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Marine Sector Analysis Report: Non-Tribal Fishing

Revised Final Report | October 31, 2014

prepared for:

Washington Coastal Marine Advisory Council

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NOTICE

The information presented in this report reflects data collected from readily available sources and the opinions of a limited number of individuals knowledgeable about this sector, including representatives of private business interests. The views and opinions expressed herein are those of the individuals consulted and are not necessarily representative of the views of any state agency or of the perspectives of other experts or participants in the marine spatial planning process, either within or outside the sector. Industrial Economics, Inc. is solely responsible for the content of this report.

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LIST OF ACRONYMS AND ABBREVIATIONS

DFW	Washington Department of Fish and Wildlife
DNR	Washington Department of Natural Resources
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FMP	Fishery Management Plan
FWS	US Fish and Wildlife Service
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSP	Marine Spatial Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PDO	Pacific Decadal Oscillation
PFMC	Pacific Fishery Management Council
PSMFC	Pacific States Marine Fisheries Commission
RCW	Revised Code of Washington
SAFE	Stock Assessment and Fishery Evaluation Report
U&A	Usual and Accustomed
WAC	Washington Administrative Code
WCMAC	Washington Coastal Marine Advisory Council

PREFACE

The Washington Department of Ecology is leading an effort to develop a marine spatial plan (MSP) for Washington's Pacific coast. The plan is being developed in coordination with an interagency team that includes the Office of the Governor, the Washington Department of Natural Resources (DNR), the Washington Department of Fish and Wildlife (DFW), Washington Sea Grant, and the Washington State Parks and Recreation Commission.[1] The planning process also involves and engages coastal stakeholders, the public and local, tribal and federal governments. In particular, the Washington Coastal Marine Advisory Council (WCMAC) is advising on the development of the plan. The WCMAC is a 26-member advisory group established in the Governor's office and comprised of a diverse range of stakeholder interests. In support of this effort, DNR has engaged Industrial Economics, Incorporated and BST Associates to develop reports on five major sectors of the state's marine economy: aquaculture; non-tribal fishing; marine renewable energy; recreation and tourism; and shipping. These reports are intended to help state agencies, the WCMAC, and other stakeholders understand the trends and potential issues associated with economically important activity in the marine environment.

This report focuses on the non-tribal fishing sector. It synthesizes information from publicly available sources to provide an overview of current economic activity, major trends in activity, and potential future resource uses and needs. In addition, the report draws on perspectives and insights from industry experts and relevant government agencies to highlight critical issues affecting the sector – including any current or potential future conflicts within the sector or with other sectors – and the role of marine spatial planning in addressing these issues (see Appendix A for a complete list of individuals interviewed). It also identifies key remaining questions, data quality issues, and data gaps.

WASHINGTON MARINE SPATIAL PLANNING OVERVIEW

Marine spatial planning is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine environments to achieve ecological, economic, and social objectives. The MSP will address issues resulting from increasing pressures on the resources in the area, as well as conflicts between and among existing

[1] For additional information on Washington's marine spatial planning efforts, see RCW 43.372 and http://www.msp.wa.gov. An interactive mapping tool is available at: www.msp.wa.gov/explore/mapping-application.

and proposed new uses of these resources. The planning process will also involve and engage coastal stakeholders, the general public, and local, tribal, and federal governments. The MSP will develop a comprehensive plan for addressing these types of potential activities to avoid and minimize impacts, reduce potential conflicts, and foster a healthy ecosystem. In addition, the MSP provides a basis for improving coordination and implementation of existing state and local laws, regulations and policies. It also provides an opportunity to coordinate with federal agencies and tribes related to their authorities. The law does not create any new authority under the MSP, nor does the MSP have authority to affect any existing or proposed project, use, or activity during the development of the plan (RCW 43.372.060). Instead, the MSP provides a consistent information framework for agencies to use when applying their existing authorities in response to particular project proposals and permit processes.

As part of the MSP planning process, the State Environmental Policy Act (SEPA) requires the state to develop an Environmental Impact Statement (EIS); the SEPA scoping summary was recently released (Ecology 2014). The EIS should be finalized within the next year; the MSP is expected to be finalized by December 2016 (Ecology 2013).

SECTOR ANALYSIS STUDY AREA

The activities considered in this sector profile are those which occur or may in occur in the future in marine or estuarine waters off the Washington Pacific coast. The area of interest includes state and federal waters from Cape Disappointment north to Cape Flattery and seaward to a depth of 700 fathoms, including Willapa Bay and Grays Harbor. The marine shoreline bordering this area includes roughly 157 miles of Pacific coastline, 89 miles in Grays Harbor, and 129 miles in Willapa Bay (Ecology 2001). The study area does not include the Strait of Juan de Fuca, the Lower Columbia River Estuary, or Puget Sound. The study area is illustrated in Exhibit P-1.

The Washington Pacific coast is mostly rural, and is supported by an economy based on tourism, recreation, and natural resources (e.g., commercial fisheries and timber). The region includes four counties: Jefferson, Clallam, Grays Harbor, and Pacific. In 2013, the total population of these counties was roughly 194,000, or three percent of the state population (Census Quickfacts 2014). In recent years, population growth and economic growth in these counties has been below the state average.

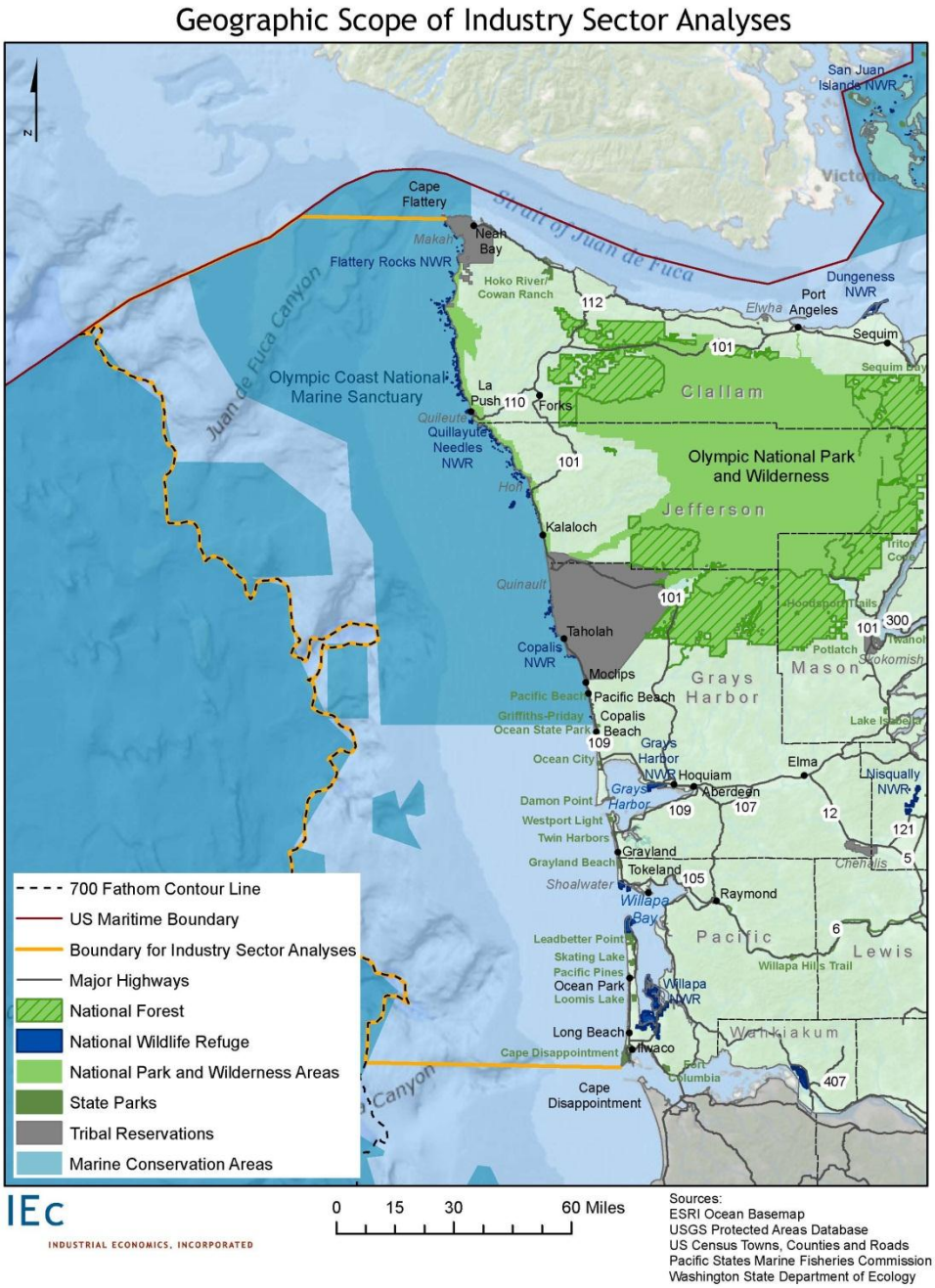
The Olympic Coast National Marine Sanctuary makes up most of the northern half of the study area, running north from the mouth of the Copalis River along the coast and extending seaward between 25 to 40 miles, including 2,408 square nautical miles of marine waters (Olympia Coast National Marine Sanctuary 2014). Olympic National Park occupies significant portions of the Clallam and Jefferson County coastlines. Other marine conservation areas in the study area include various federally-designated Essential

Fish Habitat areas. In addition, areas off the Washington coast are designated training and testing areas for the U.S. Navy.[2]

The Makah, Quileute, Hoh, Quinault, and Shoalwater Bay Indian tribes have reservation lands along the coast. Ocean resources are both economically and culturally important to these tribes, as are the tourism and recreation benefits offered by their coastal locations.

[2] The Naval Undersea Warfare Center Keyport Range Complex is located within the study area. For more information see U.S. Navy 2014, www.nwtteis.com.

EXHIBIT P-1. MAP OF STUDY AREA INCLUDING KEY FEATURES



The southern portion of the coast is more heavily developed than the northern coast, with a greater number of urbanized areas and a greater concentration of marine industry and infrastructure. Developed areas in the southern half of the coast include the cities of Hoquiam and Aberdeen and the Port of Grays Harbor, as well as the coastal towns of Pacific Beach, Ocean Shores, Westport, Ocean Park, Seaview, Long Beach, and Ilwaco. Numerous state park facilities are located along the southern half of the Washington coast. In addition, Willapa Bay, located in the southern portion of the study area, contains the Willapa Bay National Wildlife Refuge, and an economically important oyster industry.

SCOPE OF ECONOMIC INFORMATION CONSIDERED

This report focuses on the ocean economy, considering economic activity within the state that derives all or part of its inputs from the ocean (Colgan 2007). The report further focuses on current activities or activities that may occur in the reasonably foreseeable future. As a general guide we consider activities that are expected to occur within a planning horizon of 20 years. This timeframe should be sufficient to guide long-term planning, provided the MSP is periodically updated to take new information into account.

ORGANIZATION OF THE REPORT

The remainder of the report is organized as follows:

- Section 1 provides an introduction to the sector.
- Section 2 summarizes the current status of the sector.
- Section 3 describes the key issues facing the sector.
- Section 4 provides an inventory of the available economic data for the sector, and highlights limitations of the existing data and data gaps.

SECTION 1 | INTRODUCTION TO THE NON-TRIBAL FISHING SECTOR

SECTOR DEFINITION

For the purposes of this report, we define the fishing sector to be the non-tribal commercial and recreational fishing activity that is executed in Washington's outer coastal waters between Cape Flattery and Cape Disappointment, as well the distribution and processing activities that support it. The scope of the analysis specifically excludes the following significant components of Washington's overall fishing industry:

- Tribal fisheries;
- Commercial and recreational fisheries occurring in the Columbia River estuary, Strait of Juan de Fuca, Puget Sound, and all freshwater rivers, lakes and streams;
- Fisheries outside the study area in which Washington-based vessels participate, such as those in Alaska; and
- Aquaculture.

Describing the diverse ranges of activities taking place under the umbrella description of "Washington's non-tribal fishing industry" and providing descriptive statistics at that level presents a major challenge. While all fishing activity in the state exhibits certain commonalities, there are many aspects of each segment of "the non-tribal fishing industry" that make that segment unique and worthy of individual attention. At minimum, it is necessary to differentiate between the commercial and recreational subsectors. Within these sub-sectors, individual fisheries have their own unique history and face their own unique challenges. While each of these fisheries could themselves be the subject of a sector analysis, the scope of this report does not allow such an in-depth discussion.

Our profile of the non-tribal fishing sector on Washington's outer coast begins with a broad overview of the area's commercial and recreational fisheries. We then provide brief descriptions of individual fisheries within each sub-sector, including data on participation, annual harvests, and other indicators of economic value. The specific fisheries discussed in this report are listed in Exhibit 1-1.

HISTORY, TRENDS AND OPPORTUNITIES

The state of Washington has long been home to a vibrant and diverse fishing industry. The Native American tribes in the region have been fishing for salmon, groundfish and shellfish for thousands of years, and European settlers have been fishing commercially in the region since they arrived in the mid-1800s (Community Attributes, Inc. 2013).[3]

EXHIBIT 1-1. LIST OF NON-TRIBAL FISHERIES DESCRIBED IN THIS REPORT

COMMERCIAL	RECREATIONAL
• Salmon • Dungeness crab • Groundfish • Pink shrimp • Albacore tuna • Spot shrimp • Sardine • Anchovy • Hagfish • Razor clam	• Razor clam • Dungeness crab • Albacore tuna • Bottomfish • Halibut • Salmon

A number of events have substantially influenced the trajectories of the commercial and recreational fisheries in Washington, including federal court decisions associated with tribal treaty fishing rights. In *United States vs. Washington* (1974), Judge George Hugo Boldt held that Washington's native American treaty tribes reserved the right to take up to 50 percent of the harvestable salmon in their respective usual and accustomed (U&A) fishing grounds (384 F. Supp. 312 (W.D. Wash. 1974)). This ruling was also the basis for their co-management of the fishery with the state. Twenty years later, in subsequent cases under *United States vs. Washington* (1994), Judge Edward Rafeedie held that the treaty right extended to finfish other than salmon, and to shellfish, including oysters, clams, and Dungeness crab (OCNMS IPC 2008). These rulings, by providing for treaty fishing in a number of commercial fisheries, accordingly reduced the harvest share for non-treaty fishery participants. The state/tribal management plans to implement these decisions also include "special management areas," which are closed to non-treaty Dungeness crab fishing at the start of the season in order to allow treaty tribes' fleets a window to attempt harvest of 50 percent of the resource, for that interval concentrating the non-treaty commercial fishing activity into the southern portion of the coast (Personal comm. D. Beasley 2014, Personal comm. L. Thevik 2014, Personal comm. K. Krueger 2014, Personal comm. M. Culver 2014).

[3] Other important species harvested by tribes include black cod, rockfish, and other groundfish (Personal comm. K. Krueger 2014).

Another significantly influential event has been the decline in the salmon resource itself due to many factors including, but not limited to, loss of in-river habitat. Restoration projects are working to reverse that situation, nevertheless, over the past decades, there has been a significant reduction in the number of salmon available for harvest by the tribal and non-tribal commercial and recreational fisheries alike (Personal comm. M. Cedergreen 2014, Personal comm. L. Thevik 2014, Personal comm. D. Beasley 2014, Personal comm. K. Krueger 2014).

These factors and others have substantially changed the characteristics of Washington's commercial and recreational fisheries. The sizable fleet that developed to target salmon up until the 1970s now operates at a fraction of its former capacity (Personal comm. L. Thevik 2014). Where non-tribal Dungeness crab commercial fishermen had historically been able to rely upon participation in one fishery to sustain them financially, fishermen today must participate in three to four fisheries in order to survive, which is more typical of participants in fisheries that depend upon resource availability (e.g., salmon, albacore tuna, sardines) (Personal comm. M. Culver 2014, Personal comm. D. Beasley 2014). The lucrative Dungeness crab fishery that historically was dominated by coastal residents has seen an influx of vessels from Oregon, Alaska, and Seattle (Personal comm. L. Thevik 2014). On the recreational front, Washington's charter fleet, which was developed around the salmon resource, has contracted significantly, and by necessity targets a much more diverse array of species (Personal comm. M. Cedergreen 2014). The tribal and non-tribal fishery participants alike are affected by competition from out-of-state, and other factors influencing wild fish populations, such as impacts on fish habitat (Personal comm. K. Krueger 2014).

Another major change has been the near complete loss of Washington's trawling fleet. This loss was primarily due to the federal trawl buyback program, which bought out 92 permits along the West Coast, including five of Washington's seven major trawlers operating out of Bellingham, in 2005. This buyback was implemented through a loan from the federal government, which the remaining trawlers are paying back through a dedicated landing tax. This buyback was fully supported by the trawl industry via referendum in recognition of the overcapacity of the fleet. The Pacific Fishery Management Council (PFMC) worked with the trawl industry to develop a Strategic Plan in 2000, which called for a fleet reduction of 50 percent; the buyback program was one of the key steps to accomplishing this goal. While the full 50 percent target reduction was not achieved, the buyback program reduced the total number permits to the current level of 167.

Washington's non-tribal fishing industry has proven itself to be highly adaptable to the challenges it has faced in the last few decades. It continues to thrive as one of the most productive and valuable fishing industries in the country. However, one industry expert interviewed expressed concern that the industry has been pushed to its limits, and may not be able to sustain additional restrictions, particularly those that would further limit the geographic space in which they can operate (Personal comm. D. Beasley 2014).

SUMMARY OF KEY ISSUES

The experts we interviewed provided substantial insight into the issues that have influenced the development of the non-tribal commercial and recreational fishing industries, that are currently affecting various fisheries, or that are likely to present challenges in the future. Their comments suggest that requirements for resource sharing and associated seasonal restrictions in use of ocean space had a significant effect on the trajectory of certain non-tribal fisheries. Looking forward, new space use conflicts, potentially resulting from the outcome of the MSP process, are of primary concern, with the development of marine renewable energy projects perceived as the most serious threat. These and other issues identified through our interviews are summarized in Exhibit 1-2 and discussed in greater detail in subsequent sections of this report.

EXHIBIT 1-2. ISSUES OF CONCERN TO THE FISHING SECTOR

ISSUE	CONCERNS
Barriers to Entry and Success	• Expense of entering the industry • Need for participation in multiple "legs" of the industry
Limitations in Use of Space	• Time/area closures that already exist due to habitat protection, overfished species rebuilding plans, or resource sharing needs. • Concern about closures for other new uses (e.g., marine renewable energy) • Assumption that the MSP process will result in space being set aside for certain uses
Ocean Acidification	• Potential effects on Dungeness crab larvae • Potential effects on pteropods (key juvenile salmon food source)
Oil Industry Conflict	• Threat of oil spills and lack of response preparation
Overfished Species	• The potential for reduced harvest of target species due to need to rebuild overfished species
Potential for Concentration of Ownership	• Potential for concentration of ownership into hands of a few • Potential for movement of permits away from independent fishermen and towards corporations and processors
Regulatory Uncertainty	• Difficulty in long-term business planning
Salmon Production and Survivability	• Environmentally-based fluctuations in population • Predation • Hatchery production • Loss and degradation of habitat • Climate change
Laws and Regulations Limiting Catch	• Higher costs and potential loss of income • Time/area closures for Dungeness crab fishery • Increased competition and congestion

SECTION 2 | SECTOR STATUS

Describing the diverse range of activities taking place under the umbrella description of "Washington's non-tribal fishing industry" and providing descriptive statistics at that level presents a unique challenge. While all fishing activity in the state exhibits certain commonalities, there are many aspects of each segment of "the non-tribal fishing industry" that makes it unique and worthy of individual attention. At minimum, it is necessary to differentiate between the commercial and recreational sub-sectors. Beyond that, individual segments of these industries that target different species are in themselves subject to their own unique history, trends, economic characteristics, and challenges. While each of these sub-sectors and fisheries could themselves be the subject of a sector analysis, the scope of this report does not allow for an extensive discussion of each component.

The following discussion addresses commercial and recreational fishing in turn. In each case, we begin with a general overview that provides a sense of the scope and scale of the sub-sector, presenting available information on participation and overall economic impacts.[4] This discussion is followed by brief descriptions of individual fisheries within each sub-sector, including data on participation, annual harvests, and other indicators of economic value.

COMMERCIAL FISHING SECTOR

GENERAL OVERVIEW

The Washington commercial fishing industry, inclusive of aquaculture production and tribal fisheries, is one of the most productive and valuable in the U.S. According to the annual NOAA Report, "Fisheries of the United States, 2012," Washington ranked fourth in landed pounds (420.1 million) in 2012, and fifth in value of landings ($302.0 million) (NMFS 2013a). These figures represent four percent of the total landings and six percent of the total value of all U.S. commercial fisheries.

The ports of Westport and Ilwaco/Chinook, both located within our study area, rank among the most important commercial fishing ports in the country. Westport was ranked 13th by landed weight in 2012 (133 million pounds) and 16th by landed value ($59

[4] Note that this summary focuses on the most recently-available relevant data. Other potential data sources not described in detail in this section are listed in Exhibit 4-1.

million). Ilwaco/Chinook was ranked 30th by landed weight (29 million pounds) and 50th by landed value ($22 million) (NMFS 2013a).[5]

Washington ranked below California and Oregon in 2012 in commercial fishing landings by weight, but above these states in landings by value (NMFS 2013a). Its most valuable harvested species included Dungeness crab ($59,485,000), albacore tuna ($28,440,000), and salmon (multiple species) ($28,398,000) (NMFS 2013b).

Commercial landings at ports within our study area (i.e., from Neah Bay to the mouth of the Columbia River) account for a substantial share of landings statewide: 83 percent of landings by weight and 63 percent of landings by value (DFW 2008). The value of landings at ports in Grays Harbor County (including Aberdeen, Bay City, and Westport) is the highest in the state ($19,262,100 in 2006), accounting for approximately 30 percent of ex-vessel revenues statewide (DFW 2008).

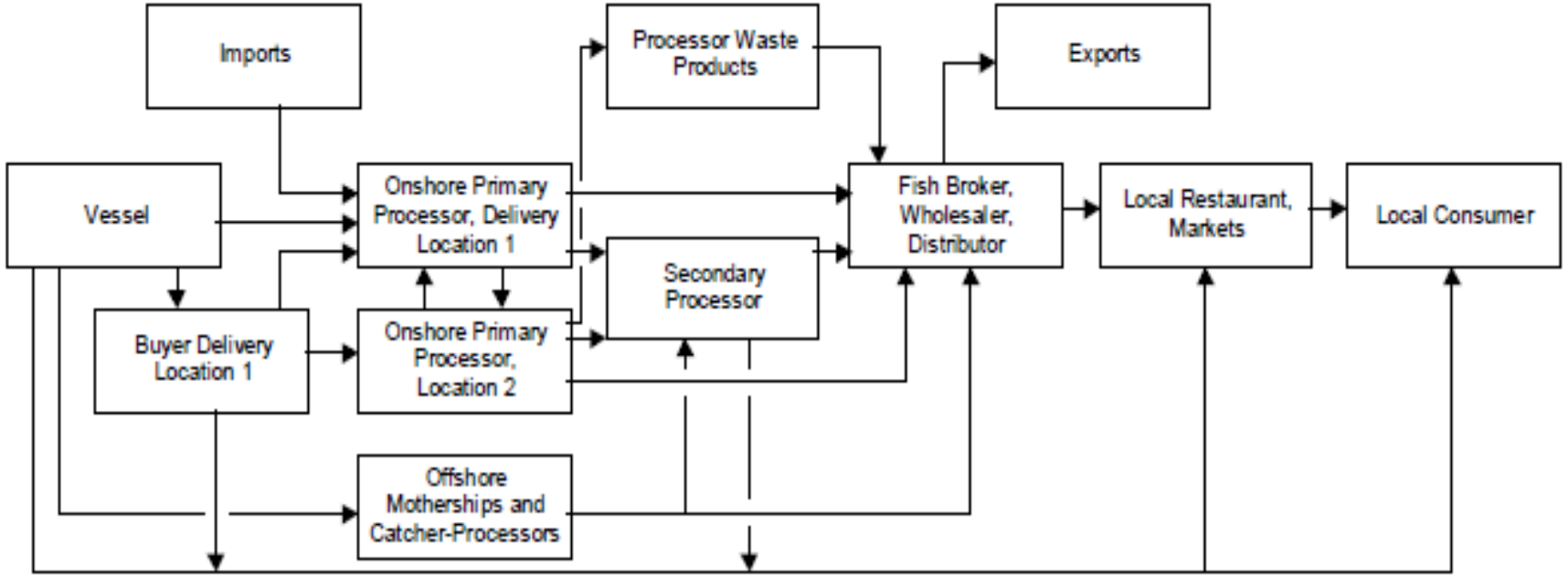
Exhibit 2-1 shows the general flow of seafood from harvest to consumer. The majority of the harvest landed in Washington is delivered to one of the many onshore processors located within the state; in 2006, there were 104 seafood processing facilities based on the Washington coast (TRG 2008). A share of the commercial Pacific whiting (aka Pacific hake) catch, however, is processed at sea. In addition, onshore processing capacity has seen some consolidation in recent years. As a result, the port at which the harvest is landed does not necessarily realize the economic benefits of related processing activity (DFW 2008). At the same time, some crab landed in California and Oregon is transferred to Washington processing facilities, helping to maintain Washington shoreside processing infrastructure (Personal comm. D. Beasley 2014).

According to a 2006 report published by the Pacific States Marine Fisheries Commission (PSMFC), the majority of processing companies on the U.S. west coast depend upon multiple species and markets. In addition, there has been a trend towards multi-species dependency for high volume processors (PSMFC 2006). Factors that have affected the fish processing industry since the early 1990s include:

- Infrastructure issues related to whether water or byproduct use in the processing process will overwhelm existing infrastructure;
- A decline in wholesale prices for seafood;
- Major expansion of the onshore Pacific whiting fishery;
- Horizontal integration of processors and consolidation of processing plants in fewer locations;
- Vertical integration into distribution and harvesting operations; and
- Return of small processors to offering specialty products in niche markets.

[5] The port of Shelton, WA is also included within the top 50 ports by landed value; however, this is due to the harvest of aquaculture products. Information on the aquaculture sector is presented in a separate report, and thus is not included in this discussion.

EXHIBIT 2-1. SEAFOOD PRODUCT DISTRIBUTION CHAIN



Source: PSMFC 2006

Economic Contribution of Commercial Fishing

Several recent studies, summarized below, provide insight into the regional economic importance of the commercial fishing industry in Washington. Note that these studies are generally focused on commercial fishing as a whole, and most do not differentiate between activity within the study area (i.e., the outer coast) and outside the area (i.e., in Puget Sound and the Strait of Juan de Fuca). Some include aquaculture, distant-waters fisheries, and tribal fisheries, and thus are not representative of the portion of the industry of interest to this effort. Comparison between these studies is not appropriate, as each focuses on different components of Washington's fishing industry.

DFW and The Research Group Reports

The 2008 DFW report "Economic Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington State" responded to a request by then-Governor Christine Gregoire to "summarize the economic benefit that our commercial and recreational fisheries provide to the state" (DFW 2008). This study provides perhaps the most valuable existing information for our purposes, as it excludes aquaculture, tribal fisheries, and distant water fisheries from the analysis. However, results are reported statewide, and do not allow us to isolate that portion of the value of commercial fishing activity attributable to harvests within the study area.

DFW (2008) relied in part upon information contained in The Research Group's (TRG) 2008 report "Washington Commercial Fisheries Economic Value in 2006." We report the values reported in TRG (2008) because they are presented in more detail (e.g., are broken down by species), but note they are slightly different from what was ultimately reported in DFW (2008).

TRG (2008) found that the commercial fishing industry was responsible for $148 million in total personal income contributions, representing 3,530 jobs in Washington in 2006. Although only representing a small fraction of total net earnings in Washington, this income and these jobs are important to the economy of many individual communities on the Washington coast and in Puget Sound. The net economic revenue generated by commercial fishing was $38 million. The Dungeness fishery contributed the greatest income, number of jobs, and net economic benefit of all fisheries (see Exhibit 2-2).

It is worth noting that the Seattle Marine Business Coalition took exception to the findings of this report, and funded a study to develop what they believed to be the true economic value of Washington's commercial fisheries (Seattle Marine Business Coalition 2011). By including components of the fishery that they argue account for 28 percent of Washington harvest values (i.e., tribal fisheries, distant-water fisheries, and aquaculture), they report a total net economic value of Washington's commercial fisheries as $3.9 billion.[6]

[6] Note that this figure appears to also include the value of recreational fisheries.

EXHIBIT 2-2. NET ECONOMIC VALUES AND ECONOMIC EFFECTS GENERATED BY WASHINGTON'S COMMERCIAL FISHERIES IN 2006

FISHERY	REVENUE (THOUSANDS OF $2006)		REGIONAL ECONOMIC IMPACT (PERSONAL INCOME) (THOUSANDS OF $2006)			SHARE	(THOUSANDS) JOBS	NET ECONOMIC VALUE (THOUSANDS OF $2006)
	EX-VESSEL	EX-PROCESSOR	HARVESTER	PROCESSOR	TOTAL			
Groundfish	$6,425	$8,858	$8,874	$3,029	$11,903	8%	0.283	$3,103
P. Whiting	$3,274	$12,296	$4,857	$12,271	$17,128	12%	0.408	$4,978
Salmon	$9,554	$16,624	$12,370	$8,935	$21,305	14%	0.507	$7,091
Crab	$29,607	$41,612	$41,721	$15,377	$57,098	39%	1.359	$11,596
Shrimp	$1,592	$2,953	$2,252	$1,509	$3,761	3%	0.090	$881
Pelagic	$509	$3,577	$735	$3,946	$4,681	3%	0.111	$1,914
Migratory	$3,792	$6,772	$4,351	$3,762	$8,112	5%	0.193	$2,142
Halibut	$422	$497	$587	$89	$676	0.5%	0.016	$201
Shellfish	$8,209	$5,183	$10,082	$9,132	$19,214	13%	0.457	$5,038
Other	$2,134	$2,838	$2,901	$1,492	$4,393	3%	0.105	$1,138
Total	**$65,517**	**$101,210**	**$88,729**	**$59,543**	**$148,272**	**100%**	**3.530**	**$38,082**

Source: Recreated from TRG (2008), Table 4

Notes:

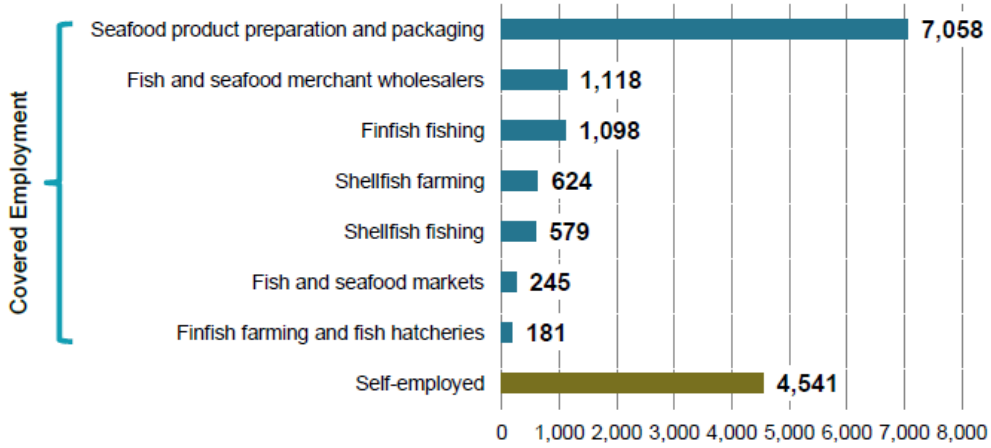
1. Based on commercial landings at Washington ports except for those in the following fisheries: tribal commercial and C&S fisheries, aquaculture, West Coast offshore fisheries, fishing grounds southerly of an extension of the Washington-Oregon land border, harvests returned from Alaska, and other distant water fisheries.
2. Ex-vessel revenues are what harvesters receive when selling their retained catch. Ex-processor revenue is the wholesale value of seafood products.
3. Regional economic impact (REI) is measured as total personal income. It includes the "multiplier" effects. It is a measurement for the state level economy.
4. Jobs are full-time and part-time employment using BEA estimates for wage and salary, and proprietorship earnings in 2006 for the State.
5. Net economic value (NEV) is the prorated profitability of vessels and processors active in the included fisheries. It does not include an accounting of social costs to sustain the fisheries. It is a measurement at the fishing industry level.

Community Attributes, Inc. Report

In 2013, Community Attributes, Inc. published a study for the Economic Development Council of Seattle and King County and the Workforce Development Council of Seattle-King County investigating the economic impacts of the sectors that comprise Washington's maritime industry cluster, including Fishing and Seafood Processing (Community Attributes, Inc. 2013). Measures provided include direct impacts (gross business income and employment), indirect/induced impacts (employment and induced/indirect revenues/output), and wages. The results of the analysis are not directly applicable to the present analysis, as it includes tribal fishing, recreational fishing, aquaculture/fish farming, and distant-waters fisheries. However, it could provide useful context for ultimately understanding the overall contribution of coastal non-tribal fisheries to the state's commercial fishing industry as a whole.

The analysis identified 720 establishments providing covered employment in the fishing and seafood processing sector, and found a trend toward consolidation of businesses. However, it also identified steady and even growing employment in the sector, with approximately 11,000 jobs provided in 2011 (not including self-employed individuals such as many fishermen (4,541 jobs)). Exhibit 2-3 describes the number of jobs that are supported by various sub-sectors of the Fishing and Seafood Processing sector. The study calculated a total jobs multiplier for this sector as 3.0, meaning that for every job in the sector, an additional two jobs are supported by fish and seafood processing activities. Total wages generated by this sector were $1.1 billion. Gross business revenues were estimated as $8.6 billion, and the sector contributed an estimated $135.7 million in tax revenues to the state.

EXHIBIT 2-3. FISHING AND SEAFOOD PROCESSING JOBS, 2011



Source: Community Attributes, Washington State Employment Security Department (2013), U.S. Department of Labor Bureau of Labor Statistics (2013).[17]

Source: Community Attributes, Inc. (2013)

Fisheries of the United States, 2012

The 2013 NOAA report "Fisheries of the United States, 2012" reports that Washington's seafood industry was responsible for 60,955 jobs, $7.5 billion in sales impacts, and $2.0 billion in personal income, and contributed $3.0 billion in value added to the economy (NMFS 2013a) (see Exhibit 2-4). These figures are not, however, strictly representative of the segment of the fishing industry of interest to this report, as they include tribal fisheries, aquaculture, and distant waters fisheries, and are inclusive of all state waters.

EXHIBIT 2-4. ECONOMIC IMPACTS OF THE PACIFIC REGION SEAFOOD INDUSTRY (THOUSANDS OF DOLLARS)

STATE	LANDINGS REVENUE	JOBS	SALES	INCOME	VALUE ADDED
California	$231,683	145,433	$24,043,813	$5,172,755	$8,582,461
Oregon	$128,030	16,051	$1,174,111	$385,350	$550,045
Washington	$275,585	60,955	$7,533,447	$2,002,804	$3,055,370
Source: Recreated from NMFS (2013a).					

FISHERY SPECIFIC INFORMATION

The marine waters off the Pacific coast of Washington support at least ten important commercial fisheries. For each fishery, we briefly describe the range of activities occurring in that fishery, and provide descriptive statistics to characterize the fishery, including landings and ex-vessel revenues over the last ten years. The landings and ex-vessel values provided in the exhibits reflect harvest from Pacific Ocean waters, Grays Harbor, and Willapa Bay. All ex-vessel values presented in the exhibits have been converted to 2014 dollars using the GDP implicit price deflator. Appendix B includes the raw data tables that serve as the basis for these exhibits. All data were provided by DFW in June and August, 2014.

Exhibit 2-5 lists the commercial fisheries with the highest participation, by licenses issued in 2011, providing a sense of overall activity in each fishery. Note that the data reported for these license categories are state-wide and that the categories are not limited to fisheries operating in our study area. We have denoted in grey license categories for fisheries that operate entirely outside the study area.

Salmon

The commercial salmon fishery within our study area operates in both the ocean and coastal estuaries (i.e., Willapa Bay and Grays Harbor). There are three methods used for the commercial harvest of salmon, each with its own license category: ocean trolling, charter, and gillnet licenses. Although none of the commercial salmon fisheries are technically limited entry, there is a moratorium on new licenses, and the total licenses available each year is capped at the number of licenses issued the previous year. An individual needs an estuary-specific permit to gillnet for salmon in Grays Harbor and/or Willapa Bay. Ownership of either permit allows one to gillnet for salmon in the Columbia River. The number issued each year ranges from 120 to 131 Ocean trolling

licenses, 119 to 131 Charter licenses, 43 to 51 Grays Harbor Gillnet licenses, and 135 to 166 Willapa Bay Gillnet licenses (Personal comm. M. Culver 2014).[7]

EXHIBIT 2-5. TOP 20 WASHINGTON COMMERCIAL FISHING LICENSES, 2011

LICENSE TYPE	LICENSE COUNT
Non-salmon Ocean Delivery	275
Dungeness Crab Pots Puget Sound	249
Dungeness Coastal Crab Pots (Perm)	223
Puget Sound Salmon Gill Net	195
Willapa Bay Salmon Gill Net	193
Salmon Troll	154
Ocean Delivery Pink Shrimp	83
Puget Sound Salmon Purse Seine	75
Grays Harbor Salmon Gill Net	63
Sea Cucumber Dive	27
Baitfish Lampara	26
Sea Urchin Dive	26
Non-Shrimp Shellfish Pots	19
Puget Sound Shrimp Pots	18
Herring Lampara	16
Sardine Purse Seine	16
Herring Purse Seine	15
Herring Dip Bag Net	14
Coastal Hagfish Pot	12
Puget Sound Salmon Reef Net	11
Other	80
Total	**1,790**

Source: Community Attributes, Inc. (2013)

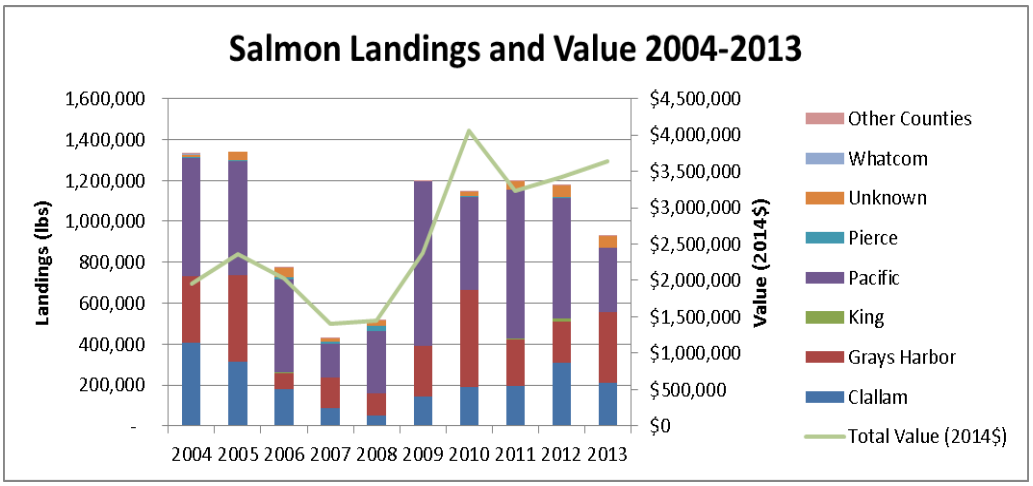
Management of this fishery is characterized by the involvement of several different government entities. Requirements for sharing of resources between treaty tribes and non-treaty participants necessitate ongoing negotiations between the state, tribes, and other stakeholders. Other challenges arise in meeting salmon conservation and escapement goals since salmon is also a target for recreational fishing (Personal comm. M. Culver 2014).

[7] Note that salmon charter licenses are coast-wide; thus, this figure is not isolated to Charter vessels operating within our study area.

The non-tribal commercial salmon fleet was historically quite large, but retracted substantially for several reasons. First, following the Boldt decision, non-treaty fishers' allocation of the resource was limited to 50 percent of the harvestable resource. Second, there was a decline in the salmon resource itself as a result of numerous factors including a loss and deterioration of habitat and access to ocean fisheries by other nations. The non-tribal commercial fishery today is comprised of trolling vessels, primarily targeting Chinook and coho salmon. Primary landing ports for this fishery are Westport and Ilwaco. Fish harvested in this fishery are typically sold fresh or frozen, rather than being processed and canned (Personal comm. L. Thevik 2014, Personal comm. K. Krueger 2014).

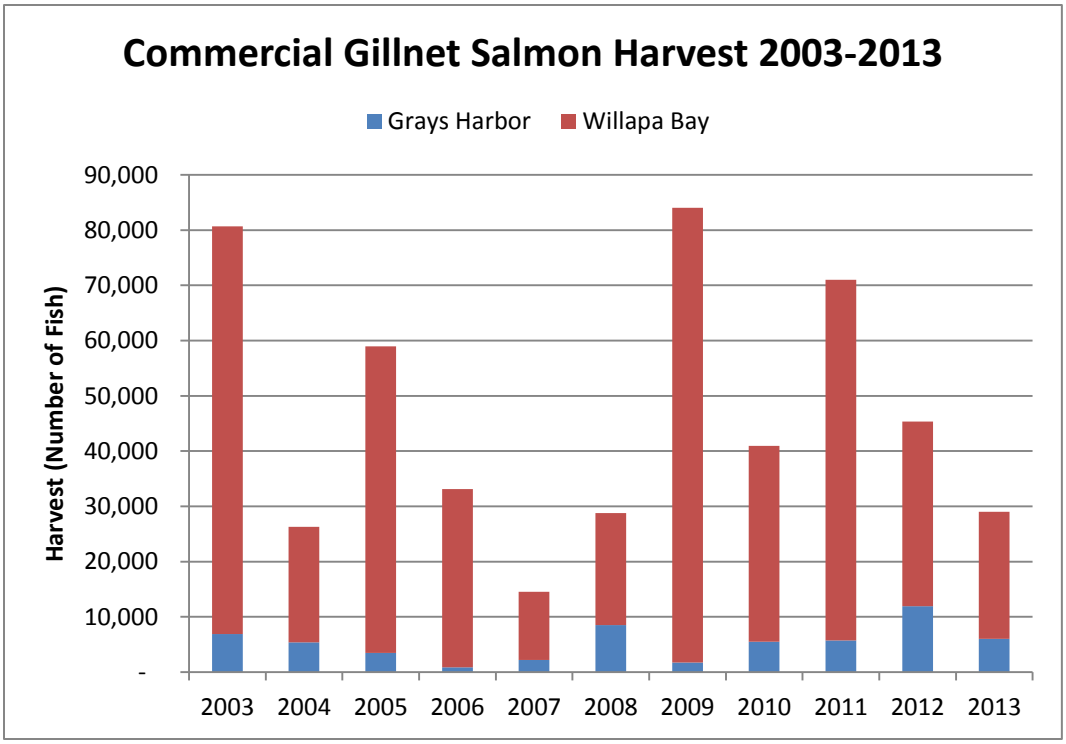
Exhibit 2-6 presents annual landings and ex-vessel revenues for the ocean portion of this fishery between 2004 and 2013 (i.e., not including Willapa Bay and Grays Harbor). Within this timeframe, landings and value have been extremely inconsistent, with the peak for this fishery by value occurring in 2010 ($4,054,392) and the low occurring in 2007 ($1,403,145). Grays Harbor County reported the greatest share of landings by value in 2013 (49.2 percent), but on average, Pacific County reports the greatest share of ex-vessel revenues (49.4 percent). Exhibit 2-7 shows the total commercial salmon harvest in the Willapa Bay and Grays Harbor gillnet fisheries. Harvest has been similarly inconsistent in these areas, peaking in 2009 with 84,039 fish landed. The harvest in Willapa Bay has consistently made up the majority of harvest in this portion of the fishery.

EXHIBIT 2-6. COMMERCIAL OCEAN SALMON LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014.

EXHIBIT 2-7. COMMERCIAL COASTAL ESTUARY GILLNET SALMON LANDINGS BY HARVEST AREA, 2003-2013

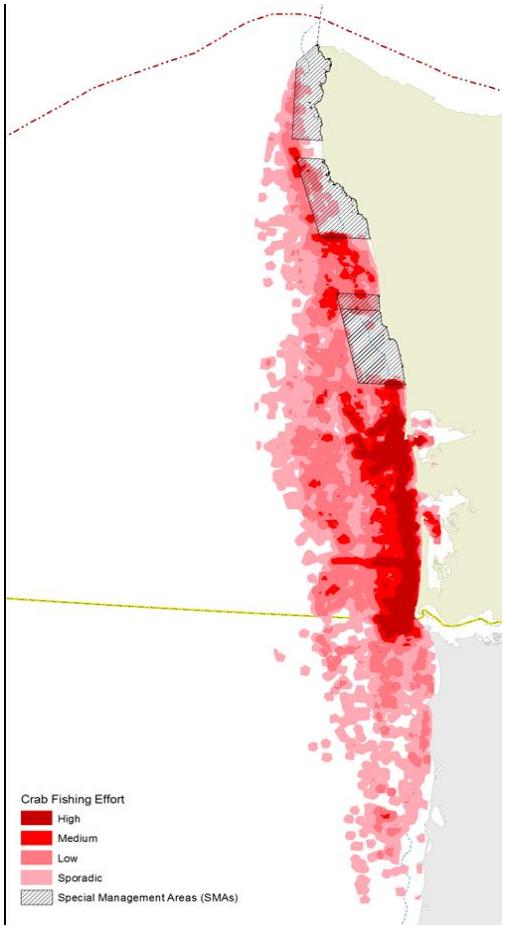


Source: Based on data contained within PFMC 2014

Dungeness Crab

The commercial Dungeness crab fishery is a pot and buoy fishery that operates from 5 to 60 fathoms along the Washington coast. Exhibit 2-8 identifies the relative level of effort for specific locations along the coast. The nine-month season runs from December through September 15 annually. Typically a majority of the catch is taken within the first two months of the season. The key ports for this fishery are Westport in Grays Harbor and Ilwaco/Chinook on the Columbia River. Minor ports to the north include Neah Bay and La Push (Personal comm. H. Reed 2014). A small number of vessels (between 20 and 30) also operate within Willapa Bay. Primary processing facilities for this fishery are located in Westport and Ilwaco Chinook. Catch landed in Neah Bay and La Push are bought by buyers who typically bring the product to other locations (e.g., Port Angeles) for processing (Personal comm. L. Thevik 2014).

EXHIBIT 2-8. COMMERCIAL CRAB FISHING EFFORT (BASED ON AVERAGE EFFORT SINCE 2009)



Source: Provided by DFW, May 2014 based upon State of Washington Marine Spatial Planning Website (DNR 2014).

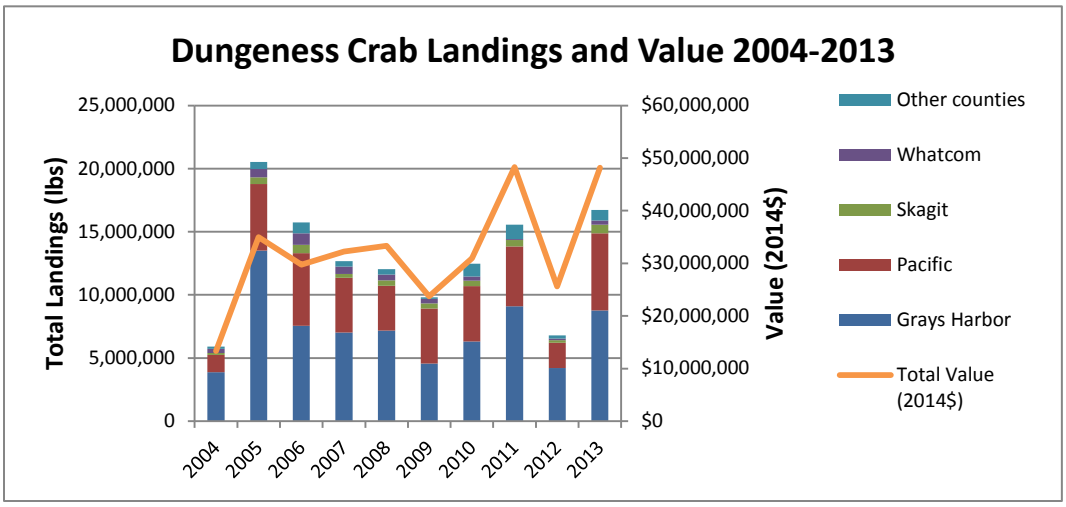
Following the Rafeedie decision (discussed in more detail in Section 3), several changes were made to management of this fishery in order to comply with the federal court order. State/tribal management plans include measures to reduce effort, particularly at the beginning of the season. Separate from the court decision, state crab managers and industry representatives recognized the need to reduce fleet capacity and developed the "Even Flow Harvest Management Plan," which included implementation of pot limits, size restrictions, and a requirement to hold a Washington state license to fish off of Washington's coast. The state of Washington has 223 Limited Entry Licenses; currently, 200 are active. Licenses are assigned limits of 300 or 500 pots based on the applicant's historical landings, and limits are enforced through a requirement for buoy tags to be attached to each pot. Vessel length is restricted to less than 99 feet (Personal comm. H. Reed 2014, Personal comm. M. Culver 2014).

Exhibit 2-9 presents annual landings and ex-vessel revenues for this fishery between 2004 and 2013. The peak in ex-vessel revenues occurred in 2011 ($48,320,273), and the low

occurred in 2004 ($13,318,175). Over the last five years, the fishery has harvested an average of 12.1 million pounds of Dungeness crab, at an average ex-vessel value of $27 million. Grays Harbor County reported the greatest share of landings by value from this fishery in 2013 (51.8 percent), and on average has accounted for the majority of ex-vessel revenues over the last ten years (56.2 percent).

Recent increases in ex-vessel value can be attributed partly to new demand for live crab in the marketplace (Personal comm. H. Reed 2014, Personal comm. L. Thevik 2014).

EXHIBIT 2-9. COASTAL COMMERCIAL DUNGENESS CRAB LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

Groundfish

The commercial groundfish fishery is split into multiple sectors categorized by the nature of fishing activity. The first sector includes vessels participating in the West Coast Groundfish Individual Fishing Quota (IFQ) program, which was implemented in 2011. Under the IFQ there are three different trawl types: bottom trawlers targeting non-whiting species; mid-water trawlers targeting non-whiting species; and mid-water trawlers targeting whiting species (also referred to as "Pacific hake") that are delivered to shore (i.e., not to motherships). There are very few active bottom trawlers left in Washington. Other recent changes in the trawl fishery in Washington include increasing activity at the port of Ilwaco since the start of the IFQ program, and an increase in activity in mid-water trawling for whiting. The IFQ program also includes a fourth component of fishermen targeting groundfish with fixed gear, including hook and line or pots/traps (Personal comm. C. Niles 2014).

At-sea co-ops are another important segment of the commercial groundfish fishery that specifically target whiting. This segment is comprised of two distinct sectors: mothership processing vessels and the catcher vessels that deliver to them, as well as catcher/processors that perform both functions. All motherships and catcher/processors

operating in this fishery are based in Washington, and the catchers that deliver to them are based in both Washington and Oregon (Personal comm. C. Niles 2014).

The last sector of this fishery is the fixed gear (i.e., bottom longline and pot gear) sector, which includes a limited entry fishery, managed through a primary annual season and restrictions on the amount of fish harvested on a given trip or set period of time (i.e., daily, weekly, monthly, bimonthly), and an open access fishery . This fishery primarily targets sablefish (also known as "black cod") (Personal comm. C. Niles 2014).

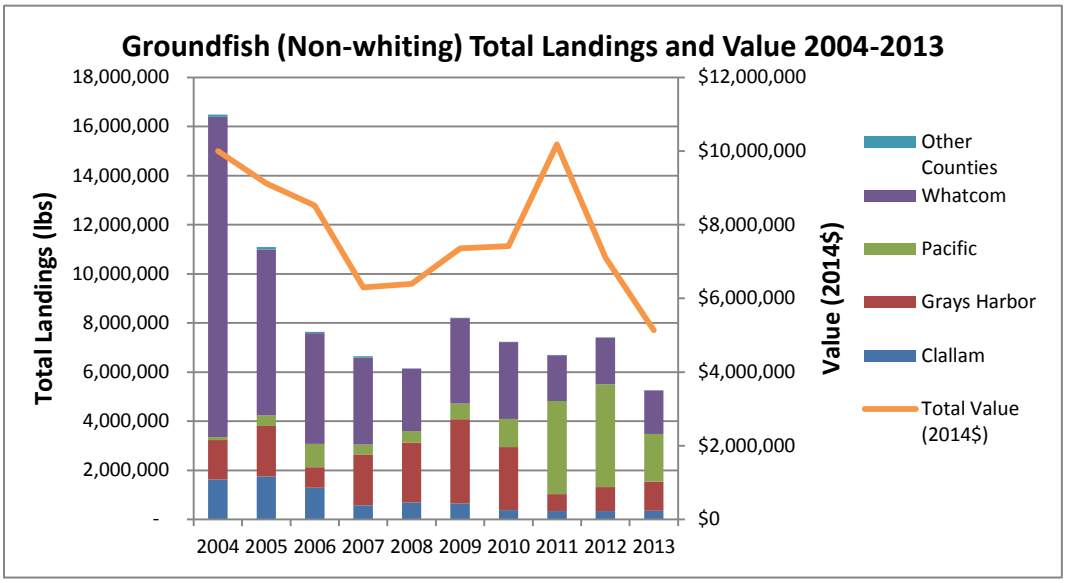
Separate from the groundfish fishery managed by PFMC, there is an open access directed commercial fishery for Pacific halibut and an incidental retention allowance of halibut for the fixed gear sablefish fishery occurring north of Point Chehalis and an incidental allowance for the salmon troll fishery West Coast-wide. There are annual surveys, stock assessments, and quotas set by the International Pacific Halibut Commission (IPHC). The allocation of halibut is managed by PFMC through its Catch Sharing Plan, which was developed in 1988. Due to the derby nature of the fishery and recent increases in effort generally, the directed commercial fishery only lasts a few days. Participation varies depending on the timing of the fishery openers and the availability of other fishing opportunities (Personal comm. M. Culver 2014).

Exhibit 2-10 presents annual landings and ex-vessel revenues for the non-whiting portion of this fishery between 2004 and 2013. During this period, the fishery peaked in value in 2011 ($10,179,125) and had its lowest value season in 2013 ($5,133,339). Pacific County accounted for the greatest share of landings by value in 2013 (40.7 percent), but prior to this, did not report substantial groundfish landings. The increase in groundfish landings in Pacific County is attributable to a new buyer entering the market in Ilwaco. Over the last ten years, Whatcom County has reported the greatest average share of ex-vessel revenues (42.2 percent), followed by Grays Harbor County (16.4 percent).

Exhibit 2-11 displays annual landings and ex-vessel revenues for the whiting portion of the groundfish fishery. 2013 saw the highest value for this fishery over the last ten years ($6,201,694), with the lowest value occurring in 2009 ($1,426,582). In 2013 and on average over the last ten years, Grays Harbor County has reported the highest share of ex-vessel revenues for this fishery (87.7 percent and 84.6 percent, respectively).

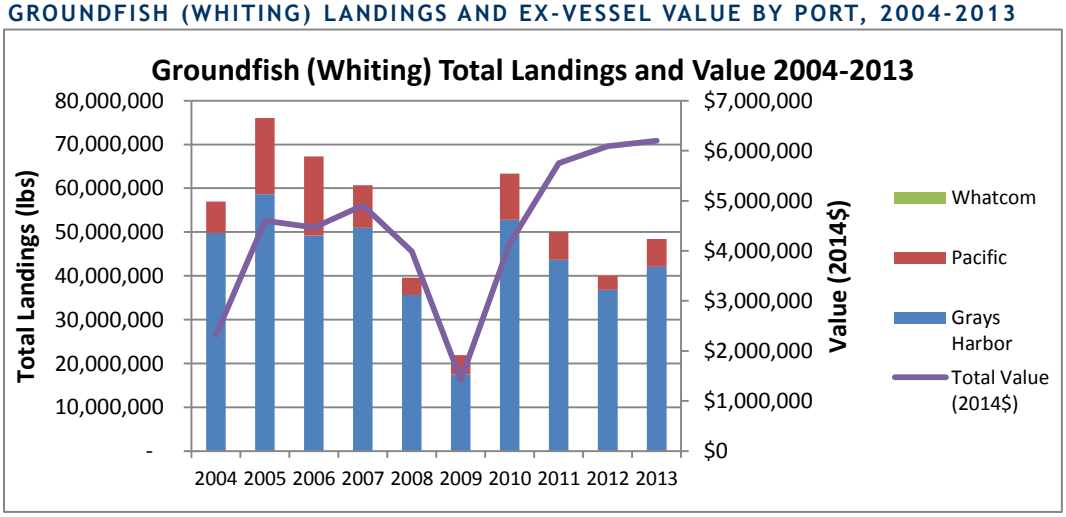
It is useful to note that vessels from the ports of Astoria and Tillamook (OR) take a significant portion of their fish off the coast of Washington. Although groundfish are plentiful off the Washington coast, there are more processors in Oregon, prompting some portion of the catch in Washington to be landed in Oregon (Personal comm. C. Niles 2014).

EXHIBIT 2-10. NON-WHITING GROUNDFISH LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

EXHIBIT 2-11. GROUNDFISH (WHITING) LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

Pink Shrimp

The commercial pink shrimp fishery is a trawl fishery that operates from 75 to 125 fathoms along the Washington and Oregon coast. This fishery is prohibited from operating in Washington state waters. The season runs from April 1 through October 31 annually. Key landing ports for this fishery include Westport and Ilwaco (Personal comm. L. Wargo 2014).

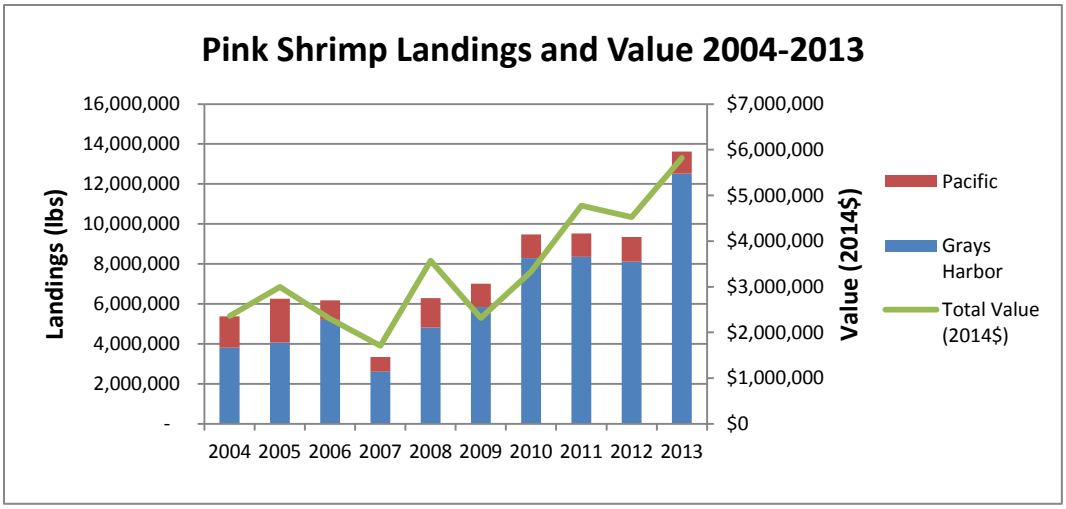
Eighty limited entry licenses to this fishery are currently in circulation, and there are approximately 20 active participants. Many of the Washington-based participants will fish in Oregon and land their catch in Washington, and vice versa. Ownership in this

fishery is a mix of sole proprietors and corporate owners (Personal comm. L. Wargo 2014).

Exhibit 2-12 presents annual landings and ex-vessel revenues for this fishery from 2004 to 2013. Over the last five years, the fishery has harvested an average of 9.8 million pounds of pink shrimp, at an average ex-vessel value of $4 million. The 2013 season represented a recent high in value ($5,819,774). Grays Harbor County accounts for the vast majority of ex-vessel revenues from this fishery, both in 2013 and on average (91.4 percent and 82.7 percent, respectively).

The pink shrimp fishery suffered from low harvests in the late 1990s, reflecting a decline in shrimp abundance. Since then, however, the population has rebounded and the fishery has stabilized. It remains limited by a lack of processing capacity, but is expected to grow in the near future with a planned expansion of processing capacity in Westport (Personal comm. L. Wargo 2014).

EXHIBIT 2-12. COMMERCIAL PINK SHRIMP LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

Albacore

The commercial albacore fishery is managed under the Pacific Fishery Management Council's (PFMC) Highly Migratory Species Fishery Management Plan (FMP) and international agreements. Permits for commercial albacore are issued by the National Marine Fisheries Service (NMFS) as "Pacific Highly Migratory Species Permits." Currently, these permits are not limited (Personal comm. C. Niles 2014).

The commercial albacore tuna fishery consists of both large vessels that harvest at ranges far off the Washington coast as well as locally-based troll vessels and a smaller fleet of bait vessels that fish with live anchovy (Personal comm. C. Niles 2014). Larger vessels typically have the capacity to freeze product on board, while smaller ones ice their fish and bring them to port (Personal comm. L. Thevik 2014). Between 221 and 338 unique vessels make landings into Washington ports each year. The fishery typically takes place between 30 and 50 nautical miles offshore. Washington does not have a landing tax on

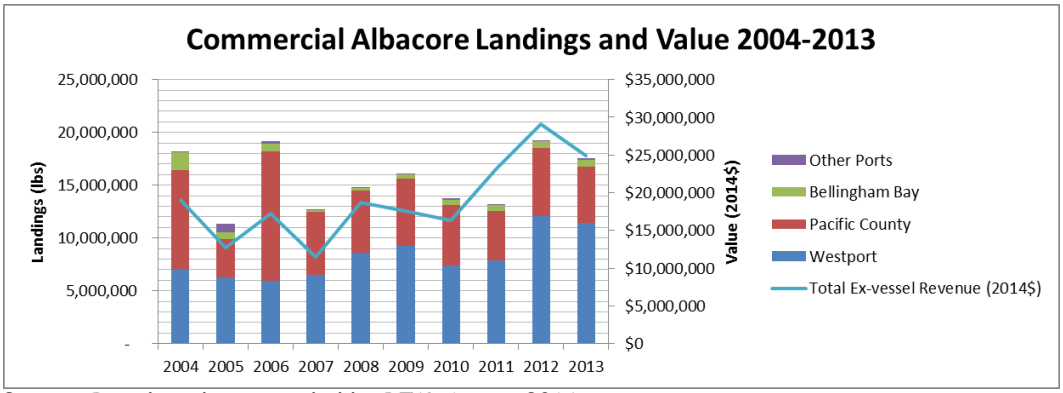
albacore fisheries, making its ports desirable landing sites (Personal comm. C. Niles 2014).

Due to the highly migratory nature of albacore, an international treaty was instated that allows vessels from participating nations to fish albacore across borders. Over the five-year period between 2009 and 2013, an average of 13 Canadian vessels made landings under this treaty in Washington each year (Personal comm. C. Niles 2014).

Historically, much of the harvest from this fishery was canned. Although a substantial portion continues to be canned, new domestic markets have developed for fresh albacore, as well as for custom-canned albacore. These trends have resulted in an increased price for these fish (Personal comm. L. Thevik 2014).

Exhibit 2-13 presents annual landings and ex-vessel revenues for U.S.-caught fish landed in Washington in this fishery from 2004 through 2013. Between 2009 and 2013 the fishery landed an average of 16 million pounds, at an average value of $21.4 million. The peak value of this fishery occurred in 2012 ($29,101,119), and the low in 2007 ($11,505,514). The value of this fishery is split among several ports, but Westport and ports in Pacific County historically have accounted for the greatest share of revenues.

EXHIBIT 2-13. COMMERCIAL ALBACORE LANDINGS AND EX-VESSEL VALUE BY PORT AREA, 2004-2013



Source: Based on data provided by DFW, August 2014

Spot Shrimp

The commercial spot shrimp fishery is relatively new, having first emerged in 1999. The commercial spot shrimp fishery along the outer coast of Washington occurs between March 15 and September 15 annually. Participants in this fishery operate approximately 20-40 nautical miles offshore at depths of between 70 and 100 fathoms in undersea canyons (see Exhibit 2-14). The primary type of gear used in this fishery is pot longline (Personal comm. L. Wargo 2014).

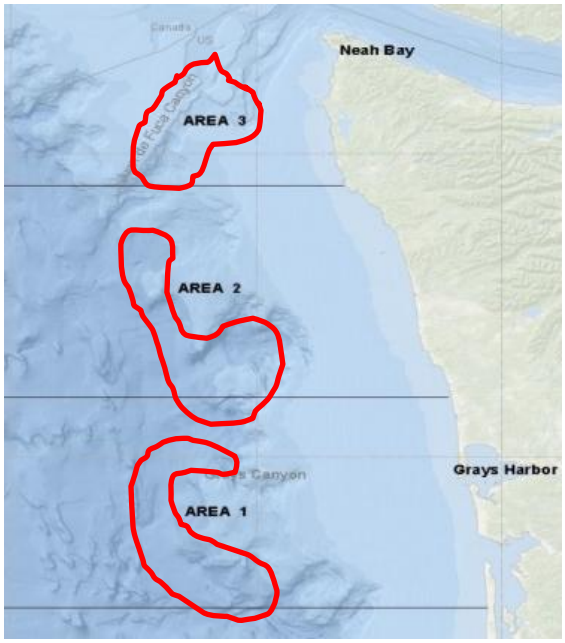
The commercial spot shrimp fishery has been managed as a limited-entry fishery since it began. Eight limited entry licenses for this fishery are currently in circulation, of which between three and five are active (Personal comm. L. Wargo 2014). Vessels range in size between 42 and 100 feet (Personal comm. L. Thevik 2014). Participants in this fishery typically also participate in other fisheries, such as the crab and albacore tuna fisheries.

The fishery is managed under a quota, but has never actually reached that quota (Personal comm. L. Wargo 2014).

Exhibit 2-15 presents annual landings and ex-vessel revenues for the commercial spot shrimp fishery from 2004 through 2013. The highest value year came in 2010 ($754,585), and the lowest in 2013 ($102,257).

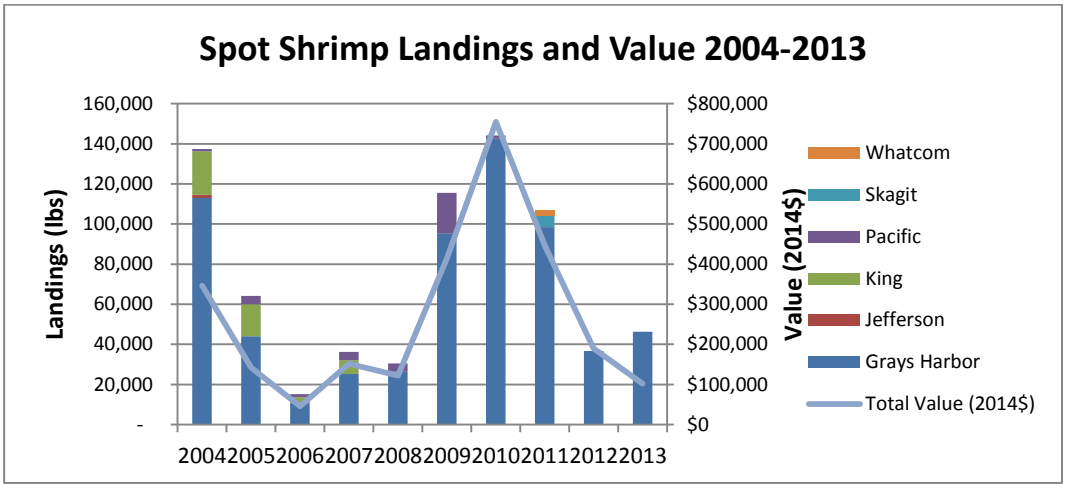
Primary landing ports for this fishery include Port Angeles, Seattle, Neah Bay, and Westport (Personal comm. L. Thevik 2014). Landings in Grays Harbor County account for the vast majority of ex-vessel revenues in this fishery (100 percent in 2013, 87.1 percent on average over the last ten years).

EXHIBIT 2-14. COMMERCIAL SPOT SHRIMP GENERAL FISHING GROUNDS



Source: Provided by DFW, May 2014

EXHIBIT 2-15. COMMERICAL SPOT SHRIMP LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

Sardine

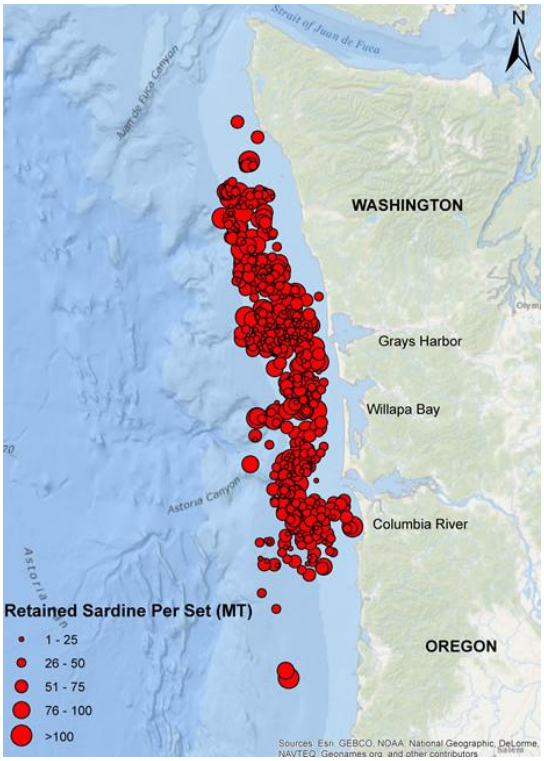
The commercial sardine fishery is a purse seine fishery open between April 1 and December 31. The opening of this season is timed to protect salmon. It is prohibited in state waters (within 3 nautical miles of shore). Exhibit 2-16 identifies the location of fishing activity in this fishery for 2013. There are presently 16 limited entry permanent license holders, of which approximately 8 are active (Personal comm. L. Wargo 2014).

The sardine fishery is managed by the Federal Annual Harvest Guideline for the US West Coast, as well as by State commercial fishery regulations. Exhibit 2-17 presents annual harvest and revenue data for Washington landings between 2004 and 2013. Over this time period, the fishery peaked in value in 2012 ($7,973,928), and had its low in 2006 ($498,377). In 2013 Grays Harbor County accounted for nearly 70 percent of ex-vessel revenues, down slightly from its historical average of 75 percent.

Washington's share of the coast-wide sardine harvest has increased recently due to the changing focus in California to more lucrative squid, and the proximity of the fish themselves to Westport, allowing fishermen to take multiple trips in one day. The fishery is managed under a reduction restriction, meaning that no more than 15 percent of the harvest can be used for purposes other than human consumption or bait (Personal comm. L. Wargo 2014).

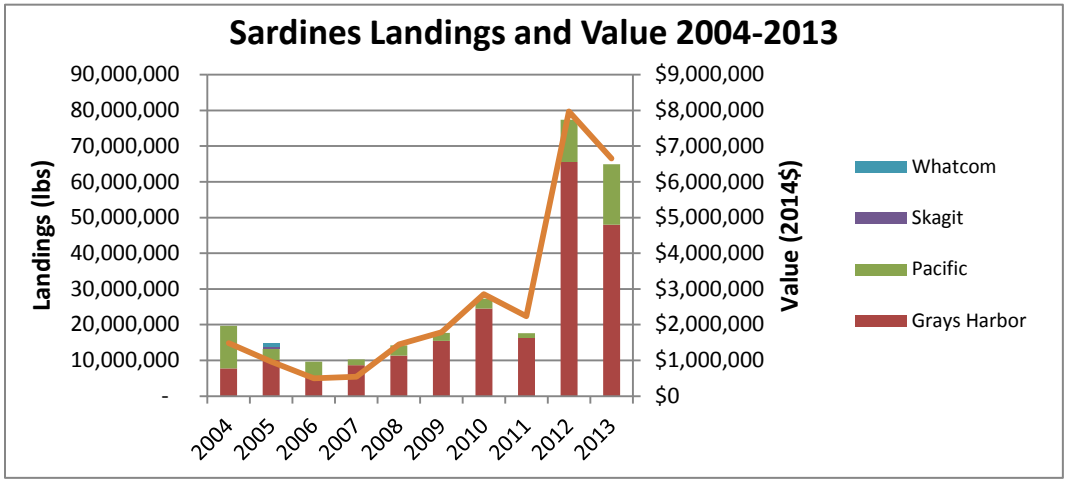
Methods used for the sardine harvest can result in bycatch of non-target species, including anchovy, mackerel, and squid. Some incidental harvest allowance is granted to baitfish fisheries, but salmon is a prohibited bycatch species (Personal comm. L. Wargo 2014).

EXHIBIT 2-16. SARDINE FISHERY CATCH LOCATIONS (2013)



Source: Provided by DFW, May 2014

EXHIBIT 2-17. COMMERICAL SARDINE LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

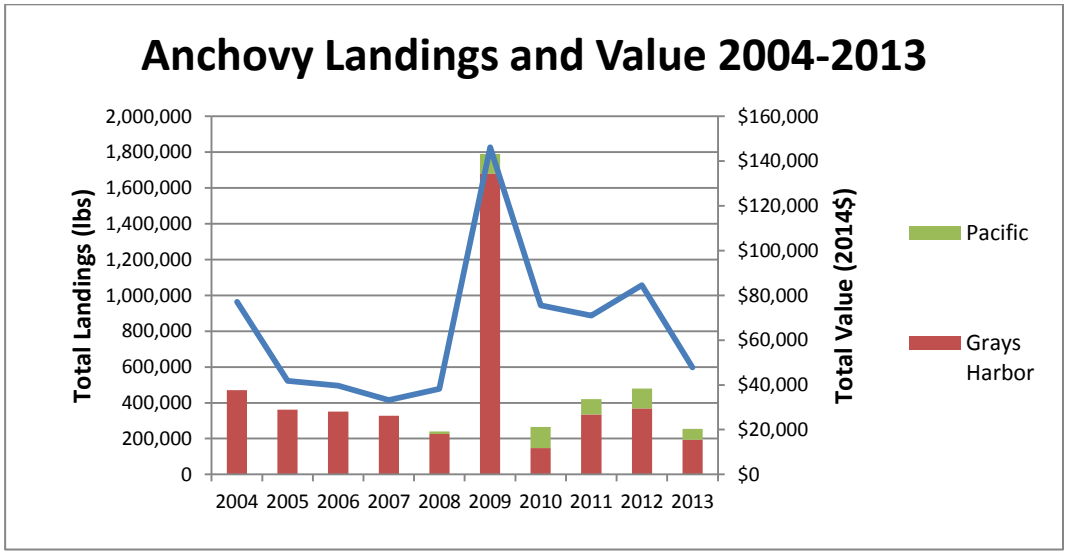
Anchovy

The commercial anchovy fishery is comprised of two distinct fisheries managed under the Annual Catch Limit for the West Coast and through state commercial fishery regulations. Licenses in this fishery are linked to the gear employed, and the fishery is open-access. Activity in this fishery tends to be near shore, and is allowed in state waters, including in Willapa Bay and Grays Harbor. Anchovy landings are limited to 11,000 pounds per day and 22,000 pounds per week. The state enforces some incidental catch limits for other non-target forage fish. The commercial anchovy season closes for a portion of the spring in order to protect out-migrating salmon (Personal comm. L. Wargo 2014).

The first segment of this fishery is comprised of commercial albacore tuna fishermen who use lampara gear to harvest anchovies for personal use. Westport is the key landing port for this fishery and supports between five and ten vessels annually. The other segment of this fishery uses purse seine gear to catch live and tray bait for recreational fisheries. Westport and Ilwaco are the key landing ports for between one and three vessels annually (Personal comm. L. Wargo 2014).

Exhibit 2-18 presents data on annual landings and ex-vessel revenues for this fishery between 2004 and 2013. There was a tremendous peak in value in 2009, when ex-vessel revenues reached $146,154. Although nearly all of the landings have occurred in Grays Harbor County, both in 2013 and historically on average, the value in Pacific County (not displayed here) was much greater in 2013 (65 percent) and has been disproportionately high (41 percent) on average over the last ten years). Over the last five years, the combined fisheries have harvested an average of 650,000 pounds annually at an average ex-vessel value of $80,000 (Personal comm. L. Wargo 2014).

EXHIBIT 2-18. COMMERICAL ANCHOVY LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

Hagfish ("Slime Eels")

The hagfish fishery is an emerging commercial fishery that began operating as an open access fishery in 2005. Since 2005, there have been between 15 and 20 licenses in circulation annually, of which anywhere between two and 15 have been active in any given year. Each license holder may fish 100 pots. The fishery is open year-round, and operates on muddy or sandy bottom between depths of 50 and 80 fathoms (see Exhibit 2-19). The fishery is closed in waters shallower than 50 fathoms (Personal comm. L. Wargo 2014).

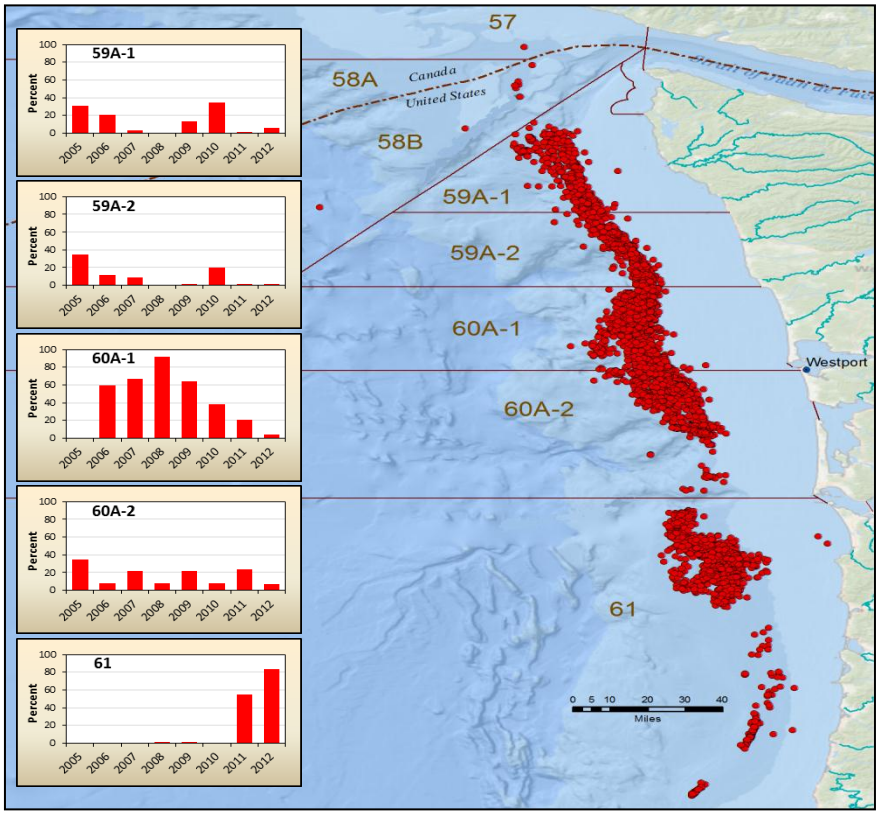
Only two individuals primarily target hagfish, while others are likely participating to supplement earnings in other fisheries. The market for this fishery consists of both fresh and frozen product that is almost exclusively exported to Korea. The market is extremely volatile, and there is a high demand for this product (Personal comm. L. Wargo 2014).

Success in this fishery requires some specialization, as the species is difficult to handle and sale of the product requires relationships with Korean buyers. This fishery is to some extent limited by the difficulty in establishing these relationships (Personal comm. L. Wargo 2014).

Exhibit 2-19 provides a graphical representation of the location of fishing effort between 2005 and 2012, as well as the total landings for each of these years by reporting area. Landings of this fish are fairly widely distributed, and Westport is a key landing port at this time. The ports of Ilwaco, Port Angeles, Port Townsend, and Blaine also receive notable landings (Personal comm. L. Wargo 2014). Neah Bay and La Push currently do not allow landings of this species (Personal comm. K. Krueger 2014).

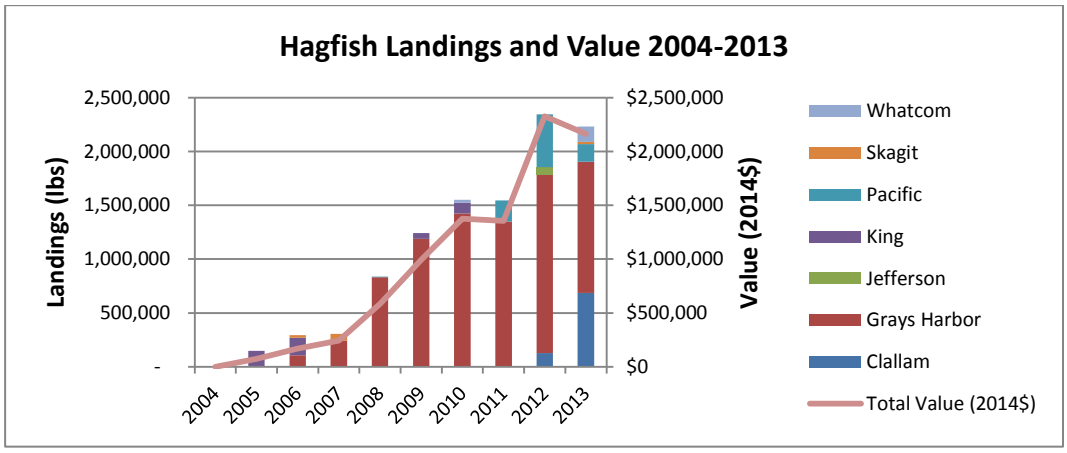
Exhibit 2-20 presents data on annual landings and ex-vessel revenues for this fishery between 2004 and 2013. Landings and revenues have climbed steadily since the fishery's inception in 2005. Ex-vessel revenues reached an historical high in 2012 ($2,326,260). Grays Harbor has been the primary port for landings of hagfish since the fishery began, accounting for 61 percent of ex-vessel revenues in 2013 and 79 percent of revenues on average since 2004.

EXHIBIT 2-19. HAGFISH LANDINGS AND LOCATION OF EFFORT BY REPORTING AREA (2005-2012)



Source: Provided by DFW, May 2014

EXHIBIT 2-20. HAGFISH LANDINGS AND EX-VESSEL VALUE BY PORT AREA, 2004-2013



Source: Based on data provided by DFW, June 2014

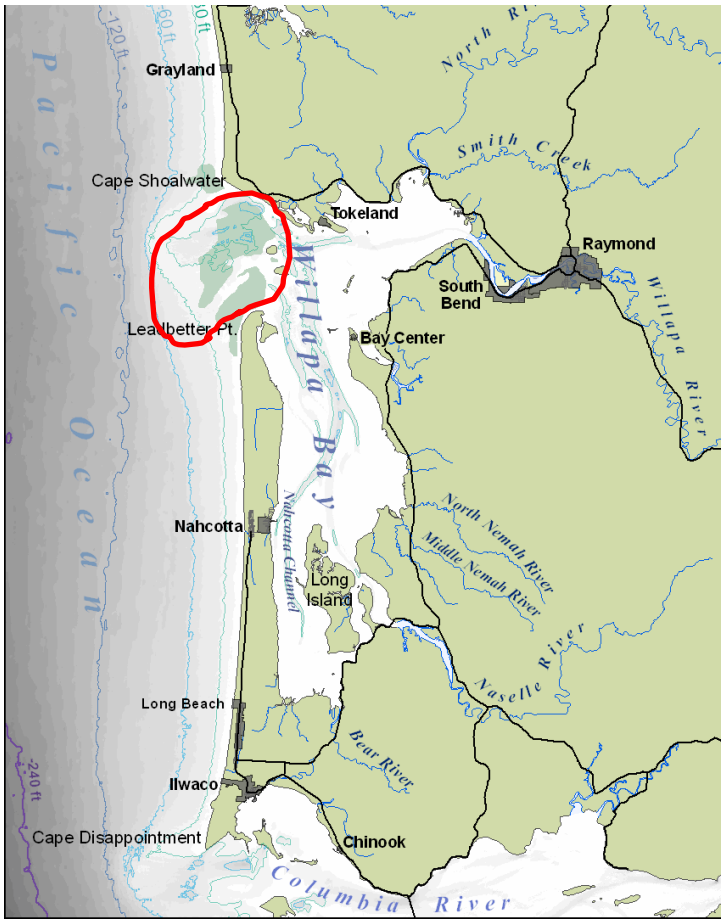
Razor Clam

The commercial razor clam fishery occurs from May through June each year. The majority of catch in this fishery is sold as bait for the Dungeness crab fishery (Personal comm. D. Ayres 2014).

At present, 110 individuals are licensed to participate in the commercial razor clam fishery. Ninety percent of license holders are residents of Pacific and Grays Harbor counties. Commercial harvest of razor clams statewide is limited to the detached spits at the mouth of Willapa Bay, which are only accessible by boat (see Exhibit 2-21) (Personal comm. D. Ayres 2014).

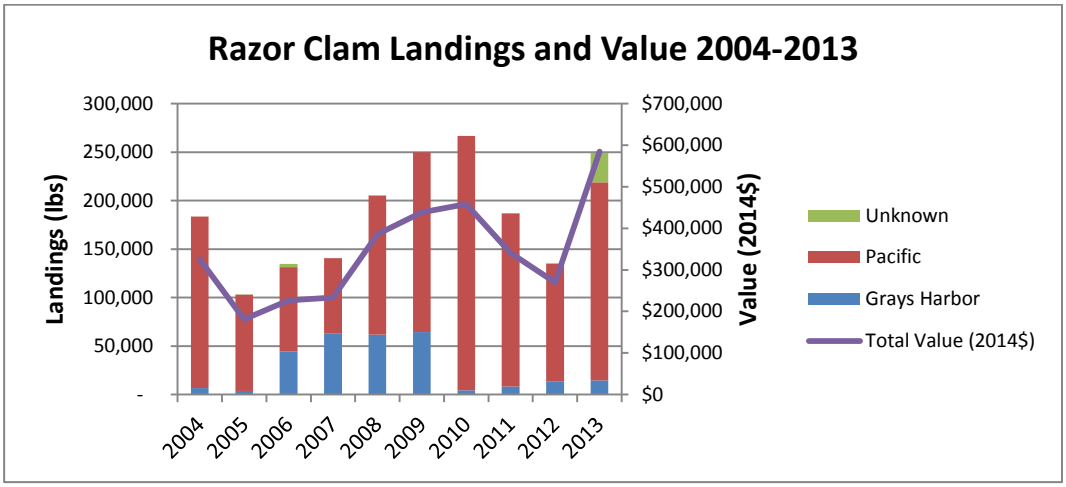
Exhibit 2-22 provides data on annual harvests and ex-vessel revenues for the commercial razor clam fishery from 2004 to 2013. During this period, annual revenues ranged from a low of $180,923 in 2005 to a high of $584,697 in 2013. Pacific County accounts for the greatest share of revenues (81.6 percent in 2013 and 82.7 percent on average between 2004 and 2013). Over the most recent five seasons, ex-vessel revenues have averaged approximately $400,000 (Personal comm. D. Ayres 2014).

EXHIBIT 2-21. LOCATION OF COMMERCIAL RAZOR CLAM AREA (WILLAPA SPITS)



Source: Provided by DFW, May 2014

EXHIBIT 2-22. COMMERCIAL RAZOR CLAM LANDINGS AND EX-VESSEL VALUE BY PORT, 2004-2013



Source: Based on data provided by DFW, June 2014

RECREATIONAL FISHING SECTOR

GENERAL OVERVIEW

Recreational fishing on the Washington coast is primarily a boat-based activity that occurs offshore. There is little activity in coastal bays or estuaries, or from the shore, except for the recreational harvest of razor clams from Kalaloch Beach and south of the Quinault Indian Reservation. Approximately 60 percent of the coastal recreational fishing activity occurs along the southernmost part of the coast, from Point Grenville to the Columbia River, largely due to there being more ports and thus greater accessibility (Personal comm. M. Cedergreen 2014).

The recreational fishing sector supports two distinct components – a for-hire (i.e., charter boat) fleet, and a private vessel fleet. The for-hire fleet ranges from 26 to 65 feet in length and carries between four and thirty anglers, while private vessels generally range from 16 to 50 feet and carry between two and ten anglers. There has been a recent trend towards larger, more powerful private vessels that are capable of going further offshore. Coastwide, approximately 40 percent of recreational fishing trips are taken on charter vessels, and 60 percent are taken on private vessels (Personal comm. M. Cedergreen 2014).

Salmon and groundfish are the most important target species for the recreational non-tribal fishing industry. Other important species include albacore tuna and halibut, with Dungeness crab ranking a very distant fifth (Personal comm. M. Cedergreen 2014).

The Washington coast supports several major port areas. The Columbia River is home to two major ports, Ilwaco and Chinook, which focus primarily on salmon and Columbia River sturgeon. Approximately 25 percent of trips from these ports are on charter vessels, with 75 percent on private vessels. Westport is another major port, and a hub of recreational fishing activity. The Westport fleet focuses on salmon and groundfish, as well as halibut and albacore. Nearly 75 percent of trips out of Westport are taken on

charter vessels. Together, Ilwaco/Chinook and Westport are responsible for approximately 75 percent of coastal angler trips (both private and for-hire). To the north, the ports of La Push and Neah Bay, which are located on tribal lands, are also important. Charter trips are much more limited in these ports, with approximately 10 percent and 20 percent of trips occurring on charter vessels, respectively (Personal comm. M. Cedergreen 2014).

The vast majority (perhaps 85 to 90 percent) of participants in Washington's coastal recreational fisheries are state residents, with most coming from along the Interstate 5 corridor. This is largely due to the fact that the Washington coast is relatively inaccessible, and lacks the substantial tourism infrastructure that characterizes other fishing destinations, such as those in Oregon (Personal comm. M. Cedergreen 2014).

During the 2012-2013 fishing season, DFW reports that a total of 720,000 anglers purchased recreational fishing licenses to participate in the State's fresh and marine water fisheries (Personal comm. M. Culver 2014). DFW issues a variety of licenses that permit different types of fishing activity in the state's waters. Licenses relevant to recreational activity within our study area include Saltwater, Combination (Saltwater/Freshwater/Shellfish), Shellfish/Seaweed, and Razor Clam licenses. Licenses may be issued on an annual or temporary basis. Temporary licenses allowing harvest in coastal areas include a 1-, 2-, or 3-day combination license, and a 3-day razor clam license. As licenses are not fishery or location-specific, it is not possible to isolate the total number of licenses sold with the intent of participation in any of the fisheries or locations of specific interest to this report.

Participation and Economic Contribution of Marine Recreational Fishing

Participation and spending on recreational fishing in Washington is part of a billion dollar industry (DFW 2008). Several recent sources discuss the economic importance of marine recreational fishing, either to the U.S. as a whole or to Washington specifically. These studies, which are summarized below, provide some insight into the economic importance of recreational fishing and shellfishing in coastal Washington. However, these studies are generally focused on marine recreational fishing as a whole, and generally do not differentiate between activity within our study area (i.e., the outer coast) and activity elsewhere (i.e., in Puget Sound and the Strait of Juan de Fuca).

National Survey of Fishing, Hunting and Wildlife-Associated Recreation

The U.S. Fish and Wildlife Service conducts its National Survey of Fishing, Hunting and Wildlife-Associated Recreation every five years (FWS 2011).[8] The survey provides statewide figures on participation in outdoor recreational activities and expenditures associated with those activities, including saltwater fishing. Exhibit 2-23 presents the saltwater fishing data for Washington for the last four surveys. In 2011, 401,000 participants fished for a total of 2.7 million fishing days. Total expenditures on saltwater

[8] Note that this report is cited extensively, and provides the basis for numerous other reports on the economic importance of recreational fishing.

fishing in Washington were $2.7 million. Exhibit 2-24 presents the data for fishing days and total expenditures graphically, and shows that total fishing effort has not followed a particular trend, ranging from 1.6 million in 2006 to 2.9 million in 2001. Further, as the exhibit indicates, expenditures have not necessarily followed the same pattern as participation. Note that these statewide results may not be representative of our study area, since they are based in part on activity in other locations (e.g., Puget Sound).

EXHIBIT 2-23. NATIONAL SURVEY OF FISHING, HUNTING, AND WILDLIFE-ASSOCIATED RECREATION - WASHINGTON STATE (2014$) - SALTWATER FISHING

STATISTICS	1996	2001	2006	2011
Participants	378,000	386,000	286,000	401,000
Participant days	2,135,000	2,941,000	1,550,000	2,700,000
Avg. days per participant	6	8	5	7
Number of trips	1,796,000	2,244,000	1,235,000	2,063,000
Total expenditures	$266,135,612	$225,042,455	$271,015,054	$271,874,675
Trip-related	$100,001,156	$163,108,758	$136,232,306	$196,979,627
Equipment and other	$262,362,437	$66,683,779	$61,934,981	$134,781,614
Average annual expenditures per angler	$573	$569	$878	$289
Average trip-related expenditure per day	$47	$55	$88	$73

Sources: FWS 2012, FWS 2008, FWS 2003, FWS 1998.

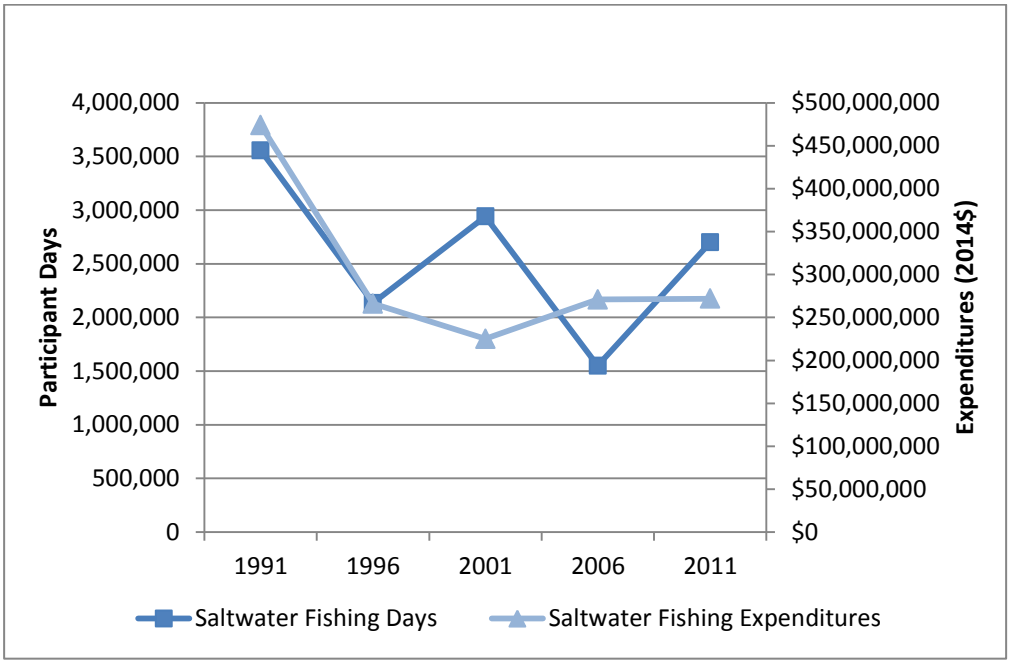
Note: All dollar estimates have been converted to 2014$ using the GDP Implicit Price Deflator.

DFW Analysis of Non-Treaty Commercial and Recreational Fisheries

In 2008, DFW published an economic analysis of the non-treaty commercial and recreational fisheries in Washington State. The report sought to estimate the economic benefits generated by commercial and recreational fishing in 2006, and provides a variety of data on recreational harvest, participation, and economic impacts.

Exhibit 2-25 presents the total recreational catch of finfish by species originating from each of the study regions. Of the total recreational finfish catch of 843,636 fish, 46 percent was caught within the waters of our coastal study area. Catches of several marine species were heavily weighted toward the coast, including bottomfish (72 percent), Pacific halibut (67 percent), and albacore tuna (100 percent). In contrast, recreational harvest of shellfish predominantly occurs outside of the study area, with the exception of razor clams. 100 percent of the total recreational razor clam harvest in 2006 came from the coast (see Exhibit 2-26).

EXHIBIT 2-24. RECREATIONAL SALTWATER FISHING EFFORT AND PARTICIPATION IN WASHINGTON



Sources: FWS 2014, FWS 2008, FWS 2003, FWS 1998

EXHIBIT 2-25. RECREATIONAL FINFISH CATCH (NUMBERS OF FISH) IN WASHINGTON IN 2006 BY SPECIES GROUP AND CATCH REGION

SPECIES GROUP	PUGET SOUND	COAST	COLUMBIA RIVER	UNKNOWN AREA	TOTAL
Bottomfish	112,457	295,151	--	--	407,608
Pacific Halibut	2,727	6,977	692	--	10,400
Albacore	--	18,941	--	--	18,941
Salmon					
--Marine	65,423	43,027	--	--	108,450
--Freshwater	98,576	7,186	65,817	1,227	172,806
Steelhead	12,709	15,415	80,294	477	108,895
Sturgeon	203	456	15,695	182	16,536
Total	**292,095**	**387,153**	**162,498**	**1,886**	**843,636**

Sources: Recreated from DFW 2008

Notes:

1. Columbia River region includes the Columbia River and all tributaries, including the Snake River.
2. Bottomfish catch in area 4b is included in the coastal region.
3. Albacore landings in Washington include fish caught in marine waters off the southern coast of Washington and northern coast of Oregon. All trips originated from ports in Ilwaco and Westport. Includes albacore caught by charter fleet only.

EXHIBIT 2-26. RECREATIONAL SHELLFISH CATCH (POUNDS) IN WASHINGTON IN 2006, BY SPECIES GROUP AND CATCH REGION

SPECIES GROUP	NORTH PUGET SOUND	SOUTH PUGET SOUND	STRAIT	COAST	COLUMBIA RIVER	TOTAL
Dungeness crab	798,2014	381,692	39,755	--	--	1,219,551
Shrimp	21,388	82,683	1,850	--	--	105,921
Razor clams	--	--	--	3,601,000	--	3,601,000
Other clams	92,704	252,964	--	--	--	345,668
Oysters	19,106	632,988	--	--	--	652,094

Sources: Recreated from DFW 2008

Notes:
1. All values in pounds except for oysters, which are in number of oysters
2. Columbia River region includes the Columbia River and all tributaries, including the Snake River.
3. Recreational Dungeness crab harvest is not tracked on the coast.

DFW's economic analysis reported data on angler expenditures, the net economic value of recreational fishing, and the economic impacts of this activity. The angler expenditures employed in this analysis came from the 2008 FWS National Survey of Fishing, Hunting, and Wildlife-Associated Recreation and are not reported here, since more recent data are available (see above). Relative to net economic value, the study reviewed previous studies on angler willingness to pay for fishing opportunities, and found those values to be $58/day for marine salmon fishing and $60/day for other marine fishing. These values resulted in a net economic value of marine recreational fishing of $81.8 million. Although the report identifies the direct, indirect and induced impacts of recreational fishing in some detail, they are reported for saltwater and freshwater recreational fishing collectively, and thus are of limited utility in describing the economic impacts of recreational fishing in our study area.

NOAA Analysis of Marine Angler Expenditures in the United States, 2011

A 2013 report by Lovell et al. for NOAA reports that anglers spent a total of $460 million on marine recreational fishing in Washington in 2011. It further reports that marine recreational fishing in Washington contributed 5,100 jobs to the economy, generated $654 million in sales, contributed $390 million to the state's Gross Domestic Product, and generated $247 million in income (see Exhibit 2-27). Marine recreational fishing in Washington also generated $102,633,000 in federal and state taxes in 2011 (Lovell et al. 2013). Again, these results represent statewide marine fishing activity and are not limited to our study area.

EXHIBIT 2-27. TOTAL ECONOMIC IMPACTS OF MARINE ANGLER EXPENDITURES GENERATED IN WASHINGTON IN 2011

EXPENSE TYPE	FISHING MODE	EXPENSE ($1,000'S)	ECONOMIC CONTRIBUTION			
			EMPLOYMENT	INCOME ($1,000'S)	VALUE ADDED ($1,000'S)	OUTPUT ($1,000'S)
Trip Expense	For Hire	$13,337	167	$9,738	$14,655	$22,366
	Private Boat	$76,621	676	$32,323	$55,316	$105,692
	Shore	$20,738	202	$8,796	$14,823	$28,336
	All Modes	$110,697	1,046	$50,857	$84,794	$156,394
Durable Expenses		$349,634	4,048	$195,821	$305,158	$497,578
Total Expenses		$460,330	5,093	$246,678	$389,952	$653,972
Source: Lovell et al. 2013						

American Sportfishing Association Analysis

A 2013 report by the American Sportfishing Association reports the economic impact of saltwater anglers in Washington (American Sportfishing Association 2013). In all categories of impacts reported, saltwater fishing represents approximately 30 percent of the economic impact generated by all forms of recreational fishing (see Exhibit 2-28). This report does not allow us to isolate the economic impacts of recreational fishing in our study area specifically, and includes data from Puget Sound/Strait of Juan de Fuca.

EXHIBIT 2-28. ECONOMIC IMPACT OF ALL SALTWATER SPORTFISHING IN WASHINGTON (2011)

STATISTICS	VALUE (ALL TYPES OF FISHING)	VALUE (SALTWATER FISHING)	SALTWATER FISHING AS % OF ALL FISHING
Retail sales	$1,186,275,897	$359,774,539	30%
Total multiplier or ripple effect	$1,956,335,653	$594,762,381	30%
Salaries and Wages	$625,222,636	$185,140,688	30%
Jobs	16,211	4,966	31%
Federal tax revenues	$150,271,880	$45,412,088	30%
State and local tax revenues	$119,631,627	$38,873,569	32%
Source: American Sportfishing Association 2013			

Charter Boat Industry

As noted above, the charter boat industry is an important component of Washington's marine recreational fishing sector. The industry developed rapidly following World War II, focusing almost exclusively on salmon through the 1960s. Between 1960 and 1977 there was tremendous growth in the industry, with approximately 500,000 people fishing annually coastwide. Between 1977 and 1984, however, the charter boat industry contracted significantly due to a decline in the salmon resource, new requirements to share salmon resources with the treaty tribes, and overcapitalization of the fleet. At this point fisherman began targeting new species such as groundfish and albacore, and eventually halibut. Beginning in the mid-1980s charter boat activity began to stabilize, and has been fairly stable since the 1990s. The decline from the historical peak, however, is evident in communities like Westport, which supported approximately 230 charter vessels in 1977 but today is home to only 30 such vessels (Personal comm. M. Cedergreen 2014).

Although much of the information presented in the previous section includes the charter boat component of recreational fishing, there are a number of sources that have specifically analyzed the economics this sub-sector specifically. For example, a 2006 survey by Leonard and Watson (2013) provides the most recent, comprehensive data on revenue sources for the charter boat industry in Washington and Oregon, as well as estimates of the industry's direct, indirect, and induced economic effects. Exhibits 2-29 and 2-30 present this information. Exhibit 2-29 focuses on the categories of revenue generated by charter vessels, allowing us to see the relative contribution of each to total revenue. These data indicate that salmon fishing provided the greatest contribution to the revenues of charter vessels in the Northwest, followed by groundfish. Exhibit 2-30 outlines expenses incurred by charter vessels. The greatest expenditures made by these businesses are for fuel, captain's fees, and government taxes and fees. Finally, Exhibit 2-31 describes the economic contributions of the charter industry in Washington. The analysis found that the charter boat industry contributed $13,333,376 in industry output, $6,094,780 in income, and $799,139 in taxes to the Washington economy. It also accounted for a total of 208 jobs statewide.

EXHIBIT 2-29. CHARTER BOAT REVENUE BY SOURCE IN WASHINGTON AND OREGON ($2006)

Revenue Source	N	Mean	Standard Deviation
Vessel Related Revenue			
Salmon Fishing	64	24,897	30,849
Groundfish Fishing	64	13,982	27,110
Halibut Fishing	64	7,432	18,822
Commercial Fishing	64	5,748	26,008
Other Recreational Fishing	64	4,552	21,179
Albacore Fishing	64	3,650	9,958
Shellfish Fishing	64	252	1,248
Other Large Pelagic Fishing	64	168	813
Nature Watching	64	150	825
Non-Fishing Scuba Diving	64	117	595
Freelance Fishing	64	107	855
Burial at Sea	64	89	199
Other Purpose 1	64	3,524	10,967
Other Purpose 2	64	2,621	13,098
Other Revenue			
Booking Revenue	64	2,367	13,777
Hotel Owned by Vessel Owner	64	469	2,403
Souvenir Sales	64	162	767
Food/Beverage Sales	64	144	1,010
Renting of Vessel	64	119	547
Other Sales	64	26	171
Total Revenue	64	70,575	95,945

Source: Leonard and Watson (2013)

EXHIBIT 2-30. CHARTER BOAT EXPENDITURES BY TYPE IN WASHINGTON AND OREGON ($2006)

Expenditure Type	N	Mean	Standard Deviation
Vessel Related Expenditures			
Captain's Payments	70	5,693	12,501
Other Crew Payments	70	2,319	4,154
Office Labor and Other Labor	70	690	2,506
Engine Overhaul	70	2,512	10,291
All Other Vessel Maintenance	70	2,624	3,004
Electronics Maintenance	70	537	1,093
Haulout	70	965	2,429
Moorage	70	1,356	1,299
Purchase of New Gear	70	1,276	2,611
Vessel Insurance	70	3,569	3,605
Vessel Professional Services	70	413	644
Vessel Advertising	70	1,345	2,240
Fuel	70	7,685	8,910
Fishing Supplies	70	2,050	3,468
Bait Expenses	70	807	1,589
Food and Drink	70	88	257
Taxes and Government Fees Domestic	70	4,172	9,251
Taxes and Government Fees Foreign	70	32	171
Commissions for Booking Agents	70	3,906	7,730
Telephone and Other Communications	70	718	981
Other Vessel Related	70	5,434	14,699
Booking Operation Expenditures			
Labor for Shorebased Personnel	70	707	5,159
Advertising	70	323	2,058
Insurance	70	436	2,606
Professional Service	70	60	328
Association Fees	70	8	60
Telephones	70	288	1,871
Other Office Expenses	70	465	3,417
Lease/Loan Payments on Vehicles	70	27	227
Legal/Financial Services	70	35	244
Other Booking Related	70	8	46
Total Expenditures	70	50,547	63,228

Source: Leonard and Watson (2013)

EXHIBIT 2-31. ECONOMIC CONTRIBUTIONS OF CHARTER BOAT INDUSTRY IN WASHINGTON (2006)

CATEGORY	DIRECT[1]	INDIRECT[2]	INDUCED[3]	TOTAL
Industry Output	$7,057,536	$2,796,345	$3,479,495	$13,333,376
Income	$2,802,449	$1,323,484	$1,968,847	$6,094,780
Sales, Excise and Property Taxes	$465,797	$145,764	$187,578	$799,139
Employment	159.0	17.4	31.6	208.0

Source: Leonard and Watson (2013)

Notes:
1. Direct effects represent production changes associated with demand for goods and services.
2. Indirect effects represent secondary activity caused by directly affected industries purchasing goods and services from other industries.
3. Induced effects represent changes in household spending due to the direct and indirect effects.

FISHERY SPECIFIC INFORMATION

Below, we present a brief description of individual recreational fisheries within the study area. For each fishery, we briefly describe the range of activities occurring in that fishery, and provide descriptive statistics to characterize the fishery, including landings and effort over the last ten years. The landings and effort figures provided in the exhibits reflect the harvest of fish taken from U.S. Pacific coastal waters only and landed in Washington. Appendix C includes the raw data tables that serve as the basis for these exhibits. All data were provided by DFW in June, 2014.

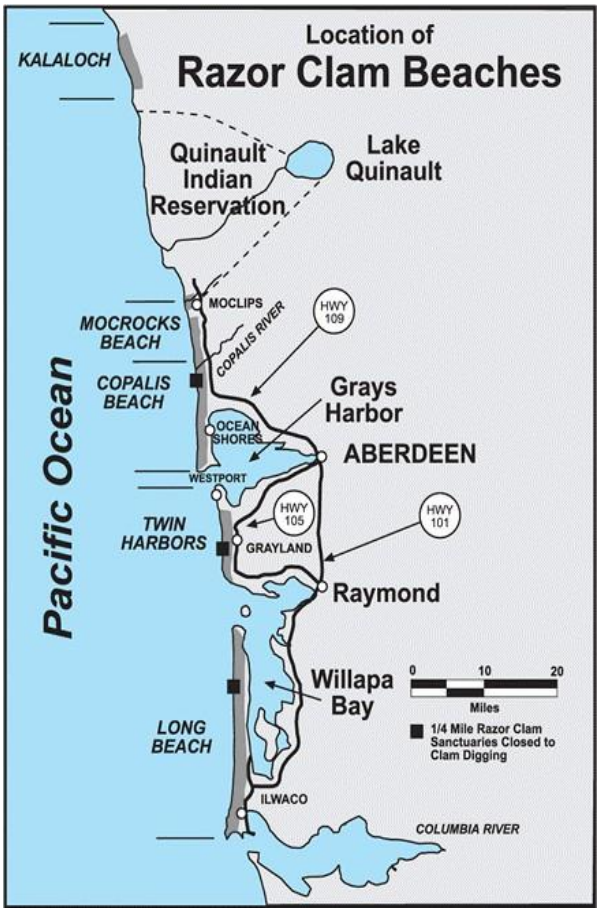
Razor Clams

The coastal beach-based razor clam fishery is the only recreational fishery for bivalves occurring within our study area. All recreational razor clamming in Washington takes place on its ocean beaches (i.e., within the study area). Approximately 58 miles of Washington beaches (one-third of the coastline) are open for periods between October and May for recreational harvest. Exhibit 2-32 shows the location of razor clam beaches in Washington, the vast majority of which are in the southern half of the state. Communities benefitting from the tourism dollars generated by recreational diggers include Long Beach, Ocean Park, Grayland, Westport, Ocean Shores, Ocean City, Copalis, Seabrook, Pacific Beach, Moclips, and Forks (see Exhibit 1 for the location of these communities) (Personal comm. D. Ayres 2014).

Over the last 11 years, the trends in recreational razor clam harvest have followed the amount of effort, measured by the number of trips taken. As shown in Exhibit 2-33, there has been a spike over the historic average in the last two years. The number of clams taken by recreational fishers has varied from a low of 2.6 million clams in 2011-12 to a high of 6.3 million in 2013-14.

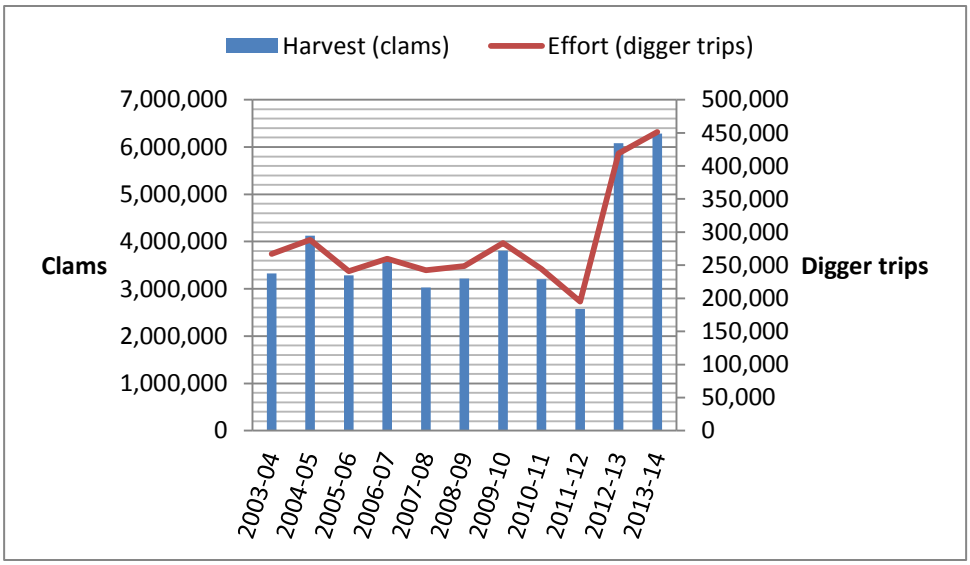
As show in Exhibit 2-32, the fishery is concentrated in five areas: Long Beach, Twin Harbors, Copalis, Mocrocks, and Kalaloch. During the 2013-14 fishing season, nearly 40 percent of the harvest came from Long Beach, and approximately 30 percent came from Twin Harbors. The level of effort is similarly distributed. Data for the last 11 years indicate that the two southernmost beaches, Long Beach and Twin Harbors, consistently account for the majority of the recreational clamming harvest and a similar share of recreational clamming effort.

EXHIBIT 2-32. LOCATION OF RECREATIONAL RAZOR CLAM BEACHES



Source: DFW 2014d

EXHIBIT 2-33. TOTAL RECREATIONAL RAZOR CLAM HARVEST AND LEVEL OF EFFORT, 2003-2014



Source: Based on data provided by DFW, June 2014

A 2010 report by Dyson and Huppert examined the local economic effects of razor clam fisheries on the coastal communities of Grays Harbor and Pacific Counties. Exhibit 2-34 identifies total expenditures on razor clamming at four beaches, based on a survey of 240 parties. Total expenditures for the 2007-2008 season were estimated at $24.4 million, contributing an estimated 404 full-time equivalent jobs and $12.6 million in labor income to the economy. The authors used these data to estimate that a full-year closure due to a harmful algal bloom would result in a loss of 339 full-time equivalent jobs and $10.6 million of labor income.

Dungeness Crab

Although Dungeness crab is one of the most popular recreational fisheries in the state, very little of this activity occurs within our study area (Personal comm. H. Reed 2014). Because recreational activity offshore is constrained by weather (the primary season occurring in the dead of winter), most coastal activity is limited to Willapa Bay, Grays Harbor, and the Columbia River. Although activity is limited, there has been an increase recently in the number of recreational crabbers who hire charter boats so they can participate in the fishery prior to the opening of the commercial season (Personal comm. H. Reed 2014).

Although DFW maintains a rigorous reporting system for the recreational crab harvest in Puget Sound and along the Strait of Juan de Fuca, reporting of recreational harvests along the coast is not required. Thus, data on total landings or harvest trips for Dungeness crab within the study area are not available (Personal comm. H. Reed 2014). The only available data are for the Puget Sound/Strait of Juan de Fuca area, where recreational crabbers caught an average of 1.4 million pounds of Dungeness crab between 2006-2011 (DFW 2014a).

EXHIBIT 2-34. PARTICIPATION AND EXPENDITURE DATA FOR FOUR RAZOR CLAMMING BEACHES ON WASHINGTON'S OUTER COAST (2008$)

CATEGORY	MOCROCKS	COPALIS	TWIN HARBORS	LONG BEACH
Annual participants	22,247	42,376	65,253	112,442
Days Open	11	13	39	22
Avg. participants per day	2,022	3,260	1,673	5,111
Average $ spent per participant per day				
Hotel	$21.22	$29.82	$16.34	$20.57
Camping	$2.68	$1.31	$3.89	$3.14
Restaurant	$15.26	$21.27	$17.42	$28.09
Groceries	$8.58	$8.65	$15.96	$15/08
Gas and oil	$20.04	$25.81	$26.82	$33.28
Ferry tolls	$0.42	$0.09	$0.11	$0.00
Other transport	$0.25	$0.19	$0.14	$3.53
All other	$3.97	$11.74	$7.07	$10.42
Total expenditures	$72.43	$98.89	$87.76	$114.01
Source: Dyson and Huppert 2010.				

Albacore Tuna

Albacore are a popular recreational target along the Washington coast during the summer and early fall. The geographic range of this fishery moves with the highly migratory fish, but tends to occur between 50 and 100 nautical miles offshore (DFW 2014b). Albacore are caught using jigs, which are trolled behind the vessel, as well as with live bait while drifting.

Albacore are targeted by both charter boats and private vessels. Managers note an increasing trend in the use of private vessels in this fishery. Private fishermen are required to carry a state saltwater or combination license. Charter boat operators must carry a salmon charter license, which are limited by the state.[9] There are presently no bag limits on albacore tuna, but increasing pressure at the international level to cap U.S. fishing effort on albacore may eventually lead to state implementation of a bag limit (Personal comm. C. Niles 2014).

Exhibit 2-35 presents the total angler trips for albacore between 2009 and 2011. In 2011, anglers made 3,744 trips targeting albacore tuna. The ports of Westport and Ilwaco saw nearly equal levels of effort (1,783 and 1,834 trips, respectively). Slightly more trips (57 percent) were made by private vessel than by charter vessels.

[9] A Salmon Charter license is required for anyone accepting a fee to take a person fishing for salmon, food fish (including albacore tuna), or shellfish in Marine Areas 1-13 (DFW 2014e).

EXHIBIT 2-35. WASHINGTON ALBACORE RECREATIONAL FISHING EFFORT (2009-2011)

Table 2-8. Washington albacore fishing effort (angler trips) for charter and private boats, and combined, by year and port area, 2009–11.

Port Area	Charter			Private			Combined		
	2009	2010	2011	2009	2010	2011	2009	2010	2011
North Coast	48	92	4	194	285	124	242	377	128
Westport	1,013	1,337	926	550	1,118	856	1,563	2,455	1,783
Ilwaco	568	696	681	1,082	1,386	1,153	1,650	2,082	1,834
Total	1,629	2,125	1,612	1,826	2,789	2,133	3,455	4,914	3,744
Private boat (%)	—	—	—	—	—	—	52.90%	56.80%	57.00%

Data source: WDFW Ocean Sampling Program, extracted May 2012.

Source: Provided by DFW, May 2014.

Bottomfish

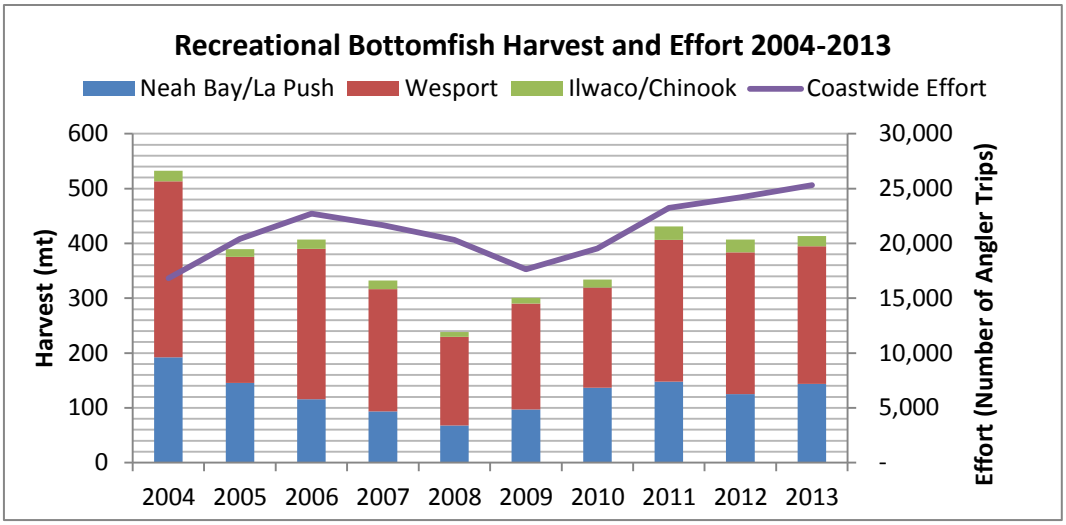
The recreational bottomfish fishery primarily consists of anglers targeting rockfish and lingcod. Other species of bottomfish include cabezon, kelp greenling, and Pacific cod. The season is year-round but weather typically constrains fishing to the months of March through October (Personal comm. H. Reed 2014).

State regulations for multiple species of bottomfish have been adopted to conform to federal regulations, and in some cases have grown more restrictive. Species such as yelloweye and canary rockfish are managed under population rebuilding plans, and state regulations focus on minimizing encounters with these species (Personal comm. H. Reed 2014).

Bottomfish are targeted by both charter boats and private vessels. The primary fishing ports are Neah Bay/La Push, Westport, and Chinook/Ilwaco. A majority of private anglers fish out of Neah Bay, and Westport supports most of the charter trips (Personal comm. H. Reed 2014).

Exhibit 2-36 presents the total recreational bottomfish harvest by port, and overall level of effort, for the recreational bottomfish fishery between 2004-2013. Over this period Westport has seen the greatest proportion of activity from the recreational bottomfish fishery, followed by Neah Bay/La Push. Bottom conditions in the waters accessible from Ilwaco/Chinook are not conducive to groundfish fishing (Personal comm. M. Cedergreen 2014). Total harvest during this period peaked in 2004 (532 metric tons), while effort peaked in 2013 (25,302 angler trips).

EXHIBIT 2-36. COASTAL RECREATIONAL BOTTOMFISH HARVEST AND EFFORT, 2004-2014



Source: Based on data provided by DFW, June 2014

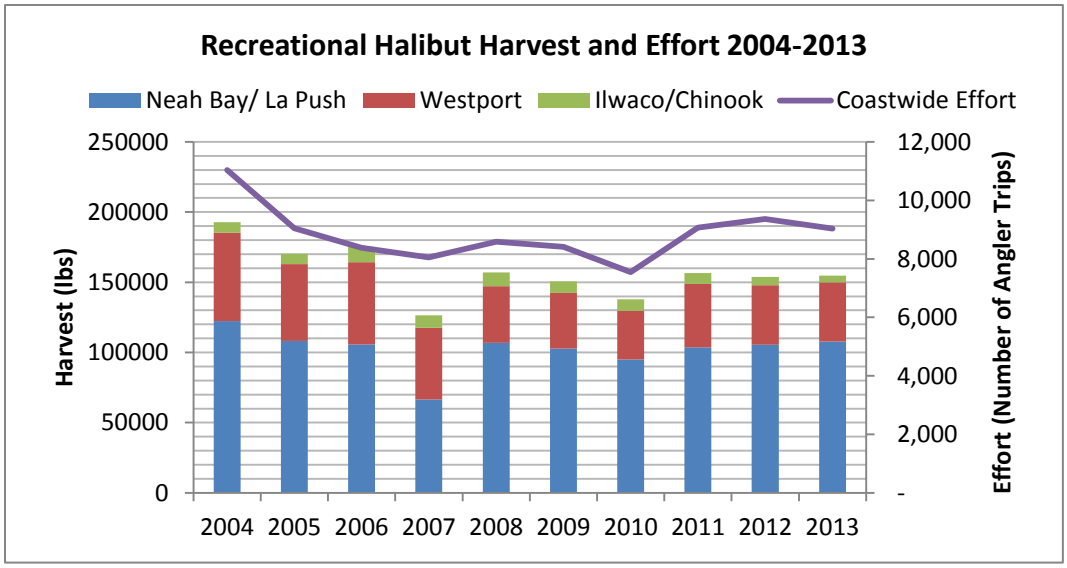
Halibut

The recreational halibut fishery occurs from May through September. On the north coast (Neah Bay/La Push), the quota-driven fishery can end in as little as five days, while the fishery south of Grays Harbor can remain open throughout the season. Both private and charter vessels participate in this fishery, but the fishery favors larger vessels since it occurs fairly far from shore (Personal comm. H. Reed 2014).

Exhibit 2-37 presents the recreational halibut harvest by port annually between 2004 and 2013, as well as the level of effort over the same period. The harvest has been relatively stable but has diminished somewhat over this period, with the largest harvest (192,787 pounds) occurring in 2004. Effort in this fishery peaked in the same year (11,034 angler trips). The majority of activity in this fishery was centered in the port of Neah Bay/La Push (62 percent in 2013), followed distantly by Westport.

Managers have noticed a trend toward increased participation by private vessels in this fishery (Personal comm. H. Reed 2014). According to data provided by DFW, the coastwide split between private and charter vessels was nearly equal in 2004 and 2005, but by the 2013 season, the number of angler trips made by private vessels (6,230) was more than twice those made by charter vessels (2,803).

EXHIBIT 2-37. COASTAL RECREATIONAL HALIBUT HARVEST AND EFFORT, 2004-2014



Source: Based on data provided by DFW, June 2014

Salmon

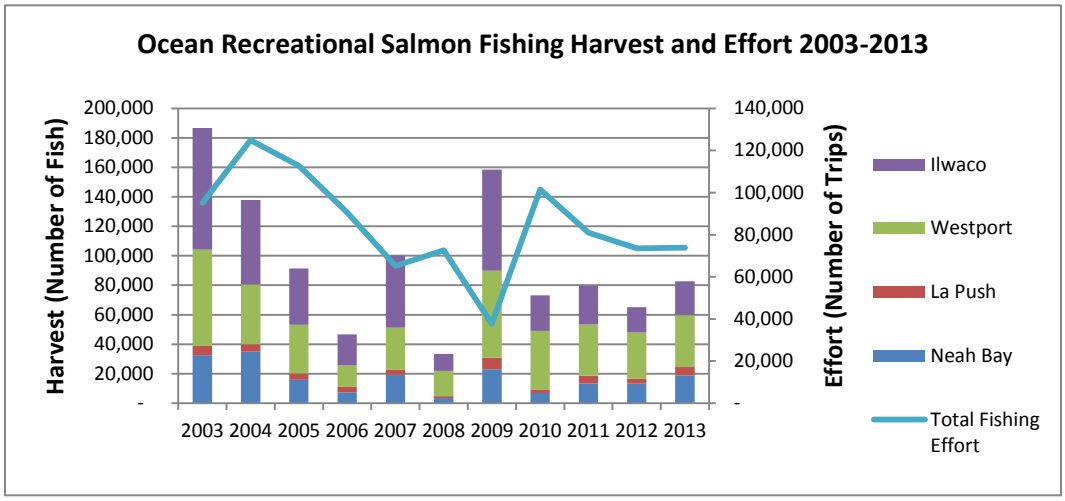
The recreational salmon fishery spreads throughout Willapa Bay, the Chehalis Basin, and the ocean. Commercial and recreational fisheries share the salmon harvest in Willapa Bay and the Chehalis Basin. The Chehalis Basin is composed of the Grays Harbor Marine Area, Humptulips River, and the Chehalis River (Personal comm. M. Culver 2014).

Management of recreational fishing of salmon in the ocean is motivated by projected impacts to ESA-listed stocks. Port quotas and in-season monitoring are enforced by the state. Some species of salmon are managed as mark-selective fisheries in which anglers can only keep fish that have been marked (i.e., the adipose fin has been removed) as originating from a hatchery. This management practice allows wild salmon stocks to repopulate (Personal comm. M. Culver 2014).

Exhibit 2-38 presents the total recreational harvest and effort in the ocean salmon fisheries between 2003 and 2013. Harvest in this fishery has been highly inconsistent, peaking in 2003 with 186,686 salmon of all species landed. Effort peaked in 2004 with 124,867 angler trips. The ports of Westport and Ilwaco have both been strongly and relatively equally represented in terms of activity in this fishery.

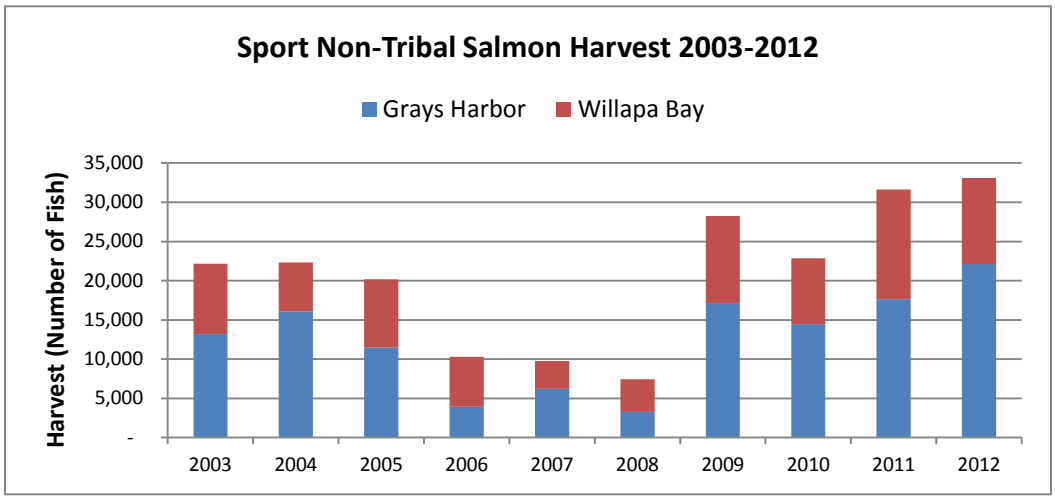
Exhibit 2-39 presents the total recreational harvest of salmon in the Willapa Bay and Grays Harbor salmon fisheries (note that effort data were not available for these areas). Harvest in these fisheries has been similarly inconsistent, with a peak in 2012 of 33,109 fish. The distribution of catch by port has been consistently skewed towards Grays Harbor, with harvest there generally representing about 60 percent of the total.

EXHIBIT 2-38. OCEAN RECREATIONAL SALMON HARVEST, 2003-2012



Source: Created from data presented in PFMC 2014.

EXHIBIT 2-39. COASTAL ESTUARY RECREATIONAL SALMON HARVEST, 2003-2012



Source: Created from data presented in PFMC 2014.

EXISTING POLICIES AND LAWS

Fisheries management in Washington's outer coastal waters is a shared responsibility of the U.S. federal government, through the National Oceanic and Atmospheric Administration (NOAA), the State of Washington, and the four coastal treaty tribes (i.e., the Makah, Quileute, Hoh and Quinault) (Personal comm. M. Culver 2014). The discussion below briefly describes the authorities and processes by which fishery management decisions are made.

FEDERAL

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 (MSA) guides the process by which U.S. fisheries are regulated in federal waters (from three miles to the 200 nautical mile limit of the U.S. Exclusive Economic Zone (EEZ) offshore of Washington's coast) (16 U.S.C. §§ 1801-1891d). The MSA establishes eight regional fishery management councils that are delegated the responsibility of developing strategies and making decisions regarding the management and conservation of commercial and recreational fisheries occurring in these waters. Management of the federal waters off Washington's coast is the responsibility of the PFMC. The PFMC executes this responsibility through development and implementation of fishery management plans (FMPs) that provide the framework under which the National Marine Fisheries Service (NMFS) issues regulations governing specific fisheries. The PFMC currently oversees implementation of four FMPs, including Salmon, Groundfish, Coastal Pelagic Species, and Highly Migratory Species, and a Fishery Ecosystem Plan.

While the PFMC has autonomous authority to make decisions regarding the majority of fisheries occurring in the U.S. EEZ, in some instances it must confer and negotiate with several international bodies. Through the IPHC, the U.S. and Canada make joint decisions on stockwide conservation measures and harvest allocations for Pacific halibut (Personal comm. M. Culver 2014). In addition, the U.S. has treaties with Canada that allow U.S. and Canadian vessels to target salmon and albacore tuna across the international border (Personal comm. C. Niles 2014).

The National Oceanic and Atmospheric Administration (NOAA), through NMFS, has the authority to promulgate regulations that implement the decisions made by the PFMC. These regulations are implemented in Title 50 of the Code of Federal Regulations.

In addition to the requirements of the MSA, the Endangered Species Act (ESA) has a significant effect on the management of U.S. fisheries. Requirements to protect and restore populations of species listed under the ESA as threatened or endangered can result in limitations to commercial and recreational fishing activities in the region.

STATE

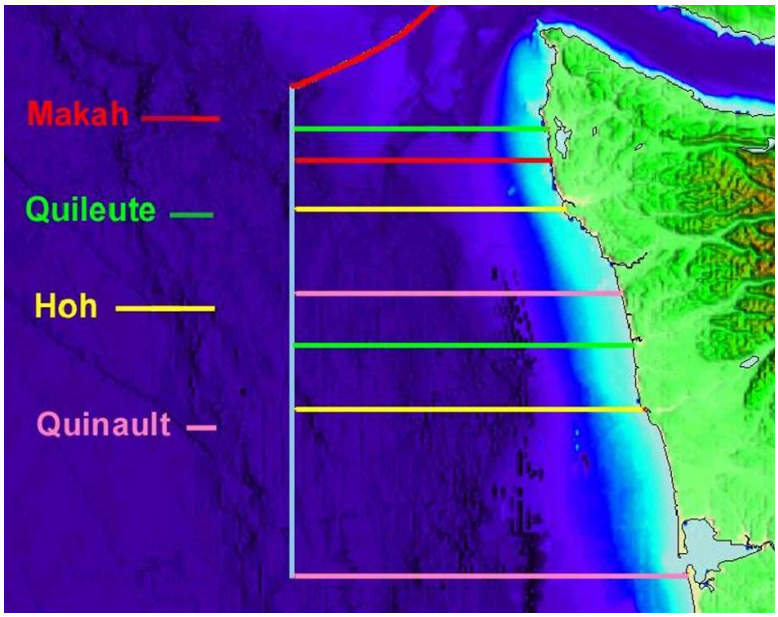
Generally speaking, the State of Washington has the authority to regulate fisheries occurring within its coastal waters (from shore to three nautical miles). However, the MSA allows states to regulate its registered fishing vessels in federal waters for fisheries that do not have federal FMPs (e.g., pink shrimp, spot shrimp and hagfish) or if the state's regulations are consistent with the FMP (e.g., sardines, anchovies and albacore tuna). The MSA also specifically delegates to the State the authority to manage the Dungeness crab fishery out to the limits of the EEZ (i.e., to 200 nautical miles). The state presently manages nine commercial fisheries, including those for Dungeness crab, albacore tuna, sardines, anchovies, salmon, pink shrimp, spot shrimp, hagfish, and razor clams, as well as numerous recreational fisheries. The majority of state laws related to management of fishery resources are contained within Title 77 of the Revised Code of Washington (RCW). Implementing regulations are contained within Section 220 of the Washington Administrative Code (WAC) (Personal comm. M. Culver 2014).

TRIBAL

Although tribal fishing activities are expressly not within the scope of this report, it is not possible to discuss management of Washington's fisheries without noting the role that Native American treaty tribes play as co-managers of these resources. Treaties signed between Native American tribes and the U.S. government in the mid-1800s reserved the right for these tribes to fish in their Usual and Accustomed (U&A) fishing areas. For four tribes, the Makah, Quileute, Hoh and Quinault, these areas include portions of Washington's marine coastal waters. The bounding latitudes of each tribe's U&A differ and overlap with one another, but the seaward boundary of 125°44' W. longitude that was adjudicated for the Makah has been used in federal fishing regulations for the other three coastal treaty tribes (see Exhibit 2-40) (Personal comm. M. Culver 2014).

Federal court cases have affected the involvement of the four treaty tribes in Washington's ocean commercial fisheries. In *United States vs. Washington*, Judge George Hugo Boldt held that Washington's Native American treaty tribes reserved the right to take up to 50 percent of the harvestable salmon in their respective U&As (384 F. Supp. 312 (W.D. Wash. 1974)). This ruling also established the fisheries co-manager relationship between the state and the treaty tribes. Twenty years later, in subsequent cases under *United States vs. Washington* (1994), Judge Edward Rafeedie held that the treaty right extended to finfish other than salmon, and to shellfish, including oysters, clams, and Dungeness crab (OCNMS IPC 2008, Personal comm. K. Krueger 2014). These rulings substantially revised involvement patterns in a number of commercial fisheries. While tribes were finally provided the opportunity to exercise their treaty rights in certain fisheries, in some cases non-treaty fishermen experienced significantly reduced participation and revenues from those fisheries (Personal comm. D. Beasley 2014, Personal comm. K. Krueger 2014, Personal comm. M. Culver 2014).

EXHIBIT 2-40. TREATY TRIBES' USUAL AND ACCUSTOMED OFFSHORE FISHING GROUNDS



Source: Provided by DFW, May 2014

SECTION 3 | ISSUES FACING THE SECTOR

The experts we interviewed provided substantial insight into the issues currently affecting various fisheries, as well as the longer-term challenges the fisheries are likely to face. Their comments suggest that requirements for resource sharing and associated concerns about the potential loss of fishing grounds have been among the most influential factors shaping the trajectory of certain non-tribal fisheries. In the longer term, new space use conflicts, potentially resulting from the outcome of the MSP process, are of primary concern, with the development of marine renewable energy projects perceived as the most serious threat.[10] These and other issues identified during the interview process are discussed below.

BARRIERS TO ENTRY AND SUCCESS

Industry experts expressed concerns related to the difficulty in entering the industry and succeeding as a commercial fisherman. Specifically, experts made the following observations:

- It is becoming increasingly expensive to get into the industry. For example, purchase of a crabbing vessel, gear, and a permit could range from $250K to $1 million – money that the younger generation typically does not have access to.
- It is becoming increasingly difficult to make a living by participating in only one fishery. Fishermen that used to be able to rely on one species/fishery now need to participate in four to survive.

LIMITATIONS IN USE OF SPACE

Industry representatives identified current and potential limitations in the use of marine space as one of their greatest concerns. Issues raised by interviewees relative to this topic included:

- Fishermen are already restricted in the areas that they are able to access. Different fisheries are subject to a variety of time and area closures for various purposes, including the protection of sensitive bottom habitats, recovery of overfished rockfish, and the need for resource sharing. Some fisheries are affected more than others. Fishermen are extremely sensitive to the possibility of losing additional fishing grounds to competing uses (Personal comm. L. Thevik 2014, Personal

[10] The authors of Butler et al. (2013) conducted a series of interviews and focus groups that generated a detailed account of concerns of those involved in the marine-resource based economy. This source could provide additional information and insight on this topic.

comm. D. Beasley 2014, Personal comm. M. Cedergreen 2014, Personal comm. Michele Culver 2014).

- The possibility of development of marine renewable energy projects off the Washington coast seems to be the greatest concern relative to space use conflicts with other industries. In theory, any new use of marine space in the region would be seen as a threat, but other potential uses such as offshore aquaculture do not appear to be on the horizon. One individual noted that conflicts with existing uses (e.g., shipping) are not viewed as a threat because the uses have co-existed for some time and participants have been able to work out arrangements to avoid conflicts (Personal comm. L. Thevik 2014, Personal comm. D. Beasley 2014, Personal comm. M. Cedergreen 2014).
- Industry experts also identified concern about the MSP process itself, in particular, about the apparent assumption in the process that space can and will be set aside for certain uses without displacing others. This matter is of particular concern when being discussed in the context of setting space aside for uses that do not yet exist (Personal comm. L. Thevik 2014).

OCEAN ACIDIFICATION

- Although the exact effects of ocean acidification on Dungeness crab larvae are unknown, the industry is concerned about how rising acidity may ultimately affect this resource (Personal comm. L Thevik 2014). Researchers have demonstrated that ocean acidification leads to thinner shells, slower growth rates, and higher mortality rates for oysters. Oysters and other shellfish are most vulnerable to the effects of ocean acidification when they are young (NOAA PMEL 2014). Additional research is being conducted to investigate the potential effects of ocean acidity on various crab species (see, for example, NOAA OAP 2014) and some studies have already found that a lower pH drastically increases juvenile crab mortality (The Seattle Times 2014). Research has also found that acidification reducing shell-building and growth rates in pteropods, a key food source for juvenile salmon (Washington State Blue Ribbon Panel on Ocean Acidification 2012).
- Recognizing the importance of this issue in a state whose economy and culture is so connected to shellfish and the marine environment, the Governor's office has taken a number of steps to promote research and actions to address it. In 2012, then-Governor Gregoire convened a Washington State Blue Ribbon Panel on Ocean Acidification to develop actions to address the causes and consequences of acidification. The recommendations of the Panel, documented in Washington State Blue Ribbon Panel on Ocean Acidification (2012), resulted in Executive Order 12-07, which directs the Washington State Department of Ecology and other cabinet agencies to implement the Panel's key early actions (State of Washington Office of the Governor 2012).

OIL INDUSTRY

One fishing industry representative identified the threat of an oil spill as a critical potential issue facing many marine and coastal-based economic sectors. An oil spill could result in the loss of entire fisheries for substantial periods of time. The anticipated increase in oil tanker traffic from Vancouver, the danger in crossing the Columbia River, and the perceived lack of preparation to respond quickly all contribute to the concern about this threat (Personal comm. D. Beasley 2014).

OVERFISHED SPECIES

Certain fisheries, especially sectors of the groundfish fishery, have the potential to be limited by requirements to protect overfished species such as canary rockfish and yelloweye rockfish, which are managed under rebuilding plans. If the allowed bycatch quota for these overfished species were filled, additional area restrictions may be implemented or fishing seasons may close prematurely, which could result in leaving some portion of the allowable catch of the target species not harvested (Personal comm. D. Beasley 2014). Since the rebuilding plans were implemented in 2000, premature closure of groundfish fisheries has occurred once in the recreational fishing sector, and has not occurred in any of the commercial fishing sectors (Personal comm. M. Culver 2014).

POTENTIAL FOR CONCENTRATION OF OWNERSHIP

Industry experts noted concern for the future of the commercial fishing industry related to the anticipated movement toward consolidation of ownership as a result of implementation of the Trawl ITQ program. By design, this program will eventually result in a contraction and consolidation of the fleet to address issues related to overcapacity. Industry representatives noted concern about his movement concentrating ownership in the hands of a few, potentially away from independent fishermen and toward processors and corporations (Personal comm. D. Beasley 2014, Personal comm. L. Thevik 2014).

REGULATORY UNCERTAINTY

Uncertainty related to future regulatory decisions makes it difficult for fishermen to make long-term business decisions, such as decisions about capital investments. For example, Dungeness crab fishermen have long been operating under a regime in which the state has the authority to manage the fishery in federal waters. However, this authority will expire in 2016, and it is unclear how the management regime may change after that point (Personal comm. L. Thevik 2014).

SALMON PRODUCTION AND SURVIVABILITY

The interview process identified a number of concerns related to salmon production and survivability in the study area. These issues have the potential to affect or are already affecting the commercial and recreational salmon fisheries. The factors of concern include:

- Oceanic conditions and climatic shifts such as the Pacific Decadal Oscillation, El Niño and La Niña, and other weather conditions (e.g., droughts and floods) over which there is no control;
- Predation by protected California sea lions (primarily at the foot of dams) and birds such as Caspian terns and cormorants (most notably at an artificial island created by the Army Corps of Engineers on the lower Columbia River); and
- A reduction in hatchery production due to a number of factors, including science suggesting that hatchery production has a negative impact on wild salmon populations, reductions in federal funding, and fulfillment of mitigation requirements related to hydropower projects (Personal comm. M. Cedergreen 2014).

In addition to those factors identified by interviewed experts, the Governor's Salmon Recovery Board identifies the following additional causes of salmon declines:

- Loss, fragmentation, and destruction of salmon habitat;
- Land uses that pollute waterways and degrade habitat;
- Dams;
- Over-fishing;
- Hatcheries that produce fish that compete with wild salmon for limited resources; and
- Climate change (WRCO 2014).

LAWS AND REGULATIONS LIMITING CATCH

Industry experts pointed to issues related to resource sharing with treaty tribes as a key factor that has shaped the trajectory of the non-tribal Dungeness crab fishing industry (Personal comm. L. Thevik 2014, Personal comm. D. Beasley 2014, Personal comm. D. Eager 2014). The 1994 ruling by Judge Edward Rafeedie ("the Rafeedie Decision") extended the tribal treaty rights to salmon confirmed in the 1974 Boldt Decision to other finfish and shellfish (including Dungeness crab), effectively guaranteeing tribes the reserved right to harvest up to 50 percent of the shellfish from their U&As, which collectively extend along approximately 75 percent of the Washington coastline, although not all four tribes participate in the Dungeness crab fishery to the same degree (see Exhibit 2-40) (Northwest Indian Fisheries Commission 2014, DFW 2014c, Personal comm. M. Culver 2014). As a result, numerous regulations were implemented in the Dungeness crab fishery to ensure that tribes had the opportunity to access their share of the harvestable resource, including implementation of pot limits, size restrictions, and a requirement to hold a Washington state license to fish off of Washington's coast (Personal comm. H. Reed 2014).

The Rafeedie Decision likely affected the potential value of the fishery to non-treaty tribal fishermen; however, subsequent to the court order, the non-tribal revenue in the Dungeness crab fishery has increased substantially, attaining its highest levels in the most recent years (2010-2014) (Personal comm. M. Culver 2014). As noted above, the opening months of the crab season gives a window to treaty fishers to assure access to their 50 percent share. As a result, non-tribal fishery participants now concentrate their effort in the southern portion of the state, in waters outside of the treaty area, which can lead to congestion and increased competition within the fishing grounds (Personal comm. D. Beasley 2014, Personal comm. L. Thevik 2014, Personal comm. K. Krueger 2014).

SECTION 4 | INVENTORY OF AVAILABLE DATA

SUMMARY AND REVIEW OF EXISTING DATA SOURCES

Exhibit 4-1 summarizes the key sources of information that are currently available to support development of an economic analysis of the non-tribal fishing industry. We include in this inventory the identity of the data source, a brief description of its contents, any known caveats or limitations with respect to using the data, and a contact or website from which the data are available.

EXHIBIT 4-1. INVENTORY OF KEY DATA SOURCES ON THE NON-TRIBAL FISHING INDUSTRY

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
American Sportfishing Association. 2013. Sport Fishing in America.	The ASA report looks at the 2011 economic benefits of the sport fishing industry at the state and national level. The ASA collected detailed information on angler numbers, expenditures, and days fished for freshwater, saltwater, and the Great Lakes.	Data cannot be isolated to specific species or counties.	http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf
Bell, Kathleen P., Daniel Huppert, and Rebecca L. Johnson. 2003. Willingness to Pay for Local Coho Salmon Enhancement in Coastal Communities. Marine Resource Economics.	The authors conducted a contingent valuation study in five rural, coastal communities in Oregon and Washington to evaluate the extent to which coastal residents are willing to pay for local coho salmon enhancement.	Information is somewhat dated.	http://www.researchgate.net/publication/23945211_WILLINGNESS_TO_PAY_FOR_LOCAL_COHO_SALMON_ENHANCEMENT_IN_COASTAL_COMMUNITIES
Bureau of Ocean Energy Management. 2012. Identification of Outer Continental Shelf Renewable Energy Space-Use Conflicts and Analysis of Potential Mitigation Measures. OCS Study BOEM 2012-083. Prepared by Industrial Economics, Inc. under BOEM contract M09PC00037.	Report commissioned by the Bureau of Ocean Energy Management examining ocean space-use conflicts and mitigation strategies for the outer continental shelf. BOEM collected data from NOAA, the U.S. Coast Guard, U.S. Army Corps of Engineers, and many state and regional offices. The study is divided into five regions: Northeast Atlantic, Mid-Atlantic, South Atlantic, Pacific Northwest, and Northern California. State-specific data are available for each region, but county-specific data are not. Some data are available by major sea port.	Data cannot be isolated to specific counties or marine areas, and species detail is limited.	http://ir.library.oregonstate.edu/xmlui/handle/1957/36453

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
Butler, K. C. Fryday, M. Gordon, Y. Ho, S. McKinney, M. Wallner and E. Watts. 2013. University of Washington Environmental Management Certificate Program Keystone Project. Washington's Working Coast: An Analysis of the Washington Pacific Coast Marine Resource-Based Economy	The Olympic Natural Resources Center initiated this project in order to develop an economic assessment of marine-resource dependent businesses and the challenges they face in five counties along the coast of Washington. The University of Washington 2013 report expands on the first phase of the project through interviews and reviews of existing economic data in order to develop a qualitative and quantitative analysis of the contribution of marine resource based jobs to the regional economy. The report is divided into sections for each of the 5 focus counties: Clallam, Grays Harbor, Jefferson, Pacific and Wahkiakum.	Report consolidates fishing into an industry category with agriculture (which includes aquaculture) and forestry. More detailed data are still consolidated as "fishing, hunting, and trapping." Report does not differentiate between recreational and commercial fishing. Data cannot be isolated to specific species and tribal vs. non-tribal fisheries.	http://www.onrc.washington.edu/MarinePrograms/WWC/WashingtonWorkingCoastPhaseIIReport.pdf.
Community Attributes Inc. (CAI). 2013. Washington State Maritime Cluster. Economic Impact Study. Prepared for the Economic Development Council of Seattle and King County.	The objective of this report is to analyze the economic impact of the six major maritime industry sectors: Passenger Water Transportation, Ship and Boat Building, Maintenance and Repair, Maritime Logistics and Shipping, Fishing and Seafood Processing, and Military and Federal Operations. Data consists of 2012 numbers for employment, wages, gross income, and other industry details in each of the six sectors.	Data cannot be isolated to specific fisheries or counties. Many data elements are reported for the maritime cluster as a whole, and cannot be isolated to the non-tribal fishing industry. Analysis includes many portions of the fishing industry that are outside the scope of this analysis (e.g., non-coastal fisheries, tribal fisheries, aquaculture, and distant waters fisheries).	http://edc-seaking.org/wp-content/uploads/2013/11/CAI.WA-Maritime-Cluster-Study.2013-1120.pdf

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
Crutchfield, J.A. and K. Schelle. 1977. An Economic Analysis of Washington Ocean Recreational Salmon Fishing with Particular Emphasis on the Role Played by the Charter Vessel Industry. Prepared for the Pacific Fishery Management Council and National Oceanic and Atmospheric Administration. Funded by NOAA/NMFS Grant 04-7-158-44024.	An economic analysis of Washington ocean recreational salmon fishing with particular emphasis on the role played by the charter industry.	Information is significantly dated.	http://www.pcouncil.org/wp-content/uploads/Econ-Analysis_WA_Rec_fisheries.pdf
DFW Commercial Harvest and Value Data (ongoing)	Data collected by DFW on the total commercial harvest by species and ex-vessel value for all commercial fishing activity licensed by the State of Washington, or landed in Washington's ports.	N/A The majority of data collected through the fish ticket program is self-reported and thus may be subject to misreporting. The exception is data for the groundfish trawl fisheries, which are subject to 100% monitoring for landings weights.	DFW
DFW Recreational Angler Trip and Harvest Data (ongoing)	Data collected by DFW on the total recreational harvest by species and effort for most recreational fishing activity taking place in Washington's state and federal waters, or landed in Washington's ports.	Data are not collected for the recreational fishery for coastal Dungeness crab).	DFW
Dyson, K and D. Huppert. 2010. Regional economic impacts of razor clam beach closures due to harmful algal blooms (HABs) on the Pacific coast of Washington. November.	This study examines the local economic effects of razor clam fisheries on the coastal communities of Grays Harbor and Pacific Counties. The study uses an economic impact model and 2008 visitor expenditure data to determine the local impact of recreational razor clamming. Findings include local expenditures, employment, labor income, and estimates of negative economic impacts from closures of clam fisheries due to harmful algal blooms.	None identified.	http://www.sciencedirect.com/science/article/pii/S1568988309001279

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
Fraser, Michael B.; Henderson, James A.; McManus, John F. 1977. Survey of Commercial Sportfishing Boats in the Coastal United States. Oregon State University Sea Grant College Program no. ORESU-T-77-009. Corvallis, OR.	Not available	Information is significantly dated.	Oregon Sea Grant
Gentner, Brad, and Scott Steinback. 2008. The Economic Contribution of Marine Angler Expenditures in the United States, 2006. U.S. Dep. Commerce, NOAA Tech. Memo. NMFSF/SPO-94, 301 p.	Update of the work done by Genter and Steinbeck (2008). See previous entry for description.	Newer version available (Lovell et al. 2013)	https://www.st.nmfs.noaa.gov/st5/publication/marine_angler.html
Hoagland, P., Anderson, D.M., Kauro, Y., White, A.M., 2002. The economic effects of harmful algal blooms in the United States: estimates, assessment issues, and information needs. Estuaries 26 (4b), 819–837.	The authors compile disparate estimates of the economic effects of HABs for events in the U.S. where such effects were measured during 1987–1992. They consider effects of four basic types – public health, commercial fisheries, recreation and tourism, and monitoring and management - and discuss many of the issues surrounding the nature of these estimates, their relevance as measures of the social costs of natural hazards, and their potential for comparability and aggregation into a national estimate.	Information is significantly dated.	http://moritz.botany.ut.ee/~olli/eutrsem/Hoagland02.pdf

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
Leonard, J. and P. Watson. 2013. The role of recreational charter boats in coastal communities: an economic and social analysis in Oregon and Washington.	This report presents data collected through cost and earnings surveys of 95 recreational charter vessels to estimate the Washington and Oregon charter fleet's economic contribution and analyze economic conditions in the charter boat industry. It is the only census of the entire charter fleet in WA and OR. Survey results provide detailed employment and revenue data including revenue not earned from for-hire fishing, as well as an economic outlook over the next 5 years. 2006 revenue data by vessel type is available for the major charter species and activities.	Data cannot be isolated to specific counties or marine areas, and species detail is limited. Much of the data reported is not disaggregated by state.	J. Leonard NOAA
Lisa Wise Consulting, Inc. 2011. West Coast US Commercial Albacore Fishery Economic Analysis	This report is a collaborative effort between the National Marine Fisheries Service and the private sector designed to provide information that will help policymakers manage the fishery. The study uses interviews of fishermen and industry stakeholders as well as statistical analyses of databases on landings, earnings, expenses, number of vessels, and employment in California, Washington, and Oregon.	Majority of data are presented in figures, but sources are provided for access to raw data.	http://www.pcouncil.org/wp-content/uploads/D1b_ATT1_ECONOMIC_JUN2011BB.pdf.
Lovell, Sabrina, Scott Steinback, and James Hilger. 2013. The Economic Contribution of Marine Angler Expenditures in the United States, 2011. U.S. Dep. Commerce, NOAA Tech. Memo.NMFS-F/SPO-134, 188 p.	This study uses a 2011 National Marine Fisheries Service (NMFS) expenditure survey and a regional input-output assessment to report the level of fishing expenditures for marine recreational fishing within each coastal state and the U.S. as a whole. It uses an expenditure model to examine how expenditures circulated through each state's economy and the economy of the entire U.S. Report includes expenditures, total output impacts, value-added impacts, and jobs supported.	Data cannot be isolated to specific counties or marine areas.	http://www.st.nmfs.noaa.gov/Assets/economics/publications/AnglerExpenditureReport/2011/pdf/Pacific_WA.pdf

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
National Marine Fisheries Service. 2008. Inventory of For-Hire Data Collections in the United States and U.S. Territories.	This report develops an inventory of available information on fishing effort and catch by marine recreational anglers fishing on professionally licensed for-hire vessels (charter, guide, and large party boats). NOAA Fisheries' objective was to provide a description of existing sources of data and data needs of for-hire fisheries in order to develop regional and national assessments of fish stocks and fisheries management. The report examines eight regions: Pacific Coast, Alaska, Pacific Islands, Caribbean, Gulf of Mexico and Florida Keys, South Atlantic, Mid-Atlantic, and North-Atlantic.	Data are not presented in the report, but it provides and discusses many resources.	http://www.countmyfish.noaa.gov/projects/downloads/Inventory_of%20For-Hire%20Methods.pdf
National Marine Fisheries Service. 2013. Fisheries of the United States 2012. Office of Science and Technology, Fisheries Statistics Division. Alan Lowther, editor. September.	This report presents 2012 data on U.S. commercial landings and processed fishery products. Report also includes some information on aquaculture production, as well as recreational fishing expenditures and their impact. Landings and production data are reported in detail by species and by state.	Data cannot be isolated to specific counties or marine areas, but some information is available by major sea port. Reported commercial fishing data includes aquaculture products.	http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus12/FUS2012.pdf .
National Marine Fisheries Service. 2013. Fisheries of the United States 2012 – Regional Profile: Pacific. Office of Science and Technology, Fisheries Statistics Division. Alan Lowther, editor. September.	This section of the 2012 Fisheries of the United States report is focused on the Pacific Region, which is comprised of California, Oregon, and Washington. Landings and production data are reported in detail by species and by state.	Data cannot be isolated to specific counties or marine areas. Reported commercial fishing data includes aquaculture products.	http://www.st.nmfs.noaa.gov/Assets/economics/documents/feus/2011/FEUS2011%20-%20Pacific.pdf

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
National Marine Fisheries Service Northwest Fisheries Science Center. 2014. Economic Data Collection Program Catcher Vessel Report 2009-2011 (Regional data).	This report summarizes the information from a survey of the West Coast groundfish trawl catcher vessel fleet, which was collected in order to monitor the economic effects of the 2011 transition of the fishery to a catch-share program. Includes 2009 through 2011 data on annual participation, physical vessel characteristics, landings, ports of delivery, costs, and revenues. Some information available by port, but the report does not break down information by state or county.	Data are presented for the West Coast region as a whole and cannot be isolated to specific states.	http://www.nwfsc.noaa.gov/research/divisions/fram/documents/Catcher_Vessel_Data_Summaries_2014.pdf
PacFIN (ongoing)	The Pacific Fisheries Information Network (PacFIN) is the nation's first regional fisheries data network. Funded by a grant from the National Marine Fisheries Service (NMFS), PacFIN is a joint federal and state project focused on fisheries data collection and information management. PacFIN provides timely and accurate data to aid effective management of fisheries and fishery resources.	None identified.	http://pacfin.psmfc.org/
Pacific States Marine Fisheries Commission. 2000. Description of the U.S. West Coast Commercial Fishing Fleet and Seafood Processors. February	The objective of this report is to describe the trends and characteristics of the U.S. West Coast fishing fleet and processors to show how revenues and participation in fisheries has changed. Information is presented by State (California, Oregon, Washington, or Alaska) and totals for the U.S. as a whole.	Data cannot be isolated to specific counties or marine areas. Information is somewhat dated. Newer version available (PSMFC 2006).	http://www.psmfc.org/efin/docs/fleetreport.pdf
Pacific States Marine Fisheries Commission. 2004. West Coast Marine Fishing Community Descriptions. Economic Fisheries Information Network.	This report describes fishing communities on the West Coast and is intended to provide information for fisheries management in California, Oregon, and Washington. Descriptions of each coastal county include information about the history and current status of the fishing industry. Data are available on the county and species level for commercial landings, revenue, permit information, and seafood processors.	Information is somewhat dated.	http://www.psmfc.org/efin/docs/communities_2004/communities_entirereport.pdf.

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
Pacific State Marine Fisheries Commission. 2004. West Coast Charter Boat Survey: Summary Report 2000.	Pacific States Marine Fisheries Commission completed a survey that gathered cost and earnings information from the West coast charter fleet for the year 2000. Survey responses are reported by vessel size (small/medium/large vessels) and geographic region.	Data cannot be isolated to specific counties. Small/medium/large vessel classification system makes comparisons with other resources difficult. Information is somewhat dated.	http://www.psmfc.org/efin/docs/WCCBSR_report2.pdf.
Pacific States Marine Fisheries Commission. 2006. Review of the West Coast Commercial Fishing Industry in 2004. September.	This report is an update of the 2000 PSMFC report, describing the trends and characteristics of the U.S. West Coast commercial fishing fleet and processors to show how revenues and participation in fisheries has changed from 1997 to 2004. This report has more state level detail than the 2000 report.	Information is somewhat dated. Most of the information provided is coast-wide and cannot be isolated to Washington or our study area.	http://www.psmfc.org/efin/docs/PSMFC%20WACA%20comm%20rpt.pdf
RecFIN (ongoing)	Established in 1992, the Pacific Coast Recreational Fisheries Information Network (RecFIN) is designed to integrate state and federal marine recreational fishery sampling efforts into a single database to provide important biological, social, and economic data for Pacific coast recreational fishery biologists, managers, and anglers.	None identified.	http://www.recfin.org/
The Research Group. 2008. Washington Commercial Fisheries Economic Value in 2006. Prepared for the Washington Department of Fish and Wildlife. December.	The Washington Department of Fish and Wildlife's objectives for this study were to determine the state and county economic values and impacts of non-treaty commercial fishing in 2006. Species-specific detail is provided. This report provides the basis for the economic discussion presented in WDFW's 2008 report "Economic Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington State."	Results of economic analysis are state-wide and thus include marine areas outside the scope of this analysis.	http://wdfw.wa.gov/publications/01361/wdfw01361.pdf

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
Seattle Marine Business Coalition. 2011. Washington State Commercial Fishing Industry Total Economic Contribution. Prepared by Hans Radtke.	This report provides economic value estimates for fisheries omitted from the 2008 Washington Department of Fish and Wildlife Economic Analysis (WDFW 2008). Such omissions include tribal fisheries, distant water fisheries, and aquaculture. The Seattle Marine Business Coalition report collected species-specific information on harvest value and onshore landed value for these omitted fisheries as well as Washington's other fisheries.	Data include elements of the industry that are outside the scope of this analysis (e.g., tribal fisheries, aquaculture, and distant water fisheries).	http://www.philipspublishing.com/smbc/attachments/SMBC%20Washington%20Total%20Commercial%20Fisheries%204.pdf.
Southwick Associates. 2006. The Relative Economic Contributions of U.S. Recreational and Commercial Fisheries	This report assesses the U.S. economic impacts of marine commercial and recreational fisheries. The data presented provides 2004 economic impacts including landings value, sales, income, jobs, and tax revenues by state. Some information on U.S. annual aquaculture production is provided as a comparison.	Economic impact data on recreational fishing taken directly from Steinback et al. 2004, which is now out of date (replaced by Lovell et al. 2013) Data cannot be isolated to specific species, counties, or marine areas.	http://www.igfa.org/images/uploads/files/Economics_of_Fisheries_Harvests.pdf.
Steinback, Scott, Brad Gentner, and Jeremy Castle. 2004. The economic importance of marine angler expenditures in the United States. NOAA Prof. Paper NMFS 2, 169 p.	In 1998, the National Marine Fisheries Service (NMFS) began a series of marine angler expenditure surveys in the coastal regions of the U.S. to evaluate marine recreational fishing expenditures and the financial impacts of these expenditures in each region and the U.S. as a whole. In this report, the authors use the previously estimated expenditure estimates to assess the total financial impact of anglers' saltwater expenditures. Estimates are provided for sales, income, employment, and tax impacts for each coastal state in the U.S.	Newer version available (Lovell et al. 2013)	http://permanent.access.gpo.gov/LPS108518/LPS108518/spo.nwr.noaa.gov/pp2.pdf

DATA SOURCE TITLE OR CITATION	DESCRIPTION	CAVEATS AND LIMITATIONS	AVAILABLE FROM
U.S. Fish and Wildlife Service. 2011. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation - Washington	The U.S. Fish and Wildlife Service produces a national report of fishing, hunting and other wildlife-associated recreation as well as complimentary reports for each state every five years. The 2011 report provides data on numbers of participants, days spent, and expenditures for each of three major recreation categories, including sportfishing. Number of trips and days spent are also provided on a species-specific level.	Data cannot be isolated to specific counties or marine areas.	http://www.census.gov/prod/2013pubs/fhw11-wa.pdf.
Washington Department of Fish and Wildlife, 2002. Economic Benefits of Fish and Wildlife Recreation in Washington State.	The Washington Department of Fish and Wildlife produced a 15-page summary report on fishing and wildlife recreation and how these activities economically benefit the coastal community. A majority of the numbers presented are from the 2001 USFWS Washington Survey, but this information is presented with anecdotes from local business owners and residents.	Heavily based on FWS National Survey of Fishing, Hunting, and Wildlife-Associated Recreation – Washington. The information is somewhat dated.	DFW
Washington Department of Fish and Wildlife. 2008. Economic Analysis of the Non-Treaty Commercial and Recreational Fisheries in Washington State. December.	This study explores the economic importance of the non-treaty commercial and recreational fisheries in Washington in 2006. Estimates include net economic values and economic impacts for both commercial and recreational fishing, by species group and county.	**Recreational:** Expenditure data come directly from the FWS National Survey, which is now out of date (see FWS 2011); much of the reported data combine saltwater and freshwater recreational fishing. **Commercial:** Most data do not differentiate by location and thus consolidate areas within and outside of our study area. Species groupings used are extremely high-level.	http://wdfw.wa.gov/publications/pub.php?id=00464
Note: A variety of reports that include valuable information on landings, values, participation in, and the economics of federally-managed fisheries are produced by NMFS and the PFMC every year. These reports include Economic Impact Statements (EISs) on amendments to fishery management plans and Stock Assessment and Fishery Evaluation (SAFE) reports conducted for different fisheries, to name a few. The scope of this analysis did not allow for an individual review of these resources, but they could be valuable in shaping a more focused economic analysis. These reports are available on the PFMC website (www.pcouncil.org).			

DATA GAPS AND KEY ECONOMIC QUESTIONS

DATA GAPS

This report relies upon existing information to develop a characterization of the non-tribal fishing industry in Washington's Pacific coastal waters. Generally speaking, reliable data quantifying harvest, effort, and value (in the case of commercial fishing) are readily available. Through this process, however, we identified a number of gaps in the existing information that limited our ability to develop a complete characterization of this sector. These gaps may present a similar challenge for the state's forthcoming economic analysis. The most important data issues are described briefly below.

- **Employment data**: Many fishermen are self-employed and thus are not captured in traditional sources of employment statistics. This information is critical to developing an accurate estimate of the economic impact of the industry.
- **Economic impacts of ocean-based commercial fishing:** Previous studies have provided information on the economic impact of commercial fishing in Washington. However, most analyses have included components of the industry outside the scope of interest (e.g., aquaculture, tribal fisheries and distant waters fisheries). We found very little information that helps us understand the economic impact of the specific segments of the commercial fishing industry that are of interest in developing the MSP for Washington's outer coast.
- **Economic impacts of ocean-based recreational fishing:** Previous studies have provided information on the economic impact of marine recreational fishing in Washington. However, most analyses are conducted on a statewide basis, and cannot be isolated to our study area/counties of interest. We found very little information specifically focused on the economic impacts of recreational fishing along Washington's outer coast.
- **Processor data:** Due to the expansive scope of the harvesting segment of the non-tribal fishing industry, we were not able to develop a characterization of the processing and distribution segment of the industry. Though we did identify some data sources that provide information on this industry segment, further research is needed to identify the extent to which detailed data are available to support the economic analysis.
- **Recreational Dungeness crab fishery:** DFW does not track effort or catch in the outer coast's recreational Dungeness crab fishery. Note, however, that this segment is a very small contributor to the overall recreational Dungeness crab fishery, and thus might not be critical to the economic analysis.

KEY ECONOMIC QUESTIONS

A number of existing studies have examined the economic impacts of the commercial and recreational fishing industry on the Washington economy. However, there are a number of questions not thoroughly addressed by previous research that should be considered in the design of the forthcoming economic analysis. These questions are described briefly below.

- **Definition of the potentially affected industry:** What is the most appropriate way to define and bound the fishing industry potentially affected by decisions made in the marine spatial planning process? Should the focus remain on non-tribal fisheries whose catch comes from Washington's outer coast, or should the scope of the analysis be expanded to provide a more complete understanding of the potentially affected industry and its economic reach?
    - **Distant Waters Fisheries:** To what extent do distant water fisheries (e.g., Washington-based vessels fishing in Alaska) generate revenues that are brought into the Washington state economy? Should this activity be included in the analysis?
    - **Tribal Fisheries:** What value are tribal treaty fisheries bringing to the Washington state economy? Should this activity be included in the analysis?
- **Economic contribution of outer coastal fisheries:** Nearly all available data on economic impacts identified though the present process is reported at the state level, and includes the aquaculture and/or tribal fishing industry. What economic contributions are specifically made by the fisheries operating off Washington's outer coast?
- **Indirect services:** How do/should we quantify services that are indirectly provided by the fishing industry (e.g., the indirect benefits provided by a seafood processing plant that purchases enough water from a public water supply system to reduce the share of the system's capital costs that must be borne by other members of the community, or the indirect benefits to recreational boaters that stem from dredging and other navigation improvement projects undertaken to allow commercial fishing vessels to access fishing ports).
- **Indirect recreational fishing value:** Can/should we quantify the economic contributions made to coastal communities when an individual's planned fishing trip results in the rest of his family visiting the coast, shopping, eating, and contributing to the economy?
- **Community fabric/social value:** How do/should we quantify or characterize the non-monetary contributions made by members of the fishing industry to their communities (e.g., through service on school boards, as volunteer firefighters, etc.)?

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Personal communication with Heather Reed, Washington Department of Fish and Wildlife, May 1, 2014.

Personal communication with Katie Krueger, Staff Attorney, Quileute Tribe, July 12 and October 28, 2014.

Personal communication with Larry Thevik, May 13, 2014 and July 15, 2014.

Personal communication with Lorna Wargo, Washington Department of Fish and Wildlife, May 1, 2014.

Personal communication with Mark Cedergreen, Westport Charterboat Association, May 15, 2014.

Personal communication with Michele Culver, Washington Department of Fish and Wildlife, May 1, 2014 and July 11, 2014.

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APPENDIX A

SUMMARY OF EXPERT INTERVIEWS

CONTACT NAME (AFFILIATION)	DATE OF INTERVIEW	CONTACT INFORMATION	MODE OF CONTACT
Michele Culver (WA Dept. of Fish and Wildlife, WCMAC)	May 1, 2014	Regional Director, South Sound and Olympic Peninsula Washington Department of Fish and Wildlife 48 Devonshire Road Montesano, WA 98563 Phone: 360-249-4628 ex 1211 E-mail: Michele.Culver@dfw.wa.gov	In person
Corey Niles (WA Dept. of Fish and Wildlife)	May 1, 2014	Coastal Marine Policy Lead Washington Department of Fish and Wildlife Montesano, WA 98563 Phone: 360-249-1223 E-mail: Corey.niles@dfw.wa.gov	In person
Heather Reed (WA Dept. of Fish and Wildlife)	May 1, 2014	Coastal Marine Resources Policy Coordinator Washington Department of Fish and Wildlife Phone: 360-249-1202 E-mail: Heather.Reed@dfw.wa.gov	In person
Lorna Wargo (WA Dept. of Fish and Wildlife)	May 1, 2014	Washington Department of Fish and Wildlife 48 Devonshire Road Montesano, WA 98563 Phone: 360-249-1221 (office) Mobile (new): 360-591-5872 (new mobile number) 360-489-4679 (old mobile number) E-mail: Lorna.wargo@dfw.wa.gov	In person
Daniel Ayres (WA Dept. of Fish and Wildlife)	May 1, 2014	Coastal Shellfish Manager Washington Department of Fish and Wildlife 48 Devonshire Road Montesano, WA 98563 360-249-4628 ext. 209 Mobile 360-470-3557 E-mail: Daniel.ayres@dfw.wa.gov	In person
Dale Beasley (Columbia River Crab Fisherman's Association and Coalition of Coastal Fisheries, WCMAC)	May 8, 2014	President Columbia River Crab Fishermen's Association and Coalition of Coastal Fisheries P.O. Box 461 Ilwaco, WA 98624 Phone: 360-642-3942 (h) 360-360-0096 (c) E-mail: crabby@willapabay.org	In person

CONTACT NAME (AFFILIATION)	DATE OF INTERVIEW	CONTACT INFORMATION	MODE OF CONTACT
Dwight Eager (Bell Buoy Crab Co. Inc.)	May 8, 2014	President Bell Buoy Crab Company Incorporated Foot of Valley Street P.O. Box 274 Chinook, WA 98614 Phone: 360-777-8430 (office) 360-244-0456 (cell) E-mail: deager@centurytel.net	In person
Tom Echols (Coalition of Coastal Fisheries)	May 8, 2014	Executive Director Coalition of Coastal Fisheries 806 Puget St. NE Olympia, WA 98506 Phone: 360-705-0551 Mobile: 360-951-2398 E-mail: tomechols@aol.com	In person
Larry Thevik (Commercial Fisherman)	May 13, 2014	Phone: 360-289-2647 E-mail: Thevik_rouse@yahoo.com	By phone
Mark Cedergreen (Westport Charterboat Association, WCMAC)	May 15, 2014	Executive Director Westport Charterboat Association Phone: 360-268-0445 E-mail: mvcedergreen@gmail.com	By phone

APPENDIX B

COMMERCIAL FISHERIES - LANDINGS AND EX-VESSEL VALUE DATA

EXHIBIT B-1. COMMERCIAL SALMON LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	MASON	PACIFIC	PIERCE	SNOHOMISH	THURSTON	UNKNOWN	WHATCOM	TOTAL
2004	407,795	321,912	-	2,254	-	575,186	8,359	882	-	7,893	6,011	1,330,292
2005	313,693	423,053	-	-	-	559,669	1,135	-	-	43,889	-	1,341,439
2006	179,330	77,560	-	6,012	194	455,321	5,803	-	-	49,760	-	773,980
2007	87,134	148,350	-	1,503	976	165,244	9,723	-	-	15,265	1,349	429,544
2008	48,692	108,163	16	1,634	-	306,131	22,711	-	-	28,202	-	515,549
2009	145,058	246,197	-	2,144	-	800,045	96	416	-	70	-	1,194,026
2010	191,158	472,933	-	-	-	456,359	2,225	-	959	19,378	-	1,143,012
2011	192,519	231,257	-	4,796	-	728,568	-	538	-	39,510	-	1,197,188
2012	306,770	203,226	-	13,020	37	592,808	930	774	158	59,924	175	1,177,822
2013	208,135	346,437	-	436	-	317,327	-	55	-	54,705	341	927,436

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-2. COMMERCIAL SALMON LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	MASON	PACIFIC	PIERCE	SNOHOMISH	THURSTON	UNKNOWN	WHATCOM	TOTAL
2004	$700,285	$675,939	$0	$5,563	$0	$524,356	$12,911	$1,853	$0	$9,051	$23,799	$1,953,757
2005	$758,310	$891,352	$0	$0	$0	$641,668	$1,895	$0	$0	$62,062	$0	$2,355,287
2006	$684,295	$296,525	$0	$24,453	$761	$909,596	$6,500	$0	$0	$108,893	$0	$2,031,024
2007	$335,544	$614,933	$0	$6,574	$2,408	$375,519	$27,086	$0	$0	$35,203	$5,878	$1,403,145
2008	$262,072	$436,775	$91	$7,752	$0	$637,317	$50,828	$0	$0	$54,921	$0	$1,449,755
2009	$464,127	$837,638	$0	$8,844	$0	$1,069,973	$229	$818	$0	$151	$0	$2,381,780
2010	$913,703	$2,341,189	$0	$0	$0	$751,116	$8,622	$0	$3,821	$35,941	$0	$4,054,392
2011	$799,667	$856,751	$0	$16,419	$0	$1,401,404	$0	$1,679	$0	$157,333	$0	$3,233,253
2012	$1,263,323	$939,517	$0	$72,148	$189	$1,029,751	$4,036	$2,611	$768	$115,441	$0	$3,427,785
2013	$1,007,623	$1,790,267	$0	$3,012	$0	$757,671	$0	$97	$0	$79,333	$0	$3,638,003

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-3. COMMERCIAL SALMON (CHINOOK AND COHO) NON-TRIBAL GILLNET HARVEST BY COASTAL ESTUARY (NUMBER OF FISH), 2003-2013

YEAR	CHINOOK SALMON		COHO SALMON	
	GRAYS HARBOR	WILLAPA BAY	GRAYS HARBOR	WILLAPA BAY
2003	295	7,268	6,623	66,470
2004	183	4,349	5,231	16,533
2005	379	6,523	3,073	49,001
2006	195	12,334	649	19,948
2007	514	4,112	1,687	8,218
2008	717	3,595	7,783	16,699
2009	1,193	6,868	561	75,417
2010	1,495	6,903	3,990	28,568
2011	2,121	17,059	3,628	48,173
2012	1,579	7,510	10,350	25,891
2013	85	11,432	5,941	11,545

Source: Based on data provided in PFMC 2014.

EXHIBIT B-4. COMMERCIAL DUNGENESS CRAB LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	MASON	PACIFIC	PIERCE	SAN JUAN	SKAGIT	SNOHOMISH	THURSTON	UNKNOWN	WHATCOM	TOTAL
2004	106,613	3,874,459	18,594	45,471	-	1,379,792	700	-	139,595	-	-	-	341,113	5,906,337
2005	517,912	13,511,827	16,985	-	-	5,264,931	-	670	528,909	-	-	20,967	661,760	20,523,961
2006	647,473	7,553,104	79,468	64,758	3,083	5,745,491	5,563	-	664,907	-	-	59,246	907,062	15,730,155
2007	223,841	7,010,382	59,532	6,298	-	4,344,562	3,622	-	290,573	-	-	140,074	594,613	12,673,497
2008	282,315	7,172,254	124,908	3,631	-	3,557,405	7,882	-	423,734	-	-	4,143	456,016	12,032,288
2009	51,290	4,560,595	53,822	-	-	4,352,112	2,060	-	411,356	-	-	509	363,458	9,795,202
2010	128,580	6,307,509	27,873	847,029	-	4,392,580	1,838	-	417,053	-	-	-	340,437	12,462,899
2011	355,823	9,093,337	13,418	171,524	-	4,752,031	308	15,298	491,107	29,225	-	562,496	81,276	15,565,843
2012	106,140	4,207,929	7,823	93,614	2,917	2,005,603	-	5,834	199,778	-	1,565	31,993	121,225	6,784,421
2013	216,327	8,767,773	83,333	371,380	655	6,118,435	-	487	661,028	1,582	108,765	68,503	329,514	16,727,782

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-5. COMMERCIAL DUNGENESS CRAB LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	MASON	PACIFIC	PIERCE	SAN JUAN	SKAGIT	SNOHOMISH	THURSTON	UNKNOWN	WHATCOM	TOTAL
2004	$219,546	$8,617,025	$55,608	$122,360	$0	$2,956,381	$1,689	$0	$375,199	$0	$0	$0	$970,367	$13,318,175
2005	$850,924	$22,629,161	$45,723	$0	$0	$8,751,571	$0	$1,958	$1,108,567	$0	$0	$40,090	$1,532,497	$34,960,491
2006	$1,245,383	$13,840,385	$214,998	$174,439	$6,948	$10,404,479	$11,895	$0	$1,512,886	$0	$0	$130,781	$2,210,321	$29,752,517
2007	$563,563	$17,497,017	$241,713	$23,824	$0	$10,629,596	$9,802	$0	$942,111	$0	$0	$313,453	$2,026,289	$32,247,368
2008	$804,520	$20,479,121	$518,500	$16,704	$0	$8,342,234	$39,244	$0	$1,456,284	$0	$0	$12,852	$1,678,434	$33,347,892
2009	$124,956	$11,754,163	$212,028	$0	$0	$9,019,789	$6,724	$0	$1,321,823	$0	$0	$885	$1,304,233	$23,744,601
2010	$261,453	$16,558,463	$105,399	$2,069,265	$0	$9,481,617	$5,784	$0	$1,357,743	$0	$0	$0	$1,136,892	$30,976,616
2011	$1,090,417	$28,928,782	$51,829	$652,429	$0	$12,967,165	$1,003	$69,994	$1,871,748	$143,387	$0	$2,178,470	$365,050	$48,320,273
2012	$397,974	$16,383,516	$41,532	$415,991	$11,162	$6,774,141	$0	$25,582	$867,825	$0	$7,148	$133,903	$537,498	$25,596,273
2013	$607,475	$24,947,003	$325,577	$1,346,720	$1,983	$16,658,048	$0	$2,703	$2,348,678	$4,517	$436,116	$230,800	$1,246,442	$48,156,063

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-6. COMMERCIAL GROUNDFISH (NON-WHITING) LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	PACIFIC	PIERCE	SAN JUAN	SKAGIT	SNOHOMISH	UNKNOWN	WHATCOM	TOTAL
2004	1,633,653	1,594,004	-	201	116,784	-	-	-	84,342	-	13,052,083	16,481,067
2005	1,749,069	2,053,487	898	6,213	436,664	-	-	-	77,153	15,616	6,747,419	11,086,519
2006	1,287,661	841,339	-	21,324	952,809	-	-	-	30,463	-	4,498,042	7,631,638
2007	578,846	2,062,067	-	42,836	,955	-	-	1,408	-	-	3,544,228	6,642,340
2008	686,725	2,444,852	-	9,281	462,344	-	-	-	-	-	2,548,492	6,151,694
2009	655,817	3,425,924	-	7,257	641,695	-	-	-	-	-	3,478,637	8,209,330
2010	378,521	2,562,981	-	-	1,155,537	113	-	-	-	-	3,124,163	7,221,315
2011	339,217	687,954	-	654	3,790,858	-	-	58	-	657	1,874,606	6,694,004
2012	338,819	982,102	-	-	4,174,788	73	-	-	-	1,204	1,907,786	7,404,772
2013	358,826	1,177,294	-	-	1,950,845	-	2,757	-	-	65	1,760,901	5,250,688

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-7. COMMERCIAL GROUNDFISH (NON-WHITING) LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	PACIFIC	PIERCE	SAN JUAN	SKAGIT	SNOHOMISH	UNKNOWN	WHATCOM	TOTAL
2004	$1,651,578	$1,606,154	$0	$122	$162,615	$0	$0	$0	$172,455	$0	$6,405,125	$9,998,049
2005	$1,481,263	$1,772,262	$1,595	$12,204	$781,883	$0	$0	$0	$186,161	$25,724	$4,862,356	$9,123,448
2006	$1,370,312	$752,544	$0	$55,037	$1,598,450	$0	$0	$0	$82,154	$0	$4,664,528	$8,523,024
2007	$1,091,800	$1,124,566	$0	$114,237	$742,491	$0	$0	$2,639	$0	$0	$3,223,497	$6,299,230
2008	$969,205	$1,598,712	$0	$32,177	$1,055,372	$0	$0	$0	$0	$0	$2,738,279	$6,393,744
2009	$1,216,327	$1,804,649	$0	$26,566	$1,354,567	$0	$0	$0	$0	$0	$2,957,463	$7,359,572
2010	$968,466	$1,260,842	$0	$0	$3,085,550	$179	$0	$0	$0	$0	$2,107,668	$7,422,705
2011	$1,151,218	$956,372	$0	$1,543	$5,762,738	$0	$0	$60	$0	$1,464	$2,305,729	$10,179,125
2012	$866,851	$1,144,586	$0	$0	$3,335,887	$118	$0	$0	$0	$2,271	$1,755,574	$7,105,286
2013	$628,570	$691,358	$0	$0	$2,087,810	$0	$5,934	$0	$0	$99	$1,719,569	$5,133,339

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-8. COMMERCIAL GROUNDFISH (WHITING) LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	WHATCOM	TOTAL
2004	49,836,319	7,126,642	186,508	57,149,469
2005	58,662,712	17,380,724	-	76,043,436
2006	49,248,798	18,037,239	-	67,286,037
2007	50,993,354	9,665,058	-	60,658,412
2008	35,667,617	3,933,818	-	39,601,435
2009	17,533,743	4,392,449	-	21,926,192
2010	52,782,827	10,534,358	-	63,317,185
2011	43,659,941	6,437,049	3,021	50,100,011
2012	36,813,930	3,285,152	116	40,099,198
2013	42,041,014	6,378,547	15	48,419,576

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-9. COMMERCIAL GROUNDFISH (WHITING) LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	WHATCOM	TOTAL
2004	$2,024,302	$272,420	$21,301	$2,318,023
2005	$3,563,563	$1,040,159	$0	$4,603,722
2006	$3,271,526	$1,193,447	$0	$4,464,974
2007	$4,115,707	$793,994	$0	$4,909,700
2008	$3,601,888	$382,809	$0	$3,984,698
2009	$1,136,733	$289,849	$0	$1,426,582
2010	$3,427,833	$727,124	$0	$4,154,957
2011	$4,979,147	$772,079	$378	$5,751,604
2012	$5,568,064	$524,645	$5	$6,092,714
2013	$5,436,671	$765,023	$0	$6,201,694

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-10. COMMERCIAL PINK SHRIMP LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	TOTAL
2004	3,807,105	1,573,182	5,380,287
2005	4,066,801	2,198,254	6,265,055
2006	5,205,497	977,144	6,182,641
2007	2,610,804	734,436	3,345,240
2008	4,817,481	1,472,839	6,290,320
2009	5,833,861	1,176,725	7,010,586
2010	8,292,405	1,177,668	9,470,073
2011	8,361,711	1,161,835	9,523,546
2012	8,116,412	1,236,281	9,352,693
2013	12,517,208	1,114,107	13,631,315
Source: Created from data provided by DFW, June 2014.			

EXHIBIT B-11. COMMERCIAL PINK SHRIMP LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	TOTAL
2004	$1,688,043	$673,829	$2,361,872
2005	$1,924,902	$1,073,829	$2,998,731
2006	$1,906,790	$386,028	$2,292,818
2007	$1,343,886	$360,615	$1,704,500
2008	$2,749,620	$820,698	$3,570,318
2009	$1,884,020	$435,853	$2,319,873
2010	$2,892,190	$437,997	$3,330,187
2011	$4,209,823	$567,822	$4,777,645
2012	$3,948,387	$573,748	$4,522,135
2013	$5,320,620	$499,154	$5,819,774
Source: Created from data provided by DFW, June 2014.			

EXHIBIT B-12. COMMERCIAL ALBACORE LANDINGS (LBS) AND VALUE BY PORT AREA, 2004-2013

PORT	2004		2005		2006	
	U.S.	Canadian	U.S.	Canadian	U.S.	Canadian
WESTPORT (includes other Grays Harbor ports)						
Pounds	7,069,861	-	6,233,764	-	5,942,954	-
Ex-Vessel Revenue (2014$)	$6,248,311	-	$6,646,167	-	$5,114,954	-
PACIFIC COUNTY (includes Ilwaco and Chinook)						
Pounds	8,395,174	993,388	2,947,559	730,057	11,838,454	387,207
Ex-Vessel Revenue (2014$)	$8,691,682	$1,239,442	$3,724,197	$1,040,548	$10,315,663	$407,342
BELLINGHAM BAY (includes ANACORTES)						
Pounds	706,134	970,178	518,812	115,327	745,905	44,576
Ex-Vessel Revenue (2014$)	$1,166,697	$1,658,234	$908,740	$209,930	$1,042,146	$54,879
SEATTLE						
Pounds	17,291	-	12,756	-	138,401	-
Ex-Vessel Revenue (2014$)	$20,864	-	$14,914	-	$164,205	-
TOKELAND (including all Willapa Bay ports)						
Pounds	12,342	-	703,489	-	48,550	-
Ex-Vessel Revenue (2014$)	$11,495	-	$77,323	-	$44,035	-
CLALLAM COUNTY (includes Port Angeles, Neah Bay)						
Pounds	15,298	-	10,593	-	25,011	-
Ex-Vessel Revenue (2014$)	$15,793	-	$17,243	-	$25,333	-
OLYMPIA						
Pounds	-	-	2,235	-	7,412	-
Ex-Vessel Revenue (2014$)	-	-	2,613	-	9,673	-
OTHER (includes LaPush, Port Townsend, Cathlamet, Longview, Everett, Shelton, Tacoma, Centralia, and Chehalis)						
Pounds	21,985	-	37,923	-	17,588	-
Ex-Vessel Revenue (2014$)	$19,631	-	$47,999	-	$16,969	-
TOTAL						
Pounds	16,238,085	1,963,566	10,467,131	845,384	18,764,275	431,783
Ex-Vessel Revenue (2014$)	$16,174,473	$2,897,676	$11,439,196	$1,250,479	$16,732,978	$462,221

PORT	2007		2008		2009	
	U.S	Canadian	U.S	Canadian	U.S	Canadian
WESTPORT (includes other Grays Harbor ports)						
Pounds	6,482,801	-	8,630,155	-	9,225,981	-
Ex-Vessel Revenue (2014$)	$5,871,431	-	$10,846,528	-	$9,847,094	-
PACIFIC COUNTY (includes Ilwaco and Chinook)						
Pounds	5,790,296	172,507	4,710,473	1,146,058	5,330,688	1,085,483
Ex-Vessel Revenue (2014$)	$5,136,574	$194,192	$5,707,337	$1,689,833	$5,900,594	$1,295,699
BELLINGHAM BAY (includes ANACORTES)						
Pounds	183,256	-	280,035	-	347,363	-
Ex-Vessel Revenue (2014$)	$211,548	-	$381,456	-	$433,273	-
SEATTLE						
Pounds	33,461	-	12,290	-	13,318	-
Ex-Vessel Revenue (2014$)	$38,368	-	$13,318	-	$14,323	-
TOKELAND (including all Willapa Bay ports)						
Pounds	10,265	-	5,661	-	7,067	-
Ex-Vessel Revenue (2014$)	$9,215	-	$6,470	-	$9,231	-
CLALLAM COUNTY (includes Port Angeles, Neah Bay)						
Pounds	41,725	-	5,177	-	13,257	-
Ex-Vessel Revenue (2014$)	$29,935	-	$5,414	-	$16,579	-
OLYMPIA						
Pounds	2,497	-	1,950	-	9,280	-
Ex-Vessel Revenue (2014$)	2,759	-	2,937	-	12,475	-
OTHER (includes LaPush, Port Townsend, Cathlamet, Longview, Everett, Shelton, Tacoma, Centralia, and Chehalis)						
Pounds	14,945	-	8,874	-	20,216	-
Ex-Vessel Revenue (2014$)	$11,491	-	$13,210	-	$24,830	-
TOTAL						
Pounds	12,559,246	172,507	13,654,615	1,146,058	14,967,170	1,085,483
Ex-Vessel Revenue (2014$)	$11,311,322	$194,192	$16,976,670	$1,689,833	$16,258,398	$1,295,699

PORT	2010		2011		2012		2013	
	U.S	Canadian	U.S	Canadian	U.S	Canadian	U.S	Canadian
WESTPORT (includes other Grays Harbor ports)								
Landings (lbs)	7,372,062	-	7,856,179	-	12,034,667	6,151	11,356,292	105,907
Ex-Vessel Revenue (2014$)	$7,959,994	$0	$12,079,968	$0	$17,485,710	$11,340	$14,619,778	$218,701
PACIFIC COUNTY (includes Ilwaco and Chinook)								
Pounds	4,733,122	1,025,504	4,238,422	476,171	6,425,644	22,684	4,970,868	327,757
Ex-Vessel Revenue (2014$)	$5,949,697	$1,522,418	$8,566,033	$1,166,384	$10,426,851	$37,935	$8,297,237	$661,711
BELLINGHAM BAY (includes ANACORTES)								
Pounds	501,938	-	567,180	-	669,059	-	642,965	-
Ex-Vessel Revenue (2014$)	$731,725	-	$1,217,879	-	$1,004,569	-	$903,558	-
SEATTLE								
Pounds	66,673	-	16,724	-	18,780	-	8,652	-
Ex-Vessel Revenue (2014$)	$71,875	-	$17,429	-	$19,546	-	$8,730	-
TOKELAND (including all Willapa Bay ports)								
Pounds	-	-	26,562	-	36,574	-	26,767	-
Ex-Vessel Revenue (2014$)	-	-	$51,313	-	$48,530	-	$31,209	-
CLALLAM COUNTY (includes Port Angeles, Neah Bay)								
Pounds	5,140	-	18,340	-	18,905	-	25,586	-
Ex-Vessel Revenue (2014$)	$4,911	-	$35,007	-	$26,818	-	$40,659	-

OLYMPIA								
Pounds	4,033	-	8,977	-	8,500	-	13,046	-
Ex-Vessel Revenue (2014$)	5,785	-	15,402	-	13,934	-	21,772	-
OTHER (includes LaPush, Port Townsend, Cathlamet, Longview, Everett, Shelton, Tacoma, Centralia, and Chehalis)								
Pounds	48,537	-	2,389	-	16,806	-	53,067	-
Ex-Vessel Revenue (2014$)	$64,830	-	$6,037	-	$25,885	-	$62,445	-
TOTAL								
Pounds	12,731,505	1,025,504	12,734,773	476,171	19,228,935	28,835	17,097,243	433,664
Ex-Vessel Revenue (2014$)	$14,788,817	$1,522,418	$21,989,068	$1,166,384	$29,051,843	$49,276	$23,985,388	$880,412
Source: Created from data provided by DFW, August 2014.								

EXHIBIT B-13. COMMERCIAL SPOT SHRIMP LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	GRAYS HARBOR	JEFFERSON	KING	PACIFIC	SKAGIT	WHATCOM	TOTAL
2004	112,971	1,665	21,678	1,069	-	-	137,383
2005	44,096	-	15,871	4,116	-	-	64,083
2006	10,742	174	2,640	1,681	-	-	15,237
2007	25,284	-	6,784	4,176	-	-	36,244
2008	26,393	-	-	4,164	-	-	30,557
2009	95,370	-	-	20,175	-	-	115,545
2010	142,513	-	-	1,599	15	-	144,127
2011	98,499	-	-	-	5,902	2,582	106,983
2012	36,715	-	-	-	-	-	36,715
2013	46,237	-	-	-	-	-	46,237

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-14. COMMERCIAL SPOT SHRIMP LANDINGS VALUE BY COUNTY (2014$) 2004-2013

YEAR	GRAYS HARBOR	JEFFERSON	KING	PACIFIC	SKAGIT	WHATCOM	TOTAL
2004	$240,268	$11,480	$91,477	$3,116	$0	$0	$346,341
2005	$70,517	$0	$50,989	$20,252	$0	$0	$141,758
2006	$28,874	$0	$7,486	$8,841	$0	$0	$45,202
2007	$105,185	$0	$22,487	$23,891	$0	$0	$151,563
2008	$90,365	$0	$0	$31,982	$0	$0	$122,347
2009	$285,172	$0	$0	$129,392	$0	$0	$414,564
2010	$748,897	$0	$0	$5,581	$107	$0	$754,585
2011	$386,010	$0	$0	$0	$36,905	$23,065	$445,979
2012	$189,675	$0	$0	$0	$0	$0	$189,675
2013	$102,257	$0	$0	$0	$0	$0	$102,257

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-15. COMMERCIAL SARDINE LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	PACIFIC	SKAGIT	WHATCOM	TOTAL
2004	-	7,737,990	11,958,671	-	-	19,696,661
2005	55,800	9,989,837	3,194,320	664,083	913,308	14,817,348
2006	-	5,211,114	4,410,214	-	-	9,621,328
2007	-	8,665,711	1,618,560	-	-	10,284,271
2008	-	11,342,157	2,845,054	-	-	14,187,211
2009	-	15,478,436	2,215,767	-	-	17,694,203
2010	-	24,536,263	2,758,121	-	-	27,294,384
2011	-	16,297,984	1,357,611	-	-	17,655,595
2012	-	65,544,441	11,848,582	-	-	77,393,023
2013	-	48,033,500	16,901,825	-	-	64,935,325

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-16. COMMERCIAL SARDINE LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	PACIFIC	SKAGIT	WHATCOM	TOTAL
2004	$0	$482,952	$998,392	$0	$0	$1,481,343
2005	$3,914	$570,343	$239,901	$77,597	$69,950	$961,706
2006	$0	$221,047	$277,329	$0	$0	$498,377
2007	$0	$450,189	$88,056	$0	$0	$538,245
2008	$0	$1,091,511	$358,475	$0	$0	$1,449,986
2009	$0	$1,510,162	$280,383	$0	$0	$1,790,545
2010	$0	$2,505,641	$345,769	$0	$0	$2,851,409
2011	$0	$2,054,415	$180,013	$0	$0	$2,234,428
2012	$0	$6,458,449	$1,515,478	$0	$0	$7,973,928
2013	$0	$4,561,582	$2,094,776	$0	$0	$6,656,357

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-17. COMMERCIAL ANCHOVY LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	TOTAL
2004	470,500	-	470,500
2005	361,000	-	361,000
2006	350,000	-	350,000
2007	327,260	-	327,260
2008	225,820	14,700	240,520
2009	1,680,927	108,950	1,789,877
2010	147,010	118,200	265,210
2011	334,891	86,200	421,091
2012	369,088	110,410	479,498
2013	193,190	61,960	255,150

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-18. COMMERCIAL ANCHOVY LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	TOTAL
2004	$77,118	$0	$77,118
2005	$41,785	$0	$41,785
2006	$39,698	$0	$39,698
2007	$33,247	$0	$33,247
2008	$27,125	$11,108	$38,232
2009	$80,041	$66,113	$146,154
2010	$12,720	$62,801	$75,521
2011	$26,084	$44,917	$71,001
2012	$27,961	$56,543	$84,504
2013	$16,607	$31,259	$47,866

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-19. COMMERCIAL HAGFISH LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	PACIFIC	SKAGIT	WHATCOM	TOTAL
2004	-	-	-	-	-	-	-	-
2005	-	-	-	149,390	-	-	-	149,390
2006	-	107,117	-	162,200	-	24,630	-	293,947
2007	-	242,485	-	-	-	62,151	-	304,636
2008	-	830,765	-	-	8,207	-	-	838,972
2009	-	1,188,243	-	54,141	-	-	-	1,242,384
2010	-	1,424,867	-	99,000	-	-	28,126	1,551,993
2011	800	1,348,456	-	-	195,850	-	-	1,545,106
2012	129,240	1,660,768	63,884	-	490,663	-	-	2,344,555
2013	686,365	1,218,618	-	-	162,737	22,490	142,904	2,233,114

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-20. COMMERCIAL HAGFISH LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	CLALLAM	GRAYS HARBOR	JEFFERSON	KING	PACIFIC	SKAGIT	WHATCOM	TOTAL
2004	$0	$0	$0	$0	$0	$0	$0	$0
2005	$0	$0	$0	$72,861	$0	$0	$0	$72,861
2006	$0	$62,585	$0	$76,402	$0	$31,367	$0	$170,355
2007	$0	$189,472	$0	$0	$0	$53,409	$0	$242,881
2008	$0	$579,200	$0	$0	$4,892	$0	$0	$584,091
2009	$0	$953,311	$0	$39,427	$0	$0	$0	$992,738
2010	$0	$1,258,004	$0	$92,500	$0	$0	$26,301	$1,376,805
2011	$0	$1,229,576	$0	$0	$124,698	$0	$0	$1,354,274
2012	$119,134	$1,776,966	$37,343	$0	$392,816	$0	$0	$2,326,260
2013	$546,415	$1,320,427	$0	$0	$148,869	$10,749	$138,243	$2,164,702

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-21. COMMERCIAL RAZOR CLAM LANDINGS BY COUNTY (LBS), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	UNKNOWN	TOTAL
2004	6,699	176,972	-	183,671
2005	3,524	99,375	40	102,939
2006	44,244	87,102	3,315	134,661
2007	62,773	77,843	-	140,616
2008	61,744	143,339	551	205,634
2009	64,405	185,614	-	250,019
2010	4,461	262,373	-	266,834
2011	8,364	178,517	-	186,881
2012	13,105	121,969	50	135,124
2013	14,441	204,430	30,427	249,298

Source: Created from data provided by DFW, June 2014.

EXHIBIT B-22. COMMERCIAL RAZOR CLAM LANDINGS VALUE BY COUNTY (2014$), 2004-2013

YEAR	GRAYS HARBOR	PACIFIC	UNKNOWN	TOTAL
2004	$12,119	$313,265	$0	$325,383
2005	$6,583	$174,269	$70	$180,923
2006	$75,294	$145,313	$5,641	$226,248
2007	$107,099	$126,179	$0	$233,278
2008	$116,474	$268,011	$1,045	$385,529
2009	$111,907	$326,072	$0	$437,979
2010	$8,296	$450,246	$0	$458,542
2011	$16,627	$324,162	$0	$340,790
2012	$27,880	$241,542	$108	$269,529
2013	$36,397	$477,275	$71,026	$584,697

Source: Created from data provided by DFW, June 2014.

APPENDIX C

RECREATIONAL FISHING SUB-SECTOR DATA TABLES

EXHIBIT C-1. RECREATIONAL RAZOR CLAM HARVEST AND EFFORT BY BEACH, 2003-2013

YEAR	LONG BEACH		TWIN HARBORS		COPALIS		MOCROCKS		KALALOCH		COAST-WIDE	
	HARVEST (CLAMS)	EFFORT (DIGGER TRIPS)	HARVEST (CLAMS)	EFFORT (DIGGER TRIPS)	HARVEST (CLAMS)	EFFORT (DIGGER TRIPS)	HARVEST (CLAMS)	EFFORT (DIGGER TRIPS)	HARVEST (CLAMS)	EFFORT (DIGGER TRIPS)	HARVEST (CLAMS)	EFFORT (DIGGER TRIPS)
2003-04	1,290,978	109,483	840,317	70,593	462,520	36,702	586,135	39,969	145,625	10,306	3,325,575	267,053
2004-05	1,696,283	118,491	525,984	40,110	1,239,173	84,121	591,167	40,426	74,263	5,368	4,126,870	288,516
2005-06	1,378,575	97,768	410,698	33,040	817,228	60,618	647,658	44,291	30,039	5,051	3,284,198	240,768
2006-07	1,751,151	126,812	773,572	55,630	466,620	31,847	595,492	42,967	14,404	2,591	3,601,239	259,847
2007-08	1,227,519	112,441	825,539	65,252	636,376	42,376	341,406	22,248	0	0	3,030,840	242,317
2008-09	1,031,223	94,845	565,138	41,288	963,497	68,384	656,309	44,211	0	0	3,216,167	248,728
2009-10	1,422,020	105,817	840,119	60,165	1,000,413	75,822	496,303	37,092	46,373	4,548	3,805,228	283,444
2010-11	1,170,069	87,417	813,417	66,566	674,714	50,533	531,766	37,749	14,345	2,163	3,204,311	244,428
2011-12	1,063,066	82,847	563,138	40,632	348,837	26,212	597,700	44,002	2,952	1,283	2,575,693	194,976
2012-13	2,382,398	165,238	1,537,299	106,278	1,393,686	95,700	764,726	51,783	0	0	6,078,109	418,999
2013-14	2,423,612	181,240	1,714,479	119,872	1,102,421	75,198	1,044,692	74,736	0	0	6,285,204	451,046
Average	**1,441,328**	**110,116**	**769,522**	**57,955**	**800,306**	**57,232**	**580,866**	**40,474**	**29,818**	**2,846**	**3,624,823**	**268,908**

Source: Created from data provided by DFW, June 2014

EXHIBIT C-2. RECREATIONAL BOTTOMFISH HARVEST BY PORT (MT) 2004-2013

YEAR	NEAH BAY/LA PUSH			WESTPORT			ILWACO/CHINOOK			COASTWIDE		
	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL
2004	14.40	178.02	192.42	311.88	8.83	320.71	16.46	3.12	19.58	342.74	189.97	532.72
2005	25.23	120.30	145.52	173.63	56.41	230.04	10.35	3.36	13.71	209.20	180.07	389.27
2006	19.37	96.32	115.68	266.54	7.70	274.24	15.11	2.13	17.24	301.02	106.15	407.17
2007	17.80	75.73	93.53	215.66	7.12	222.77	11.23	4.94	16.17	244.69	87.79	332.47
2008	14.90	52.96	67.86	158.05	3.33	161.38	6.11	2.77	8.88	179.06	59.06	238.12
2009	22.53	74.37	96.90	185.62	7.82	193.44	6.21	4.08	10.29	214.36	86.27	300.63
2010	18.91	117.47	136.38	175.89	7.15	183.04	10.57	4.21	14.78	205.36	128.83	334.20
2011	23.67	123.96	147.63	245.63	12.91	258.53	19.00	5.57	24.57	288.30	142.43	430.74
2012	20.63	104.53	125.16	248.96	9.64	258.61	17.62	5.78	23.40	287.21	119.95	407.17
2013	26.49	117.00	143.49	237.52	13.47	250.98	13.59	5.21	18.80	277.59	135.67	413.27

Source: Created from data provided by DFW, June 2014

EXHIBIT C-3. RECREATIONAL BOTTOMFISH EFFORT BY PORT (NUMBER OF ANGLER TRIPS) 2004-2013

YEAR	NEAH BAY/LA PUSH			WESTPORT			ILWACO/CHINOOK			COASTWIDE		
	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL
2004	167	3,012	3,179	10,987	1,548	12,535	631	459	1,090	11,785	5,019	16,804
2005	566	4,520	5,086	12,480	1,577	14,057	634	630	1,264	13,680	6,727	20,407
2006	384	3,975	4,359	15,390	1,662	17,052	841	475	1,316	16,615	6,112	22,727
2007	589	4,328	4,917	13,931	1,509	15,440	517	791	1,308	15,037	6,628	21,665
2008	874	3,397	4,271	13,462	1,176	14,638	688	721	1,409	15,024	5,294	20,318
2009	659	3,492	4,151	10,882	1,637	12,519	341	630	971	11,882	5,759	17,641
2010	781	6,035	6,816	9,788	1,483	11,271	655	781	1,436	11,224	8,299	19,523
2011	732	6,649	7,380	11,836	1,921	13,756	1,197	907	2,104	13,764	9,477	23,241
2012	662	6,065	6,727	13,474	1,854	15,328	1,050	1,107	2,156	15,186	9,026	24,211
2013	745	7,393	8,138	12,745	2,217	14,962	1,090	1,112	2,202	14,580	10,722	25,302

Source: Created from data provided by DFW, June 2014

EXHIBIT C-4. RECREATIONAL HALIBUT HARVEST (LBS) BY PORT 2004-2013

YEAR	NEAH BAY/LA PUSH			WESTPORT			ILWACO/CHINOOK			COASTWIDE		
	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL
2004	49,836	72,597	122,433	61,615	1,208	62,823	7,022	509	7,531	118,474	74,313	192,787
2005	40,349	67,799	108,148	53,160	1,685	54,845	5,169	1,981	7,150	98,678	71,465	170,143
2006	27,665	78,140	105,805	57,051	1,433	58,484	7,805	3,200	11,005	92,522	82,772	175,294
2007	22,193	44,237	66,430	50,836	330	51,166	6,441	2,509	8,950	79,471	47,075	126,546
2008	42,734	64,118	106,852	32,569	7,828	40,397	6,182	3,511	9,693	81,484	75,458	156,942
2009	31,108	71,674	102,782	32,399	7,197	39,596	5,193	3,066	8,259	68,699	81,938	150,637
2010	28,143	66,871	95,014	30,198	4,354	34,552	5,097	3,145	8,242	63,439	74,369	137,808
2011	26,276	77,465	103,741	35,180	9,920	45,100	5,678	1,979	7,657	67,134	89,364	156,498
2012	18,220	87,259	105,479	34,305	8,162	42,467	3,714	2,191	5,905	56,240	97,611	153,851
2013	16,629	91,227	107,856	33,873	8,213	42,086	2,912	1,765	4,677	53,414	101,205	154,619

Source: Created from data provided by DFW, June 2014

EXHIBIT C-5: RECREATIONAL HALIBUT EFFORT BY PORT (NUMBER OF FISHING TRIPS) 2004-2013

YEAR	NEAH BAY/LA PUSH			WESTPORT			ILWACO/CHINOOK			COASTWIDE		
	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL	CHARTER	PRIVATE	TOTAL
2004	1,559	4,847	6,406	3,854	138	3,992	566	70	636	5,979	5,055	11,034
2005	1,067	4,156	5,223	3,061	182	3,243	374	205	579	4,502	4,543	9,045
2006	763	4,379	5,142	2,318	160	2,478	432	325	757	3,513	4,864	8,377
2007	895	4,200	5,095	2,241	44	2,285	459	215	674	3,595	4,459	8,054
2008	1,059	4,229	5,288	1,947	461	2,408	458	432	890	3,464	5,122	8,586
2009	1,027	4,177	5,204	2,110	535	2,645	375	182	557	3,512	4,894	8,406
2010	847	3,887	4,734	1,941	298	2,240	303	274	576	3,090	4,459	7,550
2011	903	5,058	5,961	2,049	507	2,556	397	151	548	3,348	5,716	9,065
2012	521	5,581	6,102	2,017	610	2,627	384	252	636	2,922	6,443	9,365
2013	253	5,339	5,592	2,178	690	2,868	372	201	573	2,803	6,230	9,033

Source: Created from data provided by DFW, June 2014

EXHIBIT C-6. RECREATIONAL OCEAN SALMON (CHINOOK AND COHO) LANDINGS (NUMBERS OF FISH) BY PORT 2003-2013

YEAR	CHINOOK SALMON					COHO SALMON				
	NEAH BAY	LA PUSH	WESTPORT	ILWACO	TOTAL STATEWIDE	NEAH BAY	LA PUSH	WESTPORT	ILWACO	TOTAL STATEWIDE
2003	4,697	1,888	21,814	5,784	34,183	19,749	3,407	39,267	76,673	139,096
2004	5,515	1,830	11,340	6,222	24,907	29,400	3,163	29,336	51,037	112,936
2005	2,784	1,651	22,373	9,561	36,369	10,218	2,320	10,508	28,724	51,770
2006	1,417	1,670	5,815	1,765	10,667	6,023	1,884	8,779	19,401	36,087
2007	1,471	595	5,247	1,631	8,944	10,608	2,769	22,992	47,419	83,788
2008	1,357	736	9,644	2,898	14,635	2,161	541	7,528	8,640	18,870
2009	2,447	680	5,023	4,202	12,351	13,336	6,896	53,868	64,392	138,493
2010	3,299	1,177	26,989	5,409	36,874	3,687	1,180	12,607	18,805	36,278
2011	2,983	1,535	19,089	5,596	29,203	3,054	2,050	13,843	20,634	39,582
2012	5,552	1,278	19,486	7,414	33,729	7,548	2,243	11,924	9,719	31,434
2013	6,245	2,355	13,689	6,629	28,918	6,506	2,798	20,377	16,459	46,140

Source: PFMC 2014

EXHIBIT C-7. RECREATIONAL OCEAN (CHINOOK AND COHO) SALMON FISHING EFFORT IN ANGLER TRIPS BY PORT 2003-2013

YEAR	NEAH BAY	LA PUSH	WESTPORT	ILWACO	TOTAL STATEWIDE
2003	20,449	4,369	48,049	52,000	124,867
2004	26,141	4,563	38,189	43,811	112,704
2005	18,410	4,961	35,170	32,054	90,595
2006	13,409	4,143	24,541	23,170	65,263
2007	13,367	3,268	25,916	30,132	72,683
2008	6,370	2,071	18,731	10,439	37,610
2009	16,471	5,077	37,831	42,181	101,560
2010	11,549	3,836	38,428	27,141	80,955
2011	11,069	4,237	33,545	24,744	73,596
2012	13,439	3,926	33,545	22,970	77,659
2013	15,362	4,266	35,889	24,496	80,014

Source: PFMC 2014

EXHIBIT C-8. RECREATIONAL OCEAN PINK SALMON HARVEST (NUMBERS OF FISH) BY PORT 2003-2013

YEAR	NEAH BAY	LA PUSH	WESTPORT	ILWACO	TOTAL STATEWIDE
2003	8,125	905	4,359	18	13,407
2005	2,893	210	154	3	3,260
2007	4,033	126	503	8	4,670
2009	7,136	231	261	-	7,627
2011	7,473	1,520	1,832	3	10,828
2013	5,997	643	1,024	4	7,668

Source: PFMC 2014

EXHIBIT C-9. SPORTFISHING SALMON (CHINOOK AND COHO) CATCH (NUMBERS OF FISH) BY ESTUARY 2003-2013

YEAR	CHINOOK SALMON		COHO SALMON	
	GRAYS HARBOR	WILLAPA BAY	GRAYS HARBOR	WILLAPA BAY
2003	1,162	3,242	12,026	5,726
2004	6,223	3,889	9,847	2,361
2005	553	4,820	10,919	3,892
2006	1,763	5,551	2,151	806
2007	1,773	2,579	4,450	955
2008	-	2,988	3,266	1,167
2009	860	4,623	16,288	6,461
2010	1,995	3,303	12,455	5,096
2011	3,049	8,349	14,569	5,680
2012	4,416	5,957	17,706	5,030
2013	-	NA	NA	NA

Source: PFMC 2014