Institute (2012). Details of that report that relate to Pacific and Grays Harbor counties are described. Section 3 provides some further information related directly to the processing and distribution sector of Pacific and Grays Harbor shellfish aquaculture sector. This information as well as updated revenue and expenditure data provided by growers is used to augment the work of NEI and Pacific Shellfish Institute (PSI) (Hudson 2012) in the economic impact analysis reported by other project team members.

## 5.2 PREVIOUS ECONOMIC ASSESSMENTS

### 5.2.1 Literature

There are a number of studies which have conducted analysis of the economic impact of aquaculture industries on local or regional economies (Kaliba et al. 2004; Kaliba and Engle 2008; Deisenroth, Bond, and Loomis 2011) but few for the coast of Washington in particular. One such study was conducted by TCW Economics (2006) which assessed the economic impact and benefit of Washington's non-treaty commercial and recreational fisheries. The WGHOGA periodically surveys its members on production

and revenues, but the response rate and input to these surveys do not allow for any form of statistical analysis to be done (David Beugli 2015). Finally, with funding from the National Oceanic and Atmospheric Administration (NOAA), PSI and Northern Economics, Inc., conducted a revenues and expenditure survey of shellfish growers in Washington, Oregon and California and completed an input/output (I-O) model in 2013 (Northern Economics 2013). The analysis and results for Grays Harbor and Pacific Counties from this latter study are outlined below.

### 5.2.2 Northern Economics and Pacific Shellfish Institute 2013 Report

As part of the 2013 study completed by Northern Economics, the economic impact of shellfish aquaculture production in Washington State was analyzed using survey data to conduct I-O modeling. The survey was administered by PSI. Of the approximately 330 commercial shellfish growers in Washington, a total of 43 responded to the survey, with 7 respondents supplying detailed expenditure data. Even though the response rate was only 13 percent, those 43 respondents accounted for 76 percent of the total permitted acreage in Washington. Table 5-1 summarizes the survey response rate as a percentage of total commercially farmed acres by county. Pacific and Grays Harbor counties are reported as being the two largest counties, by survey acreage, in Washington State at 14,681 and 3,278, respectively.

**Table 5-1** Survey Response Rate by Acreage and County

County	Survey Acreage	Total Acreage	Response Rate (%)
Grays Harbor	3,278	2,288	143*
Island	55	87	63
Jefferson	666	1,155	58
Kitsap	25	485	5
Mason	814	4,079	20
Pacific	14,681	17,288	85
Pierce	39	138	28
Skagit	2,233	3,018	74
Thurston	710	1,037	68
Other	-	88	0
<b>Total</b>	<b>22,502</b>	<b>29,663</b>	<b>76</b>

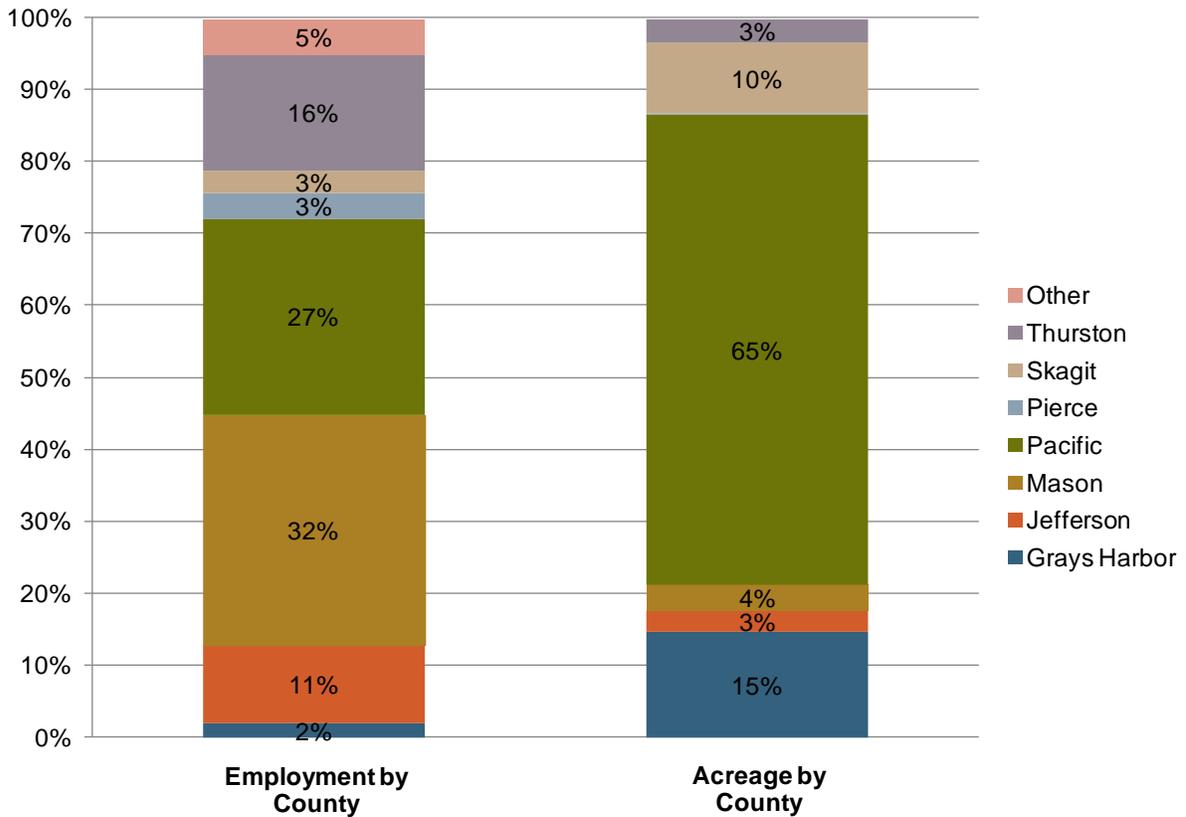
**Note:** Total acreage by county was supplied to Northern Economics by PSI.

\* Acreage reported for Grays Harbor by survey respondents exceeds total acreage in Washington Department of Health database. PSI confirmed with respondents that the survey total is likely correct and the difference is due to inaccuracies in the WDFW database.

Source: Northern Economics 2013

Survey respondents reported 1,266 direct jobs in Washington, with individual firm responses ranging from 0 to more than 400 employees. The survey data indicate a minimum employment of .01 persons per farmed acre (or 1 person per 100 farmed acres) and a maximum employment reported as 5 people per farmed acre (or 500 people per 100 acres). In all, Washington shellfish growers averaged one person per farmed acre. This is likely from reported employment varying significantly for different operation types.

Employment by shellfish producers is not specific to the county where growing operations take place. For instance, Pacific and Grays Harbor counties report the largest number of shellfish farming acres; however, they only represent 27 percent and 2 percent of total aquaculture farming employment in Washington, respectively. This indicates that employment activity generated by shellfish aquaculture farms impacts surrounding areas. Figure 5-1 summarizes employment and acreage by county.



**Figure 5-1** Washington Surveyed Shellfish Aquaculture Acreage and Employment by County, 2010

Source: Northern Economics 2013

To capture the economic impacts to Washington State, per acre expenditures were derived using acreage and expenditure data reported in the survey and the assumption that 37.8 percent of tidelands are left unfarmed in any given year. The total expenditure per acre of farmed tideland was estimated to be \$4,880 and was applied to those acres unaccounted for by the survey to estimate total industry expenditures. Extrapolated expenditures were distributed according to spending patterns reported by survey respondents and then modelled using I-O analysis. Table 5-2 summarizes estimated output, employment and labor income for non-respondents.

**Table 5-2** Economic Impacts of Non-survey Respondents

Total Impacts	Output	Employment	Labor Income
Direct	24,727,200	580	7,100,000
Indirect	9,670,300	90	4,400,500
Induced	13,813,300	90	4,012,200
<b>Total</b>	<b>48,210,800</b>	<b>760</b>	<b>15,512,700</b>

Source: Northern Economics 2013

Total Output, employment, and labor income were modelled for survey respondents separately and are summarized in Table 5-3.

**Table 5-3** Economic Impacts of Respondents

Total Impacts	Output	Employment	Labor Income
Direct	76,690,900	1,320	30,190,600
Indirect	28,562,400	300	16,793,900
Induced	30,961,587	330	14,625,400
<b>Total</b>	<b>136,214,887</b>	<b>1,950</b>	<b>61,609,900</b>

Source: Northern Economics 2013

Combining Table 5-2 and Table 5-3 make up total economic impacts of shellfish aquaculture to Washington. The results are shown in Table 5-4.

**Table 5-4** Economic Impact of Shellfish Aquaculture in Washington, 2010

Multipliers per dollar	Output	Employment	Labor Income
Direct	101,418,100	1,900	37,290,600
Indirect	38,232,700	390	21,194,400
Induced	44,774,900	420	18,637,600
<b>Total</b>	<b>184,425,700</b>	<b>2,710</b>	<b>77,122,600</b>

Source: Northern Economics 2013

From Table 5-4, it is estimated that shellfish aquaculture growing operations spent \$101.4 million in Washington and employed 1,900 people in 2010. This in turn generated approximately \$184.4 million in total output and an additional 810 jobs through indirect and induced impacts. The economic multipliers generated through industry spending are shown in Table 5-5. Multipliers can be interpreted as generation for each dollar spent. Therefore, for every dollar spent by the shellfish aquaculture industry, \$1.82 worth of economic activity is generated. In addition, every dollars spent by the shellfish aquaculture industry generates \$0.76 in labor income in Washington. Lastly, for every million dollars spent by the shellfish aquaculture industry, approximately 27 jobs are created.

**Table 5-5** Washington Shellfish Aquaculture Multipliers

	Output (per \$)	Employment (per \$ Million)	Labor Income (per \$)
Multiplier	1.82	26.72	0.76

Source: Northern Economics 2013

The economic impact each county contributes to the statewide impact as a whole is derived by assuming total output, employment, and labor income are generated in proportion to the number of leased acres. Table 5-6 summarizes the acres and economic impact of shellfish aquaculture by county. As shown, Pacific County generates total output estimated at over \$90 million and employment estimated at 1,580, representing the largest economic impact contribution of all Washington counties. Grays Harbor’s total output is estimated at nearly \$12 million with 210 jobs generated from shellfish aquaculture; representing the fourth largest economic impact contribution.

**Table 5-6** Economic Impact of Shellfish Aquaculture, by County (2010)

County	Percent of Acres	Output	Employment	Labor Income
Grays Harbor	7.7%	11,966,300	210	5,957,500
Island	0.3%	455,000	10	226,500
Jefferson	3.9%	6,432,900	110	3,007,400
Kitsap	1.6%	2,536,600	40	1,262,800
Mason	13.8%	22,452,500	370	10,621,000
Pacific	58.3%	90,416,800	1,580	45,014,700
Pierce	0.5%	721,700	10	359,300
Skagit	10.2%	16,045,700	280	7,858,300
Thurston	3.5%	5,423,500	90	2,700,200
Other	0.3%	460,200	10	229,100
<b>Total</b>	<b>100</b>	<b>156,911,400</b>	<b>2,710</b>	<b>77,236,900</b>

Source: Northern Economics 2013

### 5.3 SHELLFISH AQUACULTURE PROCESSING AND DISTRIBUTION: PACIFIC AND GRAYS HARBOR COUNTIES

#### 5.3.1 Pacific and Grays Harbor Focus Group

In January 2015, project team members met with the WGHOGA project coordinator and invited members to review the findings of the Northern Economics/PSI economic impact analysis (2013). A presentation was made that focused on findings pertinent to aquaculture production and expenditures in Pacific and Grays Harbor counties. Participants for the most part found the results of the 2013 study to be within reason with the exception of the acres in production figures, as indicated above. Participants also discussed product output measures used. The Northern Economics study team used pounds, but some growers measure output in terms of gallons. This latter point is indicative of the situation in this industry where many growers harvest and process their product so output is measured in terms of the unit of the good sold. This unit of measurement issue was taken into consideration by the project team’s economic

impacts assessment analyst. The group was also concerned about what goes into the “other category” of expenditures. In the survey and set of interviews described in the next section, this question was asked of growers for clarification. Lastly, one participant was concerned that the impacts of product harvested in Pacific and Grays Harbor Counties but processed outside of the two-county area would not be captured in the economic impact analysis. These impacts are highlighted qualitatively in the final analysis.

### 5.3.2 Survey

A survey – Shellfish Aquaculture Processing and Distribution – was designed and implemented in January 2015. This survey was intended to specifically capture information about the processing and distribution actions of shellfish growers in Pacific and Grays Harbor counties. The intention was to assure that this aspect of the industry is captured in the economic impact analysis as it was not explicitly included in the Northern Economics/PSI 2013 study. The survey (see **Appendix A**) included questions about:

- ◆ Location of the processing facility
- ◆ The types of products produced (as a percentage of total sales)
- ◆ The amount and dollar value of sales of oyster and clams sold by product type
- ◆ The origin of the shellfish processed
- ◆ The destination of processed shellfish sold
- ◆ Expenditures related to shellfish processing, sales and distribution by category by percentage of expenditure by location.

The survey was distributed in person to eight growers (seven in Willapa Bay and one in Grays Harbor). Four other growers were contacted but either did not respond or were unwilling to complete the survey. One of the surveys was filled out in person while the others were left after an extensive interview to be completed at the participant’s leisure. Six eight surveys were returned with the survey completed appropriately and thoroughly. Follow-up calls and emails were made to clarify any uncertainties in the responses. One participant also included recent 2014 profit and loss statements which allowed us to update the Northern Economics/PSI 2010 data used in their 2013 analysis.

### 5.3.3 Interview Findings

Interviews with all 8 survey participants led to some interesting findings about the shellfish aquaculture industry on the coast of Washington. While the history of the industry in this region is well known (by some) and reported in IEC (2014) and other places, the current situation suggests an industry of far greater complexity than one might otherwise expect.

In Pacific and Grays Harbor counties each shellfish aquaculture business is unique—unique in terms of its ownership structure, employment strategies, business practices, and tidal land ownership or lease tenure. Some of the operations are vertically integrated, others sell product to other businesses who process their

product. The percentage output between clam and oyster varies across all operations, etc. There appears to be less competition between firms than would be expected as each business has its own niche.

There is great sense of pride for the work that is conducted in this sector while at the same time a sentiment that the aquaculture industry in Washington coastal counties is viewed as a “step-cousin” to the often celebrated Puget Sound part of the industry—despite the fact that production and employment are highest in Pacific and Grays Harbor counties (Northern Economics 2013).

Most of the growers in these counties raise their product on bottom or use off-bottom techniques such as longlines, flip bags and rack and bags. Between 85 and 90 percent of oyster culture in Willapa Bay and Grays Harbor uses bottom culture (IEC 2014). Ekone is working with longline gear with a focus on single seed set. Most shellfish farmers rely on a mix of natural set and hatchery larvae production. Because of failures of the natural set beginning in 2005, most farmers have switched to the purchase of larvae from hatcheries to seed their beds. Three companies currently own their own hatcheries—two for their own use (Nizbet Oyster Company and Ekone of Bay Center Washington) and the other for sale to other growers (Coast Seafoods Company of Bellevue Washington, which has a hatchery operated out of Quilcene, Washington). The Nesbit hatchery is located in Hilo, Hawaii and Coast Seafoods’ second clam hatchery is in Kona, Hawaii. Many companies also purchase seed from Whiskey Creek Shellfish Hatchery of Netarts, Oregon and Taylor Shellfish of Shelton, Washington. Currently the Washington Coast aquaculture industry is enjoying strong demand for its product and, as described in the next section, is working towards development of diverse product line of goods.

### 5.3.4 Survey Results

In 2015 there are 13 identified shellfish aquaculture companies that also process shellfish products. Of these, six companies filled out the survey implemented by Northern Economics (a 46 percent response rate). All six surveys were thoroughly completed with very little follow up needed.

Five of the six companies are focused on oyster and clam processing. The sixth engages in the processing of manila clams only. Oyster processing generally takes one of two forms (IEC 2014). Some are sent to shucking houses where the meat is removed from the shell and packaged in tubs and or jars of various sizes and packaged for sale. Shellfish may also be used for other value added products such as smoked oysters. Others are sold in the shell as “dozens” for cooking (e.g., on the grill) or to be consumed on the half shell (i.e., raw). Generally speaking, larger oysters are sent to Asia, medium and small oysters remain in the United States, and extra small oysters specifically are sent to oyster bars on the West Coast. About half of those surveyed shuck most of their product. One respondent said that the shucked market with supermarkets has declined because of the desire for more processed food (from 80–90 percent of total sales to 15 percent). Clams are typically cleaned and bagged by the pound and sold either to wholesalers or retail outlets.

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“Every Processor owns a farm; not every farm owns a processor.”

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The number of processing employees (typically full time year round) is 6 to 200 depending on the size of the company.

Three of the companies are vertically integrated in that they not only raise shellfish but process and distribute it as well as provide a retail market. Those without distribution operations rely on a distributor to move their product. Ocean Beauty Group is used by some while others rely on purchasers who own their own trucks and pick up product for further distribution. Very little product (on a relative scale) is sold to local restaurants and stores.

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## CHAPTER 6. Recreational Fishing

### 6.1 RECREATIONAL FISHERIES ALONG THE WASHINGTON COAST

The major recreational fisheries along the Washington Coast include fishing for groundfish, salmon, Pacific halibut, and highly migratory species, including tunas, Pacific albacore, yellowfin, sharks, billfish/swordfish, dorado and marlin. This chapter first provides an overview of socio-demographic characteristics of marine (including Puget Sound) anglers in Washington State, followed by a coastal-specific description of the level of effort (trips) and catch of marine species along the Washington coast.

#### 6.1.1 Angler Characteristics

According to the USFWS (2014), saltwater (including Puget Sound) anglers in Washington who fished on charters, private boats, and shore fishing spent an average of about \$70 a day, as compared to about \$32 a day to fish for freshwater anglers. Also, an estimated 401,000 anglers fished in saltwaters in 2011, or about 43 percent of the estimated total of 938,000 anglers in Washington State. An estimated 89 percent of all saltwater anglers resided in Washington State. Saltwater anglers in Washington State fished an average of seven days per year, and took an estimated 2,018,000 trips involving 2,625,000 days of fishing. (U.S. Fish and Wildlife Service [USFWS] 2014)

The majority of saltwater anglers in Washington State fish for salmon, with an estimated 237,000 anglers, or 59 percent of all saltwater anglers reporting salmon as their target species. Salmon anglers are estimated to have fished a total of 1,859,000 days, or 69 percent of the total saltwater fishing days in Washington in 2011. Next to salmon, the second most popular saltwater species was shellfish, accounting for 153,000 days, or 38 percent of all marine angler days. Shellfishing accounted for 727,000 days of fishing in 2011, accounting for 27 percent of total days fished for saltwater species (USFWS 2014).

A survey completed of Washington and Oregon saltwater anglers in 2013 indicated that saltwater anglers are mostly male, about 70 percent are between the ages of 40 and 69, 65 percent have completed at least some college, and 40 percent have an annual household income of \$40-80 thousand a year. In 2011, about 58 percent of Washington saltwater anglers worked full time, and an estimated seven percent worked part time (USFWS 2014).

### Charter Boat Anglers

The two main ports for charter boat operations are Westport and Ilwaco along the southern Washington coast. A key informant survey of charter boats operators in Washington indicated that a reported 100 percent of the crew, owners, and guides/skippers resided along the Washington coast (E. Waters, pers. comm. 2015). Of clients of charter boat operators in the Westport area, 85 to 95 percent are estimated to be from Washington State, with the remainder coming from outside of Washington. Albacore brought in the highest percentage of anglers outside of the Pacific Northwest (14%). Anglers out of Westport went on a total of 38,130 charter trips, 60 percent of which were for salmon, 36 percent for bottomfish (groundfish), with 4 percent catching other species (Table 6-1). Charter operations in Ilwaco, on the southern Washington coast, attracted more anglers from Oregon, with 45 percent of anglers coming that state, primarily from the Portland area. The remainder of Ilwaco anglers came from inland Washington counties (45 percent), the Washington coast (5%), and elsewhere in the US (5%). Anglers out of Ilwaco accounted for an estimated 13,530 trips in 2014, with 72 percent targeting salmon, 10 percent sturgeon, 8 percent bottomfish, 7 percent albacore, and 3 percent halibut Table 6-2.

The number of charter boat trips by targeted species taken out of Neah Bay, La Push, Chinook and North Bay Jetty along the Columbia River between 2004 and 2013 are shown in Tables 6-3 through 6-6, respectively. Table 6-7 shows the distribution by port area of coast-wide charter boat trips taken between 2004 and 2013.

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**Table 6-1** Port Fishing Effort by Trip Type and Mode, 2004-2013: Westport Port Area

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<i>Charter Boat</i>											
Albacore											
Bottomfish	937	817	1,205	1,026	919	1,013	1,337	926	1,057	1,432	1,066.9
Halibut	10,987	12,480	15,390	13,931	13,462	10,882	9,788	11,836	13,474	12,290	12,452
Salmon	3,854	3,061	2,318	2,241	1,947	2,110	1,941	2,049	2,017	2,174	2,371.2
Other <sup>1</sup>	22,447	20,403	15,491	15,779	9,900	18,632	18,550	14,220	16,443	15,986	16785
Albacore	66	67	0	0	64	0	0	0	0	0	19.7
<b>Charter Boat Total</b>	<b>38,291</b>	<b>36,828</b>	<b>34,404</b>	<b>32,977</b>	<b>26,292</b>	<b>32,637</b>	<b>31,616</b>	<b>29,031</b>	<b>32,991</b>	<b>31,882</b>	<b>32,694.8</b>
<i>Private Boat</i>											
Albacore	57	163	199	456	635	550	1,118	856	3,071	4,350	1,145.5
Bottomfish	1,548	1,577	1,662	1,509	1,176	1,637	1,483	1,928	1,874	2,195	1,658.9
Halibut	138	182	160	44	461	535	298	507	610	690	362.5
Salmon	17,583	15,091	10,310	10,957	8,918	19,942	20,927	20,038	23,378	21,287	16,843.1
Other <sup>1</sup>	26	0	11	2	65	0	0	0	0	0	10.4
<b>Private Boat Total</b>	<b>19,352</b>	<b>17,013</b>	<b>12,342</b>	<b>12,968</b>	<b>11,255</b>	<b>22,664</b>	<b>23,826</b>	<b>23,329</b>	<b>28,933</b>	<b>28,522</b>	<b>20,020.4</b>
<b>Total Trips</b>	<b>57,643</b>	<b>53,841</b>	<b>46,746</b>	<b>45,945</b>	<b>37,547</b>	<b>55,301</b>	<b>55,442</b>	<b>52,360</b>	<b>61,924</b>	<b>60,404</b>	<b>52,711</b>

<sup>1</sup> Includes trips targeting both salmon and halibut, and dive trips.

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

**Table 6-2** Sport Fishing Effort by Trip Type and Mode, 2004-2013: Ilwaco Port Area

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<i>Charter Boat</i>											
Albacore	264	185	556	637	516	568	696	681	965	914	598.2
Bottomfish	620	629	841	517	688	341	655	1,197	1,050	1,064	760.2
Halibut	566	374	432	459	458	375	303	397	384	372	412
Salmon	11,770	9,498	8,395	10,765	4,495	10,129	7,043	7,229	7,321	7,200	8,384.5
Other <sup>1</sup>	5	27	30	33	9	0	25	0	27	0	15.6
<b>Charter Boat Total</b>	<b>13,225</b>	<b>10,713</b>	<b>10,254</b>	<b>12,411</b>	<b>6,166</b>	<b>11,413</b>	<b>8,722</b>	<b>9,504</b>	<b>9,747</b>	<b>9,550</b>	<b>10,170.5</b>
<i>Private Boat</i>											
Albacore	159	213	469	932	1,045	998	1,322	1,105	3,304	2,332	1,187.9
Bottomfish	398	547	405	669	676	583	672	815	955	1,044	676.4
Halibut	65	148	214	173	350	158	255	129	210	190	189.2
Salmon	41,297	27,063	17,493	22,247	10,706	37,405	24,316	19,271	20,673	20,103	24,057.4
Other <sup>1</sup>	6	108	14	37	49	165	112	78	77	51	69.7
<b>Private Boat Total</b>	<b>41,925</b>	<b>28,079</b>	<b>18,595</b>	<b>24,058</b>	<b>12,826</b>	<b>39,309</b>	<b>26,677</b>	<b>21,398</b>	<b>25,219</b>	<b>23,720</b>	<b>26,180.6</b>
<b>Total Trips</b>	<b>55,150</b>	<b>38,792</b>	<b>28,849</b>	<b>36,469</b>	<b>18,992</b>	<b>50,722</b>	<b>35,399</b>	<b>30,902</b>	<b>34,966</b>	<b>33,270</b>	<b>36,351.149</b>

<sup>1</sup> Includes trips targeting both salmon and halibut or salmon and sturgeon.

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

**Table 6-3** Sport Fishing Effort by Trip Type and Mode, 2004-2013: Neah Bay Port Area

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<i>Charter Boat</i>											
Albacore	3	0	0	8	0	0	0	0	0	0	1
Bottomfish	138	457	378	398	300	388	420	484	481	576	402
Halibut	3,299	2,996	3,936	3,882	2,028	1,091	744	714	358	131	1,917.9
Salmon	1,941	1,224	515	574	315	503	434	501	765	970	774.2
Other <sup>1</sup>	77	84	66	51	14	41	0	4	18	0	35.5
<b>Charter Boat Total</b>	<b>5,458</b>	<b>4,761</b>	<b>4,895</b>	<b>4,913</b>	<b>2,657</b>	<b>2,023</b>	<b>1598</b>	<b>1703</b>	<b>1622</b>	<b>1677</b>	<b>3,130.6</b>
<i>Private Boat</i>											

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Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Albacore	0	4	0	4	13	18	25	8	47	42	16.1
Bottomfish	7,348	11,318	9,361	8,779	8,926	8,087	9,907	9,335	7,969	9,824	9,085.4
Halibut	7,307	7,170	7,248	6,504	5,965	4,250	3,974	4,487	4,430	4,684	5,601.9
Salmon	24,513	14,988	11,377	12,642	5,817	16,193	11,354	10,708	12,966	14,642	13,520
Dive	513	351	317	384	303	395	507	373	375	443	396.1
Other <sup>1</sup>	1,335	830	1,187	2,163	999	845	1,047	1,226	763	947	1,134.2
<b>Private Boat Total</b>	<b>41,016</b>	<b>34,661</b>	<b>29,490</b>	<b>30,476</b>	<b>22,023</b>	<b>29,788</b>	<b>26,814</b>	<b>26,137</b>	<b>26,550</b>	<b>30,582</b>	<b>29,753.7</b>
<b>Total Trips</b>	<b>46,474</b>	<b>39,422</b>	<b>34,385</b>	<b>35,389</b>	<b>24,680</b>	<b>31,811</b>	<b>28,412</b>	<b>27,840</b>	<b>28,172</b>	<b>32,259</b>	<b>32,881</b>

<sup>1</sup> Includes trips targeting both salmon and halibut.

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

**Table 6-4** Sport Fishing Effort by Trip Type and Mode, 2004-2013: La Push Port Area

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<b>Charter Boat</b>											
Albacore	13	36	44	55	63	48	92	4	16	38	40.9
Bottomfish	49	191	57	217	622	337	408	253	240	239	261.3
Halibut	347	274	269	271	359	355	296	266	181	128	274.6
Salmon	620	563	534	383	208	683	630	666	664	691	564.2
Other <sup>1</sup>	0	0	0	20	11	0	0	0	0	0	3
<b>Charter Boat Total</b>	<b>1029</b>	<b>1064</b>	<b>904</b>	<b>946</b>	<b>1263</b>	<b>1423</b>	<b>1426</b>	<b>1189</b>	<b>1101</b>	<b>1096</b>	<b>1144</b>
<b>Private Boat</b>											
Albacore	39	64	102	301	152	176	260	116	414	261	188.5
Bottomfish	799	1,384	1,181	1,001	980	1,037	1,766	2,728	3,453	3,057	1,738.6
Halibut	861	1,115	1,634	1,494	1,253	1,671	1,804	2,077	2,421	2,164	1,649.4
Salmon	3,941	4,356	3,609	2,724	1,757	4,394	3,178	3,571	3,262	3,564	3,435.6
Other <sup>1</sup>	2	0	0	141	94	21	28	84	5	12	38.7
<b>Private Boat Total</b>	<b>5,642</b>	<b>6,919</b>	<b>6,526</b>	<b>5,661</b>	<b>4,236</b>	<b>7,299</b>	<b>7,036</b>	<b>8,576</b>	<b>9,555</b>	<b>9,058</b>	<b>7,050.8</b>
<b>Total Trips</b>	<b>6,671</b>	<b>7,983</b>	<b>7,430</b>	<b>6,607</b>	<b>5,499</b>	<b>8,722</b>	<b>8,462</b>	<b>9,765</b>	<b>10,656</b>	<b>10,154</b>	<b>8,192</b>

<sup>1</sup> Includes trips targeting both salmon and halibut or salmon and sturgeon, and jig fishing trips.

*Economic Analysis to Support Marine Spatial Planning in Washington*

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

**Table 6-5** Sport Fishing Effort by Trip Type and Mode, 2004-2013: Chinook Port Area

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<i>Charter Boat</i>											
Albacore	0	0	0	0	0	0	0	0	0	0	0
Bottomfish	11	5	0	0	0	0	0	0	0	0	2
Halibut	0	0	0	0	0	0	0	0	0	0	0
Salmon	305	69	44	0	47	0	0	0	0	0	46.5
Other <sup>1</sup>	0	0	0	0	0	0	0	0	0	0	0
<b>Charter Boat Total</b>	<b>316</b>	<b>74</b>	<b>44</b>	<b>0</b>	<b>47</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>48</b>
<i>Private Boat</i>											
Albacore	29	33	71	174	85	84	64	48	174	71	83.3
Bottomfish	61	83	70	122	45	46	109	160	184	68	94.8
Halibut	5	57	111	41	82	24	19	22	42	10	41.3
Salmon	21,088	15,855	10,241	11,862	7,719	22,655	16,415	13,274	15,344	17,165	15,161.8
Other <sup>1</sup>	0	90	21	38	6	93	41	12	26	16	34.3
<b>Private Boat Total</b>	<b>21,183</b>	<b>16,118</b>	<b>10,514</b>	<b>12,237</b>	<b>7,937</b>	<b>22,902</b>	<b>16,648</b>	<b>13,516</b>	<b>15,770</b>	<b>17,330</b>	<b>15,415.5</b>
<b>Total Trips</b>	<b>21,499</b>	<b>16,192</b>	<b>10,558</b>	<b>12,237</b>	<b>7,984</b>	<b>22,902</b>	<b>16,648</b>	<b>13,516</b>	<b>15,770</b>	<b>17,330</b>	<b>15,461</b>

<sup>1</sup> Includes trips targeting both salmon and halibut or salmon and sturgeon.

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

**Table 6-6** Sport Fishing Effort by Trip Type and Mode, 2004-2013: North Bay Jetty (Columbia River)

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<i>Jetty</i>											
Bottomfish	308	NA	862	NA	488	277	473	917	588	441	398
Salmon	3,166	NA	1,650	NA	421	2,634	128	2,207	2,662	3,026	1,384.75
<b>Total Trips</b>	<b>3,474</b>	<b>NA</b>	<b>2,512</b>	<b>NA</b>	<b>909</b>	<b>2,911</b>	<b>601</b>	<b>3,124</b>	<b>3,250</b>	<b>3,467</b>	<b>1,782.75</b>

NA = not available.

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

**Table 6-7** Sport Fishing Effort by Trip Type and Mode, 2004-2013: All Washington Port Areas

Trip Type by Mode	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
<i>Charter Boat</i>											
Albacore	1,217	1,038	1,805	1,726	1,498	1,629	2,125	1,611	2,038	2,384	1,707.1
Bottomfish	11,805	13,762	16,666	15,063	15,072	11,948	11,271	13,770	15,245	14,169	13,877.1
Halibut	8,066	6,705	6,955	6,853	4,792	3,931	3,284	3,426	2,940	2,805	4,975.7
Salmon	37,083	31,757	24,979	27,501	14,965	29,947	26,657	22,616	25,193	24,847	26,554.5
Other <sup>1</sup>	148	178	96	104	98	41	25	4	45	0	73.9
<b>Charter Boat Total</b>	<b>58,319</b>	<b>53,440</b>	<b>50,501</b>	<b>51,247</b>	<b>36,425</b>	<b>47,496</b>	<b>43,362</b>	<b>41,427</b>	<b>45,461</b>	<b>44,205</b>	<b>47,188.3</b>
<i>Private Boat</i>											
Albacore	284	477	841	1,867	1,930	1,826	2,789	2,133	7,010	7,056	2,621.3
Bottomfish	10,154	14,909	12,679	12,080	11,803	11,390	13,937	14,966	14,435	16,188	13,254.1
Halibut	8,376	8,672	9,367	8,256	8,111	6,638	6,350	7,222	7,713	7,738	7,844.3
Salmon	108,422	77,353	53,030	60,432	34,917	100,589	76,190	66,862	75,623	76,761	73,017.9
Dive	513	351	328	384	303	395	507	373	377	443	397.4
Other <sup>2</sup>	1,369	1,031	1,222	2,381	1,226	1,103	1,228	1,400	868	1,026	1,285.4
<b>Private Boat Total</b>	<b>129,118</b>	<b>102,793</b>	<b>77,467</b>	<b>85,400</b>	<b>58,290</b>	<b>121,941</b>	<b>101,001</b>	<b>92,956</b>	<b>106,026</b>	<b>109,212</b>	<b>98,420.4</b>
<i>Jetty</i>											
Bottomfish	308	NA	862	NA	488	277	473	917	588	441	398
Salmon	3,166	NA	1,650	NA	421	2,634	128	2,207	2,662	3,026	1,384.75
<b>Jetty Total</b>	<b>3,474</b>	<b>NA</b>	<b>2,512</b>	<b>NA</b>	<b>909</b>	<b>2,911</b>	<b>601</b>	<b>3,124</b>	<b>3,250</b>	<b>3,467</b>	<b>1,782.75</b>
<b>Total Trips</b>	<b>190,911</b>	<b>156,233</b>	<b>130,480</b>	<b>136,647</b>	<b>95,624</b>	<b>172,348</b>	<b>144,964</b>	<b>137,507</b>	<b>154,737</b>	<b>156,884</b>	<b>147,389</b>

NA = not applicable.

<sup>1</sup> Includes trips targeting both salmon and halibut or salmon and sturgeon, and dive and jig fishing trips.

<sup>2</sup> Includes trips targeting both salmon and halibut or salmon and sturgeon, and jig fishing trips.

Source: Washington Department of Fish and Wildlife (file = 2004-13 WA Recreational Effort.xlsx).

### Private Boat Anglers

The marinas and port areas where anglers fishing from private boats launch are identified in Table 6-8. As shown, about 30 percent of private boat anglers on average over the 2004-13 period launched from the Malaka Marina in Neah Bay, followed by 27 percent from the Port of Ilwaco, and 20 percent from Westport Narina in Grays Harbor. All of these ports cater to anglers working out of transient boats to rent slips during the fishing season. The smaller ports of La Push and Chinook have a limited number of slips for private boats. No data are currently available that identifies the county of residency of private boat anglers in ocean waters of the Washington coast.

**Table 6-8** Average Number of Ocean Private Boat Sportfishing Trips, 2004-2013

Port	Marina	# of Private Boat Trips	% of Private Boat Trips
Neah Bay	Malaka Marina	29,754	30%
La Push	Quileute Harbor Marina	7,051	7%
Grays Harbor	Westport Marina	20,020	20%
Ilwaco	Port of Ilwaco	26,180	27%
Chinook	Port of Chinook	15,416	16%

Source: Data provided in Tables 6-1 through 6-6.

The 200-slip Malaka Marina in Neah Bay caters mostly to private boats, and as indicated above accounted for on average 30 percent of ocean sportfishing trips from private boats between 2004 and 2013. The Makah Tribal Council operates the marina at Neah Bay, which is open to recreational use from April through September. Temporary moorage is available, as well as long term and short term parking to service private boat anglers (Makah Tribe 2015).

The Westport Marina, a 550-slip marina located in the Port of Grays Harbor, is currently home to about 94 annually moored recreational vessels, and 188 commercial fishing vessels. Daily, weekly, and monthly moorage is available as well as boat trailer parking and a boat launch for private boats (Port of Grays Harbor 2015).

The Port of Ilwaco is an 800-slip marina for both commercial and recreational boaters that has moorage for daily, monthly, and annual slips, as well as a 12-hour tour boat fee option (Port of Ilwaco 2015). Boat trailer parking is available for private boats, with a fee charged only for boats docked or stored for longer than 24 hours. In 2013, 17,330 private trips were launched from Ilwaco, with 84 percent of anglers fishing for salmon and about 10 percent of anglers fishing for albacore (Table 6-2).

The Port of Chinook has 300 slips with 10 reserved for transients with no reservations. In the 2004 to 2013 period, 98 percent of private boat anglers fished for salmon. Over the 2004-13 period, 99 percent of trips out of the Port of Chinook were conducted by anglers in private boats, with all charters ceasing operations in 2009 (Table 6-5).

### Shore/Jetty Anglers

The Columbia River Jetty, near Ilwaco, is the primary fishing spot for jetty anglers. In 2013, 3,467 trips were made by anglers here, the highest total since 2004. An estimated 87 percent of the fish caught by anglers were salmon, with rockfish making up the remainder (Table 6-6).

#### 6.1.2 Fishing Levels of Effort (by Port Area and Species)

Over the 2009-2013 period, salmon charter trips in the La Push area increased by 31 percent over the previous five year average (Table 6-4). Over the same period, growth in bottomfish fishing surpassed halibut, with a 24 percent decline in halibut and a 24 percent increase in bottomfish. Sportfishing effort for albacore was highly variable, with trips ranging from 92 in 2010 to four in 2011, a 96 percent decline in only one year. Overall, charter trips increased by 17 percent between 2009 and 2013, aided by good years in 2009 and 2010 when charter trips were up 24 percent over the 10 year average. Private boat trips increased 30 percent over the most recent five year period. Most of this sportfishing increase was for bottomfish, albacore and halibut, which increased by 56 percent, 46 percent, and 37 percent, respectively, over the previous five-year average. Total trips from the La Push area increased by 28 percent on average over 2009-2013 as compared to the previous five years.

Charter trips from the Westport area declined by about three percent when comparing the five year average from 2009-2013 to 2004-2008 (Table 6-1). Trips targeting halibut and bottomfish declined by 11 percent and 9 percent, respectively, over the same period, but albacore trips slightly offset these declines with a 13 percent increase. The relative catch of most species fished by charter boat operators had little annual variability, with the exception of 2008 in which salmon trips accounted for about half of all charter trips.

Total private boat trips from the Westport port area during the 2009-13 period increased by about 36 percent when compared to the 2004-08 period. The largest increase in sportfishing effort was for albacore, which had an 80 percent increase in the most recent five year average (2009-2013). In 2012, the number of albacore trips had increased by 98 percent as compared to 2004. Private boat salmon trips have more than recovered from a decline starting in 2006, with 34 percent more trips in 2009-2013. Private boat trips in the Westport area between 2009 and 2013 increased by 14 percent when compared to averages during the 2004-08 period.

Charter trips from the Westport area declined by about 3 percent when comparing the 5-year average of 2009- 2013 to 2004-2008. Halibut and bottomfish trips declined (11 percent and 9 percent, respectively) over the same comparison periods, while albacore trips slightly offset these declines with a 13 percent increase during the 2009-13 period. The relative catch of most species fished for from charter boats had little annual variability, with the exception of 2008, in which almost half of the charter boat trips were for salmon.

From the Chinook port area, all charter boat trips ceased in 2009, at the same time that private boat angler trips notably increased (Table 6-5). Private boat trips were up 10 percent when comparing the five year

averages of 2009-2013 to 2004-2008. Most of the additional trips were for salmon, with an average of about 1,500 more trips in the most recent five year period.

From the Ilwaco area, average total trips were down 3 percent in the five year period from 2009-2013 compared to the previous five year period average (Table 6-2). Charter boat trips were down 7 percent in comparison of the two 5-year periods. Most of this decline was attributable to a reduction in salmon trips, with 1,167 fewer trips (a reduction of 16 percent) per year on average than in the most recent five year period. Increases in albacore and bottomfish charter trips out of Ilwaco somewhat offset this decrease, with 257 and 311 more trips, respectively, on average, or a 34 percent increase for each species.

Over the past five year period, private boat trips out of Ilwaco were down slightly, with a one percent decline in average total trips (Table 6-2). Similar to charter trips in Ilwaco, private boat salmon trips were down the most, with 1,514 fewer trips on average, or 7 percent. Private boat trips targeting albacore and bottomfish trips increased, with albacore increasing by 1,027 trips a year, or 58 percent.

Overall, sport fishing trips out of all Washington ports increased by a total of 8,205 trips or 6 percent, when comparing the five year averages of 2009-2013 to 2004-2008 (Table 6-7). Charter trips were down 3,366, or 8 percent, over the same period. Most of this decline occurred in trips for halibut, with 2,187 fewer trips, or 60 percent, in the most recent five year average. Salmon trips also declined by 801 trips, or 3 percent, as did trips for bottomfish, which were down by 711 trips, or 5 percent. Some of the decline in charter trips was offset by an increase of about 400 additional albacore trips, or 21 percent in the most recent five year period. Private boat trips went up by 10,496, an 11 percent increase over the same period. The species with the largest increase in trips was salmon, with 6,876 more trips (+10 percent), followed by albacore, (2,687 trips, +66 percent), and bottom fish (1,847 trips, +13 percent).

### 6.1.3 Sport Catch

This section highlights trends in the sport catch of marine species caught along the Washington coast over the 5-year period from 2007-08 through 2011-12 fishing seasons (Table 6-9) and profiles the 2011-12 season by catch area (Table 6-10). As shown in Table 6-9, the salmon catch during the 2008-09 season was particularly weak, with a total catch that was only one third of the five year average catch. The catch peaked in 2009-10 at twice the average, only to fall 65 percent in the following year. During the 2008-09 catch year when far fewer salmon trips were made, about one salmon was caught per trip along the coast. Neah Bay had the worst catch rate with about an average catch rate of one half a salmon per trip. In 2009-10, salmon catch rates in the Neah Bay region dramatically increased, with more than four salmon caught per trip. Historically, steelhead also has had annual catch variability, with the catch rate during the 2008-09 season tumbling to half the average, and then in 2011-12 when the catch rate almost doubled the five year average. Catch rates for all other species were relatively stable during the 2007-08 through 2011-12 five year period.

**Table 6-9** Annual and Average Annual Sport Catch in Marine Waters along the Washington Coast, 2007-08 through 2011-12 Sport Fishing Seasons<sup>1</sup>

Species Group	2007-08	2008-09	2009-10	2010-11	2011-12	Average Annual
Salmon <sup>2</sup>	100,512	37,272	221,205	77,157	89,240	105,077
Steelhead <sup>3</sup>	7,268	4,451	10,603	11,271	19,124	10,543
Sturgeon <sup>4</sup>	330	475	473	349	262	378
Pacific halibut	8,055	7,460	7,301	7,209	8,039	7,613
Bottomfish <sup>5</sup>	273,967	230,263	287,872	303,629	293,831	277,912
Razor Clams	3,030,840	3,216,167	3,805,228	3,158,886	2,436,288	3,129,482
Dungeness Crab <sup>6</sup>	22,850	31,550	13,674	10,244	9,392	17,542

**Notes:**

Numbers represent the number of fish caught or clams dug.

- 1. Salmon totals include all species, including coho, Chinook, etc.
- 2. Steelhead total include winter and summer steelhead
- 3. Sturgeon total include only fish caught in coastal streams.
- 4. Bottomfish include all rockfish species and other bottomfish.
- 5. Dungeness crab values are in pounds harvested.

Source: WDFW, *Sport Fish Catch Report, 2014*.

**Table 6-10** Profile of Sport Catch along the Washington Coast during the 2011-12 Sport Fishing Season, by Catch Area

Species Group	Marine Catch Area						Total Coastal Streams
	Area 1: Ilwaco	Area 2: Westport	Area 3: La Push	Area 4a: Neah Bay	Area 4b: Neah Strait	Total Marine Waters	
Salmon <sup>2</sup>	26,948	43,710	5,558	13,024		89,240	5,996
Steelhead <sup>3</sup>	316	68	49	15		448	18,676
Sturgeon <sup>4</sup>	N/A						262
Pacific halibut	3,025		5,014			8,039	N/A
Bottomfish <sup>5</sup>	29,336	154,636	42,035	46,628	21,196	293,831	N/A
Razor Clams	1,060,066	1,373,230	2,952	N/A		2,436,248	N/A
Dungeness Crab <sup>6</sup>	N/A			1,669		1,669	N/A

**Notes:**

- Numbers represent the number of fish caught or clams dug.
- 1. Salmon totals include all species, including coho, Chinook, etc.
- 2. Steelhead total include winter and summer steelhead
- 3. Sturgeon total include only fish caught in coastal streams.
- 4. Bottomfish include all rockfish species and other bottomfish.
- 5. Dungeness crab values are in pounds harvested.

Source: WDFW, Sport Fish Catch Report, 2014.

The catch rates for razor clams, which are harvested along the southern portion of the Washington coast, have remained near the 5-year average except during the 2009-10 season when the catch increased by about 700,000 clams, and during the 2011-12 season when about 700,000 fewer clams were harvested as compared to the five year average (Table 6-9). Digger trips appeared to be the main difference between both of the years, with almost 800,000 more trips in 2009-10. Dungeness crab catch steadily declined from the 2008-09 catch year, in which the sport harvest was about double the five year average. The drop in 2011 coincides with a statewide decline in crab catch, as both years comprise about 3 percent of the total state crab haul.

During the 2011-12 fishing season, about half of the ocean marine salmon catch occurred near Westport (Area 2), about 25 percent near Ilwaco, and about 12 percent near Neah Bay. La Push and coastal streams both recorded about 6,000 salmon being caught during the 2011-12 season (Table 6-10). Coho were mostly caught along the south coast, with only about 5,000 (11 percent) caught north of Grays Harbor. About half of all Chinook salmon were caught out of Westport; about three quarters of all pink salmon were landed in Neah Bay; and jack salmon were only caught in Westport, with 472 caught. Ocean salmon catch rates per trip were about double of the Washington State freshwater salmon catch rates (USFWS 2014).

Over the 5-year period of 2007-08 through 2011-12, only about 2 percent of steelhead were caught in the ocean (Table 6-9). On average, the Quillayute River accounts for about 32 percent of the steelhead caught in coastal freshwaters, followed by the Chehalis River for about 39 percent, the Queets River for about 11

percent, and the remainder of the steelhead catch occurring in other smaller river systems. About half of all coastal stream sturgeon were caught on the Naselle River, with the Chehalis River and Willapa River sharing the other half about equally.

The majority of bottomfish caught during the 2011-12 season were black rockfish caught near Westport in Area 2, comprising about a third of all bottomfish caught (Table 6-10). Area 2 also had the most yellowtail rockfish and lingcod, comprising about 8 percent each of the total bottomfish catch on the Washington coast. Neah Bay had the largest variety of rockfish caught, with significantly more rare rockfish including China rockfish, Quillback rockfish, and Copper rockfish. Although the catch of Pacific halibut is only broken down by the north and south coast, the 2011-12 catch in the north coast accounted for about 24 percent more catch than along the south coast (Table 6-10).

Razor clams digging rates were similar throughout the catch areas, with about 12 clams dug per trip in the fall and almost 14 in the spring. During the 2011-12 season, total harvest of razor clams was similarly split between Catch Areas 1 and 2 (Table 6-10). Area 4, comprised only of Kalaloch beach in the La Push area, accounted for the remaining harvest. During the 2011-12 season all Dungeness Crab were all caught in Area 4, near the Strait of Juan de Fuca, with the majority caught in the summer season (1,541 lbs. compared to only 128 lbs. caught in the fall/winter season).

## 6.2 FISHING REGULATIONS AND MANAGEMENT

This section describes regulations and management affecting the three most important recreational finfish fisheries along the Washington coast: Pacific halibut, bottomfish, and salmon.

### 6.2.1 Halibut Recreational Fisheries

Washington’s halibut fisheries are managed under the Pacific Fishery Management Council’s (Council) Pacific Halibut Catch Sharing Plan for Area 2A. The catch sharing plan specifies how the Area 2A total allowable catch as defined by International Pacific Halibut Commission (IPHC) is allocated or “shared” among various state commercial and recreational fishing interests. For Washington, WDFW manages its recreational fisheries by subarea. These subareas are:

- ◆ North Coast (waters in the Strait of Juan de Fuca west of the Sekiu River and Pacific Ocean waters south to the Queets River)
- ◆ South Coast (Pacific Ocean waters south of the Queets River to Leadbetter Point)
- ◆ Columbia River (Pacific Ocean waters south of Leadbetter Point to Cape Falcon, Oregon)
- ◆ Management of Washington’s recreational halibut seasons for 2014 is described in Table 6-11.

**Table 6-11** Recreational Halibut Season in 2014, by Management Subarea

Subarea	Quota (lbs)	Catch (lbs)	Avg Wt (lbs)	Season Dates
North Coast	108,030	112,002	18.47	May 15, 17, 22, 24
South Coast	42,739	45,903	18.62	Primary: May 4, 6, 11, 13, 18

South Coast	42,739	45,903	18.62	Primary: May 4, 6, 11, 13, 18
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\* Columbia River harvest is Washington catch only. Area includes Ilwaco, WA.

Halibut are measured at the dock and the lengths of the samples are then converted to weights. On the coast, lengths are taken throughout the season on a weekly basis and applied to the number of halibut caught to project the total catch in pounds. The catches are then monitored and the fisheries are closed when they are projected to attain their respective subarea quota (WDFW 2015a). If the quota is not reached by the end of the season in the North and South Coast, a few days of additional halibut sport fishing may be allowed in select subareas.

The 2015 Catch Plan established both total weight limits for the entire season by subarea as well as daily possession and bag limits. These quotas are based upon each Washington port. All Washington ports have a daily bag and possession limit of one halibut per day per sport fisherman. There are no minimum size restrictions. (WDFW 2015b)

Halibut also are caught incidentally while targeting other fish. This results in total weight of halibut catch higher than the established quota. For example, 14,274 pounds were allocated in 2014 for incidental halibut landings in the longline sablefish fishery north of Pt. Chehalis. For sablefish, the Council adopted a 75-pound halibut per 1,000 pound sablefish limit per landing with up to two additional halibut in excess of the 75 pounds per 1,000 pound landing. The WDFW and Council establish rules by subarea and time of year related to bottomfish and salmon co-retention for boats targeting; during the 2015 fishing season, some of the rules near the Columbia River have been relaxed due to the availability of additional quota

### 6.2.2 Bottomfish Recreational Fisheries

The groundfish covered by the Council's groundfish fishery management plan (FMP) include over 90 different species that, with a few exceptions, live on or near the bottom of the ocean. These species include the following: Pacific cod, Pacific tomcod, Pacific hake (or whiting), walleye pollock, all species of dabs, sole and flounders (except Pacific halibut), lingcod, ratfish, sablefish, cabezon, greenling, buffalo sculpin, great sculpin, red Irish lord, brown Irish lord, Pacific staghorn sculpin, wolfeel, giant wrymouth, plainfin midshipman, all species of shark, skate, rockfish, rattail, and surf perches excluding shiner perch. Table 6-12 identifies restrictions and seasons during 2014 for key groundfish species (WDFW 2015c).

**Commented [MT2]:** After I went through the whole document, I wondered if you mean Pacific Fishery Management Council, not Pacific Coast Council. If so, that means, do a global "replace" on PCC change to PFMC.

**Table 6-12** Groundfish fishing season and restrictions in 2014, by management area

Subarea	Daily Limit	Release Rules	Minimum Size	Season Dates
Area 1: Ilwaco	12, rockfish 10, cod 2	Various sharks may not be retained	Lingcod 22", All other fish no minimum size	Year round, lingcod March to October
Area 2: Westport	12, rockfish 10, cod 2	Lingcod 22" with retention restricted in certain depths, all other fish no minimum size	Lingcod 22", All other fish no minimum size	Year round, with seasonal lingcod depth restrictions
Area 3: La Push	12, rockfish 10, cod 2	Various sharks may not be retained, rockfish and cod depth restrictions	Lingcod 22", All other fish no minimum size	Year round, lingcod March to October
Area 4: Neah Bay	12 western area, 10 eastern, cod 2	Various sharks may not be retained, rockfish and cod depth restrictions	Lingcod 22", cabezon 18"	Year round, lingcod April to October

The Council’s groundfish plan has several strategies that are used to manage groundfish fisheries, including measures to reduce bycatch and bycatch mortality, defining authorized fishing gear, trip and bag limits, establishing fishing seasons/areas, and limiting fishing through permits/licenses. For recreational groundfish fishing, the only types of gear authorized are hook-and-line and spear. Routine management measures have been established that cover the number and size of hook limits depending on the species.

### 6.2.3 Salmon Recreational Fisheries

Council management of salmon focuses on Chinook and coho salmon. Pink, sockeye, chum and steelhead are rarely caught in Council-managed ocean fisheries. Because certain coho and Chinook salmon are either federal- or state-listed species under the Endangered Species Act, Fishery Management Plans (FMP) have been developed to manage salmon fisheries. Because salmon migrate to distant waters when in the ocean, managing the ocean salmon fisheries is an extremely complex task.

Salmon and their habitat are affected by a wide array of environmental factors, both in the ocean and in freshwaters. These factors include ocean and climate conditions, dams, habitat loss, urbanization, agricultural and logging practices, water diversion, and predators (including humans). For Native Indian tribes along the Washington coast, salmon are an important source of spiritual and physical sustenance, as well as being symbolically important to many residents of the Northwest.

On the Washington Coast, most Chinook salmon that are caught are of hatchery origin, largely from hatcheries in nearby coastal streams as well as in the Columbia River and Puget Sound. Hatchery production escapement goals are established for most salmon stocks based on long-range production programs and/or mitigation requirements associated with displaced natural stocks (WDFW 2015).

Some of the tools used to manage salmon along the Washington coast, including daily catch limits, release rules, minimum sizes, and season dates, during the 2014 season are described by subarea in Table 6-13.

**Table 6-13** Marine recreational fishing regulations for salmon, by management area

Subarea*	Daily Limit	Release Rules	Minimum Size**	Season Dates
Area 1: Ilwaco	Early: Chinook: 2 Coho: 0, Late: 1.	Early: all wild Chinook, all coho. Late: all wild coho	Early: 24" Chinook, Late: 15" coho	Early: May 31 through June 13, Late: June 14-September 30th (if quota available)
Area 2: Westport	Early: Chinook: 2 Coho: 0, Late: coho 1.	Early: all wild Chinook, all coho. Late: all wild coho	Early: 24" Chinook Late: 16" coho	Early: May 31 through June 13, Late: June 11-September 30 (if quota available)
Area 2-1: Willapa Bay	Early: Area 2 rules apply Late: limit 6, 3 adults.	Early: all wild Chinook, all coho. Late: all wild coho	Early: 16-24" Late: 12"	Early: May 31 through July 31, Late: August 1-Jan 31 30th
Area 2-2: Grays Harbor	Early: Area 2 limits Late: limit 2,3, or 6*	Same as Area 2, except all salmon required to be released must not be removed from the water on boats under 30'	Early: 16-24" Late: 12"	Early: May 31 through August 10, Late: August 16
Area 3: La Push	2, for both seasons	Early: all wild Chinook, all coho. Late: all wild coho	Early: Chinook 24" Late: Chinook 24", coho 16"	Early: May 16,17,23,24, May 31-June 13. Late: June 14-September 21
Area 4: Neah Bay	2, for both seasons	Early: all wild Chinook, all coho. Late: all wild coho and chum on August 1	Early: Chinook 24" Late: Chinook 24", coho 16"	Early: May 16,17,23,24, May 31-June 13. Late: June 14-September 21
Bay		coho. Late: all wild coho and chum on August 1	Late: Chinook 24", coho 16"	June 13. Late: June 14-September 21

\* Areas may have locations with different limits and size restrictions. \*\*No size restrictions unless otherwise noted.

### 6.3 ECONOMIC CONTRIBUTIONS OF RECREATIONAL FISHING

This section describes estimates of trip-related expenditures made by Washington resident and out-of-state visitors associated with marine sport fishing activities in the coastal area of Washington. Although expenditures on equipment and durable goods (e.g., boats, trailers, OHVs) also contribute to the local and state-wide economy, the extent of equipment purchases and their relationship to coastal sport fishing activities cannot be determined with reasonable accuracy; therefore, these expenditures are not considered in the analysis.

#### 6.3.1 Trip-Related Expenditures Associated with Marine Angler Activities in the Washington Coastal Study Area

Total trip-related expenditure made by Washington State residents associated with sport angling activities in the coastal study area are estimated at about \$32.1 million in 2014 (Tables 6-14 through 6-16). Of this total, it is estimated that about \$2.7 million was made in the coastal study area and about \$29.4 million was made by Washington residents elsewhere in the state.

Trip-related expenditures associated with outdoor recreation and tourism activities in the coastal study area made by out-of-state visitors are estimated at about \$5.7 million in 2014 (Tables 6-14 through 6-16). In addition to the spending by out-of-state visitors within the coastal study area, it is estimated that these visitors also spent about \$3.1 million related to outdoor recreation and tourism elsewhere in Washington.

**Table 6-14** Trip-Related Expenditures Associated with Ocean Sport Fishing Trips in 2014 from Charter Vessels in the Washington Coastal Region (2014 dollars)

	Coastal Area Spending				Elsewhere in WA Spending				Total Spending in WA			
	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL
Auto fuel	\$29,194	\$445,665	\$65,704	\$540,563	\$0.00	\$1,586,827	\$716,790	\$2,303,617	\$29,194	\$2,032,492	\$782,494	\$2,844,179
Auto rental	\$0	\$0	\$27,052	\$27,052	\$0.00	\$0	\$295,121	\$295,121	\$0	\$0	\$322,173	\$322,173
Bait	\$561	\$34,068	\$5,689	\$40,318	\$0.00	\$4,968	\$1,714	\$6,682	\$561	\$39,036	\$7,403	\$47,000
Boat rental	\$0	\$0	\$23,772	\$23,772	\$0.00	\$0	\$0	\$0	\$0	\$0	\$23,772	\$23,772
Charter fees	\$112,551	\$7,835,893	\$2,264,071	\$10,212,515	\$0.00	\$0	\$0	\$0	\$112,551	\$7,835,893	\$2,264,071	\$10,212,515
Crew tips	\$13,799	\$960,727	\$204,981	\$1,179,508	\$0.00	\$0	\$0	\$0	\$13,799	\$960,727	\$204,981	\$1,179,508
Fish processing	\$2,031	\$141,398	\$69,543	\$212,973	\$0.00	\$0	\$0	\$0	\$2,031	\$141,398	\$69,543	\$212,973
Food from grocery store	\$14,223	\$558,709	\$107,271	\$680,202	\$0.00	\$431,513	\$98,649	\$530,162	\$14,223	\$990,222	\$205,919	\$1,210,364
Food from restaurants	\$13,712	\$833,267	\$244,134	\$1,091,113	\$0.00	\$121,388	\$47,698	\$169,086	\$13,712	\$954,655	\$291,832	\$1,260,200
Gifts and souvenirs	\$1,084	\$42,317	\$168,334	\$211,735	\$0.00	\$33,153	\$106,920	\$140,073	\$1,084	\$75,470	\$275,254	\$351,809
Ice	\$1,464	\$57,152	\$19,256	\$77,873	\$0.00	\$44,776	\$12,231	\$57,007	\$1,464	\$101,928	\$31,487	\$134,880
Lodging	\$12,454	\$825,937	\$390,907	\$1,229,298	\$0.00	\$41,103	\$6,961	\$48,064	\$12,454	\$867,040	\$397,868	\$1,277,362
Parking & site access	\$0	\$0	\$25,911	\$25,911	\$0.00	\$0	\$14,022	\$14,022	\$0	\$0	\$39,933	\$39,933
Public transportation	\$972	\$14,836	\$20,153	\$35,962	\$0.00	\$52,827	\$219,860	\$272,687	\$972	\$67,663	\$240,013	\$308,648
Tournament fees	\$2,635	\$160,121	\$18,990	\$181,746	\$0.00	\$23,350	\$5,720	\$29,070	\$2,635	\$183,471	\$24,710	\$210,816
<b>Trip Total-Related Spending</b>	<b>\$204,680</b>	<b>\$11,910,091</b>	<b>\$3,655,768</b>	<b>\$15,770,540</b>	<b>\$0</b>	<b>\$2,339,904</b>	<b>\$1,525,686</b>	<b>\$3,865,590</b>	<b>\$204,680</b>	<b>\$14,249,995</b>	<b>\$5,181,454</b>	<b>\$19,636,130</b>

Source: Derived from information in Surfrider 2015

**Table 6-15** Trip-Related Expenditures Associated with Ocean Sport Fishing Trips in 2014 from Private Vessels in the Washington Coastal Region (2014 dollars)

	Coastal Area Spending				Elsewhere in WA Spending				Total Spending in WA			
	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL
Auto fuel	\$577,739	\$791,263	\$62,629	\$1,431,631	\$0.00	\$2,817,360	\$683,238	\$3,500,598	\$577,739	\$3,608,623	\$745,867	\$4,932,229
Auto rental	\$352	\$482	\$8,760	\$9,595	\$0.00	\$1,718	\$95,567	\$97,285	\$352	\$2,200	\$104,328	\$106,880
Bait	\$116,605	\$635,635	\$87,898	\$840,137	\$0.00	\$92,691	\$26,478	\$119,169	\$116,605	\$728,326	\$114,375	\$959,306
Boat rental	\$846,529	\$4,965,484	\$655,438	\$6,467,451	\$0.00	\$322,029	\$0	\$322,029	\$846,529	\$5,287,513	\$655,438	\$6,789,480
Charter fees	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Crew tips	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fish processing	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Food from grocery store	\$385,218	\$1,357,593	\$205,964	\$1,948,774	\$0.00	\$1,048,523	\$189,409	\$1,237,932	\$385,218	\$2,406,116	\$395,373	\$3,186,707
Food from restaurants	\$119,423	\$651,081	\$313,520	\$1,084,025	\$0.00	\$94,848	\$61,255	\$156,103	\$119,423	\$745,929	\$374,775	\$1,240,127
Gifts and souvenirs	\$10,392	\$36,397	\$92,580	\$139,369	\$0.00	\$28,515	\$58,804	\$87,318	\$10,392	\$64,911	\$151,384	\$226,687
Ice	\$53,723	\$188,152	\$31,952	\$273,827	\$0.00	\$147,406	\$20,295	\$167,701	\$53,723	\$335,558	\$52,248	\$441,528
Lodging	\$132,281	\$787,074	\$421,691	\$1,341,046	\$0.00	\$39,169	\$7,509	\$46,678	\$132,281	\$826,243	\$429,200	\$1,387,724
Parking & site access	\$108,855	\$458,185	\$104,639	\$671,678	\$0.00	\$221,733	\$56,625	\$278,358	\$108,855	\$679,917	\$161,264	\$950,036
Public transportation	\$22,546	\$30,879	\$25,465	\$78,889	\$0.00	\$109,946	\$277,805	\$387,751	\$22,546	\$140,824	\$303,270	\$466,640
Tournament fees	\$20,080	\$109,460	\$257	\$129,797	\$0.00	\$15,962	\$78	\$16,039	\$20,080	\$125,422	\$335	\$145,837
<b>Trip Total-Related Spending</b>	<b>\$2,393,743</b>	<b>\$10,011,683</b>	<b>\$2,010,793</b>	<b>\$14,416,219</b>	<b>\$0.00</b>	<b>\$4,939,899</b>	<b>\$1,477,064</b>	<b>\$6,416,963</b>	<b>\$2,393,743</b>	<b>\$14,951,582</b>	<b>\$3,487,857</b>	<b>\$20,833,182</b>

Source: Derived from information in Surfrider 2015

**Table 6-16** Trip-Related Expenditures Associated with Ocean Sport Fishing Trips in 2014 from Shore and Jetties in the Washington Coastal Region (2014 dollars)

	Coastal Area Spending				Elsewhere in WA Spending				Total Spending in WA			
	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL	Coastal Residents	Residents Elsewhere in WA	Out-of-State Visitors	TOTAL
Auto fuel	\$35,278	\$15,467	\$3,850	\$54,595	\$0.00	\$55,072	\$41,996	\$97,067	\$35,278	\$70,539	\$45,845	\$151,662
Auto rental	\$0	\$0	\$275	\$275	\$0.00	\$0	\$3,000	\$3,000	\$0	\$0	\$3,275	\$3,275
Bait	\$9,523	\$16,617	\$5,990	\$32,130	\$0.00	\$2,423	\$1,805	\$4,228	\$9,523	\$19,041	\$7,795	\$36,358
Boat rental	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Charter fees	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Crew tips	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fish processing	\$0	\$0	\$0	\$0	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Food from grocery store	\$25,273	\$28,513	\$0	\$53,786	\$0.00	\$22,021	\$0	\$22,021	\$25,273	\$50,534	\$0	\$75,807
Food from restaurants	\$9,322	\$16,269	\$28,369	\$53,960	\$0.00	\$2,370	\$5,543	\$7,913	\$9,322	\$18,639	\$33,912	\$61,873
Gifts and souvenirs	\$0	\$0	\$6,893	\$6,893	\$0.00	\$0	\$4,378	\$4,378	\$0	\$0	\$11,270	\$11,270
Ice	\$1,567	\$1,757	\$3,096	\$6,420	\$0.00	\$1,376	\$1,967	\$3,343	\$1,567	\$3,133	\$5,063	\$9,763
Lodging	\$4,400	\$8,380	\$1,559	\$14,339	\$0.00	\$417	\$28	\$445	\$4,400	\$8,797	\$1,587	\$14,784
Parking & site access	\$3,415	\$4,602	\$13,701	\$21,718	\$0.00	\$2,227	\$7,414	\$9,641	\$3,415	\$6,829	\$21,115	\$31,359
Public transportation	\$2,612	\$1,145	\$169	\$3,925	\$0.00	\$4,077	\$1,840	\$5,917	\$2,612	\$5,222	\$2,009	\$9,843
Tournament fees	\$0	\$0	\$8,924	\$8,924	\$0.00	\$0	\$2,688	\$2,688	\$0	\$0	\$11,612	\$11,612
<i>Trip Total-Related Spending</i>	<i>\$91,389</i>	<i>\$92,750</i>	<i>\$72,825</i>	<i>\$256,964</i>	<i>\$0.00</i>	<i>\$89,984</i>	<i>\$70,658</i>	<i>\$160,641</i>	<i>\$91,389</i>	<i>\$182,733</i>	<i>\$143,483</i>	<i>\$417,606</i>

Source: Derived from information in Surfrider 2015

### 6.3.2 Employment and Labor Income Effects of Angler Expenditures in the Washington Coastal Study Area

The trip-related spending by state residents and out-of-state visitors identified in Tables 6-14, 6-15, and 6-16 above generates economic activity that supports jobs and personal income for residents of the coastal study area and elsewhere in the state. In the coastal study area, trip-related spending by residents of both the coastal region and those residing elsewhere in Washington who recreate at the coast is estimated to support 325 jobs and \$17.3 million in labor income within the coastal economy (Tables 6-17 and 6-18). Statewide, as dollars and economic activity multiply through the state's economy, it is estimated that 596 jobs are supported directly and indirectly by ocean angler activities in the coastal area, and \$32.3 million in labor income.

**Table 6-17** Contribution of Trip-Related Angler Expenditures in the Coastal Area to Coastal Employment and Coastal Labor Income

2-digit NAICS Code	Description	Contribution to Employment				Contribution to Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
11	Agriculture, Forestry, Fishing and Hunting	4	3	0	7	277,670	56,573	11,524	345,768
21	Mining, Quarrying, and Oil and Gas Extraction	2	0	0	2	7,657	7,706	405	15,768
22	Utilities	0	0	0	0	0	13,394	7,207	20,601
23	Construction	0	2	0	3	0	168,784	18,550	187,335
31	Food Processing	4	0	0	4	218,071	6,647	5,888	230,607
32	Wood&Construction Products	0	0	0	0	19,651	11,526	2,825	34,001
33	Metal Products	0	0	0	0	7,896	10,199	1,607	19,702
42	Wholesale Trade	3	1	1	5	277,570	84,288	64,944	426,802
44	Retail Food&Clothing	16	0	7	23	678,181	16,285	290,058	984,524
45	Other Retail	5	0	3	8	112,366	4,997	110,543	227,907
48	Transportation	60	3	1	64	5,182,750	208,211	32,304	5,423,265
49	Warehousing&storage	0	8	0	8	3,097	486,249	24,605	513,951
51	Information	0	1	0	1	0	57,906	20,954	78,860
52	Finance and Insurance	0	1	1	3	1,892	117,055	95,746	214,694
53	Real Estate and Rental and Leasing	87	2	1	90	3,560,771	46,307	30,132	3,637,209
54	Professional, Scientific, and Technical Services	0	3	1	4	0	241,865	57,045	298,909
55	Management of Companies and Enterprises	0	1	0	1	0	161,745	7,995	169,740
56	Administrative and Support and Waste Management and Remediation Services	0	5	1	6	0	236,548	36,813	273,362
61	Educational Services	0	0	1	1	0	2,574	32,962	35,536
62	Health Care and Social Assistance	0	0	8	8	0	40	452,672	452,712

*Economic Analysis to Support Marine Spatial Planning in Washington*

2-digit NAICS Code	Description	Contribution to Employment				Contribution to Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
71	Arts, Entertainment, and Recreation	2	1	1	4	47,636	14,973	24,159	86,768
72	Accommodation and Food Services	47	2	6	55	1,323,998	59,149	153,870	1,537,018
81	Other Services (except Public Administration)	0	3	6	8	0	136,631	195,792	332,423
100Misc	Miscellaneous	0	0	0	0	0	0	0	0
200S/L Govt	S-L Government	15	1	1	16	1,523,198	143,619	104,596	1,771,413
300Fed Govt	Federal Government	0	0	0	1	4,642	1,847	2,388	8,877
<b>Grand Total</b>		<b>246</b>	<b>39</b>	<b>40</b>	<b>325</b>	<b>13,247,047</b>	<b>2,295,117</b>	<b>1,785,587</b>	<b>17,327,751</b>

**Table 6-18** Contribution of Trip-Related Recreation and Tourism Expenditures to Statewide Employment and Labor Income

2-digit NAICS Code	Description	Contribution to Employment				Contribution to Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
11	Agriculture, Forestry, Fishing and Hunting	7	7	1	16	462,794	162,205	55,722	680,722
21	Mining, Quarrying, and Oil and Gas Extraction	0	1	0	1	349	6,766	1,462	8,578
22	Utilities	0	0	0	0	0	33,321	27,563	60,884
23	Construction	0	4	1	5	0	248,730	76,412	325,141
31	Food Processing	7	1	1	9	417,822	46,075	69,522	533,419
32	Wood&Construction Products	1	2	1	3	120,346	136,219	58,064	314,629
33	Metal Products	0	1	1	1	16,022	48,479	33,937	98,438
42	Wholesale Trade	16	4	5	25	1,369,248	384,693	415,418	2,169,359
44	Retail Food&Clothing	40	1	15	55	1,685,682	24,405	648,648	2,358,735
45	Other Retail	7	0	10	18	179,946	9,131	348,059	537,137

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2-digit NAICS Code	Description	Contribution to Employment				Contribution to Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
48	Transportation	88	5	2	95	7,165,536	351,010	159,936	7,676,482
49	Warehousing&storage	0	10	1	12	5,416	639,065	84,257	728,738
51	Information	0	3	2	5	0	317,619	217,179	534,798
52	Finance and Insurance	1	6	9	15	104,441	429,899	607,386	1,141,726
53	Real Estate and Rental and Leasing	104	6	8	118	4,290,661	147,441	161,301	4,599,402
54	Professional, Scientific, and Technical Services	0	12	6	18	0	899,628	382,429	1,282,057
55	Management of Companies and Enterprises	0	4	1	5	0	534,593	81,589	616,182
56	Administrative and Support and Waste Management and Remediation Services	0	17	6	23	0	728,632	242,848	971,480
61	Educational Services	0	0	5	5	0	7,699	140,918	148,618
62	Health Care and Social Assistance	0	0	28	28	0	124	1,803,222	1,803,346
71	Arts, Entertainment, and Recreation	3	2	6	11	78,583	45,625	131,669	255,877
72	Accommodation and Food Services	66	4	16	86	1,848,771	110,500	421,001	2,380,272
81	Other Services (except Public Administration)	0	4	12	17	0	239,658	498,705	738,363
100Misc	Miscellaneous	0	0	0	0	0	0	0	0
200S/L Govt	S-L Government	20	1	1	22	2,011,650	139,236	161,247	2,312,133
300Fed Govt	Federal Government	2	0	1	4	20,673	17,202	24,056	61,931
<b>Grand Total</b>		<b>363</b>	<b>95</b>	<b>138</b>	<b>596</b>	<b>19,777,941</b>	<b>5,707,953</b>	<b>6,852,551</b>	<b>32,338,444</b>

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## CHAPTER 7. Recreation and Tourism

Historically, recreation and tourism has always been a part of the economy of Washington coast counties, but it has been small relative to other well-established sectors of fishing, forestry, and manufacturing. While structural shifts continue to take place leading to declines in both forestry and manufacturing, recreation and tourism remains steady or growing, and is increasing in prominence. Foreseen for some time, a Sea Grant report from a decade ago pointed to continued growth in the magnitude and, consequently, economic importance of coastal tourism (Hadley 2002). Recent Bureau of Economic Analysis data on industry earnings and trends supports this finding (BEA 2015).

In this chapter, an economic baseline is developed that characterizes existing recreation and tourism in the coastal study area. The study region includes four counties with coastal access: Jefferson, Clallam, Grays Harbor, and Pacific. (Wahkiakum County is included as part of the regional economy although it does not have coastal access.) The total population of the four coastal access counties was estimated at 198,000 in 2010, or about three percent of the state population (U.S. Census 2013). In recent years, population and economic growth in these counties has been below the state average (Industrial Economics 2014).

In addition to establishing an economic baseline for recreation and tourism, this chapter addresses the relative importance of recreation and tourism within community areas along the Washington coast. These community areas are located within three distinct regions of the coastal study area: Northern Washington Coast, Southern Washington Coast – Grays Harbor Area, and Southern Washington Coast – Willapa Bay/Long Beach Peninsula.

[Insert map that shows regions/areas discussed below]

## 7.1 NORTHERN WASHINGTON COAST (CLALLAM AND JEFFERSON COUNTIES)

The Northern Washington Coast is defined to include the Pacific coastlines of Clallam and Jefferson counties, extending from Cape Flattery south to the northern border of the Quinault Indian Reservation. The northern coast is dominated by high rocky cliffs, as well as islands and sea stacks scattered offshore. The Makah, Quileute, and Hoh Indian Tribes have reservation lands along portions of this coastline. This portion of the coast has relatively few access points. No major changes in access to the ocean have occurred in several years, and no substantial changes are expected (C. Dennehey, pers. comm. 2014).

The Olympic Coast National Marine Sanctuary makes up most of the northern half of the study area, running north from the mouth of the Copalis River along the coast and extending seaward between 25 to 40 miles, including 2,408 square nautical miles of marine waters (Industrial Economics 2014). Olympic National Park occupies significant portions of the Clallam and Jefferson County coastlines. Major recreation features along the Northern Washington Coast include Cape Flattery, Olympic National Park's campgrounds and trails, several well-known surfing beaches, and various Tribal facilities, including lodging, marinas, and trails. The northern coast primarily attracts visitors looking to spend time connecting with nature (Industrial Economics 2014).

Recreation and tourism are important contributors to the economies of both Clallam and Jefferson counties. In 2009, it was estimated that visitor-related travel expenditures totaled \$179.4 million in Clallam County and \$103.3 million in Jefferson County (Dean Runyan Associates 2011). In Clallam County, this spending supported an estimated 2,980 jobs (direct, indirect, and induced), representing 8.2 percent of countywide employment. In Jefferson County, the estimated employment effects were smaller, at 1,630 jobs, but the relative contribution to the economy was larger, representing 11.6 percent of the county's total employment. According to "Ocean Economy" data available from the National Ocean Economics Program (NOEP), the recreation and tourism sector contributed 2,282 jobs to the Clallam County economy and helped to support 238 businesses establishments in 2011 (National Ocean Economic Program 2015). In Jefferson County, the recreation and tourism sector contributed 1,065 jobs and helped to support 115 business establishments. (Note: Ocean Economy data include only ocean-related activities and industries compiled from the databases of the Bureau of Labor Statistics.)

The Northern Washington Coast region's most prominent destination, Olympic National Park, receives an estimated three million visitors annually (National Park Service 2014, in Industrial Economics 2014). Olympic National Park estimates that visitation for the three coastal park districts located in the Northern Washington Coast region (Mora, Kalaloch, and Ozette) ranged from about 759,000 to 783,000 visitors each year from 2011 through 2013, while park-wide visitation was roughly between 2.8 and 3.1 million visitors each year (Industrial Economics 2014).

### 7.1.1 Neah Bay Area

[To be completed later]

### 7.1.2 La Push Area

#### Communities

La Push is the only coastal community that provides an array of tourist services between the Makah Indian Reservation’s Hobuck Beach Resort and the Quinalt Indian Reservation. With a 2010 population of 460, La Push is the largest community within the Quileute Indian Reservation and is home to the Quileute Tribe. All of the businesses in La Push are owned by the tribe, including Quileute Oceanside Resort and its marina. In addition, the Lonesome Creek Store RV Park offers recreational vehicle (RV) spaces and a small number of tent sites. First Beach, at the north edge of the reservation, is a wide sandy beach with sea stacks between the beach and western horizon, and during whale migration season, whales can be seen from the beach (Wikipedia 2015a). Although tourism has become increasingly important to the Quileute Tribe, tourism-sensitive industries do not employ a large share of La Push’s resident population, as represented by the resident population of the 98350 zip code area. According to U.S. Census Bureau data (2009-2013), an average of about 8 percent of employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

**Table 7-1** Resident Employment in Tourist-Sensitive Industries, by Coastal Community

Region/Community	Total Resident Employment <sup>1</sup>	Employment in Tourism-Sensitive Industries <sup>2</sup>	Percentage of Residents Employed in Tourism-Sensitive Industries
<i>Northern Washington Coast</i>			
La Push <sup>3</sup>	152	12	7.9%
Ruby Beach	N/A	N/A	N/A
Kalaloch	N/A	N/A	N/A
Queets CDP	38	7	18.4%
<i>Southern Washington Coast (Grays Harbor area, including the coastal portion of Grays Harbor County)</i>			
Taholah CDP	257	22	8.6%
Moclips CDP	21	0	0.0%
Pacific Beach <sup>4</sup>	40	23	57.5%
Copalis Beach CDP	50	41	82.0%
Ocean City CDP	98	84	85.7%
Ocean Shores	1,876	645	34.4%
Hoquiam	3,028	718	23.7%
Aberdeen	6,326	1,619	25.6%
Cosmopolis	659	150	22.8%
Markham CDP	64	27	42.2%
Ocosta	N/A	N/A	N/A
Bay City	N/A	N/A	N/A
Westport	652	112	17.2%
Grayland CDP	261	87	33.3%

**Comment [TW1]:** Note that this table 7-4 on page 14 and has been moved here.

Region/Community	Total Resident Employment <sup>1</sup>	Employment in Tourism-Sensitive Industries <sup>2</sup>	Percentage of Residents Employed in Tourism-Sensitive Industries
<i>Willapa Bay/Long Beach Peninsula (including the coastal portion of Pacific County)</i>			
Tokeland CDP <sup>5</sup>	39	0	0.0%
Raymond	1,016	145	14.3%
South Bend	646	73	11.3%
Bay Center CDP	21	0	0.0%
Nemah	N/A	N/A	N/A
Johnson's Landing	N/A	N/A	N/A
Chinook CDP	78	6	7.7%
Ilwaco	475	81	17.0%
Seaview <sup>6</sup>	219	126	57.5%
Long Beach	578	212	36.7%
Ocean Park CDP <sup>7</sup>	261	80	31.0%
Oysterville	N/A	N/A	N/A

Notes: N/A = not available; CDP = Census Designated Place.

<sup>1</sup> Includes civilian employed population 16 years and older.

<sup>2</sup> Includes residents employed in retail, arts, entertainment, recreation, accommodation, and food services sectors.

<sup>3</sup> Data represent the 98350 zip code area.

<sup>4</sup> Data represent the 98571 zip code area. Includes the community of Seabrook.

<sup>5</sup> Includes the community of North Cove.

<sup>6</sup> Data represent the 98644 zip code.

<sup>7</sup> Includes the community of Nahcotta.

Source: U.S. Census Bureau, 2009-2013 American Community Survey 5-Year Estimates. Table S2405: Industry by Occupation for the Civilian Employed Population 16 Years and Older. Accessible: [factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t](https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t). Accessed: March 17, 2015.

### Recreation Resources and Tourism Activities

Key recreation sites along the Northern Washington Coast are identified in Table 7-2. As shown, these sites, and the recreation and tourism resources they provide, are largely located on tribal reservation lands or within the coastal portion of Olympic National Park.

**Table 7-2** Key Recreation Sites Along the Northern Washington Coast region

Clallam County	Jefferson County
<p><b>Makah Tribe:</b></p> <ul style="list-style-type: none"> <li>♦ Cape Flattery (maintained trail to NW tip of U.S.)</li> <li>♦ Hobuck Beach Resort (tent campsites, cabins, RV sites)</li> </ul>	<p><b>Olympic National Park:</b></p> <ul style="list-style-type: none"> <li>♦ Kalaloch Lodge</li> <li>♦ Kalaloch Campground (170 campsites)</li> <li>♦ Queets Campground (20 campsites)</li> <li>♦ South Beach Campground (55 campsites)</li> <li>♦ Wilderness Campsites: Second Beach, Third Beach, Scott Creek, Strawberry Point, Toleak Point, Mosquito Creek</li> </ul>
<p><b>Olympic National Park:</b></p> <ul style="list-style-type: none"> <li>♦ Lake Ozette Campground (15 campsites)</li> <li>♦ Mora Campground (94 campsites)</li> <li>♦ Wilderness Campsites: Shi Shi Beach, Seafield Creek, N. Ozette River, S. Ozette River, Cape Alava, Wedding Rocks, Sand Point, South Sand Point, Yellow Banks, Norwegian Memorial, Cedar Creek, Chilean Memorial, Hole-in-the-Wall</li> </ul>	<p><b>Coastal Communities:</b></p> <ul style="list-style-type: none"> <li>♦ Queets</li> </ul>
<p><b>Quileute Tribe:</b></p> <ul style="list-style-type: none"> <li>♦ Quileute Oceanside Resort</li> <li>♦ Campsites: 24 RV sites, 42 tent or RV</li> <li>♦ Hotel: 25 motel/42 cabin units</li> <li>♦ Quileute Marina (95 slips)</li> </ul>	
<p><b>Coastal Communities:</b></p> <ul style="list-style-type: none"> <li>♦ La Push</li> </ul>	

Sources: *Olympic National Park, 2014; Industrial Economics, 2014; and Makah Tribe. Hobuck Beach Resort. Accessible at [www.hobuckbeachresort.com/](http://www.hobuckbeachresort.com/). Accessed on March 23, 2015.*

In the vicinity of La Push, key recreation and tourism resources include the Olympic National Park and Quileute Reservation tribal lands. Nearby campgrounds operated by Olympic National Park include Mora Campground, with 94 campsites, and wilderness campsites at Hole-in-the-Wall, Second Beach, Third Beach, Scott Creek, Strawberry Point, Toleak Point, and Mosquito Beach.

On the Quileute Reservation, the tribe’s Oceanside Resort, located along First Beach in La Push, provides accommodations ranging from luxurious to rustic, including oceanfront cabins and motel units, a campground, and two full-service RV parks (Quileute Nation 2012). In addition to the resort, the tribe operates a marina open year-round. There are 95 slips at the marina, some of which are leased to commercial and sport fishermen (Industrial Economics 2014). The Tribe also operates a restaurant and small store/gas station used by tourists. Activities available from the resort and marina include wildlife viewing and photography, camping, coastal hiking, boating, scenic boat cruises, fishing and while watching charters, surfing, stand-up paddle boarding, and mountain biking (Quileute Nation 2012).

Other recreational opportunities available to visitors include kayaking, beachcombing, swimming (when the weather is warm enough), camping, and beach campfires. First Beach is a popular surf spot year-round, but primarily in the winter when bigger waves occur. In addition, whale watching is a popular activity from March through May. Gray whales stay relatively close to the coast when going north as they migrate from Mexico to Alaska. At high tide the whales may be observed very close to First Beach, perhaps 20 feet offshore. Transient orcas hunt the calves and are sometimes seen cruising along the shoreline as well. Visitors trickle in all through these months to walk the beach and watch the whales (Industrial Economics 2015).

Within the Mora District of Olympic National Park that encompasses the La Push area, visitation is estimated for the entire district and for two sub-districts, including Rialto Beach, located just north of La Push, and Second and Third Beach, located just south of La Push. For the entire Mora District, estimated visitation averaged about 263,300 visitors from 2011 through 2013 (Industrial Economics 2014). For the Rialto Beach sub-district, yearly visitation averaged about 144,600 visitors. For the Second and Third Beach sub-districts, visitation was estimated to annually average 108,500 visitors.

### 7.1.3 Kalaloch Area (including Ruby Beach and Queets)

#### Communities

Within the Kalaloch Area, the only community of substantial size is Queets, with a 2010 population of 174. An unincorporated community on the border of Jefferson County and Grays Harbor County, Queets is located about five miles south of Kalaloch Beach along the Queets River at the northern edge of the Quinalt Indian Reservation. The community, which is populated primarily by Native Americans of the Quinalt Indian Reservation, consists of several homes, a store, gas station, fishery-related businesses, Head Start, and a remote office for the tribe (Wikipedia 2015b). As discussed previously, a campground is located along the Queets River, and beach access and hiking trails are located nearby in the Kalaloch area. Because of its size, not many residents are employed in tourism-sensitive industries. According to U.S. Census Bureau data (2015), within the Queets Census Designated Place (CDP), an average of seven of the community's 38 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-2).

#### Recreation Resources and Tourism Activities

South of the Hoh Indian Reservation, where U.S. Highway 101 (US 101) touches the coastline and runs south through the coastal portion of Olympic National Park to the Quinalt Indian Reservation, lies an area marked by several beaches and whale-watching locations. Ruby Beach, which can be reached from a short trail off US 101, is the northernmost of these southern beaches in the coastal section of Olympic National Park. Like many beaches along this coastline, Ruby Beach is notable for its sea arches, sea stack, and offshore islands, as well as for the large amounts of driftwood that wash up on the beach (Wikipedia 2015c). Although the beach provides scenic views, beach walks, and beachcombing, no significant visitor accommodations are available near Ruby Beach (National Park Service 2015). Nearby whale-watching

vantage points include pull-offs along US 101 between Ruby Beach and Queets, and the Destruction Island overlook (Great Pacific Recreation & Travel Maps 2000).

Traveling south between Ruby Beach and Kalaloch, visitors can access Beach Six and Beach Four from US 101. Kalaloch has a year-round campground (170 campsites) and offers cliff-top views of the coast (Table 7-2). South Beach, which is located immediately south of Kalaloch, also has a campground, providing for about 50 campsites. The Kalaloch and South Beach campgrounds are the only places to camp on the southern coast of Olympic National Park (National Park Service 2015). In addition, the Kalaloch Lodge, set high on a bluff overlooking the ocean provides 65 units for guests, including cabins and cottages (AAA Publishing 2014). The lodge's Creekside Restaurant also provides dining opportunities for guests and visitors. Kalaloch Lodge is the only such class of accommodations available for nearly 75 miles along this stretch of pristine Pacific Northwest coast (DNC Parks and Resorts at Kalaloch, Inc. 2015).

Approximately five miles south of Kalaloch Beach, a campground with 20 campsites is located near Queets, inland along the Queets River. Small beaches are also located between Kalaloch and Queets, including Beach 1 and Beach 2, in Olympic National Park.

Recreational and tourist activities available in the Kalaloch and Queets Area include whale watching from Kalaloch bluffs, wildlife viewing (e.g., bald eagles, brown pelicans, sea lions, harbor porpoise, harbor seals, sea otters), and digging for razor clams (Wikipedia 2015d). At Kalaloch, seven area beach trails lead to coastal hikes and Kalaloch Creek. Fishing possibilities include surf perch and salmon.

Within the Kalaloch District of Olympic National Park, visitation was estimated to average 452,900 visitors between 2011 and 2013 (Industrial Economics 2014). Visitation included an average of 343,000 trail users and 35,300 visitors using concessionaire lodging.

## 7.2 SOUTHERN WASHINGTON COAST (GRAYS HARBOR AREA, INCLUDING THE COASTAL PORTION OF GRAYS HARBOR COUNTY)

The Southern Washington Coast region includes the coastline of Grays Harbor County and Grays Harbor. The geography along the southern coastline, extending into Pacific County, is dominated by long sandy beaches created by sand carried northward from the mouth of the Columbia River. In addition to coastal beach activities, peninsulas such as Point Brown and Damon Point provide access to the protected, calmer waters of Grays Harbor, where watersports like kayaking, windsurfing, and paddleboarding are popular (Industrial Economics 2014). The coastline of Grays Harbor County is more heavily developed than the northern coast, with a greater number of urbanized areas and a greater concentration of marine industry and infrastructure (Industrial Economics 2014).

Developed areas in the Southern Washington Coast region include the cities of Hoquiam and Aberdeen and the Port of Grays Harbor, the coastal towns of Pacific Beach, Ocean Shores, Westport, and several smaller communities. The Quinault Nation Indian Reservation takes in much of the coastline of the northern half of Grays Harbor County, and public access to the shoreline is greatly limited for much of the area within the reservation, particularly between Queets and Taholah. South of the reservation, access

is provided by State Route (SR) 109 between Taholah and Hoquium/Aberdeen, and by SR 105 between Aberdeen and Grayland.

Key recreation sites along the Southern Washington Coast region are identified in Table 7-3. As shown, the recreation and tourism resources are largely located on tribal reservation lands or within the coastal portion of the Olympic National Park.

**Table 7-3** Key Recreation Sites Along the Southern Washington Coast (Grays Harbor County)

<p><b>Quinault Nation:</b></p> <ul style="list-style-type: none"> <li>♦ Quinault Beach Resort and Casino (located at Ocean Shores)</li> </ul>
<p><b>Federal Wildlife Refuges:</b></p> <ul style="list-style-type: none"> <li>♦ Grays Harbor National Wildlife Refuge</li> <li>♦ Copalis National Wildlife Refuge (offshore)</li> </ul>
<p><b>State Parks:</b></p> <ul style="list-style-type: none"> <li>♦ Pacific Beach (22 standard sites, 42 utility sites, 2 yurts)</li> <li>♦ Griffiths-Priday (day use)</li> <li>♦ Ocean City (149 standard sites, 29 full utility sites)</li> <li>♦ Westhaven (day use)</li> <li>♦ Westport Light (day use)</li> <li>♦ Bottle Beach (day use)</li> <li>♦ Twin Harbors Beach (219 tent, 42 utility, 1 group, 2 yurts)</li> <li>♦ Grayland Beach (55 full-hookup campsites)</li> <li>♦ Oyhut Wildlife Recreation Area</li> </ul>
<p><b>Coastal Communities:</b></p> <ul style="list-style-type: none"> <li>♦ Taholah</li> <li>♦ Moclips</li> <li>♦ Pacific Beach</li> <li>♦ Seabrook (150 cottage rentals)</li> <li>♦ Copalis Beach</li> <li>♦ Ocean City</li> <li>♦ Ocean Shores (1,500 hotel rooms(4))</li> <li>♦ Hoquiam</li> <li>♦ Aberdeen</li> <li>♦ Cosmopolis</li> <li>♦ Westport (including Markham, Ocasta, and Bay City)</li> <li>♦ Westport Marina (600 slips)</li> <li>♦ Boat ramp at Westport Marina</li> <li>♦ Grayland</li> </ul>

Sources: Industrial Economics 2014

Two national wildlife refuges are located in the Southern Washington Coast region, but only Grays Harbor National Wildlife Refuge near Hoquim is open for visitation. Copalis National Wildlife Refuge is located offshore, running from the northern part of the Quinault Indian Reservation to Copalis Beach.

This refuge is open to wildlife observation by boat, but public access to islands within the refuge is not permitted (Industrial Economics 2014). Several state parks are located on or near coastal areas of the Southern Washington Coast region. From north to south, these parks include Pacific Beach, Griffiths-Priddy, and Ocean City, all located north of Grays Harbor; and Westhaven, Westport Light, Bottle Beach, and Twin Harbors, located near the southern mouth of Grays Harbor and just to the south along Point Chehalis and the coastline. Also, the Oyhut Wildlife Recreation Area is located at Point Brown, south of the community of Ocean Shores.

Like in the Northern Washington Coast region, recreation and tourism are important contributors to the economy of the Southern Washington Coast region. In 2009, visitor-related travel expenditures totaled an estimated \$253.7 million in Grays Harbor County (Dean Runyan Associates 2011). This spending supported an estimated 2,980 jobs (direct, indirect, and induced), representing 15.6 percent of countywide employment, the third largest percentage among the state's counties, behind only Pacific and Skamania counties. According to "Ocean Economy" data available from NOEP, the recreation and tourism sector contributed 1,537 jobs to the Grays Harbor County economy and helped to support 178 businesses establishments in 2011 (National Ocean Economic Program 2015). (Note: Ocean Economy data include only ocean-related activities and industries compiled from the databases of the Bureau of Labor Statistics.)

### 7.2.1 Taholah Area

#### Communities

Taholah, with a population of 840 in 2010, is the headquarters for the Quinault Tribal Nation, and is largely populated by tribal members. Businesses of potential interest to tourists include a mercantile shop and the Quinault Pride seafood processing plant, where visitors can buy the blue back salmon unique to the Quinault River (NorthBeachVacation.com 2015). According to U.S. Census Bureau data (2015), within the Taholah CDP, an average of 22 (8.6 percent) of the community's 257 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

#### Recreation Resources and Tourism Activities

The Taholah Area largely consists of the coastline of the Quinault Nation Indian Reservation. No roadway access is available between the communities of Queets and Taholah, substantially reducing access to the coastline along the northern half of the reservation. Additionally, restrictions have been enacted at beaches along the Quinault reservation, limiting access to beaches and surf spots to Quinault tribal members only (Industrial Economics 2014). Visitors, however, can obtain a beach pass for \$15 from the tribal administration building or police station (NorthBeachVacation 2015). The rocky beach immediately accessible from Taholah lies at the mouth of the Quinault River. Views in the vicinity include the red sandstone rocks of Cape Elizabeth to the north, massive piles of driftwood on the beaches to the south of the river's mouth, and the rocks of Point Grenville to the south (NorthBeachVacation 2015).

Traveling south from Taholah on Highway 109, a whale-watching viewpoint is available at Point Greenville, and wildlife viewing possibilities occur at Grenville Bay (Great Pacific Recreation & Travel Maps 2000).

## 7.2.2 Moclips/Pacific Beach Area

### Communities

The communities of Moclips and Pacific Beach, which are about two miles apart, are relatively small unincorporated communities linked by SR 109. Within the Moclips CDP, which encompasses both communities, the 2010 population was 207 persons. Within the larger Pacific Beach area (98571 zip code) that excludes Moclips but includes nearby Seabrook, the 2010 population was 483. According to Pacific Beach's website (2014), several B&Bs, motels, hotels, and inns are located in or near Moclips and Pacific Beach, including Pacific Beach Inn, Sand Dollar Inn, Hi-Tide Resort, and Ocean Crest Resort. Other businesses in the vicinity include several small grocery stores and gas stations, a restaurant, and antique and gift shops. According to U.S. Census Bureau data (2015), within the combined Moclips CDP and Pacific Beach zip code area, an average of 23 (37.7 percent) of the area's 61 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

### Recreation Resources and Tourism Activities

The Moclips/Pacific Beach Area is a popular beach getaway (AAA Publishing 2014). From the mouth of the Moclips River, a long beach runs north and south from the community of Moclips, and Sunset Beach and Pacific Beach are located just to the south of Moclips. These beaches are often open year-round. Pacific Beach State Park, located just south of the community of Pacific Beach, provides 22 standard campsites, 42 utility campsites, and 2 yurts (Industrial Economics 2014). Moclips and Pacific Beach offer great central locations for visiting Lake Quinault, Kalaloch, or Ocean Shores (Pacific Beach 2014).

Recreation and tourism activities available in the Moclips/Pacific Beach Area include horseback riding, kiting on the beach, beachcombing, camping, hiking, bird watching and wildlife viewing, storm watching, sea kayaking, clamming, and visiting the Museum of the North Beach and the Quinault Nation Indian Reservation (Washington Tourism Alliance 2015). Additionally, whale-watching viewpoints are available from area beaches and from viewpoints along SR 109 (Great Pacific Recreation & Travel Maps 2000).

The Washington State Parks and Recreation Commission (WSPRC) tracks visitation at state parks, ocean beach approaches (OBAs) and at access points for seashore conservation areas (SCAs). Although these data likely include some double counting, they still provide a gauge for the level of visitation to the area over time. For Pacific Beach State Park, visitation over the 2004-2013 period has grown from 160,000 in 2004 to 291,300 in 2013, averaging 201,100 visitors over the 10-year period (Industrial Economics 2014).

### 7.2.3 Seabrook Area

#### Communities

Seabrook, a beach town designed around new urban principles, was founded in 2005 just south of Pacific Beach. This development currently includes 250 homes (half of which are in the Seabrook Cottage Rentals program), and is slated to expand to a total of 300 homes and over 450 units (Seabrook 2014, in Industrial Economics 2014). No population data are currently available for Seabrook, but the population of the Pacific Beach zip code area, which includes Seabrook, was 483 in 2010. The town includes beach access and has its own retail district, including a market, restaurant/pub, an arts-and-craft shop, and a gift shop. Additionally, convenience stores with basic groceries are available a few minutes away in Pacific Beach.

#### Recreation Resources and Tourism Activities

Seabrook, which is located about a mile south of the community of Pacific Beach, shares many of the recreation and tourism resources of the Moclips/Pacific Beach Area described previously. In addition to those resources, the town of Seabrook offers many scenic vistas and a network of paths, trails, and sidewalks for visitors (Washington Tourism Alliance 2015). Access to the beach at Seabrook is available from two points in the community.

### 7.2.4 Copalis Beach/Ocean City Area

#### Communities

Copalis Beach, with a population of 415 in 2010, and Ocean City with a population of 200, are the two largest communities in this area. Other smaller nearby communities include North Beach, Hogan's Corner, Oyehut-Hogan's Corner, Simpson, and Oyehut. In addition to the campground at Ocean City State Park, visitor accommodations are available at both Copalis Beach and Ocean City, including, but not limited to, the Copalis Beach RV Resort and RV Park, Riverside RV Resort, Beach Wood Resort, Dunes Beach Resort, Linda's Low Tide Motel, and Blue Pacific Motel and RV Park. Other tourist-serving businesses, including restaurants, are located in the area.

According to U.S. Census Bureau data (2015), within the combined Copalis Beach and Ocean City CDPs, an average of 125 (84.5 percent) of the area's 148 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

#### Recreation Resources and Tourism Activities

The coastline stretching from Copalis Beach south to Ocean City is well known for its razor clams, with an extensive razor clam bed running south from Copalis Beach (Wikipedia 2015e). Access to Copalis Beach and the beaches running south to Ocean City are available in several locations along SR 109, and from many of the resorts in the area. Recreational and tourist activities available in the immediate vicinity of Copalis Beach and Ocean City include clamming, beachcombing, surf fishing, camping, bird watching, wildlife viewing, and kiting (Sunrise Resorts 2015, Ocean City RV Resort 2015).

Two Washington State Parks are located in Copalis Beach/Ocean City Area. Griffiths-Friday Ocean State Park, located just north of Copalis Beach, is a 364-acre marine park with 8,316-feet of saltwater shoreline on the Pacific Ocean and 9,950-feet of freshwater shoreline on the Copalis River (Washington State Parks 2015). The park extends from the beach through low dunes to the river, then north to the river's mouth. This oceanside beach day-use park extends through walkable low dunes to a river. The park is the northern border of the National Marine Sanctuary, and the Copalis Spit natural area is a designated wildlife refuge, particularly for birds. The day-use area includes picnicking facilities.

Ocean City State Park, located south of Ocean City, is a year-round, 170-acre camping park, featuring ocean beach, dunes, and dense thickets of shore pine. Migratory birds may be viewed at the park and beach combing is a popular activity (Washington State Parks 2015). In addition to picnicking and day use facilities, the park provides 149 standard campsites and 29 full utility sites (Table 7-3).

According to WSPRC data, visitation to Griffiths-Friday Ocean State Park over the 2009-2013 period has varied from a low of 160,000 in 2004 to 291,300 in 2013, averaging about 64,000 visitors over the five-year period (Industrial Economics 2014). At Ocean City State Park, visitation has averaged 397,600 between 2004 and 2013, peaking at 602,800 in 2012.

## 7.2.5 Ocean Shores Area

### Communities

Ocean Shores, with a population of 5,569 in 2010, is the largest city in what is considered the North Beach area that extends north from Ocean Shores to Moclips. As such, the city provides shopping and consumer services for visitors along this portion of the Washington coastline. In addition to an extensive retail district that includes antique shops, gift stores, and other specialty shops, the city offers a movie theater complex, a bowling alley, and a golf course (Ocean Shores 2015). Additionally, a 30,000 square-foot convention center provides conference and meeting space. Several hotels, inns, condominium resorts, and restaurants are available in Ocean Shores to accommodate visitors, including the Best Western Lighthouse Suites Inn, the Canterbury Inn, the Floating Feather Inn "On the Grand Canal," the Polynesian Condominium Resort, the Quality Inn Ocean Shores, the Ramada Ocean Shores, and the Shilo Inn Suites Hotel (AAA Publishing 2014). Accommodations and gaming are also available at the nearby Quinalt Beach Resort and Casino. Additionally, the RV park located at the Ocean Shores Marina provides space for 99 sites with full hook-ups.

According to U.S. Census Bureau data (2015), an average of 645 (34.4 percent) of Ocean Shore's 1,876 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

It should be noted that a community similar to, but smaller than Seabrook and planned around new urban principles, has been proposed for development in Ocean Shores (Industrial Economics 2014).

### Recreation Resources and Tourism Activities

Ocean Shores is located on a six-mile long peninsula bordered by the Pacific Ocean and Grays Harbor. Ocean Shores is a popular resort area. More than six miles of sandy beach and a network of freshwater lakes and canals lend themselves to swimming, fishing, clamming, and kayaking (AAA Publishing 2014). Other activities available in the area include crabbing, beachcombing, kiting, horseback riding, bird watching, sightseeing, surfing and boogie boarding, whale watching, storm watching, golfing, biking, and shopping (OceanShores 2015). In Ocean Shores, access to the beach is provided every 7/10ths of a mile throughout the municipality's five mile beachfront (Industrial Economics 2014).

The Ocean Shores Marina is located at the tip of the peninsula at Grays Harbor. Ocean-bound boats can launch from the marina, and charter fishing trips depart from the marina (AAA Publishing 2014). Although small in comparison to Westport, the marina is home to several private fishing and crabbing boats. It is also the departure point for the passenger ferry the El Matador, which makes scheduled trips to and from Westport starting Memorial Day and going through Labor Day (OceanShores 2015). The RV Park located at the marina has 99 sites with full hook-ups.

The Ocean Shores area has two notable bird watching resources. Damon Point, at the southern tip of the peninsula, is considered one of the Pacific Northwest's premier sites for bird watching (AAA Publishing 2014), and is one of the few nesting sites for Snowy Plover. Oyehut Wildlife Recreation Area, located just north of Damon Point State Park, is another bird watching area. Blue Herons, Brown Pelicans, Pheasants, Snowy Plovers and other species of birds can be spotted on the 682 acres of protected land (OceanShores 2015).

In addition to these two areas, the North Jetty located at the southwestern tip of the peninsula draws tourists and locals to this area for sightseeing and ocean viewing. Jetty surf fishing for salmon and perch, surfing, and kite flying are available here (OceanShores.com 2015). Parking and public restrooms are available to the public.

The Quinault Beach Resort and Casino, owned and operated by the Quinault Indian Nation, is located north of Ocean Shores in an area that offers beachside activities such as horseback riding, kite flying, beachcombing or just relaxing in ocean view rooms. The beachside resort includes a full service casino, conference facilities, RV parking, numerous dining options and a spa (Quinault Beach Resort 2014).

The North Beach SCA, which includes 22 miles of Pacific Ocean shoreline stretching roughly from Moclips to Point Brown, attracted an average of 2,332,100 visitors per year between 2004 and 2013, with visitation peaking at 2,636,600 in 2010 (Industrial Economics 2014). Over the same period, visitation to the North Jetty OBA, which provides ocean access at Point Brown, averaged 537,900 visitors, peaking at 678,700 in 2010.

## 7.2.6 Grays Harbor Port Area (including Hoquiam, Aberdeen and Cosmopolis)

### Communities

Hoquiam and Aberdeen border each other but maintain separate identities. The economies of both cities have historically been driven by the logging and fishing industries, although tourism has become more of a regional focus in recent years (City of Aberdeen 2015). With a population of 8,726 in 2010, Hoquiam is the smaller of the two communities but sponsors several tourism-related events, including the Shorebird Festival, the Logger's Playday, the Hoquiam Riverfest, and the On Track Arts Festival (Wikipedia 2015f). Other visitor attractions include the Polson Museum and the 7th Street Theater, a historical theater seating 1,100 people for concerts and plays (Grays Harbor Tourism 2015). The Hoquiam Castle Bed & Breakfast, constructed in 1897 and located a short distance from the theater, is open for tours. Downtown Hoquiam offers restaurants and shops for visitors. Traveler accommodations include the EconoLodge Inn & Suites and the Hoquiam River RV Park (Greater Grays Harbor 2015). According to U.S. Census Bureau data (2015), an average of 718 (23.7 percent) of Hoquiam's 3,028 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

Aberdeen, with a population of 16,896 in 2010, is home to the Port of Grays Harbor. Once the leading export port for U.S. grown timber, Grays Harbor now leads the U.S. in exports of American grown soybean meal, and is the number one seafood landing point in Washington State (The Port of Grays Harbor 2015). While forest products remain an important piece of the Grays Harbor cargo mix, the Port has substantially diversified the products shipped through this Pacific Northwest gateway to include automobiles, biodiesel and other liquid and dry bulk products. Several motels, B&Bs, inns, and restaurants are available to visitors, including Grays Harbor Inn & Suites, A Harbor View Inn, Central Park Motel, and Olympic Inn Motel (Greater Grays Harbor 2015). According to U.S. Census Bureau data (2015), an average of 1,619 (25.6 percent) of Aberdeen's 6,326 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

Other smaller communities located along the north shore of Grays Harbor include Chenois Creek, Gray Gables, and Grays Harbor City. Cosmopolis, located inland from Aberdeen along the Chehalis River, is somewhat larger than these communities, with a 2010 population of 1,649 persons. Situated along Highway 101, Cosmopolis likely benefits from visitors traveling to the Grays Harbor area, the Pacific coast, or to Olympia National Park.

### Recreation Resources and Tourism Activities

The Grays Harbor Port Area includes the northern shoreline of Grays Harbor and the mouth of the Chehalis and Wishkay rivers as they empty into the harbor. Travelling east from the Pacific coastline toward Hoquiam and Aberdeen on SR 109, the most notable recreation and tourism resource is the Grays Harbor National Wildlife Refuge, where hundreds of thousands of shorebirds stop over on the refuge's

muddy tidal flats during their spring and fall migrations (Grays Harbor Tourism 2015). An 1,800-foot boardwalk provides access for viewing birds at the refuge.

Aberdeen is home to two tall sailing ships that are available for tours and local sailing excursions (AAA Publishing 2014). Lake Aberdeen fish hatchery, located three miles east of the city, offers guided tours by appointment. Aberdeen is also a large regional retail center, benefiting from recreationists and tourists traveling to the North Beach area (e.g., Ocean Shores) or to Westport. Aberdeen also receives some visitation related to its reputation as the birthplace and hometown of Nirvana frontman Kurt Cobain.

Activities available to recreationists and tourists in the Grays Harbor Port Area include beachcombing, bird watching, kayaking, and hiking (City of Aberdeen 2015).

### 7.3 SOUTHERN WASHINGTON COAST: WILLAPA BAY/LONG BEACH PENINSULA, INCLUDING THE COASTAL PORTION OF PACIFIC COUNTY

The Willapa Bay/Long Beach Peninsula region includes Willapa Bay and the coastline of Pacific County. Similar to the coastline of Grays Harbor County, the Pacific County coastline features long sandy beaches, with access generally available from state highways and local roads. Additionally, Long Beach Peninsula offers access to the protected, calmer waters of Willapa Bay, where watersports like kayaking, windsurfing, and paddleboarding are popular (Industrial Economics 2014). Willapa Bay also supports an economically important oyster industry. Developed areas in this region include the communities of Tokeland, Raymond, South Bend Chinook, Ilwaco, Seaview, Ocean Park, Nahcotta, and several smaller communities. Additionally, Shoalwater Bay Indian Reservation is located on the north shore of Willapa Bay. Key recreation sites in the Willapa Bay/Long Beach Peninsula region are identified in Table 7-3.

**Table 7-4** Key Recreation Sites in the Willapa Bay/Long Beach Peninsula Region (Pacific County)

<p><i>Shoalwater Bay Indian Tribe:</i></p> <ul style="list-style-type: none"> <li>◆ Shoalwater Bay Casino (located at Tokeland)</li> </ul>
<ul style="list-style-type: none"> <li>◆ Federal Wildlife Refuges:</li> <li>◆ Willapa Bay National Wildlife Refuge</li> </ul>
<p><i>State Parks:</i></p> <ul style="list-style-type: none"> <li>◆ Ledbetter Point (day use)</li> <li>◆ Pacific Pines (day use)</li> <li>◆ Loomis Lake (day use)</li> <li>◆ Cape Disappointment (137 standard campsites, 78 utility campsites, 14 yurts, 5 primitive campsites, 3 cabins, 1 boat ramp)</li> <li>◆ Fort Columbia (2 vacation houses)</li> </ul>

**Coastal Communities:**

- ♦ North Cove/Tokeland
- ♦ Raymond/South Bend/Bay Center
- ♦ Seaview/Long Beach
- ♦ Chinook
- ♦ Ilwaco
- ♦ Seaview/Long Beach
- ♦ Ocean Park/Nahcotta

Source: *Industrial Economics*. 2014.

Willapa Bay National Wildlife Refuge is located adjacent to Willapa Bay, with units in several locations, including the northern tip of Long Beach Peninsula on Long Island, and along areas of Shoalwater Bay. The refuge encompasses diverse ecosystems, including salt marsh, muddy tidelands, forest, freshwater wetlands, streams, grasslands, coastal dunes and beaches. This diversity supports a variety of recreational activities, including wildlife viewing, hiking, hunting, boating from boat launches located at the refuge, photography, fishing, and shellfish harvesting (U.S. Fish and Wildlife Service 2015). Based on a recent study of the economic impacts of visits to the Willapa Bay National Wildlife Refuge (Industrial Economics 2014), refuge visitation was estimated at 114,680 visits in 2011, with annual spending associated with refuge visitation totalling an estimated \$1.8 million and adding an estimated 21 jobs, and \$720,000 in labor income to the region's economy.

In addition to the refuge, several state parks are located in the Willapa Bay/Long Beach Peninsula region. From north to south, these parks include Ledbetter, Pacific Pines, and Loomis Lake state parks, all located on Long Beach Peninsula, and Cape Disappointment and Fort Columbia state parks, located near the mouth of the Columbia River.

Tourism in Pacific County, which is largely driven by its coastal resources, generates substantial economic benefits to the county. In 2009, visitor-related travel expenditures totaled an estimated \$120.2 million in Pacific County (Dean Runyan Associates 2011). This spending supported an estimated 2,060 jobs (direct, indirect, and induced), representing 22.0 percent of countywide employment, the largest percentage among the state's counties. According to "Ocean Economy" data available from the NOEP, the recreation and tourism sector contributed 728 jobs to the Pacific County economy and helped to support 112 businesses establishments in 2010 (Industrial Economics 2014). (Note: Ocean Economy data include only ocean-related activities and industries compiled from the databases of the Bureau of Labor Statistics.)

### 7.3.1 North Cove/Tokeland Area (including Markham, Ocosta, Bay City, Grayland)

#### Communities

North Cove and Tokeland are the primary communities in the northern part of Willapa Bay. Perched above the shore of the rapidly eroding Cape Shoalwater, North Cove is a small community that has been slowly losing homes and businesses to beach erosion for decades (Chinook Observer 2014). Including the nearby Shoalwater Bay Indian Reservation, the North Cove area currently has a population of 415, but as more homes are lost to erosion, the future population is uncertain. The Shoalwater Indian Reservation

reportedly has a population of 70 tribal members (Port of Willapa Harbor 2015). In addition to the Shoalwater Bay Casino facilities on the reservation, the tribe operates a health clinic.

Tokeland, with a population of 417, is a traditional fishing community that has become more oriented towards tourism over the years (Port of Willapa Harbor 2015). Marine facilities at the Port of Willapa Harbor include two seafood servicing businesses and an RV park. A fish processing plant is located nearby. Tourist-serving businesses include the historic Tokeland Hotel & Restaurant, Tradewinds-on-the-Bay, My Suzies RV Park, and Bayshore RV Park, as well as several restaurants and specialty shops (Tokeland-North Cove Chamber of Commerce, Westport-Grayland Chamber of Commerce, and Cranberry Coast Chamber of Commerce 2015).

#### **Recreation Resources and Tourism Activities**

The North Cove/Tokeland Area takes in Cape Shoalwater and the north shore of Willapa Bay, and includes the Shoalwater Bay Indian Reservation. Over decades substantial erosion of the beaches at the mouth of Willapa Bay near North Cove has limited tourism-related development. The focus of recreation and tourism-related activities is now Tokeland and Toke Spit, a three-mile long spit extending into Willapa Bay (AAA Publishing 2014). Recreation resources in the Tokeland area include sandy beaches and destinations such as the historic Tokeland Hotel and the Tokeland Marina, which is operated by the Port of Willapa Harbor. The marina offers both recreational and commercial moorage, a boat ramp, and a pier for public fishing and bird watching (Port of Willapa Harbor 2015). In addition to sport fishing, boating, and wildlife viewing, recreational opportunities in the Tokeland area include clam digging, crabbing, surfing, and beachcombing (Tokeland-North Cove Chamber of Commerce 2015).

The Shoalwater Bay Tribe operates the Shoalwater Bay Casino, located near Tokeland on the north rim of Willapa Bay. The resort includes 17 suites, as well as a small casino, restaurant, gift shop, and gas station near the beach (Shoalwater Bay Casino 2015).

### **7.3.2 Raymond/South Bend/Bay Center Area**

#### **Communities**

The City of Raymond, with a 2010 population of 2,975, is largely supported by an economy that is based on logging and fishing, together with a limited amount of tourism (Wikipedia 2015g). Industrial uses at the Raymond Port Dock are also important contributors to the city's economy. Based on the Willapa Harbor Chamber of Commerce visitor directory, visitor-serving accommodations and restaurants in Raymond are limited, although additional facilities are available in nearby South Bend. According to U.S. Census Bureau data available for the City of Raymond (U.S. Census Bureau 2015), an average of 145 (14.3 percent) of Raymond's 1,016 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

South Bend, located on the southern side of the Willapa River across from Raymond with a population of 1,637, is widely known for its oyster processing industry and for the scenery at the entrance to Willapa Harbor. Tourist accommodations in South Bend include Chen's Motel & Restaurant, the Sequest Motel,

and the Cabin at Willapa Bay (Willapa Harbor Chamber & Visitor Kiosk 2015). The Willapa Restaurant & Lounge also is available to visitors. According to U.S. Census Bureau data available for the City of South Bend (U.S. Census Bureau 2015), an average of 73 (11.3 percent) of South Bend's 646 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

Bay Center, located 16 miles southwest of Raymond and South Bend, had a 2010 population (within the Bay Center CDP area) of 276 persons. The unincorporated residential community is home to several commercial oyster-growing operations. Additionally, facilities at the Port of Willapa Harbor located in Bay Center accommodate a thriving shellfish and crabbing industry (Port of Willapa Harbor 2015). Based on the Willapa Harbor Chamber of Commerce visitor directory, visitor-serving accommodations and restaurants in Bay City are limited, although facilities are available in South Bend and in communities along the Long Beach Peninsula; the Bay Center/Willapa Bay KOA provides camping and RV facilities in Bay Center.

Other nearby communities on Willapa Bay include Nemah and Johnson's Landing, both located South of Bay Center on U.S. 101. Nemah is a small farming community. The Nemah Salmon Hatchery is located near the community and offers visitor tours. Johnson's Landing is a very small community located just to the south of Nemah.

#### **Recreation Resources and Tourism Activities**

Raymond and South Bend are situated along the Willapa River on U.S. 101, adjacent to Willapa Harbor. Proximity to the harbor and Willapa Bay provide opportunities for water-based recreation, such as paddling and bird watching along water trails and in the bay (Willapa Harbor Chamber & Visitor Kiosk 2015). Although the Raymond Dock, which is operated by the Port of Willapa Harbor, primarily serves commercial vessels and commercial/industrial tenants, public fishing is available from the dock and moorage is available to recreational boats (Port of Willapa Harbor 2015). The Willapa Hills trail traverses the entire length of the port dock along U.S. 101 as part of its 57-mile route between Raymond/South Bend and Chehalis. Nearby, visitors can access viewing sites for the Lewis & Clark Trail and visit inland waterfalls, rivers, and streams (Willapa Harbor Chamber & Visitor Kiosk 2015). South Bend offers a recreational dock and boat launch that support canoeing, kayaking, boating, and fishing in Willapa Bay or in the Willapa River system (City of South Bend 2015). South Bend also has a large shellfish industry that attracts visitors.

Bay Center and other communities in the area benefit from the regional recreational and tourist resources that draw visitors to the region, including Willapa National Wildlife Refuge, tourist attractions located on Long Beach Peninsula, and coastal state parks. The Bay Center Marina provides boating opportunities in Willapa Bay, but the marina primarily serves the commercial fishing and aquaculture industries (Port of Willapa Harbor 2015).

### 7.3.3 Chinook Area

#### Communities

The community of Chinook is a fishing village with a busy port on the Columbia River. The Chinook CDP had a 2010 population of 466 persons. Based on a review of internet travel sites, visitor accommodations appear to be limited in Chinook, with the exception of the River's End Campground. Accommodations and other visitor services, however, are readily available in nearby Ilwaco. According to U.S. Census Bureau data available for the Chinook CDP (U.S. Census Bureau 2015), an average of 6 (7.7 percent) of Chinook's 78 employed residents 16 years of age or older were employed in retail, arts, entertainment, recreation, accommodation, and food services sectors between 2009 and 2013 (Table 7-1).

#### Recreation Resources and Tourism Activities

Chinook is located on U.S. 101 at the mouth of the Columbia River. Access to the Columbia River and the Pacific Ocean for boating and fishing is provided by the Port of Chinook and its marina. Facilities provided by the port, which accommodates both commercial and sport fisherman vessels ranging from 16 to 60 feet in length, include 300 boat slips, a boat launch and boat hoist, a fueling facility, and a cannery (Pacific County Economic Development Council 2015). The port also accommodates charter boat fishing operators.

Fort Columbia State Park is located immediately east of the community of Chinook. The day-use park provides an interpretive center, as well as restored historic barracks, gun emplacements and batteries, picnicking facilities, two historic vacation houses for overnight stays, and a five-mile forested hiking trail (Washington State Parks 2015). In addition to hiking, picnicking, and sightseeing, outdoor recreation opportunities at the park include bird watching and wildlife viewing.

According to WSPRC data (Industrial Economics 2014), visitation at Fort Columbia State Park, including vacation housing users, ranged from 68,100 to 134,900 over the 2004-2013 period, averaging 112,800 visitors annually.

### 7.3.4 Ilwaco Area

#### Communities

Ilwaco, with a population of 936 in 2010, is a working fishing community that is home to a large commercial fishing fleet and several charter fishing operators. The city's economy also benefits from its reputation for being a popular sport fishing destination and from local and regional tourism. As discussed previously identified, the Port of Ilwaco provides extensive facilities for both commercial and sport fishermen. Ilwaco also provides a variety of accommodations for visitors. In addition to vacation rentals, accommodations include Heidi's Inn; Inn at Harbour Village; Col-Pacific Motel; China Beach Retreat; Harbor Lights Motel, Restaurant, and Lounge; Eagle's Nest Resort; and 101 Haciendas Motel (Ilwacowashington 2015).

### **Recreation Resources and Tourism Activities**

Ilwaco, which is located at the south end of Long Beach Peninsula, is situated on Baker Bay just inside the mouth of the Columbia River. Ilwaco has excellent boating access to both the river and the Pacific Ocean. Ilwaco is a popular sport fishing port, with charter operators specializing in guided fishing trips for salmon, halibut, tuna, bottomfish, sea bass, ling cod, and sturgeon (AAA Publishing 2014). Ilwaco's sport fishing industry is supported by the Port of Ilwaco, which provides an 800-slip marina used by both recreational boaters and commercial fishermen (The Port of Ilwaco 2015). Guest moorage is available year-round at the marina. Other facilities provided by the port include a boat launch, two small boat hoists, and two fuel docks. Several businesses are located at the port, including boat repair and related businesses. The Columbia Pacific Heritage Museum, which depicts frontier life in southwest Washington, is also available to visitors.

In addition to Willapa National Wildlife Refuge, Cape Disappointment State Park attracts recreationists and visitors to the Ilwaco area. Located about three miles southwest of Ilwaco, Cape Disappointment State Park is a camping park, offering two miles of beachfront, two lighthouses, and the Lewis and Clark Interpretive Center. Cape Disappointment has 137 standard campsites, 60 full hookup sites, 18 sites with water and electricity only, five primitive hiker/biker campsites, 14 yurts, and three cabins (Washington State Parks 2015). Camping is available year-round. Three vacation rentals also are provided by the park. Other facilities include picnic tables, a dock, a boat launch, and eight miles of hiking trails. Besides camping and visiting the park's two historic lighthouses and the interpretive center, opportunities at the park include beachcombing, kayaking, bird watching, boating, saltwater and freshwater fishing, crabbing, and clamming.

According to WSPRC data (Industrial Economics 2014), visitation at Cape Disappointment State Park ranged from 571,200 to 1,078,000 over the 2004-2013 period, averaging 980,700 visitors annually.

### **7.3.5 Seaview/Long Beach Area**

#### **Communities**

In 2010, Seaview had a population of 473 and the City of Long Beach had a population of 1,392. According to the U.S. Census, of the 578 people employed in the Long Beach CDP, 212 were employed in tourist sensitive businesses, or about 37 percent. The Long Beach Peninsula has many options for travel accommodations, especially as compared to more rural parts of the Washington coast. Accommodations in Seaview/Long Beach include The Breakers, Chautauqua Lodge, Anchorage Cottages, Enchanted Cottages, Mermaid Inn and RV Park, Crow's Nest RV Parkbeach, Boreas Bed & Breakfast, Bloomer Estates, The Shelburne Inn, Our Place at the Beach, Cedars Ocean View Inn, the Worldmark Club at Long Beach, Adrift, Inn at Discovery Coast, Hackney Cottage, A Rendezvous Place Bed & Breakfast, The Swan, Sou'wester Lodge and Cabins, and Seaview Motel and Cottages.

#### **Recreation Resources and Tourism Activities**

The communities of Seaview and Long Beach are located a few miles north of Ilwaco along the U.S. 101 and Highway 103 on the Long Beach Peninsula. The Long Beach peninsula is a popular area for razor

clamdigging, and the Razor Clam Festival is held annually in April in the town of Long Beach. According to the Washington Department of Fish and Wildlife (WDFW), more than six million razor clams were harvested along the Washington coast in 2014. The WDFW regulates the days that digging is allowed; in 2014, the season was cancelled due to high levels of domic acid., Closure of the clam digging season during the 2002-03 season was estimated to represent a \$10.4 million loss to the economies of Washington's coastal communities (Washington Department of Fish and Wildlife 2015).

The World Kite Museum & Hall of Fame, Cranberry Museum, and Marsh's Free Museum are located in the Seaview/Long Beach area. The area also is home to the Peninsula Golf Course; numerous pubs, eateries, and tourist-orientated shops are located along US 101. Other tourist attractions on the Long Beach Peninsula include several kite flying festivals, crab feeds, SummerFest, the Doggie Olympic Games, a half marathon/5/10k, the Columbia Pacific Farmers Market, events with sanctioned fireworks, fall wild mushroom events, and rodeos (Long Beach Peninsula Visitor's Bureau 2014).

### **7.3.6 Ocean Park/Nacotta Area**

#### **Communities**

Ocean Park CDP, with a population of 1,573 in 2010 (U.S. Census Bureau 2015), is a small resort community known for its oysters and recreation opportunities. According to the census, approximately 80 of the 261 employed population over 16 are employed in tourist sensitive industries, or about 31 percent (Table 7-1). Tourist accommodations include Westgate Cabins and RV Park, Blackwood Beach Cottages, The DoveShire Bed and Breakfast, Bloomer Estates Admiral House, Evergreen Court & Trailer Park, Campbell House at Klipsan Beach, Shakti Cove Cottages, Black Bear Beach Camp, Ocean Park Resort, Moby Dick Hotel, Surfside Inn, Harbor View Motel, and Klipsan Beach Cottages.

#### **Recreation Resources and Tourism Activities**

The small communities of Ocean Park and Nahcotta are located a few miles north of the community of Long Beach. Nahcotta is home to the Port of Peninsula, which contains 90 slips and a public boat launch. The port serves both commercial and recreational uses, with fifteen oyster dredges, a gillnet fleet and crab operations (Port of Peninsula, Nahcotta, Washington 2015). The Port of Peninsula also sponsors the Willapa Bay Oyster House Interpretive Center. Loomis Lake State Park is a nearby 326-acre park with 24 picnic sites, a 67 car parking lot, and a trail to the beach. Other tourist attractions include the Northwest Garlic Festival, Jazz and Oysters, 4<sup>th</sup> of July Parade, and Beach Barons Car Club Rod Run in Ocean Park, the Great Washington Birding Trail, and the historic nearby town of Oysterville (Ocean Park Chamber of Commerce 2015).

## **7.4 OUTDOOR RECREATION VISITATION ALONG THE WASHINGTON COAST**

During 2014 and early 2015, an internet-based survey of residents of Washington state was conducted by the Surfrider Foundation to establish recreation and tourism baseline conditions. The survey consisted of both an internet panel survey focused on recreation trips to the Washington coast over the past 12

months, and an “opt-in” survey focused on participation in specialized recreational activities along the coast.

The internet panel survey was conducted in two survey waves between June 2014 and February 2015, and gathered more than 6,100 survey responses. The results of the survey, which were extrapolated to the Washington State population, are presented in a May 2015 report (Surfrider Foundation 2015). Both surveys conducted by the Surfrider Foundation included only residents of Washington State.

According to the study’s findings, 41 percent of all respondents reported visiting the Washington coast over the past 12 months. Most respondents (34 percent) stayed one night on their last trip to the coast, and 26 percent stayed two nights on their last trip. About 13 percent of respondents went to the coast for day use only. Coastal recreation trips to Pacific and Grays Harbor counties were visited most frequently, accounting for about 37 percent and 36 percent of total coastal recreation trips by state residents, respectively.

In terms of recreational activities, the top three activities that survey respondents participated in on their most recent trip were beach going (60.5 percent), sightseeing or scenic enjoyment (57.1 percent), and watching wildlife (35.1 percent). The most favorite activities of participants were beach going (32 percent), sightseeing or scenic enjoyment (22.6 percent), camping (11.3 percent), hiking or biking (7 percent), and photography (3.6 percent). During trips to the coast over the last twelve months, the three most popular activities were beach going (67.7 percent of respondents), sightseeing or scenic enjoyment (62.3 percent), and viewing wildlife (39.9 percent).

During respondents’ most recent trip, average spending was estimated to be about \$117 per trip. The highest expense was for lodging and/or campsite fees at \$25.96 per trip. The most frequently cited expenditure item was for car fuel, with 77.1 percent of respondents reporting expenditures, at an average per-trip cost of \$24.02 per trip; expenditures for food and beverages at a restaurant or bar averaged \$23.95 per trip. This average trip duration was 2.8 days per trip.

As shown in Table 7-5, about 26 percent of state residents who visited only one coastal county on their most recent trip to the Washington coast resided in King County, followed by Pierce County (19.2% of state residents) and Snohomish County (11.3% of state residents). For multi-county trips to the Washington coast, the same three counties accounted for most of the trips by state residents, although residents of King County accounted for an even higher percentage (34.2%) of coastal visitors.

**Table 7-5** Percentage of Single County and Multiple County Trips to the Coastal Study Area, by Washington County of Origin

Washington County of Origin	Last Trip to One Coastal County	Trips to Multiple Coastal Counties
Benton	1.7%	1.6%
Chelan	0.6%	0.0%
Clark	10.7%	9.8%
Cowlitz	5.1%	2.2%
Douglas	0.0%	0.5%

Washington County of Origin	Last Trip to One Coastal County	Trips to Multiple Coastal Counties
Franklin	0.0%	0.5%
Grant	1.7%	0.0%
Island	1.1%	1.1%
King	26.0%	34.2%
Kitsap	5.1%	3.3%
Kittitas	0.6%	0.5%
Klickitat	0.0%	0.5%
Lewis	1.7%	1.6%
Mason	1.1%	1.1%
Pend Orielle	0.0%	1.1%
Pierce	19.2%	13.6%
San Juan	0.6%	0.0%
Skagit	1.1%	1.6%
Snohomish	11.3%	10.9%
Spokane	2.3%	8.2%
Stevens	0.6%	0.5%
Thurston	5.6%	4.3%
Whatcom	1.7%	1.6%
Whitman	1.1%	0.5%
Yakima	1.1%	0.5%

Source: Derived from Surfrider 2015 data

## 7.5 ECONOMIC CONTRIBUTION OF COASTAL RECREATION AND TOURISM TO THE COASTAL STUDY REGION AND STATEWIDE

This section describes estimates of trip-related expenditures made by Washington resident and out-of-state visitors associated with outdoor recreation and tourism activities in the coastal area of Washington. Although expenditures on equipment and durable goods (e.g., boats, trailers, off-highway vehicles [OHVs]) also contribute to the local and state-wide economy, these expenditures are not considered in the analysis. The extent to which equipment purchases are specifically needed for participating in recreation activities along the Washington coast cannot be determined with reasonable accuracy and therefore are not included in the following economic analysis.

### 7.5.1 Trip-Related Expenditures Associated with Recreation and Tourism Activities in the Washington Coastal Study Area

Total trip-related expenditure made by Washington State residents associated with recreation activities in the coastal study area are estimated at about \$481 million in 2014 (Table 7-6). Of this total, an estimated \$331 million was made in the coastal study area, and about \$150 million was made by Washington residents elsewhere in the state.

**Table 7-6** Trip-Related Expenditures by Washington Residents Associated with Recreation and Tourism Activities in the Washington Coastal Area (2014 dollars)

Item	Trip Spending (average spending per trip)	Proportion of Per-Trip Expenditures, by Spending Category	Total Trip-Related Spending	WA Residents Living INSIDE the Coastal Study Area		WA Residents Living OUTSIDE the Coastal Study Area		Total Recreation-Related Spending by WA Resident Associated with Coastal Recreation	
				Inside Coastal Study Area	Elsewhere in WA	Inside Coastal Study Area	Elsewhere in WA	In the Coastal Study Area	Elsewhere in WA
Lodging/Campsite Fee	\$25.96	0.2216	\$106,642,069	\$4,478,967	\$0	\$68,857,931	\$33,305,171	\$73,336,898	\$33,305,171
Car fuel	\$24.02	0.2051	\$98,672,670	\$4,144,252	\$0	\$63,712,153	\$30,816,264	\$67,856,406	\$30,816,264
Food and beverages at a restaurant or bar	\$23.95	0.2045	\$98,385,114	\$4,132,175	\$0	\$63,526,481	\$30,726,458	\$67,658,656	\$30,726,458
Food and beverages from a store	\$14.29	0.1220	\$58,702,433	\$2,465,502	\$0	\$37,903,692	\$18,333,240	\$40,369,194	\$18,333,240
Shopping and souvenirs (t-shirts, posters, gifts)	\$9.87	0.0843	\$40,545,348	\$1,702,905	\$0	\$26,179,807	\$12,662,636	\$27,882,711	\$12,662,636
Airline flight	\$2.43	0.0207	\$9,982,289	\$419,256	\$0	\$6,445,484	\$3,117,549	\$6,864,740	\$3,117,549
Charter fee (whale watching, etc.)	\$2.10	0.0179	\$8,626,670	\$362,320	\$0	\$5,570,172	\$2,694,178	\$5,932,492	\$2,694,178
Bus/Ferry/Train ticket	\$1.81	0.0155	\$7,435,368	\$312,285	\$0	\$4,800,957	\$2,322,125	\$5,113,243	\$2,322,125
Park entrance, museum, aquarium, or other entrance fee	\$1.51	0.0129	\$6,202,986	\$260,525	\$0	\$4,005,219	\$1,937,242	\$4,265,744	\$1,937,242
Other	\$1.50	0.0128	\$6,161,907	\$258,800	\$0	\$3,978,694	\$1,924,413	\$4,237,494	\$1,924,413
Sundries (sunscreen, surf wax, motion sickness pills, batteries, camera data cards)	\$1.49	0.0127	\$6,120,828	\$257,075	\$0	\$3,952,169	\$1,911,583	\$4,209,244	\$1,911,583
Lessons, clinics, camps	\$1.45	0.0124	\$5,956,510	\$250,173	\$0	\$3,846,071	\$1,860,266	\$4,096,244	\$1,860,266
Car rental	\$1.28	0.0109	\$5,258,161	\$220,843	\$0	\$3,395,152	\$1,642,166	\$3,615,995	\$1,642,166
Boat rental	\$1.07	0.0091	\$4,395,494	\$184,611	\$0	\$2,838,135	\$1,372,748	\$3,022,746	\$1,372,748
Parking	\$1.05	0.0090	\$4,313,335	\$181,160	\$0	\$2,785,086	\$1,347,089	\$2,966,246	\$1,347,089
Boat fuel	\$0.83	0.0071	\$3,409,589	\$143,203	\$0	\$2,201,544	\$1,064,842	\$2,344,747	\$1,064,842

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Item	Trip Spending (average spending per trip)	Proportion of Per-Trip Expenditures, by Spending Category	Total Trip- Related Spending	WA Residents Living INSIDE the Coastal Study Area		WA Residents Living OUTSIDE the Coastal Study Area		Total Recreation-Related Spending by WA Resident Associated with Coastal Recreation	
				Inside Coastal Study Area	Elsewhere in WA	Inside Coastal Study Area	Elsewhere in WA	In the Coastal Study Area	Elsewhere in WA
Bait and tackle	\$0.71	0.0061	\$2,916,636	\$122,499	\$0	\$1,883,248	\$910,889	\$2,005,747	\$910,889
Equipment rental (Surfboard, bike, kayak, stand up paddle, etc)	\$0.67	0.0057	\$2,752,318	\$115,597	\$0	\$1,777,150	\$859,571	\$1,892,747	\$859,571
One-day fishing license fee	\$0.57	0.0049	\$2,341,525	\$98,344	\$0	\$1,511,904	\$731,277	\$1,610,248	\$731,277
Dive equipment rental and airfills	\$0.32	0.0027	\$1,314,540	\$55,211	\$0	\$848,788	\$410,541	\$903,999	\$410,541
Boat ramp fees	\$0.26	0.0022	\$1,068,064	\$44,859	\$0	\$689,640	\$333,565	\$734,499	\$333,565
<b>Total</b>	<b>\$117.14</b>	<b>1.0000</b>	<b>\$481,203,852</b>	<b>\$20,210,562</b>	<b>\$0</b>	<b>\$310,709,478</b>	<b>\$150,283,813</b>	<b>\$330,920,039</b>	<b>\$150,283,813</b>

Sources: Derived from information in Surfrider Foundation 2015 and The Research Group 1991.

Trip-related expenditures made by out-of-state visitors associated with outdoor recreation and tourism activities in the Washington coastal study area are estimated at about \$160 million in 2014 (Table 7-7). In addition to the spending within the coastal study area made by out-of-state visitors, out-of-state visitors are estimated also to have spent about \$29.8 million related to outdoor recreation and tourism elsewhere in Washington.

**Table 7-7** Trip-Related Expenditures by Out-of-State Visitors Associated with Recreation and Tourism Activities in the Washington Coastal Area (2014 dollars)

	Proportion of Per-Trip Expenditures, by Spending Category	Total Trip-Related Spending by Out-of-State Visitors for Outdoor Recreation in Washington	Recreation Activities within the Coastal Study Area	Recreation Activities Elsewhere in WA Associated with Coastal Trips
Accommodations	0.31	\$1,066,758,980	\$49,604,293	\$506,166
Food and Beverage Places	0.19	\$653,820,020	\$30,402,631	\$2,171,616
Grocery Stores	0.12	\$412,938,960	\$19,201,662	\$1,477,051
Transportation	0.02	\$68,823,160	\$3,200,277	\$2,800,242
Fees to recreation providers	0.06	\$206,469,480	\$9,600,831	\$0
Government fees	0.03	\$103,234,740	\$4,800,415	\$124,686
Miscellaneous retail	0.11	\$378,527,380	\$17,601,523	\$293,359
Gas & oil	0.16	\$550,585,280	\$25,602,216	\$22,401,939
TOTAL	1	\$3,441,158,000	\$160,013,847	\$29,775,059

Sources: Derived from information in *Earth Economics 2015* and *Dean Runyan 2010*.

### 7.5.2 Employment and Labor Income Effects of Recreation and Tourism Activities in the Washington Coastal Study Area

The trip-related spending by state residents and out-of-state visitors identified in Tables 7-8 and 7-9 above generates economic activity that supports jobs and personal income for residents of the coastal study area and elsewhere in the state. In the coastal study area, trip-related spending by residents of both the coastal regions and elsewhere in Washington who recreate at the coast is estimated to support 9,309 jobs and \$196.8 million in labor income within the coastal economy (Table 7-8). Statewide, as dollars and economic activity multiply through the state’s economy, it is estimated that 9,309 jobs are supported directly and indirectly by recreation and tourism activities in the coastal area, and \$413.0 million in labor income (Table 7-9).

**Table 7-8** Contribution of Trip-Related Recreation and Tourism Expenditures in the Coastal Area to Coastal Employment and Coastal Labor Income

2-digit NAICS Code	Description	Contribution to Coastal Employment				Contribution to Coastal Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
11	Agriculture, Forestry, Fishing and Hunting	16	51	2	70	1,004,408	1,197,961	131,304	2,333,674
21	Mining, Quarrying, and Oil and Gas Extraction	1	7	0	97	361,918	231,335	4,607	597,859
22	Utilities	0	2	1	3	0	289,239	82,535	371,773
23	Construction	0	45	2	47	0	3,010,396	210,787	3,221,183
31	Food Processing	80	3	1	84	4,130,385	187,721	67,226	4,385,333
32	Wood&Construction Products	18	3	0	22	1,725,895	224,483	32,042	1,982,420
33	Metal Products	19	2	0	21	1,264,857	105,036	18,213	1,388,106
42	Wholesale Trade	147	15	9	171	12,814,615	1,319,054	746,653	14,880,322
44	Retail Food&Clothing	602	8	74	684	25,117,764	352,399	3,285,189	28,755,352
45	Other Retail	72	3	39	114	1,970,194	101,976	1,252,005	3,324,174
48	Transportation	124	21	6	151	9,497,814	1,443,031	364,594	11,305,438
49	Warehousing&storage	1	42	4	47	68,773	2,920,811	279,307	3,268,891
51	Information	0	12	3	15	0	940,035	238,716	1,178,752
52	Finance and Insurance	1	18	14	34	185,338	1,423,349	1,084,606	2,693,294
53	Real Estate and Rental and Leasing	90	28	15	132	3,785,915	682,296	346,622	4,814,833
54	Professional, Scientific, and Technical Services	0	60	11	70	0	4,193,952	645,786	4,839,738
55	Management of Companies and Enterprises	0	14	1	15	0	1,882,344	91,000	1,973,344
56	Administrative and Support and Waste Management and Remediation Services	0	69	10	78	0	2,767,941	418,221	3,186,163

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2-digit NAICS Code	Description	Contribution to Coastal Employment				Contribution to Coastal Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
61	Educational Services	0	3	14	17	0	66,090	366,634	432,724
62	Health Care and Social Assistance	0	0	96	96	0	395	5,165,366	5,165,761
71	Arts, Entertainment, and Recreation	112	10	12	134	2,670,116	150,151	272,930	3,093,197
72	Accommodation and Food Services	2,143	47	65	2,255	60,085,041	1,251,261	1,747,865	63,084,167
81	Other Services (except Public Administration)	0	40	62	103	0	2,080,412	2,215,886	4,296,299
100Misc	Miscellaneous	0	0	0	0	0	0	0	0
200S/L Govt	S-L Government	219	18	8	244	22,002,623	2,779,653	1,188,289	25,970,566
300Fed Govt	Federal Government	18	2	2	22	190,203	35,635	27,153	252,992
<b>Grand Total</b>		<b>3,663</b>	<b>520</b>	<b>453</b>	<b>4,725</b>	<b>146,875,859</b>	<b>29,636,959</b>	<b>20,283,538</b>	<b>196,796,355</b>

**Table 7-9** Contribution of Trip-Related Recreation and Tourism Expenditures to Statewide Employment and Labor Income

2-digit NAICS Code	Description	Contribution to Statewide Employment				Contribution to Statewide Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
11	Agriculture, Forestry, Fishing and Hunting	40	127	17	184	2,565,258	3,064,481	718,490	6,348,229
21	Mining, Quarrying, and Oil and Gas Extraction	2	12	2	15	6,597	91,201	18,854	116,652
22	Utilities	0	5	3	8	0	715,500	355,785	1,071,285
23	Construction	0	57	12	69	0	3,882,276	984,882	4,867,158
31	Food Processing	110	23	16	149	5,978,758	1,336,728	896,658	8,212,144
32	Wood&Construction Products	60	32	8	101	5,972,430	2,846,720	748,399	9,567,549
33	Metal Products	29	13	7	48	2,050,735	856,402	436,949	3,344,086
42	Wholesale Trade	338	70	62	470	29,522,127	6,118,556	5,367,834	41,008,517
44	Retail Food&Clothing	868	10	189	1,068	36,288,990	460,482	8,349,769	45,099,241
45	Other Retail	113	5	130	248	3,051,352	167,619	4,480,399	7,699,370
48	Transportation	332	51	32	415	21,715,915	3,599,103	2,055,747	27,370,765
49	Warehousing&storage	2	78	16	96	96,116	5,185,493	1,085,566	6,367,175
51	Information	0	48	28	76	0	5,362,027	2,799,964	8,161,991
52	Finance and Insurance	9	74	112	195	1,270,261	5,592,517	7,816,837	14,679,615
53	Real Estate and Rental and Leasing	147	106	100	352	6,168,175	2,371,296	2,085,905	10,625,377
54	Professional, Scientific, and Technical Services	0	200	72	272	0	14,556,834	4,924,607	19,481,441
55	Management of Companies and Enterprises	0	51	8	59	0	6,677,840	1,051,915	7,729,755
56	Administrative and Support and Waste Management and Remediation Services	0	226	72	298	0	9,278,218	3,129,501	12,407,719
61	Educational Services	0	5	59	64	0	129,371	1,803,503	1,932,874

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2-digit NAICS Code	Description	Contribution to Statewide Employment				Contribution to Statewide Labor Income			
		Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
62	Health Care and Social Assistance	0	0	367	367	0	1,630	23,262,300	23,263,929
71	Arts, Entertainment, and Recreation	195	35	71	302	4,643,393	757,061	1,693,729	7,094,183
72	Accommodation and Food Services	3,559	94	203	3,856	100,258,496	2,514,194	5,423,177	108,195,868
81	Other Services (except Public Administration)	0	73	160	232	0	3,970,141	6,419,590	10,389,730
100Misc	Miscellaneous	0	0	0	0	0	0	0	0
200S/L Govt	S-L Government	228	16	14	258	21,790,471	2,602,694	2,077,463	26,470,628
300Fed Govt	Federal Government	80	9	17	106	825,079	386,551	310,226	1,521,856
Grand Total		6,112	1,421	1,775	9,309	242,204,153	82,524,936	88,298,049	413,027,137

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## CHAPTER 8. Ecosystem Services

### 8.1 INTRODUCTION

The new planning environment within which managed natural resources operate requires a reexamination of not only the relationship between the natural landscape and resource use, but also a more complete understanding of its role in the economic environment of the region. Contemporary economic theory suggests that many environmental attributes can be measured and monetized. Once these environmental attributes (e.g., water quality, maintenance of vegetation cover for carbon sequestration) are connected to the human condition and assigned dollar values, they can be incorporated with more traditional ways of identifying economic impacts and benefits of open space or protected areas. This line of reasoning supports the notion that sometimes the highest economic value for a natural or cultural resource base may be to maintain it in its undisturbed condition. This contemporary thinking is referred to as “ecosystem services” and is often instructive in the context of natural and recreational resource planning.

A number of studies have attempted to estimate the value of ecosystem services in watersheds, small regions, or even particular land parcels. These studies have utilized a wide variety of site-specific physical and biological data to derive estimates. Such information is not generally available in uniform measure or degree of detail at the full scale that can be applicable to all counties.

In this chapter, the concepts of ecosystem services are provided on a qualitative basis of the types and forms of ecosystem services that are associated with the area, with examples drawn from individual locations on the coast. This be followed by a discussion of research on valuations from representative locations, and the identification of sites in the planning area that are likely to carry relatively high

ecosystem service values. The section will also include a discussion of the data requirements associated with preparing a site-specific valuation of ecosystem services.

## 8.2 CONCEPT OF ECOSYSTEM SERVICES

In 2001, the United Nations launched the Millennium Ecosystem Assessment, a work effort designed to meet the needs of decision makers and the public for scientific information concerning ecosystem change for human well-being and options for responding to those changes. The MA focuses on the benefits people obtain from natural systems. The MA synthesizes information from the scientific literature, datasets, and scientific models, and includes knowledge held by the private sector, practitioners, local communities, and indigenous peoples. The effort took four years, and involved some 1,360 experts in 95 countries in a rigorous peer review. The MA has been adopted internationally and within a number of federal resource agencies in the United States (Millenium Ecosystem Assessment 2005).

One of the products of that effort is a way to categorize ecosystem goods and services. The MA involves a synthesis of information from the scientific literature, datasets, and scientific models, and has been adopted internationally and within a number of federal resource agencies in the United States. It groups ecosystem goods and services as follows:

- ◆ Supportive Functions: Services necessary for production of other ecosystem services (e.g., nutrient cycling, soil formation, wildlife habitat);
- ◆ Regulating Services: Benefits obtained from ecosystem processes (e.g., improved water quality, waste assimilation, and flood control);
- ◆ Provisioning Services: Goods produced or provided by ecosystems (e.g., shellfish and salmon, water, timber, and fiber);
- ◆ Cultural Services: Non-material benefits from ecosystems (e.g., recreational, spiritual, and aesthetics).

Within the categories of ecosystem services are the subcategories representing specific aspects that pertain to the areas on the Washington coast. These benefit subcategories are shown in Table 8-1 (note that economic *impacts*, measures that are discussed in other chapters, are separate from ecosystem *benefits*).

**Table 8-1** Summary of Organizing Coastal Attributes into Benefit Categories

Ecosystem Goods and Service Values	Indirect Benefit to Humans	<b>Supportive Functions</b>
		Biodiversity Nutrient Cycling Soil Formation Habitat
	Direct Benefit to Humans	<b>Regulating Services</b>
		Natural Hazard Regulation (Flood Control) Water Regulation (Hydrologic Flows) Water Purification and Waste Treatment
		<b>Provisioning Services</b>
		Food Fresh Water Fiber (Timber)
		<b>Cultural Services</b>
		Recreation and Tourism Aesthetic Cultural Heritage Education Spiritual and Inspirational

Source: Adapted from Millenium Ecosystem Assessment 2005.

The MA also examined how ecosystem services influence human well-being. Human well-being has several constituent parts, including (Millenium Ecosystem Assessment 2005, p. v):

- ◆ Basic material for a good life – food, shelter, clothing, secure and adequate livelihoods
- ◆ Health – healthy physical environment, clean air and water
- ◆ Good social relations – social cohesion, ability to help others and care for children
- ◆ Security – secure access to natural and other resources, personal safety, security from natural disasters
- ◆ Freedom of choice and action – opportunity to achieve what an individual values doing and being

The conceptual framework for the MA posits a linkage between ecosystem services and human well-being in a manner as shown in Figure 8-1. It further notes that people are integral parts of ecosystems and that a dynamic relationship exists between people and other parts of ecosystems; changes in human conditions lead, directly or indirectly, to changes in ecosystems and therefore to human well-being. This interaction and feedback effect is demonstrated in Figure 8-2.

As demonstrated by Table 8-1 and Figures 8-1 and 8-2, a considerable part of the contributions to human well-being provided by ecosystems are “pure public goods,” with the characteristics of non-rivalry and

non-excludability (Costanza et al. 1997). Non-rivalry means that more than one person can enjoy the benefits of ecosystem services without diminishing it for another. Non-excludability means that it is difficult (costly) to prevent an individual from enjoying the benefits without explicitly paying for it (thus, they will “free ride”), and therefore price data that reflects the value of those benefits will not be available (Dumas, et al. 2004). This “non-excludability” characteristic extends as well to private investment (e.g., shellfish aquaculture production, or sustainable forest practices), where the full set of benefits are not paid for by those enjoying them (Northern Economics 2009).

Because of the public good nature of many ecosystem services, many ecosystem services accrue directly to people without passing through the market economy. If the public goods are not explicitly recognized or accounted for, the frequent result for many ecosystems is overuse or excessive exploitation (or, in the case of restoration or enhancement, underinvestment) even though they provide services that people desire and would otherwise be willing to pay for. It may also be argued that the reason why many ecosystems are in decline is that they are not valued as much as the other activities and products that degrade them due to a lack of public awareness of the many ecologic, economic, societal, and cultural values of ecosystems (EPA 2010). If fully recognized and accounted for, ecosystem service benefits can be included making comparisons among competing resource uses. Explicit costs and benefits would provide important information that can be included in decision making.

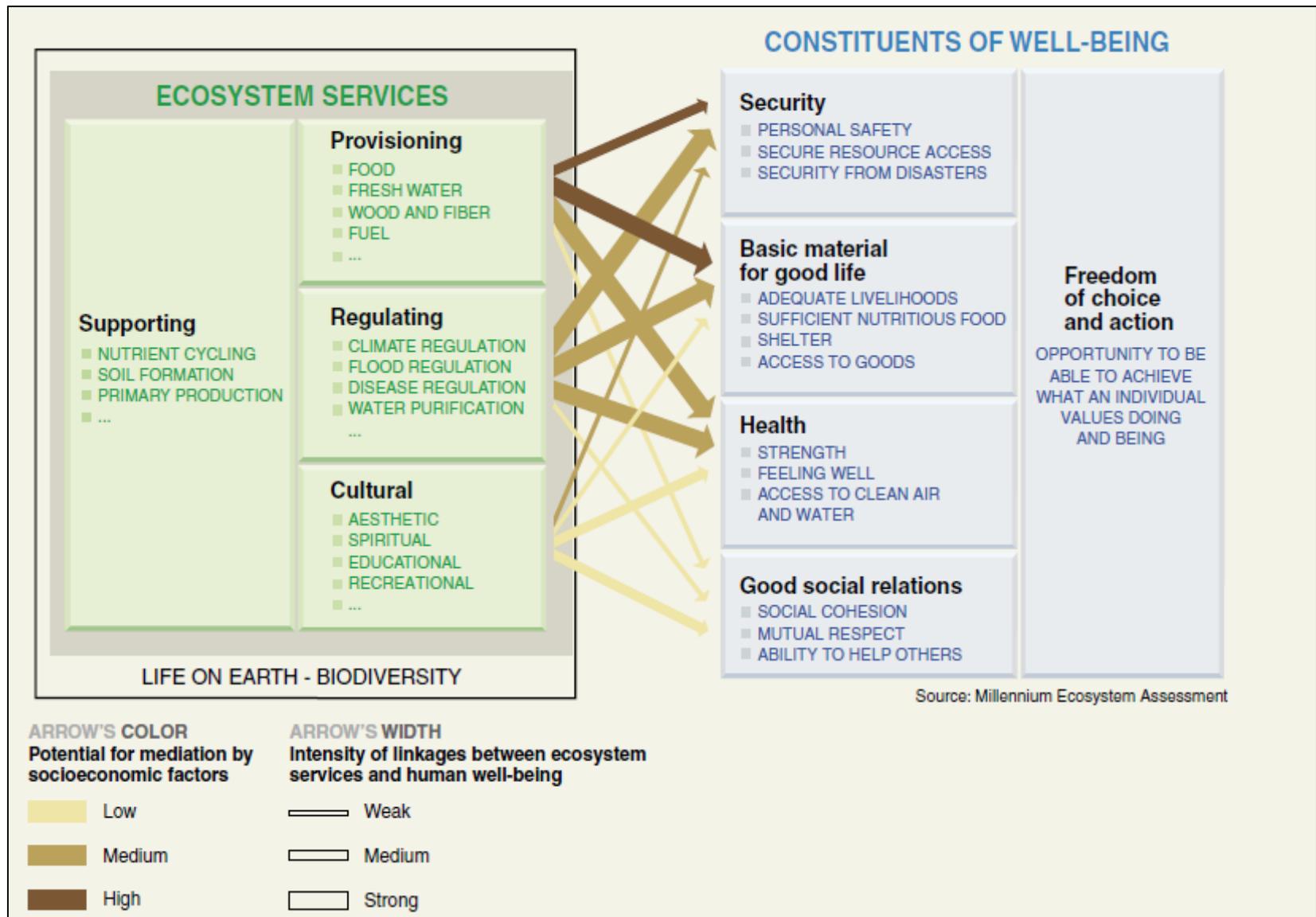


Figure 8-1 Linkage of ecosystem services and human well-being.

Source: Millennium Ecosystem Assessment 2005, p. vi.

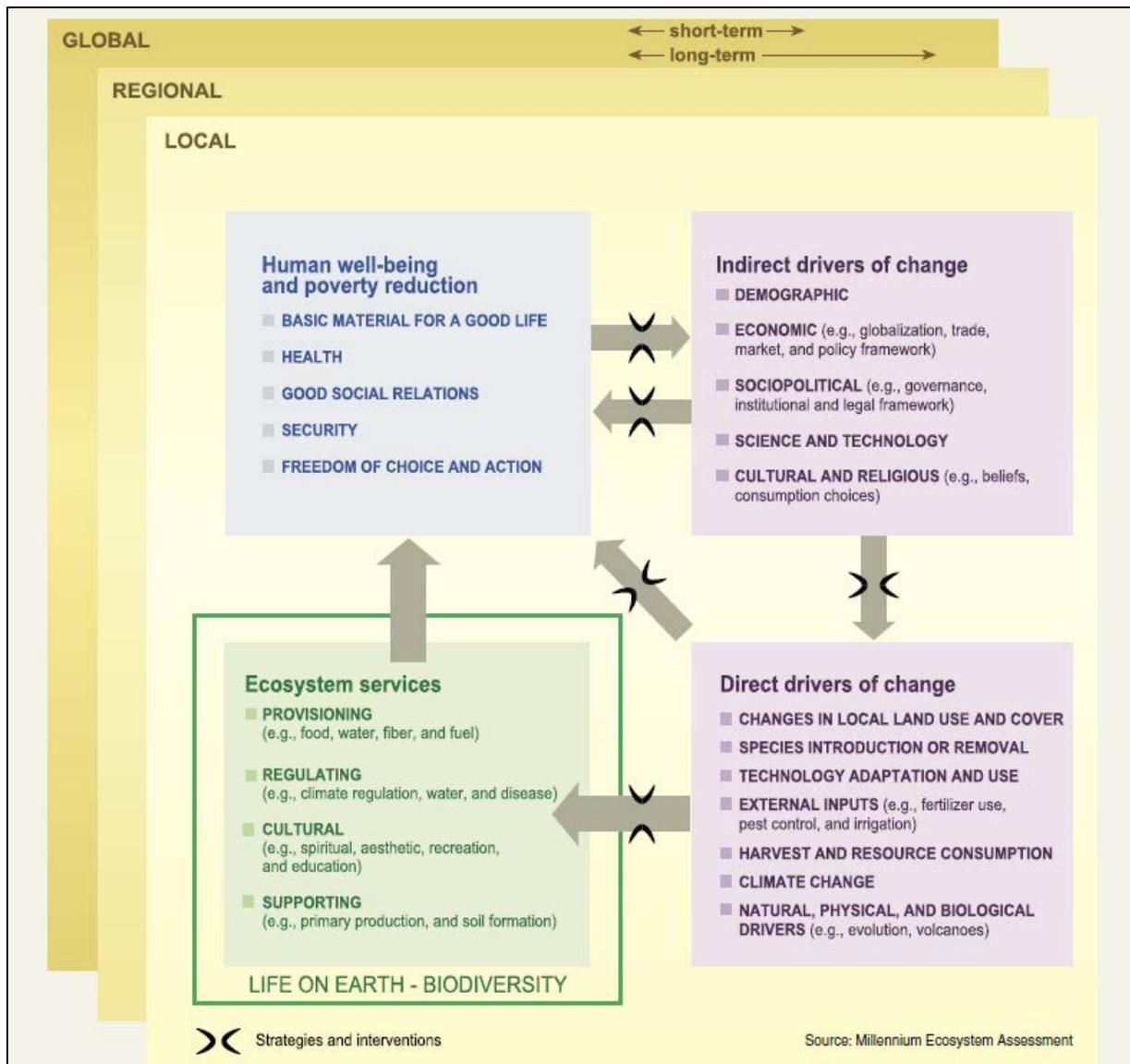


Figure 8-2 Direct and indirect “drivers of change” and relationship to ecosystem services and human well-being.

Source: Millenium Ecosystem Assessment 2005, p. vii.

### 8.3 CONTEMPORARY CONSIDERATION OF ECOSYSTEM BENEFITS

Federal and state agencies have in recent years begun to build in explicit consideration of ecosystem services into their programs. This includes agencies with jurisdiction over activities or protection of resources involving the coast or coastal waters.

The National Oceanic and Atmospheric Administration (NOAA) includes in its mission “to conserve and manage coastal and marine ecosystems and resources,” and is responsible for stewardship of ocean and coastal resources. Its Habitat Conservation program has developed a policy goal of recognizing social and economic contributions of coastal resource management decisions (NOAA 2015):

*“We conserve habitat to make sure the benefits of our natural resources—or ecosystem services—are available for healthy coastal communities and future generations. And, the work of conserving habitat makes a positive contribution to our economy by generating “green” jobs and making sure coastal resources are available for industries such as fishing and tourism.”*

The Environmental Protection Agency (EPA) Western Ecology Division has an Estuarine Ecosystem Services program that will develop the tools and approaches for estimating the effects of habitat alteration on important ecosystem services associated with estuarine tidal wetlands of the Pacific Northwest. Their research focuses on highly valued services such as healthy fish, shellfish, and wildlife populations, and will evaluate the likely changes in terms of these and other ecosystems services resulting from impacts of current and future alterations of tidal wetland habitats. The primary products of the research are generally applicable GIS-based tools capable of estimating the value of ecosystem services provided by different combinations of habitat types, habitat conditions, and habitat area coverage in PNW estuaries at scales from single system to the entire Pacific coast (EPA 2010).

The Natural Capital Project is a collaborative research institute involving Stanford University, The Nature Conservancy, World Wildlife Fund, and the University of Minnesota with goals of “develop[ing] practical, science-based approaches and software tools that quantify, map, and value services provided by nature” (Natural Capital Project 2015). The Natural Capital Project is working on a 2-year, \$1.9 million program to develop a marine decision support tool called InVEST (Integrated Valuation of Ecosystem Services Tradeoffs), which will be used to assess ecosystem services in a marine environment along the Pacific Coast. The InVEST modeling tool includes components for carbon sequestration, pollination of crops, managed timber production, water pollution regulation and sediment retention for reservoir maintenance. It also includes a biodiversity model so that comparisons and tradeoffs between biodiversity and ecosystem services can be analyzed. The newest addition is intended to include models for ecosystem services, including flood mitigation, agriculture production, irrigation, open access harvest and hydropower production.

The U.S. Bureau of Reclamation and U.S. Army Corps of Engineers are both required to follow the “Principles and Guidelines” (P&G), devised by the Water Resources Council in 1983 (WRC 1983). Given the era and age of the document, the original version did not include an economic measure of environmental benefits. Several attempts have been made to revise and update the P&G to explicitly incorporate environmental protection and restoration into the document, including valuation of

ecosystem benefits. The latest version in draft form, renamed “Principles and Standards,” and prepared by the Council on Environmental Quality, includes as its first two principles (CEQ 2009):

- (a) Protect and restore natural ecosystems and the environment while encouraging sustainable economic development; and
- (b) Account for ecosystem services.

In discussing ecosystem services, the report states (p. 5):

*Consideration of ecosystem services can play a key role in evaluating water resource alternatives. Using the best available methods in the ecological, social, and behavioral sciences to develop an explicit list of the services derived from an ecosystem is the first step in ensuring appropriate recognition of the full range of potential impacts of a given alternative. This can help make the formulation and the analysis of alternatives more transparent and accessible and can help inform decision makers of the full range of potential impacts stemming from different options before them.*

Finally, for the purposes of water and land resource planning, it concludes (p. 6):

*In the context of these Standards, evaluations shall focus on identifying ecological service and intrinsic natural value **changes** and the significance of those changes, rather than attempting to assess the value of entire ecosystems. [emphasis in original]*

## 8.4 VALUATION OF ECOSYSTEM SERVICES ON THE WASHINGTON COAST: A SUMMARY OF THE LITERATURE

There have been a number of research efforts in recent years that have addressed ecosystem services on the Washington coast. This section provides a review of relevant studies.

### 8.4.1 Valuation of Ecosystem Services from Shellfish Restoration, Enhancement and Management: A Review of the Literature, for the Pacific Shellfish Institute by Northern Economics, Inc. (2009)

The report was prepared to offer planners and decision makers an overview of the existing literature on the valuation of ecosystem services provided by shellfish restoration and enhancement and by shellfish management (i.e., the sustainable use of natural shellfish beds). Within the scientific literature, there is growing recognition of the central role shellfish can play in the maintenance and stability of coastal ecosystems. For example, oysters support a complex community of species by performing a number of functions essential to the diverse array of species that surround them.

The report proceeds to identify the role of shellfish in each of the four benefit categories, including: provisioning, regulating (water quality maintenance, protection of shorelines and sediment stabilization, and carbon sequestration), supporting (cycling of nutrients and nursery habitats), and cultural services. Economic valuation literature is then discussed, including methods and issues associated with the four benefit categories. In the next section are discussed the costs of shellfish restoration, enhancement, and management. Finally, economic valuation issues are presented.

#### **8.4.2 An Assessment of the Value of Pacific County’s Nearshore Ecosystems, Economic Data for the Shoreline Master Program Planning Process, for Pacific County by L. Flores and D. Batker (2014)**

In support of the county’s Shoreline Master Program planning update, the authors from Earth Economics produced an economic analysis that estimated the value of the ecosystem services provided by natural assets in Pacific County’s nearshore environment. The authors developed a matrix of 15 ecosystem services provided by the nearshore environment, with a comparison to 12 land cover types found within the county. A subset of those ecosystem services are explicitly valued within the report.

To value ecosystem services, the authors used county Geographic Information Systems (GIS) data. Existing peer-reviewed ecosystem service valuation studies were then selected from their database and applied to Pacific County Nearshore. Each land cover in the county was assigned a total high and low annual per-acre dollar value for its ecosystem services produced. Values were summed across all land covers, resulting in a total annual flow of value for Pacific County. The value of Pacific County’s nearshore ecosystems was estimated to be approximately \$985 million to \$4.4 billion dollars per year. The authors also developed recommendations for the “preservation of ecosystems that contribute tangibly to the local economy.”

#### **8.4.3 Valuing Nearshore Ecosystems in Grays Harbor County: A Natural Capital Assessment to inform the Shoreline Master Program planning process, for Grays Harbor County by L. Flores and G. Shundler (2014)**

In support of the county’s Shoreline Master Program planning update, the authors from Earth Economics produced an economic analysis that estimated the value of the ecosystem services provided by natural assets in Pacific County’s nearshore environment. The authors developed a matrix of 15 ecosystem services provided by the nearshore environment, with a comparison to 11 land cover types found within the county. A subset of those ecosystem services are explicitly valued within the report.

The report begins with a discussion of the economy of Grays Harbor County, followed by a section on threats to the nearshore, with a focus on Crude by Rail (CBR) transport and on oil spills. The report next provides a valuation of the ecosystem services in Grays Harbor County. Finally, the report concludes with a set of recommendations on incorporation and use of the values in planning efforts.

To value ecosystem services, the authors used county Geographic Information Systems (GIS) data. Existing peer-reviewed ecosystem service valuation studies were then selected from their database and applied to Pacific County Nearshore. Each land cover in the county was assigned a total high and low annual per-acre dollar value for its ecosystem services produced. Values were summed across all land covers, resulting in a total annual flow of value for Pacific County. The value of Pacific County’s nearshore ecosystems was estimated to be approximately \$985 million to \$4.4 billion dollars per year. The authors also developed recommendations for the “preservation of ecosystems that contribute tangibly to the local economy.”

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## CHAPTER 9.

# Social Impacts Assessment

## 9.1 INTRODUCTION

It is important to include an assessment of social dimension in any review of the costs and benefits of potential new uses of the coastal zone in conducting Marine Spatial Planning. Coastal environments are fundamental to the sociocultural wellbeing of people and contribute to peoples' sense of place, wellbeing, relationships, and community resilience. Failure to consider social and cultural dimensions of a region risks creating or reproducing social inequalities, diminishing community resilience, and stripping away mitigating processes (e.g., customary tenure, social norms, and knowledge systems). (Poe et al. 2014, p. HD-13). Moreover, omitting important human dimensions may create conflict, reduce trust, and hinder collaborative management. Conversely, including sociocultural dimensions in conservation may increase buy-in, reduce conflict and costs associated with negotiations, and yield better alternatives that address concerns of those most affected by environmental and institutional changes (Poe et al. 2014). Poe et al. (2014) suggest a set of guiding principles for conservation scientists and practitioners working across socio-ecological systems that can be transferred to Marine Spatial Planning (MSP) decision making. These include: (1) recognizing the diverse cultural meanings and values embedded in human-environment interactions; (2) protecting access to resources, spaces, and processes upon which cultural well-being depends; (3) involving communities who have cultural connections to ecosystems in science and management at all stages; (4) allowing for cross-scale and nested linkages when assessing and managing cultural dimensions of ecosystems; and (5) recognizing the integrated and coupled nature of sociocultural wellbeing and ecosystem health.

We have reviewed several projects that focus on the social and cultural dimension of MSP and, more generally, ecosystem-based management on the coast of Washington State. These projects, described in

the next section, in addition to analysis in Section [X], have provided us with a potential suite of indicators by which we might assess the impacts of introducing potential new uses to the Washington coast on the local communities. As indicated in the various Sector Analyses completed for the Washington Coastal Marine Advisory Council (WCMAC), the rural communities on Washington's Pacific coast depend heavily on natural resource-based industries (fisheries, aquaculture, timber, and tourism). These communities already face considerable uncertainty due to both economic and environmental conditions. The introduction of potential new uses of the coast, including, marine product extraction, offshore aquaculture, dredge disposal, mining of gas hydrates, mining of marine sand and gravel, and renewable energy sources such as offshore wind, wave, and tidal, all offer both potential benefits and use compatibilities but even more likely environmental costs and use conflicts.

In order to conduct a social assessment of the impact of new potential uses we considered secondary data collected and analyzed by Norman et al. (2014) and Poe et al. (2015) related to several select indicators outlined in Section 9.2.1 and designed and implemented a survey that is described in Section 9.3.

## 9.2 RELATED EFFORTS

### 9.2.1 University of Washington Sea Grant: Integrated-based Social Indicators for Washington Marine Spatial Planning

Washington Sea Grant (WSG) has, in collaboration with the Northwest Fisheries Science Center (NWFSC), created a conceptual model for social indicators of human well-being for the integrated ecosystem assessment (IEA) for Washington State MSP. The social indicators generated through this model are designed to communicate information about the status and trends of objective categories of social conditions (e.g. housing, education, health, safety, etc.). They were derived in part through local input on what matters to coastal community residents. An analysis of the results from a 2013 WSG-hosted Values, Goals and Objectives Setting Workshop, together with the result of the Coastal Voices Marine Resources Committee (MRC) workshops conducted by Bridget Trosin of WSG resulted in a set of themes of importance including:

- ◆ Access to natural resources
- ◆ Aesthetic beauty and open space
- ◆ Remoteness
- ◆ Healthy ecosystems
- ◆ Tribal and non-tribal communities
- ◆ Engagement in decision-making
- ◆ Natural resource livelihoods

These status and trends of social well-being are part of the Washington IEA, which is not the same as a social impact assessment, but could be used as supporting baseline data. In addition, WSG has invested in the gathering and assessing of existing data for each indicator for four coastal counties—Pacific, Grays,

Jefferson, and Clallam—for 2000, 2005, and 2010. The indicator model and assessment will be presented in the spring of 2015 at four meetings with Washington Marine Resource Councils (MRC) and other constituents, as well as the coastal Treaty tribes. Feedback from these meetings will be included in reports to Washington Department of Natural Resources (DNR). WSG's social indicators do not include subjective measures of well-being which require new data collection, and were outside the scope of the WSG project. The indicators included in their analysis are:

- ◆ Access to social services
  - Social support: nutritional assistance, reduced lunch, human services, transportation, etc.
  - Availability of medical care
  - Mobility
- ◆ Basic Needs
  - Housing
  - Clean water
  - Healthy food
- ◆ Education
  - Expenditure
  - Attainment
  - Enrollment
- ◆ Governance
  - Management
  - Planning
- ◆ Health
  - Birth
  - Life expectancy
  - Mortality
  - Recreational opportunity
- ◆ Social connectedness
  - Participation in democracy
  - Access to communication
  - Social gathering places
  - Arts and culture
  - Tenure in community
- ◆ Safety
  - Safety from natural disaster
  - Safety from crime
- ◆ Environmental conditions
  - Impervious cover
  - Coastal water quality
  - Water sediment
  - Beach closures
  - Air quality
- ◆ Economic security
  - Government economic security
  - Industry economic security
  - Household economic security
  - Population in poverty
  - Individual economic security

### 9.2.2 NOAA Northwest Fisheries Science Center California Current Integrated Ecosystem Assessment (CCIEA): Social Wellbeing Indicators for Marine Management

The Social Well-being Indicators for Marine Management (SWIMM) project is a CCIEA two-year effort supported by NWFS, WSG, and the University of Washington (UW) to improve understanding of the human dimensions of ecosystem-based management (EBM). The primary objective of this project was to develop a suite of indicators of human wellbeing for use in National Oceanic and Atmospheric Administration's (NOAA)'s Integrated Ecosystem Assessment of the California Current. The broader

objective was to develop a generalizable social science protocol for assessing human well-being that can be used in other socio-ecological assessments, such as MSP and social impact assessment (Breslow et al. 2014). The NOAA team developed a conceptual model of human wellbeing for the purposes of EBM by comparing and compiling priorities for wellbeing found in U.S. federal environmental policy and legislation and existing socio-ecological indicators projects around the world. In addition, through a pilot project they are seeking guidance on local issues, concerns, and definitions of well-being, specifically with respect to marine conditions and management from conversations with stakeholders on the outer coast (in progress personal communication with Sara Breslow, February 11, 2015). The NOAA team has identified six priority domains that cover the breadth of potential indicators. These include:

- ◆ Resource access (resource access and utility, resource availability, environmental quality, etc.)
- ◆ Self-determination (sense of control: agency, self-governance, sovereignty, political participation, government transparency, etc.)
- ◆ Social integrity (social relationships, social capital, community integrity, etc.)
- ◆ Job equality (jobs/employment, demographics, livelihoods, personal activities, time allocation, etc.)
- ◆ Food Systems (food resources, nutrition, food security, etc.)
- ◆ Tangible connections to nature (sense of place, wonder and spirituality, recreation and tourism, cultural values, knowledge, etc.) (Breslow et al. 2014)

To the best of our knowledge the team has not completed a screening of indicators that fall within these domains or ground truthed indicators as of May 2015.

### **9.2.3 Northwest Fisheries Science Center CCIEA: Community Vulnerability Assessments**

Norman et al. (Breslow et al. 2015) have developed a method for using secondary data to assess fishing community-level vulnerability to ecosystem changes as well as management, policy and other shifts. The method relies primarily on sociodemographic data derived from the U.S. Census combined with commercial fisheries data. This community vulnerability assessment approach is supported by earlier efforts within the NWFSC to define and characterize fishing communities both quantitatively and qualitatively (Norman et al. 2007). Indices developed to account for socioeconomic vulnerability of California Current coastal communities included (1) a Personal disruption index; (2) a population composition index; and (3) an index of community poverty (Breslow et al. 2015).

The Norman et. al. team describes the personal disruption index as providing a means of assessing commercial fishing-reliant communities according to one aspect of their relative socioeconomic vulnerability:

Relatively frequent personal disruptions within the community are linked to increased overall vulnerability to natural hazards and other events associate with livelihood and social impacts. (Cutter et al. 2000, Jacob et al. 2012).

This index includes indicators such as:

- ◆ Percent within the community unemployed
- ◆ Percent of the community with no diploma
- ◆ Percent of the community living in poverty
- ◆ Percent of separated females in the community

According to Norman et al., the population composition index describes the social make-up of the human communities related to the coasts off Washington, Oregon and California. This index relies on community-specific data from the American Community Survey and combines data on race, gender and other demographics including;

- ◆ Percent of Community identifying racially as “white alone”
- ◆ Percent of Community with female single headed households
- ◆ Population age 0-5
- ◆ Percent that speak English less than well

The poverty index, like the personal disruptions index and population composition index, can offer an assessment of socioeconomic vulnerability for coastal communities. The poverty index provides a means of assessing relative well-being, vulnerability and resilience potential of fishing-reliant communities. Included in this index are:

- ◆ Percent within the community receiving assistance
- ◆ Percent of families within the community living below the poverty level
- ◆ Percent of the community over 65 years old living in poverty
- ◆ Percent of the community under 18 years old living in poverty.

Norman et al. used data from the U.S. Census survey (2010) and conducted a factor analysis in order to provide single factor solutions for each index of social vulnerability. Together these indices provide a means of comparing socioeconomic vulnerabilities across the coastal communities of the California Current Large Marine Ecosystem (CCLME). Their results suggest that a community such as Long Beach, Washington, as less socially vulnerable according to all three indices while Queets, Washington is relatively more socially vulnerable (Breslow, et al. 2015).

Norman et al. also developed indices of coastal community reliance on and engagement with commercial fishing. The data used for these indices are from Pacific Fisheries Information Network (PacFIN) and employment data from the U.S. Census’ American Community Survey. Indicators incorporated in the commercial fishing reliance index include:

- ◆ Value of commercial fisheries landings per capita by community
- ◆ Processors with landings per capita for each community

- ◆ Percent of employment in agriculture, fishing, and forestry

Indicators included in the commercial fishing engagement index include:

- ◆ Value of commercial fisheries landed
- ◆ Total landings for each community
- ◆ Processors with landings

These indices allow for selection of those communities that are clearly linked to the coast through data that capture commercial fishing activity and are also potentially most socioeconomically vulnerable to exogenous shifts and events. Norman et al. find that Neah Bay is more vulnerable relative to communities such as Naselle and Long Beach, Washington.

#### **9.2.4 University of Washington Washington’s Working Coast: An Analysis of the Washington Pacific Coast Marine Resource-Based Economy**

Butler et al. (2013) conducted an assessment of the economics of marine-resource dependent businesses and the challenges that they face. They gathered varying opinions on subjects including environmental and economic stability and social factors. Some of the most compelling statements relative to MSP include the following:

- ◆ “Competition for resources, particularly conflicts between traditional and new uses, was also often mentioned as a problem for the coast.”Pg. 3
- ◆ “Many stakeholders cited the lack of political will to act in the interest of marine resource-based industries as a source of frustration”.Pg. 4
- ◆ “The most frequently voiced concern in terms of the environment was animal population stability and health; specifically, stakeholders expressed extreme concern about the health of commercial fisheries and the longevity of fishing jobs.” Pg. 4
- ◆ “Our interviews revealed a general lack of trust in regulatory agencies and suspicion that agencies were actively working against the coast’s self-governance efforts.” Pg. 4
- ◆ “Interviewees hoped to see specific marine resource-based industries and their supporting industries continue as viable, sustainable options in perpetuity. Permanent, long-term jobs are most desirable”. Pg. 5
- ◆ “Many interviewees expressed an unwillingness to forfeit current natural resource-based industries in exchange for new, potentially damaging industries.” Pg. 5
- ◆ “Interviews identified the absence of a strong political voice for the Pacific coastal communities in Olympia: demographic shifts as a result of younger people moving away from the coast; and a lack of economic diversification that limits job opportunities as an obstacle to maintaining a viable coastal economy.” Pg. 5

### 9.3 SOCIAL ASSESSMENT OF NEW POTENTIAL USES

In order to assess the social impacts of new potential uses of the marine environment off the coast of Washington State we designed and implemented a survey using Survey Monkey (See Appendix [XX]). The survey asked participants to describe the impact of potential new uses for a set of indicators of human well-being. The potential new uses included: (1) marine product extraction; (2) offshore aquaculture; (3) dredge disposal in new locations; (4) mining gas hydrates; (5) mining marine sand and gravel; and (9) marine renewable energy—offshore, wave and tidal. Because we did not have definitive project geographic placement, timelines, scale, etc., this assessment was meant to be general and preliminary in nature. The geographic scope includes Washington State coastal counties: Clallam, Grays Harbor, Jefferson, Pacific, and Wahkiakum. Indicators used in the survey were derived from earlier indicator selection efforts by NOAA NWFSC, WSG, and the Puget Sound Partnership/Puget Sound Institute as well as from the work being conducted by Cascade Economics LLC on behalf of WCMAC. The indicators used include:

- ◆ Nature-based recreation: Average number of hours per week coastal residents spend recreating outdoors
- ◆ Safe locally harvestable foods: Availability of locally harvested food species
- ◆ Shellfish bed closures: Number of recreational shellfish bed closures per year
- ◆ Natural resource industry output: Gross domestic product for natural resource industries on the Washington coast (timber, commercial fishing, shellfish aquaculture, recreational fish and shellfish harvest, tourism)
- ◆ Participation in cultural practices: percent of residents who feel they are able to maintain cultural practices associated with the natural environment
- ◆ Opportunity to influence decisions: Percent of residents who feel they have the opportunity to influence natural resource management if they wish
- ◆ Trust in government: Percent of residents who trust local and regional government to make the right decisions related to protecting the Washington coast
- ◆ Sense of Place:
  - Positive connections: Percent of residents who express a positive connection to the region
  - Sense of stewardship: Percent of residents who feel a strong sense of stewardship for the coast
  - Pride of place: Percent of residents who feel a sense of pride about being from coastal counties
- ◆ Inspiration: Average number of residents who experience inspiration from being in nature
- ◆ Safety from navigational hazards: Number of vessel incidents along shores of coastal counties
- ◆ Access to coastal environment: Number of public access points (parks, boat ramps, marinas, beaches) to the marine environment

- ◆ Economic development goals/issues: Citizens who feel there are barriers to Tribal development goals
- ◆ Marine water quality: Water quality that allows for traditional and historical uses of the marine environment
- ◆ Beach closures: Number of incidents per year of public beach closure to recreational activities

Participants of the survey included citizens suggested by members of WCMAC, state agency representatives, individuals associated with economic development councils, Chambers of Commerce, tourism bureaus and local officials, community members, and Tribal members. These individuals were asked to list their affiliation, whether they represent a Tribal or Non-Tribal community, and their town and county of residence. Respondents were asked to answer all questions to the best of their ability for their geographic area.

### 9.3.1 Results

[Forthcoming]

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# Appendix A

## Menu of Approaches for Economic Analysis: A Comparison Summary

The components that make up an economic analysis will vary by the identified needs of the study, scenarios being investigated, required precision of output, sectors or groups of particular interest or emphasis, locations being examined, data availability and delivery, timeline, and budget available. Because so many elements must be balanced in order to frame an appropriate economic analysis, we developed a summary comparison of three bundled packages, as shown in Table 1. The three packages represent different levels of investment in studies, each yielding a different set of output estimates that vary in precision and reliability.

Summary information about particular components as they relate to each study level is shown across the rows in Table 1. The categories of components are oriented to addressing points raised by the Technical Committee in Exhibit D of the RFP, plus some additional components that our team believes are useful or necessary in this economic analysis.

**Table 1 - Economic Impact Studies Comparison Matrix**

Item	Level I Study	Level II Study	Level III Study
Strengths	<ul style="list-style-type: none"> <li>• Quickest implementation.</li> <li>• Data already exists.</li> <li>• Advantageous if budget is limited.</li> </ul>	<ul style="list-style-type: none"> <li>• Impact estimators specifically designed for the study region.</li> <li>• Most data already exists.</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts fine-tuned for individual communities in the study region.</li> <li>• Most accurate representation of sectors, contributions and impacts.</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• “Off-the-shelf” so accuracy may suffer.</li> <li>• Finer-level activity and geographic detail may not be available.</li> </ul>	<ul style="list-style-type: none"> <li>• May require access to confidential business data.</li> <li>• Relies on existing data but some interviews required.</li> </ul>	<ul style="list-style-type: none"> <li>• May require access to confidential business data.</li> <li>• Data needed for fine-tuning must be collected via interviews.</li> <li>• Most time-consuming implementation.</li> </ul>
Economic Profile of the Coast	<ul style="list-style-type: none"> <li>• Research and provide narrative profile of economic base. Rely on existing publications.</li> <li>• Socioeconomic data from US census, REIS, BEA, WA Employment Security.</li> <li>• Incorporate information from Sector Analyses.</li> </ul>	<ul style="list-style-type: none"> <li>• Research and provide profile of economic base, coast-wide and by county.</li> <li>• Socioeconomic data from US census, REIS, BEA, WA Employment Security.</li> <li>• Incorporate information from Sector Analyses.</li> <li>• Research and discuss trends affecting coastal economy.</li> </ul>	<ul style="list-style-type: none"> <li>• Research and provide profile of economic base, coast-wide and by county.</li> <li>• Socioeconomic data from US census, REIS, BEA, WA Employment Security.</li> <li>• Incorporate information from Sector Analyses.</li> <li>• Research and discuss trends affecting coastal economy; research and forecast near-term economic conditions for major sectors.</li> </ul>

Item	Level I Study	Level II Study	Level III Study
Economic Profile of Tribal Communities	<ul style="list-style-type: none"> <li>Research and provide socioeconomic profile of Quinault, Quileute, Hoh, Shoalwater Bay, and Makah Tribes, based on published sources.</li> </ul>	<ul style="list-style-type: none"> <li>Research and provide socioeconomic profile of Quinault, Quileute, Hoh, Shoalwater Bay, and Makah Tribes. Use published sources, plus direct interviews with the Tribes.</li> <li>Discuss economic relationship of Tribes within coastal community.</li> </ul>	<ul style="list-style-type: none"> <li>Research and provide socioeconomic profile of Quinault, Quileute, Hoh, Shoalwater Bay, and Makah Tribes. Use published sources, plus direct interviews with the Tribes.</li> <li>Discuss economic relationship of Tribes within coastal community.</li> <li>Research and discuss trends affecting tribal economy; research and forecast near-term economic conditions for major sectors.</li> </ul>
Economic Impact Analysis Measures	<ul style="list-style-type: none"> <li>Document and use published industry impact multipliers.</li> <li>Quantitative direct impact estimates apply coast-wide, with qualitative discussion relating to localized impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Economic models of coastal region with minor adjustments to data.</li> <li>Models and data turned over to DNR.</li> </ul>	<ul style="list-style-type: none"> <li>Economic models of coastal region plus state with significant adjustments to data.</li> <li>Conduct business interviews in order to adjust trade flow data.</li> <li>Models and data turned over to DNR.</li> </ul>
Regulatory and Policy Decision Impacts	<ul style="list-style-type: none"> <li>Work with Technical Committee, provide qualitative analysis of impacts of several “key decisions.”</li> </ul>	<ul style="list-style-type: none"> <li>Work with Technical Committee, provide quantitative estimate of impacts of several “key decisions.”</li> </ul>	<ul style="list-style-type: none"> <li>Work with Technical Committee, provide quantitative analysis of impacts of several “key decisions.”</li> </ul>
Estimate Impacts of Potential Uses	<ul style="list-style-type: none"> <li>Provide qualitative and, if possible, quantitative estimates of impacts of up to 5 potential uses identified by Technical Committee</li> </ul>	<ul style="list-style-type: none"> <li>Provide quantitative estimates of impacts of up to 5 potential uses identified by Technical Committee.</li> </ul>	<ul style="list-style-type: none"> <li>Provide quantitative estimates of impacts on the region and state of up to 5 potential uses identified by Technical Committee.</li> </ul>
Ecosystem Services	<ul style="list-style-type: none"> <li>Discuss general concepts, identify coastal sites that are providers of relatively high level of ecosystem services.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss general concepts, provide examples of valuation within the state, and identify coastal sites that are providers of relatively high level of ecosystem services.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss general concepts, provide examples of valuation within the state, and identify coastal sites that are providers of relatively high level of ecosystem services.</li> <li>Identify data needs required for a site specific valuation.</li> </ul>

Item	Level I Study	Level II Study	Level III Study
Commercial Fishery Profile of the Coast	<ul style="list-style-type: none"> <li>Research and develop profile of major or significant fisheries by species, ports of landing, and processors. Include discussion of trends by major species.</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of commercial fisheries by species, ports of landing, processors, market forms and markets. Include discussion of trends, including data by port.</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of commercial fisheries by species, ports of landing, processors, market forms and markets. Include discussion of trends, including data by port.</li> <li>Update economic models to incorporate data from sector profiles and industry interviews.</li> </ul>
Tribal Fisheries and Ports	<ul style="list-style-type: none"> <li>Provide profile of tribal fisheries and ports based on published information.</li> </ul>	<ul style="list-style-type: none"> <li>Provide profile of tribal fisheries and ports based on published information and interviews with tribal fisheries managers.</li> </ul>	<ul style="list-style-type: none"> <li>Provide profile of tribal fisheries and ports based on published information and interviews with tribal fisheries managers.</li> <li>Include details as available related to tribal fish markets and hatchery operations.</li> </ul>
Estimate Impacts of Potential Uses on Fisheries	<ul style="list-style-type: none"> <li>Include qualitative and, if possible, quantitative impacts on commercial fisheries of proposed uses identified above</li> </ul>	<ul style="list-style-type: none"> <li>Include quantitative impacts by location on commercial fisheries of proposed uses identified above</li> </ul>	<ul style="list-style-type: none"> <li>Include quantitative impacts by location on commercial fisheries of potential alternative uses identified above</li> </ul>
Profile of Commercial Aquaculture	<ul style="list-style-type: none"> <li>Develop profile of aquaculture production, processing, and markets. Incorporate sector analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Develop profile of aquaculture production, processing, and markets, including future trends. Incorporate sector analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Develop profile of aquaculture production, processing, and markets, including future trends. Incorporate sector analysis.</li> <li>Update economic models to incorporate data from sector profiles and industry interviews.</li> </ul>
Estimate Impacts of Potential Uses on Aquaculture	<ul style="list-style-type: none"> <li>Include qualitative and, if possible, quantitative impacts on aquaculture of proposed uses identified above</li> </ul>	<ul style="list-style-type: none"> <li>Include quantitative impacts by location on aquaculture of proposed uses identified above</li> </ul>	<ul style="list-style-type: none"> <li>Include quantitative impacts by location on aquaculture of potential alternative uses identified above</li> </ul>

Item	Level I Study	Level II Study	Level III Study
Recreational Fishing	<ul style="list-style-type: none"> <li>Research and develop profile of recreational fishing on the coast, including activities and participation rates and trends, based on published information.</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of recreational fishing on the coast, including activities and participation rates and trends, based on published information.</li> <li>Incorporate WDFW data on recreational fishing participation.</li> <li>Research and incorporate published spending profiles by activity in order to estimate baseline and impacts</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of recreational fishing on the coast, including activities and participation rates and trends, based on published information.</li> <li>Incorporate WDFW data on recreational fishing participation.</li> <li>Research and incorporate published spending profiles by activity to estimate economic contribution and impacts</li> </ul>
Other Recreation Sector	<ul style="list-style-type: none"> <li>Research and develop profile of recreation on the coast, including activities and participation rates and trends, based on published information.</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of recreation on the coast, including activities and participation rates and trends, based on published information.</li> <li>Incorporate Surfrider study of recreation participation.</li> <li>Research and incorporate published spending profiles by activity in order to estimate baseline and impacts</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of recreation on the coast, including activities and participation rates and trends, based on published information.</li> <li>Incorporate Surfrider study of recreation participation.</li> <li>Research and incorporate published spending profiles by activity to estimate economic contribution and impacts</li> </ul>
Tourism Industry	<ul style="list-style-type: none"> <li>Research and develop profile of tourism on the coast, based on published information and incorporating information from sector analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of tourism on the coast, based on published information and incorporating information from sector analysis.</li> <li>Research future trends, incorporating broader regional or national research on participation.</li> </ul>	<ul style="list-style-type: none"> <li>Research and develop profile of recreation on the coast, including activities and participation rates and trends, based on published information.</li> <li>Research future trends, incorporating broader regional or national research on participation</li> </ul>

Item	Level I Study	Level II Study	Level III Study
Social Impact Analysis	<ul style="list-style-type: none"> <li>• Provide social impact information based on recent community profiles by NOAA and PFMC in EISs</li> </ul>	<ul style="list-style-type: none"> <li>• Provide social impact information based on NOAA research, addressing effects by port or community if possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide a NOAA guidelines-based “social impact analysis,” as practical, by port and community of each proposed use.</li> <li>• Identify data requirements for a fully compliant analysis.</li> </ul>

**2014**

**Washington Coast Marine Spatial  
Planning Project**

**Shellfish Aquaculture Processing and  
Distribution Survey**

## Coastal Shellfish Processing and Distribution Survey

### Content

This survey is designed to ask pertinent questions needed to characterize the role of shellfish (oyster and clams) processing and distribution in the Washington Coast economy. **For purposes of this survey, the Washington Coast economy includes communities in Pacific, Wahkiakum, Grays Harbor, Jefferson and Clallam counties.** Data from this survey will be used to estimate economic impacts generated by the Washington Coast shellfish aquaculture industry.

### Confidentiality

Per applicable Federal and State of Washington laws and administrative rules, strict confidentiality of data gathered by this survey will be maintained at all times. Survey participants' responses will be treated as confidential, private information at all times. Your name, business name, and contact information will be used only for the purposes of administering this survey. Individual surveys will be viewed by only a limited number of project researchers. Once data have been entered into electronic formats, only selected researchers will have password-protected access to the electronic data for the explicit purpose of analyzing economic contributions of Washington Coast shellfish aquaculture production, processing, and distribution. State of Washington government agencies and members of the general public will see only aggregated, summary results of the analysis reported by the project researchers.

**Contact Information**

<b>Facility Name:</b>	
<b>Parent Company:</b>	
<b>Facility Address:</b>	
<b>Contact Person:</b>	
Phone:	
Email:	
<b>Interview Date:</b>	

**A. Location of Licensed Shellfish Aquaculture Processor**

1. Did your business have multiple shellfish processing facilities in 2014?  
*(If yes please complete Sections B, C, and D for each facility)*

Yes	No

2. In what regions were your shellfish processing facilities located?

Region	Number of facilities
Coastal Counties	
Elsewhere in Washington State	
Outside Washington State	

3. What types of products do you produce? *(Indicate percent of total sales for all that apply)*

Product	Approx. percent of total sales
Whole oysters	____%
Shucked oyster meat	____%
Whole clams	____%
Shucked clam meat	____%
Other (specify): _____	____%
Other (specify): _____	____%
<b>Total</b>	<b>100%</b>

**B. Number of and Sales of Cultured Shellfish Sold (by product type and unit of measurement you use) NOTE: If you have more than one product type please list output and value for each type.**

1. What was the approximate total output (estimate across all sizes) of Washington grown <b>oysters</b> you processed and sold during 2014?	____ oysters
2. What was the approximate total sales value (estimated across all sizes of Washington grown <b>oysters</b> you processed and sold during 2014?	\$ _____
3. What was the approximate total output (estimate across all sizes) of Washington grown <b>clams</b> you processed and sold during 2014	____ clams
4. What was the approximate total sales value (estimated across all sizes of Washington grown <b>clams</b> you processed and sold during 2014?	\$ _____

**C. Origin of Shellfish (Oyster and Clam) Supply**

Consider the following sources of oyster and clams to your processing facility: (1) Your Lease or Owned Acres, (2) Other Growers, (3) Wholesalers, (4) Other sources.

4. Of the total quantity (in whatever unit of measurement you use) and value of shellfish you processed and sold in 2014, estimate the quantity and value obtained from the following sources:

Source	Approx. Quantity	Approx. Sales Value
Your Lease or Owned Acres		\$ _____
Other Growers		\$ _____
Wholesalers		\$ _____
Other Sources		\$ _____

*(Note: The total should add up to the answers for questions B.1 through B.4.)*

5. Of those shellfish obtained from **Your Lease or Owned Acres** estimate what percent were grown on leases in each region.

Region	Approximate Percent
Coastal Counties	_____ %
Elsewhere in Washington State	_____ %
Outside Washington State	_____ %
<b>Total</b>	<b>100%</b>

6. Of those shellfish obtained from **Other Growers** estimate what percent were obtained from growers in each region.

Region	Approximate Percent
Coastal Counties	_____ %
Elsewhere in Washington State	_____ %
Outside Washington State	_____ %
<b>Total</b>	<b>100%</b>

7. Of those shellfish obtained from **Wholesalers** estimate what percent were obtained from wholesalers in each region?

Region	Approximate Percent
Coastal Counties	_____ %
Elsewhere in Washington State	_____ %
Outside Washington State	_____ %
<b>Total</b>	<b>100%</b>

8. Of those shellfish obtained from **Other Sources** estimate what percent were obtained from wholesalers in each region?

Region	Approximate Percent
Coastal Counties	_____ %
Elsewhere in Washington State	_____ %
Outside Washington State	_____ %
<b>Total</b>	<b>100%</b>

**D. Destination of Cultured Shellfish Sales**

The following questions ask for information on destination of your shellfish product sales. Please provide estimated percentages of total sales that went to different types of buyers in the following general locations:

- Washington Coast
- Elsewhere in Washington
- Oregon
- Elsewhere in the U.S.
- Outside the U.S.

1. Of **total shellfish** you processed and sold in 2014, estimate the **approximate percent of total sales** that were sold to buyers in the following locations:

<b>Location</b>	<b>Approximate Percentage</b>
Washington Coast	_____ %
Elsewhere in Washington	_____ %
Oregon	_____ %
Elsewhere in the U.S.	_____ %
Outside the U.S.	_____ %
<b>Total</b>	<b>100%</b>

2. Of the sales **on the Washington Coast**, who did you sell them to?

<b>Purchaser</b>	<b>Approximate Percentage</b>
Other wholesalers	_____ %
Restaurants/food service	_____ %
Retail Seafood Shops	_____ %
Direct to Consumers	_____ %
<b>Total</b>	<b>100%</b>

3. Of the sales **Elsewhere in Washington**, who did you sell them to?

<b>Purchaser</b>	<b>Approximate Percentage</b>
Other wholesalers	_____ %
Restaurants/food service	_____ %
Retail Seafood Shops	_____ %
Direct to Consumers	_____ %
<b>Total</b>	<b>100%</b>

4. Of the sales **in Oregon**, who did you sell them to?

<b>Purchaser</b>	<b>Approximate Percentage</b>
Other wholesalers	_____ %
Restaurants/food service	_____ %
Retail Seafood Shops	_____ %
Direct to Consumers	_____ %
<b>Total</b>	<b>100%</b>

5. Of the sales Elsewhere in the U.S., who did you sell them to?

<b>Purchaser</b>	<b>Approximate Percentage</b>
Other wholesalers	____%
Restaurants/food service	____%
Retail Seafood Shops	____%
Direct to Consumers	____%
<b>Total</b>	<b>100%</b>

6. Of the sales Outside the U.S., who did you sell them to?

<b>Purchaser</b>	<b>Approximate Percentage</b>
Other wholesalers	____%
Restaurants/food service	____%
Retail Seafood Shops	____%
Direct to Consumers	____%
<b>Total</b>	<b>100%</b>

### E. Expenditures Related to Cultured Shellfish Processing, Sales and Distribution

Please enter your total expenses **related to your processing and distribution** of product. Following that, please enter the dollar amount of expenditures in each of the following expense categories. Also please record the approximate percentages of expenditures for each cost category spent in *Washington Coast Communities, Elsewhere in Washington, Oregon, Elsewhere in the U.S. and Outside the U.S. (NOTE: This table continues to the next page)*

#### 1. Oysters: Expenses for the 2014 Calendar Year

	Total Expenditures	Percentage of Expenditures by Location				
		WA Coast Communities	Elsewhere in WA	Oregon	Elsewhere in the U.S.	Outside the U.S.
<b>Total Expenses</b> <i>Likely more than the sum of categories listed below</i>	\$	%	%	%	%	%
<b>Labor Expenses</b>						
Total Payroll (wages) <i>Owners and employees(not including profits)</i>	\$	%	%	%	%	%
Total Non-Wage Benefits <i>Include medical, bonuses, etc.</i>	\$	%	%	%	%	%
<b>Payments to Govt.</b>						
Federal <i>Include payroll taxes, income taxes, etc.</i>	\$	%	%	%	%	%
State & Local <i>Include permit and license fees, property taxes, etc.</i>	\$	%	%	%	%	%
<b>Other Expense Categories</b>						
Capital Expenditures <i>Include vessels, buildings &amp; heavy machinery &gt; \$10K</i>	\$	%	%	%	%	%
Packaging	\$	%	%	%	%	%
Insurance <i>Total payments to insurance companies</i>	\$	%	%	%	%	%
Freight <i>Expenses paid to freight companies (ground, air &amp; water)</i>	\$	%	%	%	%	%
Gas/Fuel <i>Expenses paid to fueling stations or fuel deliveries</i>	\$	%	%	%	%	%
Utilities (water, sewer, gas...)	\$	%	%	%	%	%

Shellfish Purchases	\$	%	%	%	%	%
Interest Payments	\$	%	%	%	%	%
Other costs	\$	%	%	%	%	%

## 2. Clams: Expenses for the 2014 Calendar Year

	Total Expenditures	Percentage of Expenditures by Location				
		WA Coast Communities	Elsewhere in WA	Oregon	Elsewhere in the U.S.	Outside the U.S.
<b>Total Expenses</b> <i>Likely more than the sum of categories listed below</i>	\$	%	%	%	%	%
<b>Labor Expenses</b>						
Total Payroll (wages) <i>Owners and employee, not including profit</i>	\$	%	%	%	%	%
Total Non-Wage Benefits <i>Include medical, bonuses, etc.</i>	\$	%	%	%	%	%
<b>Payments to Govt.</b>						
Federal <i>Include payroll taxes, income taxes, etc.</i>	\$	%	%	%	%	%
State & Local <i>Include permit and license fees, property taxes, etc.</i>	\$	%	%	%	%	%
<b>Other Expense Categories</b>						
Capital Expenditures <i>Include vessels, buildings &amp; heavy machinery &gt; \$10K</i>	\$	%	%	%	%	%
Packaging	\$	%	%	%	%	%
Insurance <i>Total payments to insurance companies</i>	\$	%	%	%	%	%
Freight <i>Expenses paid to freight companies (ground, water &amp; air)</i>	\$	%	%	%	%	%
Gas/Fuel <i>Expenses paid to fueling stations or fuel deliveries</i>	\$	%	%	%	%	%
Utilities (water, sewer, gas....)	\$	%	%	%	%	%
Shellfish Purchases	\$	%	%	%	%	%
Interest Payments	\$	%	%	%	%	%
Other costs	\$	%	%	%	%	%

THANK YOU!!

For questions please contact Katharine (Trina) Wellman

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# APPENDIX C

## Washington Marine Spatial Planning Social Impacts Survey

Cascade Economics LLC, on behalf of the WCMAC, welcomes you to this survey.

As you may know, the State of Washington is engaged in a Marine Spatial Planning Project. The purpose of this survey is to get a qualitative sense of the social impacts that could occur in Washington coastal communities as a result of potential new uses of the coastal zone identified by the state-led Marine Spatial Planning process. These new uses include **(1) marine product extraction; (2) offshore aquaculture; (3) dredge disposal in new locations; (4) mining gas hydrates; (5) mining marine sand and gravel; and (9) marine renewable energy - offshore, wave and tidal.**

Because we do not have definitive project geographic placement, timelines, scale and etc. this assessment is meant to be general and preliminary in nature. The geographic scope includes Washington State coastal counties: Clallam, Grays Harbor, Jefferson, Pacific and Wahkiakum.

When answering the survey questions, please try to answer for your own geographic location. If not applicable to your area, please use Not Applicable. If your perspective is not geographic in nature please answer more broadly.

The list of characteristics of social or human well-being are derived from several sources including NOAA NWFSC, University of Washington Sea Grant and the Puget Sound Partnership/Puget Sound Institute as well as from the work being conducted by Cascade Economics LLC on behalf of WCMAC. The indicators listed below cover multiple dimensions of human well being and represent both quantitative and qualitative measures. The indicators include:

Nature-based recreation: Average number of hours per week coastal residents spend outdoor recreating

Safe locally harvestable foods: Availability of locally harvested food species

Shellfish bed closures: Number of recreational shellfish bed closures per year

Natural resource industry output: Gross domestic product for natural resource industries on the Washington coast (timber, commercial fishing, shellfish aquaculture, recreational fish and shellfish harvest, tourism)

Participation in cultural practices: percent of residents who feel they are able to maintain cultural practices associated with the natural environment

Opportunity to influence decisions: Percent of residents who feel they have the opportunity to influence natural resource management if they want to

Trust in government: Percent of residents who trust local and regional government to make the right decisions related to protecting the Washington coast

Sense of Place:

Positive connections: Percent of residents who express a positive connection to the region

Sense of stewardship: Percent of residents who feel a strong sense of stewardship for the coast

Pride of place: Percent of residents who feel a sense of pride about being from coastal counties

Inspiration: Average number of residents who experience inspiration from being in nature

Safety from navigational hazards: Number of vessel incidents along shores of coastal counties

Access to coastal environment: Number of public access points (parks, boat ramps, marinas, beaches) to the marine environment

Economic development goals: Reduces barriers to economic opportunity for residents.

Marine water quality: Water quality that allows for traditional and historical uses of the marine environment

Beach closures: Number of incidents per year of public beach closure to recreational activities

# Washington Marine Spatial Planning Social Impacts Survey

## Tell us about yourself

Please tell us a bit about yourself.

### 1. Town and County of workplace

### 2. Affiliation. Please select from the following options.

Other (please specify)

- Industry (e.g. fish, shellfish, timber)
- Ports
- Non-profit
- NGO
- Resident
- Tribal Government
- MRC
- Economic development council
- Chamber of commerce
- Tourism bureau
- Local government
- State government
- County planner
- Academic institution

### Marine Product Extraction

Marine product extraction (also sometimes called bioextraction) is the practice of harvesting marine plants and animals to develop non-food related goods. Examples include anti-viral, anti-cancer, and anti-tumor agents used in medical treatments, anti-inflammatories in cosmetics, chemicals used in biomedical and cell biology research, and fatty amino acids in nutritional supplements. New genome sequences have also been discovered within marine organisms.

Researchers, universities, government agencies, and private companies use **marine bioprospecting** to search for novel chemicals for human health products. SCUBA diving, manned submersible vehicles, and remotely operated vehicles are current methods for marine bioprospecting.

Several phases occur between initial discovery and commercial sales of a developed product. Initial chemical discovery and genome sequencing often require small amounts of the target organism. Testing, clinical trials, and commercial sales will require greater amounts of availability.

Based on the literature, it does not seem likely that the Washington coast is a primary target for marine bioprospecting and marine product extraction. However, the Plan's study area has some high biodiversity and extreme environments including seamounts, deep sea corals, and hydrothermal vents. Organisms within these habitats are predicted have the greatest potential to contain undiscovered genome sequences and chemicals. Therefore, as technology continues to expand the depths of the ocean to be explored, it is possible that novel chemicals and DNA sequences could be discovered within Plan waters.

**3. Do you think that Marine Product Extraction will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**4. Please share any additional thoughts you have on the effects of Marine Product Extraction in the space below**

# Washington Marine Spatial Planning Social Impacts Survey

## Offshore Aquaculture

Aquaculture, the culture or growing of fish, shellfish, or other aquatic plants and animals, is an active industry in Washington. All of Washington’s marine aquaculture currently occurs close to shore, within bays, estuaries, and Puget Sound. There is no offshore aquaculture currently in the state.

There is no standard definition for offshore aquaculture. Offshore aquaculture typically occurs in deep water and is generally exposed to one or several of the following: strong waves, storms, swells, and currents. Given the physical exposure of Washington’s Pacific coast, offshore aquaculture is currently defined within the Marine Spatial Plan as **any new aquaculture operation outside of the coastal estuaries**.

**5. Do you think that Offshore Aquaculture will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please share any additional thoughts you have on the effects of **Offshore Aquaculture** in the space below

### Dredge Disposal

Navigation channels in Grays Harbor, the Mouth of the Columbia River, and other locations within the Plan area require frequent dredging to maintain vessel access to critical port infrastructure and services. In some locations, millions of cubic yards are dredged annually to keep navigation channels safe and accessible.

The majority of the dredged material is disposed of in-water at specific disposal sites. Current disposal types include:

**Nearshore and on-shore beneficial use sites** keep sediment within the nearshore system, which can minimize erosion. These sites have boundaries, and sediment can accumulate on the seafloor. These sites are designed for the sediment to disperse over time.

**Flow lane sites** are generally used for relatively small volumes of material. The material is placed in scour channels, and does not accumulate on the seafloor.

**Deep water sites** are located offshore in federal waters. Sediment disposed at deep water sites is effectively removed from the nearshore system.

Currently dredge disposal area in the MSP part of the coast include:

- Grays Harbor: 5 active disposal locations (nearshore and onshore use)
- Mouth of the Columbia River (MCR): 4 active disposal locations (nearshore use and deepwater)
- Willapa Bay: Flow lanes
- La Push: 2 beneficial use sites

Future Trends and Factors in Washington

--The Mouth of the Columbia River Regional Sediment Management Plan identified two potential new locations for dredge disposal. An onshore site at Benson Beach has been a demonstration project, but there are concerns about the safety and cost effectiveness of this site. A proposed North Head nearshore site is currently under consideration.

--Two sites at Grays Harbor may undergo small shifts in locations. The South Jetty site may be shifted slightly northward to accommodate the shifting scour channel. The Point Chehalis open water site may undergo a one-time northwestern shift in order to accommodate the additional material from the Grays Harbor channel deepening.

- Additional flow lanes in Willapa Bay may be established in the future for small port dredging.

**7. Do you think that **Dredge Disposal** will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**8. Please share any additional thoughts you have on the effects of **Dredge Disposal** in the space below**

# Washington Marine Spatial Planning Social Impacts Survey

## Gas Hydrates

Gas hydrates are a mixture of gas and water which, under low temperature and high pressures, forms a solid ice-like structure in marine sediments. Methane is the main type of gas in hydrates. When methane hydrates are exposed to warmer temperatures or lower pressures, the hydrates “dissociate” and release methane gas. Preliminary research suggests traditional oil and gas equipment and infrastructure can be successfully adapted to mine gas hydrates. Globally, no commercial methane mining activities currently exist, and no projects are currently proposed for offshore Washington.

**9. Do you think that Gas Hydrates will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Please share any additional thoughts you have on the effects of **Gas Hydrates** in the space below

# Washington Marine Spatial Planning Social Impacts Survey

## Marine Sand and Gravel Mining

Sand and gravel mining is the dredging of sand or gravel from the seafloor for use in beach nourishment, coastal hazard defense, and other uses such as upland construction. Suction dredges are used to extract the material, which is stored and transported by ship, barge, or pipeline to a beach or re-handling area.

**11. Do you think that Marine Sand and Gravel Mining will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please share any additional thoughts you have on the effects of **Marine Sand and Gravel Mining** in the space below

### Marine Renewable Energy: **Offshore Wind Energy**

Marine renewable energy includes any technology that converts potential energy from wind, waves or tides into electricity. Currently, researchers are developing different technologies and testing devices in research labs and waters throughout the United States to provide clean energy alternatives for the nation. No devices are currently permitted for the marine waters along Washington's coast.

**Offshore Wind Energy** uses technology adapted from land-based wind turbines and applies the technology to floating or anchored support structures that vary according to water depth. Turbines used in offshore installations can be up to 500 feet tall to gain access to reliable wind resources. Offshore Wind Energy is classified by base structures including fixed bases for shallow and floating bases for deep waters.

**13. Do you think that Offshore Wind Energy will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**14. Please share any additional thoughts you have on the effects of Offshore Wind Energy in the space below**

# Washington Marine Spatial Planning Social Impacts Survey

## Marine Renewable Energy: **Wave Energy**

Marine renewable energy includes any technology that converts potential energy from wind, waves or tides into electricity. Currently, researchers are developing different technologies and testing devices in research labs and waters throughout the United States to provide clean energy alternatives for the nation. No devices are currently permitted for the marine waters along Washington’s coast.

**Wave Energy** extracts energy from ocean wave movements or from changes in pressure below the surface. It is classified by type, including point absorber, wave overtopping reservoir, attenuator, oscillating water column, and inverted pendulum.

**15. Do you think that **Wave Energy** will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Please share any additional thoughts you have on the effects of **Wave Energy** in the space below

# Washington Marine Spatial Planning Social Impacts Survey

## Marine Renewable Energy: **Tidal Energy**

Marine renewable energy includes any technology that converts potential energy from wind, waves or tides into electricity. Currently, researchers are developing different technologies and testing devices in research labs and waters throughout the United States to provide clean energy alternatives for the nation. No devices are currently permitted for the marine waters along Washington’s coast.

**Tidal Energy** extracts energy from a steady water flow typically through an existing narrow channel. It is classified by type, including horizontal and vertical axis turbines, oscillating hydrofoil, and venturi effect turbine.

**17. Do you think that **Tidal Energy** will have a Positive Impact, Negative Impact, or No Effect on the following indicators:**

	Positive Impact	Negative Impact	No Effect	Not Applicable
Nature-based recreation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe locally harvestable foods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shellfish bed closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural resource industry output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in cultural practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opportunity to influence decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trust in government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: positive connections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: sense of stewardship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sense of Place: pride of place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspiration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety from navigational hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to coastal environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic development goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine water quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beach closures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Please share any additional thoughts you have on the effects of **Tidal Energy** in the space below

# Washington Marine Spatial Planning Social Impacts Survey

## Qualitative Impact Assessment

19. Finally, we are interested in your overall assessment of the impacts of all potential new uses. For each, please provide a Qualitative Impact Assessment (High, Medium, or Low Impact, or No Effect)

	High Impact	Medium Impact	Low Impact	No Effect
Marine Product Extraction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Offshore Aquaculture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dredge Disposal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gas Hydrates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine Sand and Gravel Mining	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine Renewable Energy: <b>Wind</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine Renewable Energy: <b>Wave</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marine Renewable Energy: <b>Tidal</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Washington Marine Spatial Planning Social Impacts Survey

### Thank you! Additional Thoughts?

Thank you for your time. We value any further insights or thoughts you might have regarding the social impacts of potential new uses of the coastal Washington marine environment.

**20. Please use the space provided below to share any additional comments.**