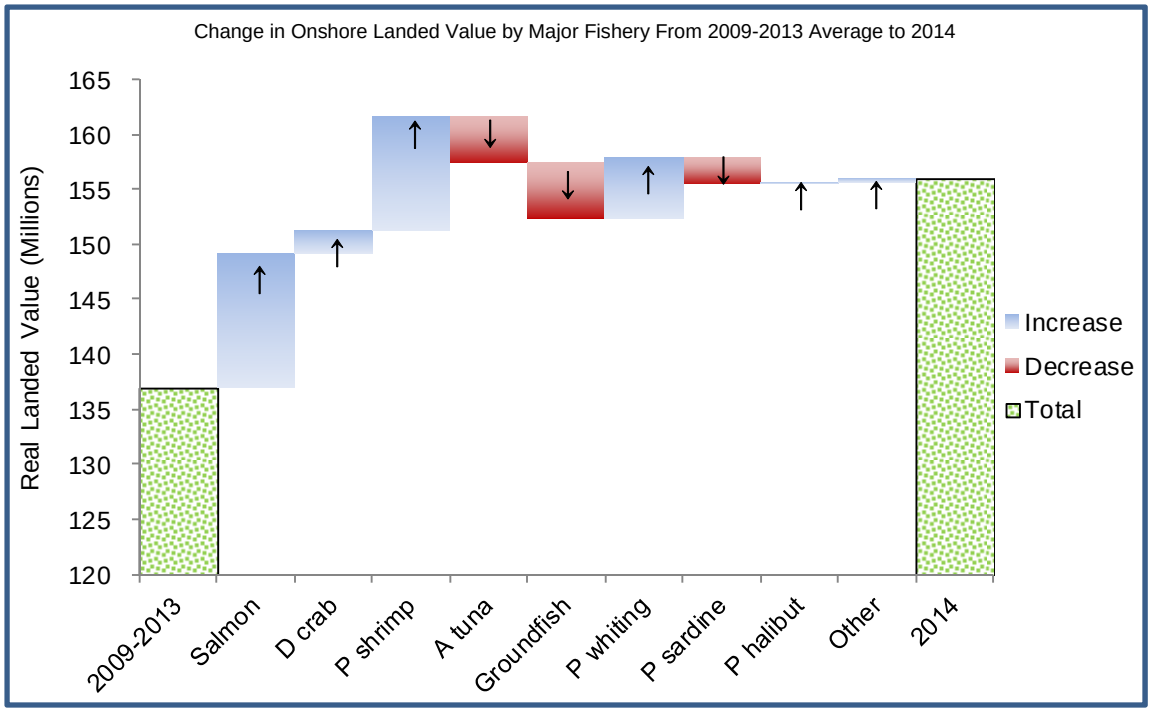
OREGON'S COMMERCIAL FISHING INDUSTRY

Year 2013 and 2014 Review



Oregon Department of Fish and Wildlife

and

Oregon Coastal Zone Management Association

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Year 2013 and 2014 Review

Version 2.1

prepared by

The Research Group, LLC
Corvallis, Oregon

prepared for

Oregon Department of Fish and Wildlife

and

Oregon Coastal Zone Management Association

September 2015

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PREFACE

This study was sponsored by the Oregon Department of Fish and Wildlife (ODFW) and administered by the Oregon Coastal Zone Management Association (OCZMA). The OCZMA is a voluntary association of over 40 local coastal governments comprised of counties, cities, ports, Indian tribe, and soil and water conservation districts. The ODFW contract manager was John Seabourne and the OCZMA administrator was Georgia York.

The study consultant was The Research Group, LLC, Corvallis, Oregon (TRG). Shannon Davis was the principal author and was greatly assisted by Kari Olsen. Dr. Chris Carter (retired ODFW economist) and William Jenkins (current ODFW economist) were instrumental participants in the study conduct. Dr. Gil Sylvia (Superintendent, Coastal Oregon Marine Experiment Station) was consulted on marketing, organizational, and research needs for the industry. Dr. Hans Radtke (independent consulting economist) provided insights on the processing sector. Market reports from seafoodsource.com, minato-tsukiji.com, globefish.org, firstchoice.com, alaskaseafood.org, and other sources were scrutinized. Oregon Department of Agriculture commodity commissions' staff provided valuable interpreted information about fisheries. Industry trade associations' staff and board members gave advice and understandings about their member activities. Many other management agencies' personnel and industry participants are thanked anonymously for providing industry information and perspectives about the harvesting and processing sectors.

TRG has assisted ODFW and OCZMA in the past with economic analysis studies. For this current report, sections from the ODFW and OCZMA previous reports are embellished and/or repeated where applicable so readers do not have to review the more extensive background material. Several other serial reports about Oregon fisheries were relied upon for data and there were conversations with ODFW staff, other government agencies staff, and fishing industry representatives. Standard technical writing practices would demand their citing. For readability reasons, full bibliographies and references to personal communication are not always included in this summary report.

This report was reviewed in draft form for the purpose providing candid and critical comments that were to assist in making study results as sound as possible and to ensure that the report meets standards for objectivity, evidence, and responsiveness to the study charges. Although the reviewers have provided many useful comments and suggestions, they were not asked to endorse study findings and recommendations. The authors are solely responsible for making certain independent examination of this report was carried out in accordance with accustomed procedures and that review comments were carefully considered.

The authors' interpretations and conclusions should prove valuable for this study's purpose, but no absolute assurances can be given that the described results were interpreted correctly or that outlook statements will be realized. Government legislation and policies, market circumstances, and other situations can affect the basis of assumptions in unpredictable ways and lead to unanticipated changes. The information should not be used for investment or operational decision making. The authors do not assume any liability for the information and shall not be

responsible for any direct, indirect, special, incidental, or consequential damages in connection with the use of the information.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADFG	Alaska Department of Fish and Game
BRD	bycatch reduction device
CFEC	Alaska Commercial Fisheries Entry Commission
CFF	Commercial Fish Fund
COMES	Coastal Oregon Marine Experiment Station
CPS	coastal pelagic species
CPUE	catch per unit effort
EEZ	exclusive economic zone
EFH	essential fish habitat
EFP	exempted fishing permit
ENSO	El Niño/Southern Oscillation
ESA	Endangered Species Act
FCMA	Fishermen's Collective Marketing Act
FEAM	Fishery Economic Assessment Model
FMP	fishery management plan
HMS	highly migratory species
IBQ	individual bycatch quota
IFQ	individual fishing quota
IPQ	individual processor quota
ITQ	individual transferable quota
LAB	Legislative Approved Budget
LE	limited entry
MRP	Marine Resource Program
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSC	Marine Stewardship Council
mt	metric tons
NMFS	National Marine Fisheries Service, now called NOAA Fisheries
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
OA	open access
OCZMA	Oregon Coastal Zone Management Association
ODFW	Oregon Department of Fish and Wildlife
ONI	Oceanic Niño Index
OY	optimum yield
PacFIN	Pacific Fisheries Information Network (PacFIN is sponsored by the Pacific States Marine Fisheries Commission)
PDO	Pacific Decadal Oscillation
PFMC or Council	Pacific Fishery Management Council
QP	quota pounds
QS	quota share
RBFM	rights based fishery management
RCA	rockfish conservation area
RFMO	regional fishery management organization
TCEY	total constant exploitation yield
TRG	The Research Group, LLC
U.S.	United States
VMS	vessel monitoring system
WDFW	Washington Department of Fish and Wildlife
WCGOP	West Coast Groundfish Observer Program

OREGON'S COMMERCIAL FISHING INDUSTRY
Year 2013 and 2014 Review

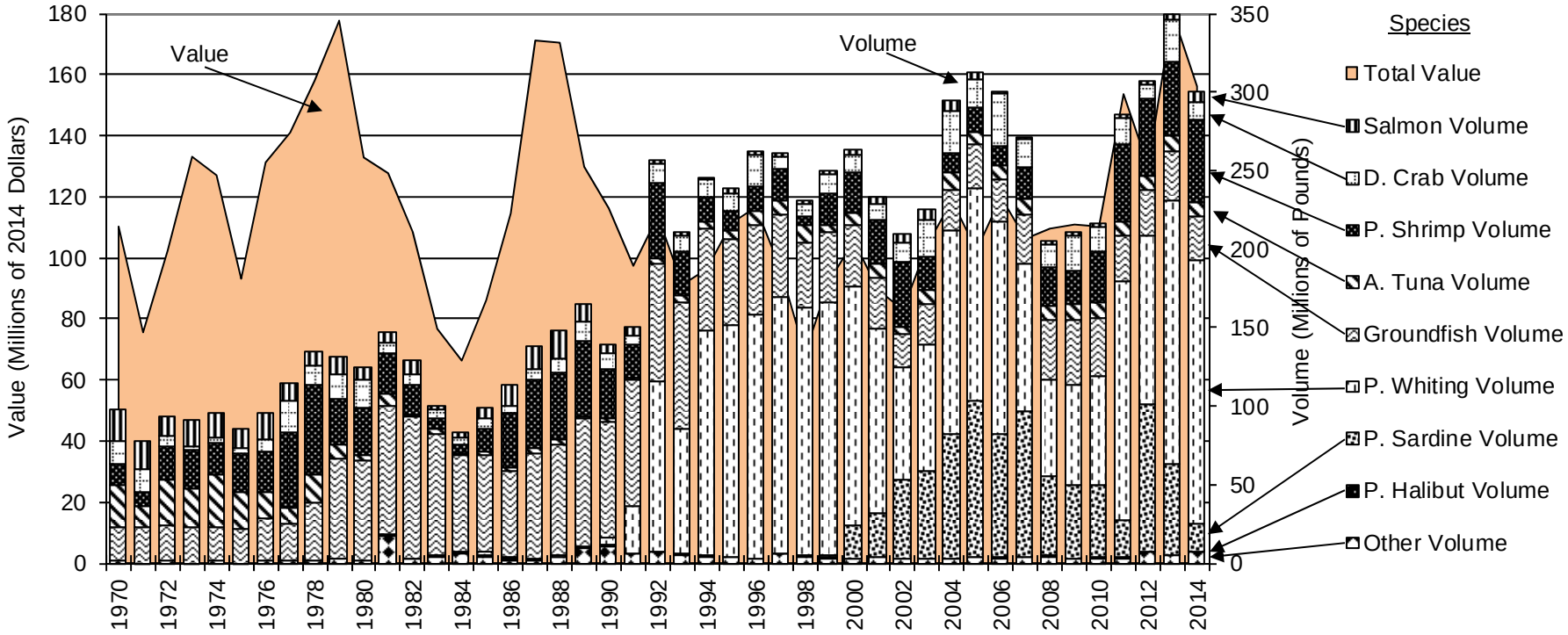
SUMMARY

This report section summarizes results from a study sponsored by the Oregon Department of Fish and Wildlife and administered by the Oregon Coastal Zone Management Association that provides information about Oregon's commercial fishing industry. The information includes descriptions for harvests, fleets, processors, distant water fisheries, industry local and state level economic contributions, and current issues facing the industry. Historical trends are offered, and the years 2013 and 2014 are discussed in detail. The report is a biennium serial publication.

The study results show 2013 and 2014 were good years for the industry, although some harvesters and processors dependent on certain fisheries had disruptions in their business opportunities. There were 349.4 and 300.4 million pounds of fish delivered to Oregon ports in 2013 and 2014 respectively (Figure S.1). Salmon totaled about 3.5 and 6.4 million pounds in those years and were mostly delivered in the Astoria area. (Astoria area deliveries include harvests from ocean as well as Columbia River inriver gillnet and treaty fisheries.) The central and southern Oregon Coast (south of Cape Falcon to the Oregon-California border) had traditional salmon fishery open days, and catch rates allowed for moderate increases in harvested volume. Total salmon catch in 2014 was the highest in the last 10 years. Dungeness crab volume increased to 26.1 million pounds in 2013, but then was about half that at 11.9 million pounds in 2014. (The crab season starts on December 1 if not delayed by meat recovery rate or health standards and runs through August 14 of the following year, so calendar year landing compilations can mix season conditions.) Shrimp volume dropped slightly to 47.6 million pounds in 2013, but increased to a 36-year high of 52.0 million pounds in 2014. Albacore tuna volume increased to 10.2 million pounds in 2013, then fell back 14 percent to 8.8 million pounds in 2014. Groundfish (mostly black cod and flatfish) volume increased to 31.1 million pounds in 2013, and then decreased to 28.4 million pounds in 2014. There were significant increases in Pacific whiting landings (167.5 million pounds in 2013 and rose to a 34-year high 168.2 million pounds in 2014). Pacific sardine volume decreased to 58.0 million pounds in 2013, and dropped to a 14-year low of 17.2 million pounds in 2014. Halibut remained about the same as in the previous seven years at 205 thousand pounds in 2013 and 206 thousand pounds in 2014. Other fisheries volume in 2013 and 2014 (such as chub and jack mackerel, hagfish, and red sea urchins) did not change much between 2013 and 2014.

The harvest value of all Oregon onshore landings (sometimes called ex-vessel value) in 2013 was $180.0 million, a 43-year high, but decreased in 2014 to $156.1 million, the second highest in 25 years. (All harvest value, prices, and economic contributions are adjusted for inflation and expressed in 2014 dollars.) The record high harvest value in 2013 is explained by high volumes which overcame price decreases from 2012 levels, such as for Dungeness crab and some groundfish species. Prices for most fisheries remained steady between 2013 and 2014, except Dungeness crab shot up and albacore tuna decreased. Year-over-year harvest

Figure S.1
Onshore Landed Value and Volume by Major Fishery in 1970 to 2014



Notes:
1. Salmon includes landings of steelhead, which have come exclusively from the treaty Indian fisheries since 1975.
2. D. crab includes only Dungeness crab; p. shrimp includes only pink shrimp; and a. tuna includes only albacore tuna, except a. tuna includes landings of albacore, yellowfin and skipjack tuna for 1970 to 1979. Essentially all tuna landings from 1980 forward are albacore.
3. Groundfish includes landings of halibut and Pacific whiting until 1980. Pacific whiting (also known as hake) did not emerge as a major fishery species until after 1990. Groundfish in 2013 and 2014 includes (respectively, in thousands of round pounds) flatfish (19,503, 16,527), sablefish (3,844, 3,297), and other species (7,763, 8,551).
4. Biological studies have found the northern population of the Pacific sardine has a three decade or so abundance cycle, and did not emerge as a major fishery species until 2000 in the latest cycle.
5. 'Other' in 2013 and 2014 includes landings (respectively, in thousands of round pounds) of chub mackerel (968, 2,585), hagfish (2,741, 1,845), jack mackerel, (272, 1,765), red sea urchins (651, 505), and other species (566, 620). Shellfish volume excludes aquaculture harvests.
6. Landing data is preliminary for 2014.

value was down 13.3 percent in 2014 from the previous year.

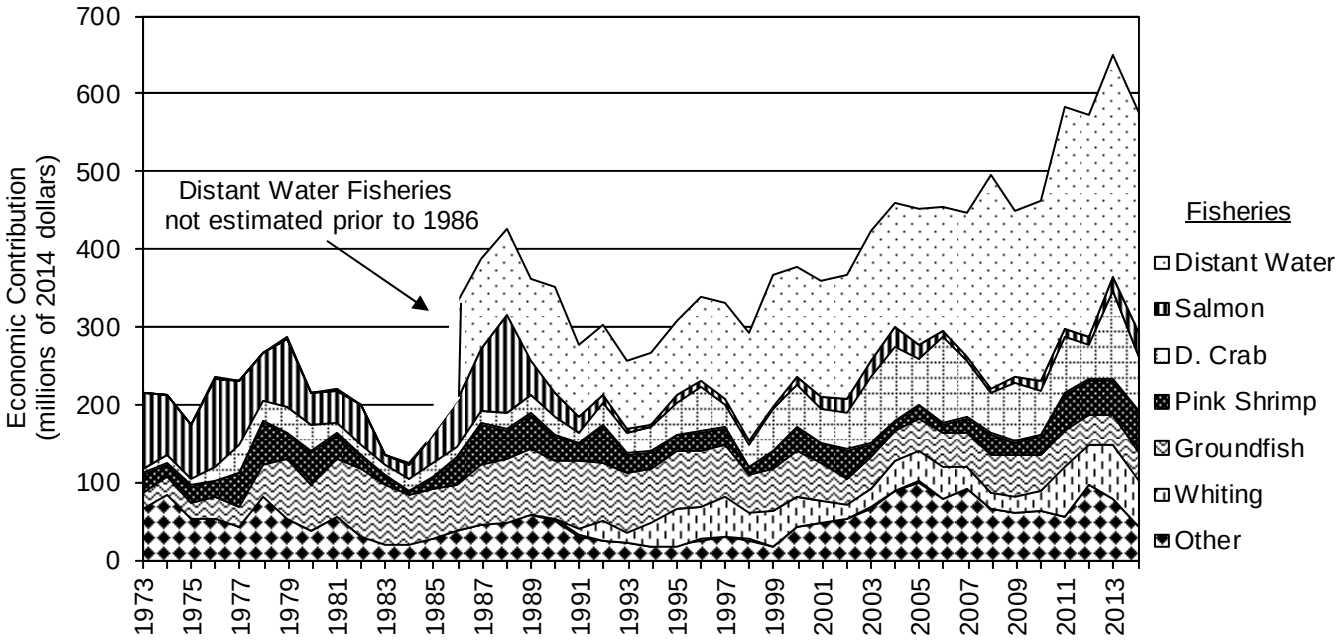
Consumers view seafood as a higher price food commodity and general economic conditions weaken spending for this protein. Lower consumer demand will place downward pressures on wholesale prices that ultimately lower harvest level prices. The world seafood supply/demand situation for substitute Oregon products, foreign currency rates, and distributor hold-over inventories also will influence harvest level prices in any given year. Example price changes can be illustrated in reviewing two fisheries. Average black cod price decreased to $2.00 in 2013 after a record year at $3.58 in 2011. The price recovered to $2.45 in 2014 largely due to the price strength of fixed gear caught fish. The black cod market is both domestic and export to Japan. There was market resistance to the higher prices in 2011 and hold-over inventories decreased prices in more recent years. The per pound harvest price for Pacific whiting rose to $0.140 in 2012 as the Eastern European market for headed and gutted product forms strengthened. However, partly due to international market disruption for the fillet and H&G product forms from the U.S. and European Ukraine conflict sanctions and retaliatory Russian seafood import ban, Pacific whiting prices fell to $0.124 in 2013 and fell again to $0.109 in 2014. With the decreased demand for fillet and H&G product, a higher proportion of Pacific whiting was directed to be used in surimi production in 2014.

While individual fisheries harvest value is an important indicator for showing commercial fishing industry trends, the health of the industry has a social context for the well-being of harvester participants, processor workers, managers/enforcers, and ultimately the public which favors and enjoys Oregon origin seafood products. There are other measurements to use for indicator accounting, such as participant and delivery activity counts, and regional economic contributions that include the multiplier effect.

There was a total of 929 active vessels (active means delivered more than $500 in harvest value; about one in 20 vessels that make any deliveries lands less than $500) with an Oregon home-port (port group where a vessel delivered the most, measured by revenue) in 2014. There were 30.7 thousand deliveries to Oregon ports from harvests in ocean and Columbia River catch areas in 2014. There was a total of 192 active first-purchasers (purchased more than $500) in 2014. (First purchasers can be buyers that sell to processors, businesses that do process fish into seafood products, restaurants, and the public buying directly from vessels. Using a $500 threshold will tend to filter the latter two buyer types.) The total estimated seafood product wholesale value (sometimes called ex-processor value) of the Oregon onshore harvests was $226 million in 2014. Another intermediary economic value that is difficult to calculate because Oregon produced products get dispersed into many domestic and foreign markets would account for exports and other distribution chain transactions before it reaches the consumer.

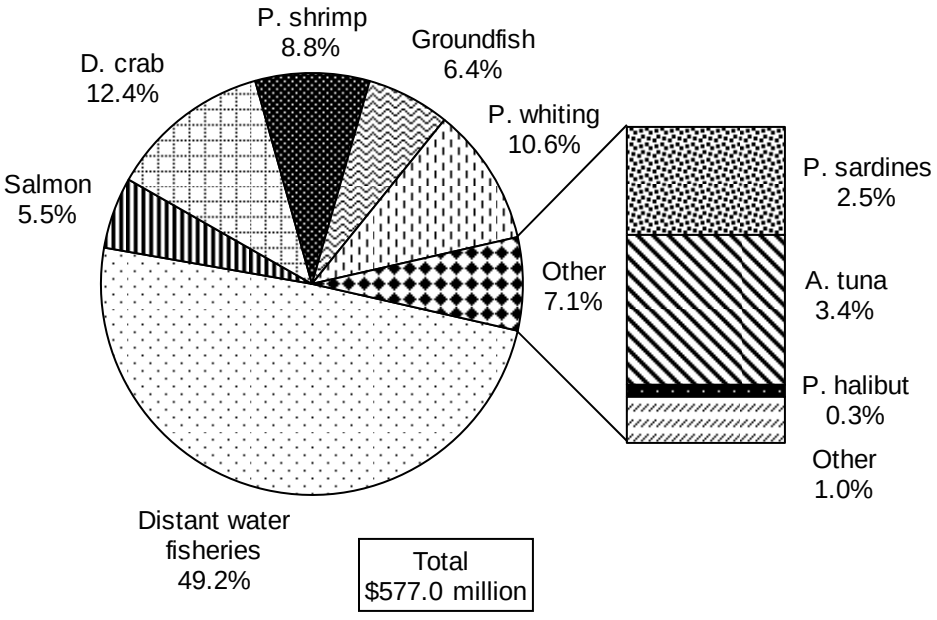
The 2014 commercial onshore fisheries generated a total of $293 million economic contribution to Oregon's economy (measured by personal income), which is down from the $366 million generated in 2013 (Figures S.2 and S.3). (This income includes the so called multiplier effect.) The estimated distant water fisheries economic contribution in 2013 was $286 million and in 2014 was $284 million. (The distant water fisheries are West Coast offshore

Figure S.2
Economic Contributions From Onshore Landings in 1973 to 2014
and Distant Water Fisheries in 1986 to 2014



Notes: 1. Economic contributions are expressed as total personal income in millions of 2014 dollars.

Figure S.3
Economic Contributions by Major Fishery in 2014



Notes: 1. Economic contributions are expressed as total personal income in millions of 2014 dollars.

fishing and fishing that takes place in Alaska and the western Pacific.) So the total estimated total personal income generated by the Oregon commercial fishing industry in 2014 is $577 million. Based on average earnings in Oregon, the economic contribution is equal to about 15,334 part and full-time equivalent jobs. Using a decade for a comparison period to iron out natural abundance cycles, Year 2014 economic contribution is about 15 percent higher than the average of the previous 10 years. The commercial fishing industry annually pays about $53 million in state and local taxes each year.

These large number economic measurements show the importance and integration of this industry with the Oregon Coast and State's residents and visitors. However, those involved in the industry know its vagaries: part-time employment, changes in abundances, dangerous weather conditions, volatile prices, and seeming unending surprises in management and regulations. Families and businesses must be dynamic and flexible to survive and prosper. Their resilience is appreciated by all those that consume Oregon origin seafood.

The fishing industry is becoming more industrialized. Fewer vessels are participating and those that do participate require higher annual revenues to be a viable business. The trend in processor ownership consolidation and centralization of operations continues. Some landings are hauled out-of-state, precluding the need for local labor and support businesses.

Goals for the industry would be to extract more value from the fishery resources that are available. Raising resource value has several challenges. There will be continuing price pressures on seafood products from substitute aquaculture products. Consumer concerns about quality (freshness, inclusions of toxics, etc.) will affect seafood product demands. Considerations about health and wholesomeness of natural coldwater fish could be a marketing advantage to Oregon's industry. Modernization of vessels for better handling capabilities and initial onboard processing, and modernization of processing plants will improve seafood products. Assistance through industry trade associations, Oregon Department of Agriculture commodity commissions, Oregon State University Sea Grant and Extension Service, and other entities for developing marketing strategies that will gain market power for Oregon seafood products should help the industry raise value at all levels of seafood production.

I. INTRODUCTION

A. Background

This report's purpose is to provide attribute descriptions and economic contribution estimates for the Oregon commercial fishing industry in 2013 and 2014. Descriptions include the total volume (fish weight) and value (revenue realized by harvesters) of landings in Oregon.[1] Harvester and processor characteristics are explained. An estimate of economic contribution from onshore landings made to the State and local economies is provided. An estimate for the economic contribution generated by revenue received in distant water fisheries is also described.[2] Statements are offered about stock abundances, management measures, harvesting and processing technologies, seafood markets, and structural issues that the industry is currently facing.

B. Data Sources and Definitions

Study results are expressed in different measurements. Landings are either measured by weight in round pounds or value in revenue received by harvesters. Round pounds are either the actual weight of fish when purchased by the buyer or processor, or the weight corrected by an adjustment factor in the case that the fish was dressed (such as gutted, gilled, and headed) when sold to the buyer or processor. Payments to harvesters (sometimes called harvester revenue or ex-vessel value) is simply the amount of the transaction between the harvester and the purchaser, which is usually a seafood processor. A harvester can also sell directly to the public through provisions of a special license. The value of seafood products with primary manufacturing in Oregon is called first wholesale value (sometimes also called ex-processor value). All values, prices, and economic impact estimates have been adjusted to real dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis, except where noted.

Landing data is mostly from ODFW's annual pounds and value reports. Other landing data is from the Pacific Fisheries Information Network (PacFIN) extraction dated April 2015. Both of these information sources use fish ticket data. Fish tickets are issued to a harvester when there is delivery of catch to a buyer or processor or sale of catch to the public. The ODFW gets copies of the tickets, compiles this information, and then uploads it to the PacFIN system.[3] Landing information includes harvests made in the Pacific Ocean, Columbia River, and several other Oregon locations. The other locations include Yaquina Bay for a herring fishery, Alsea Bay for a crab fishery, and a small amount of shellfish and crayfish caught at inland locations. Both non-Indian and treaty commercial fisheries are included in the landings. Treaty ceremonial and subsistence fisheries are not included; they are a relatively minor quantity. For some of the analysis, shellfish harvests from State and private lands, which are not issued fish tickets, have been added to the landing data. Reported characteristics for the crab fishery are calendar years, while crab season management is generally for the period December 1 through August 14. The crab season opening can be delayed if crab fill-out or health standards are not met.

This report's intent is to provide summary level descriptions about commercial fisheries as soon as possible after data becomes available. However, the early harvest information data for the current years used in the report is subject to verifications and updates. The tabulations

and analysis must be considered preliminary. Most tables and graphs in the report have source information that shows database extraction dates so that reader will know the data status.

A vessel's home-port group is defined as the port group where a vessel made the most annual landings by harvest value. Home-port counts will differ from the number of vessels that make landings at Oregon ports, since some vessels delivering in Oregon may have home-ports elsewhere. Counts exclude those vessels that may moor at Oregon ports, but only participate in distant water fisheries. Counts will also exclude those vessels that generally make landings at Oregon ports, but for some reason are inactive during any one year. Counts will exclude vessels that deliver within tribal fisheries, since vessels are not uniquely identified within those fisheries.

The number of onshore deliveries to a buyer or processor is defined to be fish ticket counts and may be slightly higher than trip counts since a vessel may elect to deliver to more than one buyer or processor following a trip.

This report's annual catch per unit effort (CPUE) applied to major fisheries and calculated by volume divided by deliveries should be considered a general indicator.[4] Time, labor, equipment, etc. dedicated to actual harvesting is not always reflected in delivery counts. Different fishing strategies and the mix of species caught could vary on the same trip. Distance to fishing grounds, gear used, vessel licensing limitations, weather conditions, captain avidity, etc. will be distributed across the statistics. Further, fisheries management changes year-by-year and the fleet response to the changes can be counter to a ratio statistic's meaning.

A more rigorous effort statistical treatment would include more information about fisheries' central tendency measures. Variance is an especially important descriptor in fisheries, because measures typically have wide ranges. For example, harvest prices vary within the season and vary within each delivery depending on fish quality and size. Selling catches is a negotiated transaction that can have a different price for each sale.

Landings are not filtered for harvests from research, illegal fishing activities, full retention fisheries, weigh backs, confiscated overages, and personal use. Excluding zero value landings will cause average annual price to be higher in some species.

Vessel fishery harvest participation is highly variable. For example, it can be shown that the Pareto principle generally applies to vessel harvest volume in most fisheries. The principle states that about 20 percent of total participants will harvest about 80 percent of the volume. This skewness is hidden when vessel revenue measurement is a fleet average.

Some measurements used in this report stratify vessels for landing more than $500 harvest value in a year. This is to help account for fish ticket database errors as well as to assist in segregating vessels into a class where a serious economic event is occurring. The threshold may have some justification for showing the vessel is active in the fishery, but it is not necessarily an indicator it is a vessel's targeted fishery.

Another simplifying assumption is the modeling being mostly based on linear relationships between variables. Many economic behavior relationships and certainly biological growth functions are

non-linear over time or between causation and effect.

These statistical caveats are not typically mentioned unless they are important to qualifying descriptions when averages or totals are the measures. This hides clarity to favor brevity, and the reader is encouraged to look at other fishery descriptive reports by the authors or others if more detail is desired about a fishery or vessel class.

The distant water fisheries economic contribution estimates are modeled using current data from North Pacific Fishery Management Council (NPFMC), NOAA Fisheries, U.S. Energy Information Administration, Alaska Commercial Fisheries Entry Commission (CFEC), and Alaska Department of Fish and Game (ADFG). The model is an extension of an investigation reported by The Research Group (TRG) (1999). An annual fishery change index is developed and applied to the earlier modeling results.

The harbors where landings are made and their assigned port groups are shown on Figure I.1. The Astoria port group includes Gearhart/Seaside and Cannon Beach; Tillamook port group includes Garibaldi, Netarts, Nehalem, and Pacific City; Newport port group includes Depoe Bay and Waldport; Coos Bay port group includes Florence, Winchester Bay, and Bandon; and Brookings port group includes Port Orford and Gold Beach.

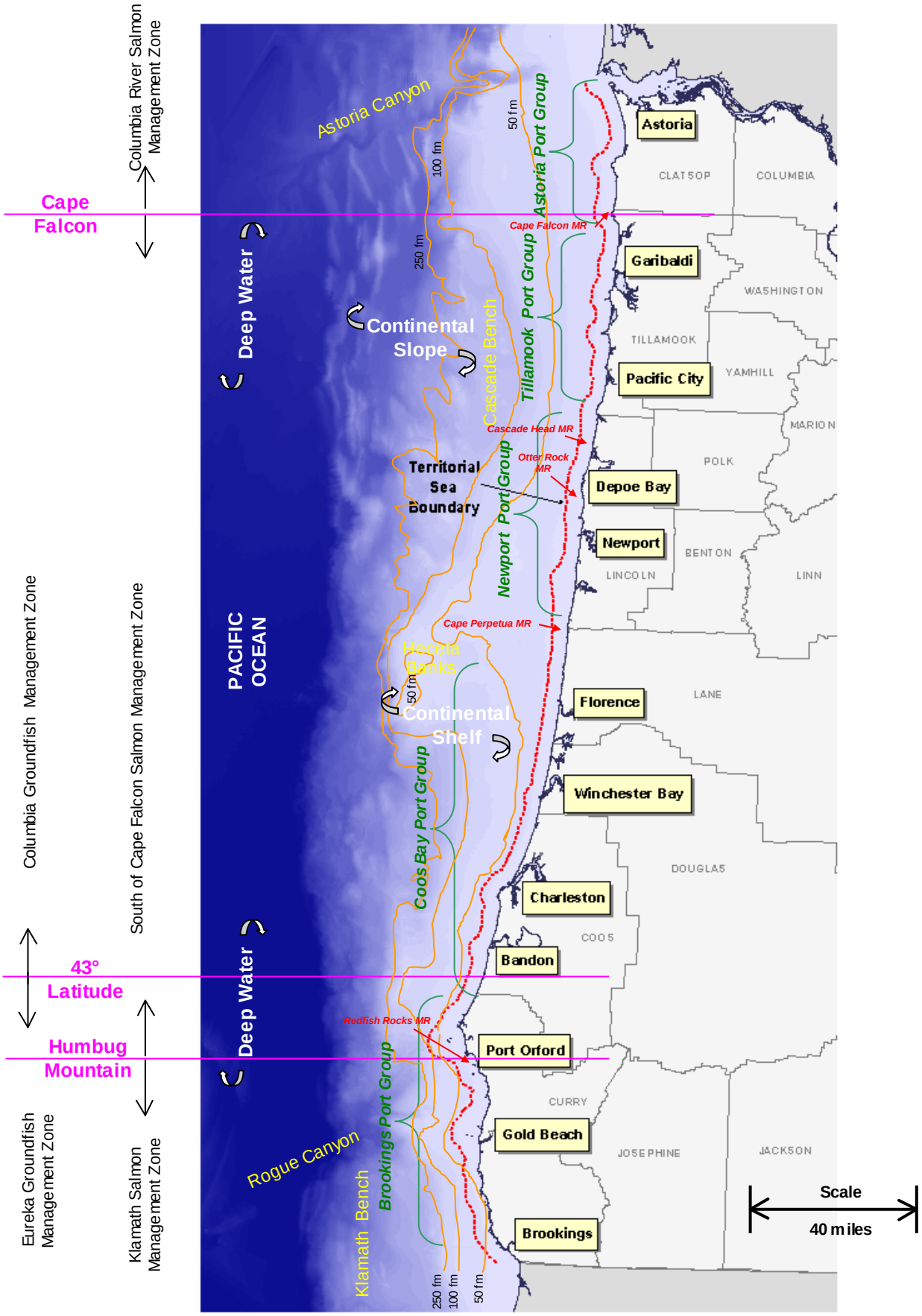
Figure I.1 shows some general latitudinal demarcations for groundfish and salmon fisheries management zones. The bathymetric boundary between the continental shelf and slope and Oregon's territorial sea boundary is also shown. The map does not show many of the fishery management boundaries and area closures. For example, refined depth contours were used for the first time in 2003 for federally managed groundfish fishery area closures. Oregon has developed a nearshore groundfish fishery plan whose management overlays federal groundfish fishery jurisdiction. There are several late season salmon bubble fisheries that usually occur within Oregon's territorial sea. While not intended to be used for fishery management purposes, Oregon has established a system of five small marine reserves that have added to permanent fishery area closures. The purpose of the marine reserves includes providing research opportunities for determining whether there are biodiversity and fish resource abundance changes in areas that were once open to fishing.

C. Economic Analysis Methods

1. Economic Contribution

Measuring the economic contributions from activities such as harvesting, processing, and distributing seafood products requires development of economic models to show how the dollar flows within and between industries and reaches households in Oregon. Seafood landed and processed in coastal communities and shipped out of state to major markets, such as Los Angeles, is an export that brings in new money to coastal communities as well as the State of Oregon in general. Revenue generated by delivery to at-sea processors, fishing in Alaska, or other fisheries and returned to Oregon in terms of crew shares, profits, and payments for repair and maintenance can also be considered a source of export earnings. The spending and respending of these revenues from local harvesters, local processors, and distant water harvesters creates additional wages and profits for workers and proprietors in the general economy. The

Figure I.1
Port Groups and Fishery Management Zones



Note: MR = marine reserve site.
Source: Ocean and Coastal Program, Oregon Department of Land Conservation and Development.

sum of all of these dollar flows (in economic jargon, the direct, indirect, and induced effects) that end up in households is called total personal income.

This study did not estimate the impacts of other activity, such as those by visitors drawn to fishing industry attractions, special fishery management and enforcement centers, fish resource education and research institutions, etc. These economic activity generators bring new money into communities and their impact can be considerable.

The Fishery Economic Assessment Model (FEAM) was developed and has been updated for this project to calculate fishing industry economic contributions. The FEAM is a derivation of the IMPLAN input-output model. FEAM results are estimates of the total personal income derived from the commercial fishing industry for local economies and for the State of Oregon economy. The FEAM is more fully described in William Jensen Consulting (1996), and more recently by Seung and Waters (2006). The FEAM calculates economic contributions using response coefficients based on revenue flows and expenditure categories of harvesters and processors. A fleet classification scheme is central to the development of the FEAM where effort, revenues and expenditures are tracked by types of commercial fishing vessels. A processor classification scheme separates first purchasers into size categories that detail expenditures for workers and other costs of manufacturing. The fleet and processor classification schemes used in this study are more fully described in TRG (2006).

The economic contribution factors associated with fisheries (defined by species and gear groups) in 2013 are contained in Appendix A. Factors for the port group level are also available from the authors. An analyst might find the factors useful as a tool to calculate the economic impacts from marginal changes to fisheries. For example, the factors could be used to show the economic impacts to the State's economy if for some reason (management, natural abundances, etc.) there was a reduction in a certain fishery's harvest. Or the average value of a proportion of a fishery could be calculated. It is suggested the analyst consult TRG (2003) for procedures to determine marginal and average economic contributions.

2. Other Economic Activity Measurement Units

The economic contribution estimates are for the commercial fishing activity that is associated with harvesting and primary processing. Economic contribution is an expedient albeit arbitrary choice to define total economic value for the commercial fishing industry. There are other metrics that can be used as indicators. For example, Appendix A contains the factors to determine the total added value of harvests as it moves into the market distribution chain.

The data and analysis problem for determining economic contribution is tracking how much the coastal and State economy is benefiting after primary processing. Informal interviews with seafood distributors and retailers tell us that much more seafood consumed in Oregon is imported than comes from local harvests. Further, the degree of economic activity that can have substitution increases downstream of primary processing. Therefore, to have economic contribution measurements that can be compared with other basic industries, a decision is made to limit the extent of

producer involvement at the primary processor level.

This study uses personal income to measure economic contribution. The derived personal income is a portion of a household's net earnings. This component of total personal income includes wages, salaries, and proprietorship income. To measure economic effects using job numbers, the simple ratio of areawide employment counts to net earnings was used. Even other economic activity measurements can be made. Gross business output and gross value added (gross output less intermediate goods used up in production) can be calculated from study modeling results. It is left to future research prompted by analyst interest to make these other economic calculations.

3. Fiscal Impact Measurement Units

Fiscal impact measurement units can be approximated with the assumption that there are causal and integral relationships to areas' total personal income. The relationships could be used to show effects to local property taxes and fees as well as State level income taxes and fees.[5] It might be argued that current levels of countywide total property assessed value are being maintained by economic activity. Then district tax rates based on property value can be used to show the proportion of taxes being contributed by the fishing industry sector. The fishing industry's general property and personal property valuation subject to taxation would be related to its estimated business asset value plus a share of downstream supporting business and household property valuation.[6] There are many property valuation exemptions that make such an estimate difficult.

A thorough analysis would be necessary to show total marginal fiscal impacts for the purpose of evaluating changes. A change from industrial development can include costs (like roads, schools, and other public services) as well as adding to local property tax bases (University of Nevada Economic Development Center 1996).

The specific fees charged to the commercial fishing industry to help offset ODFW government services is estimated and discussed in this study. Assessments on landing value used to fund commodity commissions are also estimated. Other local and state fees are mentioned, but not estimated.

D. Report Contents

Report contents first include a chapter that describes statewide landings history and trends, fishing fleet characteristics, and other port specific information. The next chapter provides some detail about Oregon's major fisheries that includes statements about the fishery's near-term outlook. Seafood processing businesses are then described in a separate chapter. This is followed by a chapter about the economic contribution that the commercial fishing industry makes at the State and local level. The last chapter discusses current structural and fisheries management issues facing the industry.

II. LANDING HISTORY

A. Landings Overview

Total landed volume in Oregon in 2014 decreased to 300.4 million pounds compared to 349.4 million pounds in 2013 and 306.7 million pounds at the end of the previous biennium Year 2012 (Table II.1 and Table A.1). The overall ex-vessel value in 2014 was $156.1 million, which was down from $180.0 million in 2013 and up from the previous biennium Year 2012 of $130.2 million (Table II.2). Figure II.1 shows the ex-vessel value change in 2014 as compared to the previous five year average. The volume in 2014 was the fifth highest level in the last 25 years, and the value was the second highest in those years. The increased value in 2013 and 2014 is related to a mix of up and down trends in individual fisheries:

- Chinook salmon volume caught in the ocean with troll gear and landed in Oregon in 2013 and 2014 was dramatically up from the previous biennium years average ending in 2012 for both the north and south of Cape Falcon catch areas; catch south of Cape Falcon was more than triple the previous biennium average; prices were slightly down from 2012; the coastwide seasonal average price was $4.95 per pound in 2014.

- Increased landing volume for Chinook and coho salmon caught in the Columbia River using net gear in 2013 and 2014 from the previous biennium years average, but there was price erosion following 2012.

- Dungeness crab landing volume in 2012 was a 14-year low, but rebounded in 2013 only to be followed by an off year in 2014 that was about half the volume as in 2013; Year 2014 price was over 16 percent higher than the previous biennium ending year.

- Increased volume in pink shrimp in 2014 is the highest since 1978, and prices increased by about three percent over the previous two years biennium.

- Price of albacore tuna has generally decreased in the last few years, while landings have been steady; the value in 2011 at $2.03 per pound was the highest since 1978. The price decreased from that high to $1.26 in 2014.

- Slightly increased landings for non-whiting groundfish during 2013 and 2014 over the previous biennium years, but prices decreased; sablefish (over a third share of groundfish revenue in 2013 and 2014) prices continued downwards in 2013 before rising in 2014 causing overall harvest value to decrease over previous biennium years.

- Landings of Pacific whiting in 2013 and 2014 were 30 percent higher than the annual average 2011 to 2012 period; prices decreased from a record high in 2012, but the increased volume caused the overall harvest value in 2013 to be a record high.

- Sardine harvest in 2013 dipped to less than two-thirds of 2012, then dropped again in 2014 to less than a third of 2013; prices decreased in 2013 from the previous biennium, then nearly doubled in 2014.

Table II.1
Onshore Landed Volume by Major Fishery in 1981 to 2014

Year	Salmon	D. Crab	P. Shrimp	A. Tuna	Groundfish	P. Whiting	P. Sardine	P. Halibut	Other	Total
1981	7,009	6,981	25,904	7,693	81,835	360	--	150	17,614	147,546
1982	8,572	7,020	18,429	1,855	90,084	3	--	234	2,581	128,779
1983	2,669	5,332	6,532	3,397	77,369	143	--	579	3,952	99,972
1984	3,595	4,999	4,844	1,594	61,309	746	--	1,055	5,702	83,844
1985	6,570	7,358	14,840	1,518	61,920	1,950	--	813	4,276	99,245
1986	13,792	4,658	33,884	2,461	54,883	927	--	1,314	1,599	113,517
1987	15,094	5,991	44,589	2,288	67,176	403	--	916	1,925	138,383
1988	17,789	9,417	41,846	3,967	70,495	543	--	582	3,486	148,126
1989	11,724	11,676	49,129	1,080	81,047	196	--	916	9,640	165,408
1990	5,412	9,510	31,883	2,079	73,305	5,058	--	622	11,033	138,903
1991	5,344	4,924	21,711	1,259	80,847	29,109	--	544	6,136	149,875
1992	2,364	11,908	48,033	3,896	75,215	107,939	9	712	6,744	256,820
1993	1,848	10,456	26,923	4,754	81,303	78,970	1	663	5,377	210,294
1994	1,285	10,638	16,386	4,698	64,265	143,563	0	540	4,226	245,602
1995	2,862	11,954	12,106	5,034	55,066	147,355	--	543	3,655	238,574
1996	2,842	19,302	15,727	8,948	57,002	155,590	0	310	2,731	262,452
1997	2,245	7,777	19,560	9,168	52,703	162,782	0	377	6,267	260,877
1998	1,978	7,410	6,096	10,603	41,806	157,895	2	237	4,375	230,402
1999	1,560	12,347	20,451	4,553	44,119	160,965	1,710	350	3,339	249,394
2000	3,142	11,180	25,462	8,757	39,311	151,461	21,005	331	2,774	263,423
2001	5,266	9,690	28,482	8,959	31,645	117,673	28,176	253	3,527	233,671
2002	6,119	12,444	41,584	4,362	21,102	71,220	50,069	529	2,684	210,112
2003	6,722	23,930	20,546	9,165	25,934	80,648	55,683	342	2,662	225,632
2004	5,936	27,273	12,207	10,754	25,590	130,238	79,610	345	2,264	294,217
2005	4,688	17,730	15,784	8,087	27,231	135,503	99,450	357	3,609	312,439
2006	1,814	33,316	12,195	8,536	27,395	135,186	78,634	251	3,216	300,543
2007	1,384	17,026	20,125	10,468	30,881	94,360	92,911	244	3,598	270,997
2008	1,923	13,888	25,520	8,864	37,922	61,466	50,593	243	4,345	204,765
2009	2,312	21,854	22,153	10,072	41,400	62,988	47,357	234	2,442	210,811
2010	2,774	15,868	31,463	10,700	36,855	69,530	45,971	186	3,270	216,618
2011	2,422	17,260	48,314	9,682	28,936	151,464	24,302	217	3,222	285,821
2012	1,927	8,666	49,144	9,886	28,475	107,652	93,957	197	6,811	306,716
2013	3,513	26,073	47,629	10,205	31,111	167,499	57,956	205	5,198	349,390
2014	6,414	11,915	51,960	8,777	28,375	168,226	17,171	206	7,319	300,362

Notes:
1. Landings are reported in thousands of round pounds.
2. Salmon includes landings of steelhead, which have come exclusively from the treaty Indian fisheries since 1975.
3. D. crab includes only Dungeness crab; p. shrimp includes only pink shrimp; and a. tuna includes only albacore tuna.
4. Pacific whiting (also known as hake) did not emerge as a major fishery species until after 1990. Groundfish in 2013 and 2014 includes (respectively, in thousands of round pounds) flatfish (19,503, 16,527), sablefish (3,844, 3,297), and other species (7,763, 8,551).
5. Biological studies have found the northern population of the Pacific sardine has a three decade or so abundance cycle, and did not emerge as a major fishery species until 2000 in the latest cycle.
6. 'Other' in 1981 was almost all scallops, and 1989 to 1990 bump was predominantly sea urchins. 'Other' in 2013 and 2014 includes landings (respectively, in thousands of round pounds) of chub mackerel (968, 2,585), hagfish (2,741, 1,845), jack mackerel, (272, 1,765), red sea urchins (651, 505), and other species (566, 620). Shellfish volume excludes aquaculture harvests.
7. Landing data is preliminary for 2014.

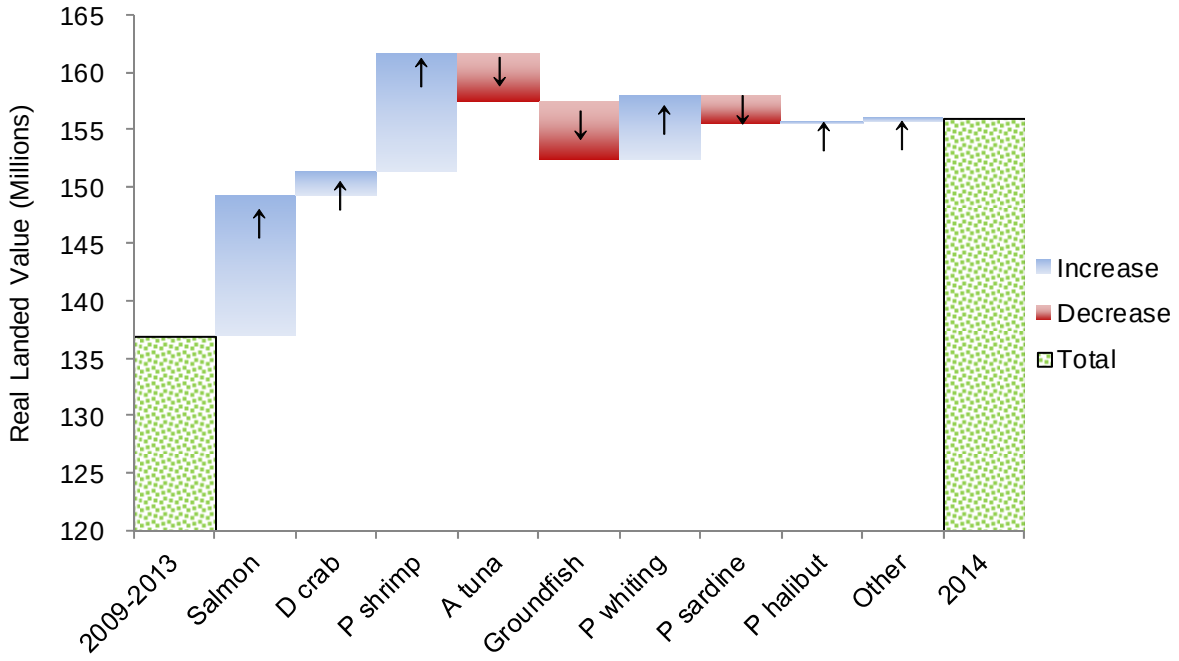
Source: ODFW Table 4 and 42 for years 1970 to 1980; PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions for years 1981 to present.

Table II.2
Onshore Landed Value by Major Fishery in 1981 to 2014

	Price	Salmon		Dungeness Crab		Pink Shrimp		Albacore Tuna		Groundfish		Pacific Whiting		Pacific Sardine		Pacific Halibut		Other		Total	
Year	Index	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal
1981	44.9	24,593	11,047	14,936	6,709	29,017	13,034	14,819	6,657	32,269	14,496	56	25	--	--	356	160	11,609	5,215	127,655	57,344
1982	47.7	25,926	12,356	15,806	7,533	19,449	9,269	2,582	1,230	42,099	20,064	0	0	--	--	559	266	2,062	983	108,483	51,702
1983	49.5	6,138	3,040	15,968	7,910	9,403	4,658	3,803	1,884	37,042	18,349	48	24	--	--	1,273	631	3,081	1,526	76,756	38,023
1984	51.3	9,978	5,118	15,101	7,746	4,197	2,153	1,730	888	29,205	14,981	114	59	--	--	1,584	813	4,433	2,274	66,343	34,031
1985	52.9	17,108	9,056	20,125	10,654	9,891	5,236	1,548	819	31,975	16,927	327	173	--	--	1,508	798	3,633	1,923	86,116	45,587
1986	54.0	28,108	15,181	12,196	6,587	33,569	18,131	2,453	1,325	32,129	17,353	111	60	--	--	3,479	1,879	2,508	1,355	114,555	61,871
1987	55.3	48,786	26,994	15,093	8,351	54,712	30,273	3,036	1,680	44,014	24,353	62	34	--	--	2,572	1,423	2,868	1,587	171,143	94,696
1988	57.3	68,132	39,020	19,696	11,280	29,945	17,150	5,811	3,328	41,963	24,033	72	41	--	--	1,531	877	3,289	1,883	170,439	97,612
1989	59.5	23,914	14,228	22,797	13,564	30,094	17,905	1,490	887	42,390	25,221	25	15	--	--	2,187	1,301	6,834	4,066	129,731	77,187
1990	61.7	15,514	9,573	23,586	14,554	25,328	15,629	2,858	1,764	37,512	23,147	356	220	--	--	1,805	1,114	9,252	5,709	116,211	71,710
1991	63.8	9,141	5,828	11,705	7,462	18,942	12,076	1,536	979	45,197	28,814	2,149	1,370	--	--	1,603	1,022	7,108	4,531	97,381	62,083
1992	65.2	5,654	3,687	20,531	13,388	26,357	17,187	6,086	3,969	41,016	26,745	7,788	5,078	--	--	1,269	828	4,946	3,225	113,648	74,106
1993	66.8	3,633	2,425	17,822	11,898	13,349	8,912	5,816	3,883	41,399	27,638	3,429	2,289	--	--	1,291	862	4,422	2,952	91,160	60,859
1994	68.2	2,141	1,459	21,213	14,462	14,119	9,626	5,500	3,750	42,197	28,769	6,304	4,298	--	--	1,488	1,015	3,348	2,282	96,309	65,662
1995	69.6	5,134	3,574	28,799	20,044	12,355	8,599	5,819	4,050	44,501	30,974	10,058	7,000	--	--	1,352	941	3,283	2,285	111,300	77,467
1996	70.9	4,639	3,288	36,940	26,180	13,209	9,362	10,483	7,430	42,719	30,275	5,851	4,147	--	--	993	704	1,748	1,239	116,583	82,623
1997	72.1	3,845	2,772	20,303	14,636	10,973	7,910	10,184	7,342	38,823	27,987	9,464	6,823	--	--	965	695	1,952	1,407	96,508	69,573
1998	72.9	3,554	2,590	17,180	12,519	4,376	3,189	8,975	6,540	26,747	19,491	5,155	3,756	1	1	444	323	2,188	1,595	68,620	50,005
1999	73.9	2,763	2,042	31,262	23,107	12,948	9,571	5,119	3,784	30,023	22,192	8,006	5,917	116	86	936	692	1,420	1,050	92,594	68,441
2000	75.6	5,330	4,029	31,361	23,709	13,482	10,192	9,906	7,489	32,239	24,373	8,044	6,081	1,520	1,149	923	698	2,661	2,012	105,465	79,732
2001	77.3	7,561	5,847	24,956	19,296	9,778	7,560	9,776	7,559	26,390	20,405	5,344	4,132	2,093	1,619	624	482	2,866	2,216	89,387	69,116
2002	78.5	8,831	6,933	26,444	20,761	14,460	11,353	3,760	2,952	18,100	14,210	4,101	3,219	3,591	2,819	1,291	1,013	2,406	1,889	82,984	65,149
2003	80.1	11,076	8,869	46,354	37,117	6,308	5,051	7,705	6,169	22,071	17,673	4,549	3,642	3,673	2,941	1,075	860	1,453	1,163	104,263	83,487
2004	82.3	15,795	12,995	52,210	42,954	5,762	4,740	11,115	9,145	19,863	16,342	5,641	4,641	5,919	4,870	1,063	875	1,420	1,168	118,788	97,730
2005	84.9	12,291	10,438	31,320	26,597	8,127	6,901	10,381	8,816	21,756	18,475	8,369	7,107	7,300	6,199	1,055	896	1,811	1,538	102,409	86,965
2006	87.5	5,644	4,940	61,473	53,807	5,135	4,494	9,217	8,067	22,773	19,933	9,110	7,974	4,276	3,743	876	766	1,378	1,206	119,881	104,931
2007	89.9	5,187	4,662	42,511	38,202	10,421	9,365	10,536	9,468	22,810	20,497	7,234	6,501	5,064	4,551	945	849	1,529	1,374	106,237	95,468
2008	91.6	4,629	4,240	31,839	29,164	15,218	13,939	11,628	10,651	29,415	26,943	7,456	6,830	6,185	5,665	988	905	2,196	2,012	109,555	100,349
2009	92.3	3,839	3,544	45,932	42,404	7,380	6,813	11,026	10,179	30,475	28,135	4,029	3,720	5,731	5,291	726	670	1,759	1,624	110,898	102,380
2010	93.5	8,237	7,698	35,041	32,746	11,752	10,982	13,293	12,422	27,426	25,629	5,793	5,414	5,620	5,252	792	740	2,258	2,111	110,214	102,996
2011	95.4	7,064	6,737	46,855	44,690	25,800	24,607	19,675	18,766	29,817	28,439	17,318	16,518	3,346	3,192	1,196	1,141	2,512	2,395	153,582	146,485
2012	97.1	7,132	6,925	29,984	29,114	25,424	24,685	15,528	15,077	24,547	23,834	15,048	14,611	9,245	8,977	993	965	2,248	2,183	130,150	126,370
2013	98.5	12,602	12,418	72,263	71,209	24,510	24,153	16,317	16,079	22,653	22,322	20,707	20,405	6,393	6,299	997	982	3,581	3,529	180,023	177,396
2014	100.0	20,124	20,124	47,988	47,988	29,326	29,326	11,023	11,023	21,810	21,810	18,274	18,274	3,522	3,522	1,149	1,149	2,911	2,911	156,127	156,127

Notes:
1. Nominal value is the revenue received by fishermen/harvesters in the landing year. Real value is in thousands of 2014 dollars.
2. Groundfish in 2013 and 2014 includes landings (respectively, real ex-vessel value in thousands) of sablefish ($7,706, $8,076), flatfish ($10,000, $8,651), and other species ($4,947, $5,083). 'Other' in 2013 and 2014 includes (respectively, real ex-vessel value in thousands) hagfish ($2,335, $1,514), chub mackerel ($81, $325), red sea urchins ($371, $285), and other species ($794, $788). Shellfish value excludes private lands harvest.
3. Notes and sources from volume table concerning species composition also apply to this table.

Figure II.1
Change in Onshore Landed Value by Major Fishery From 2009-2013 Average to 2014



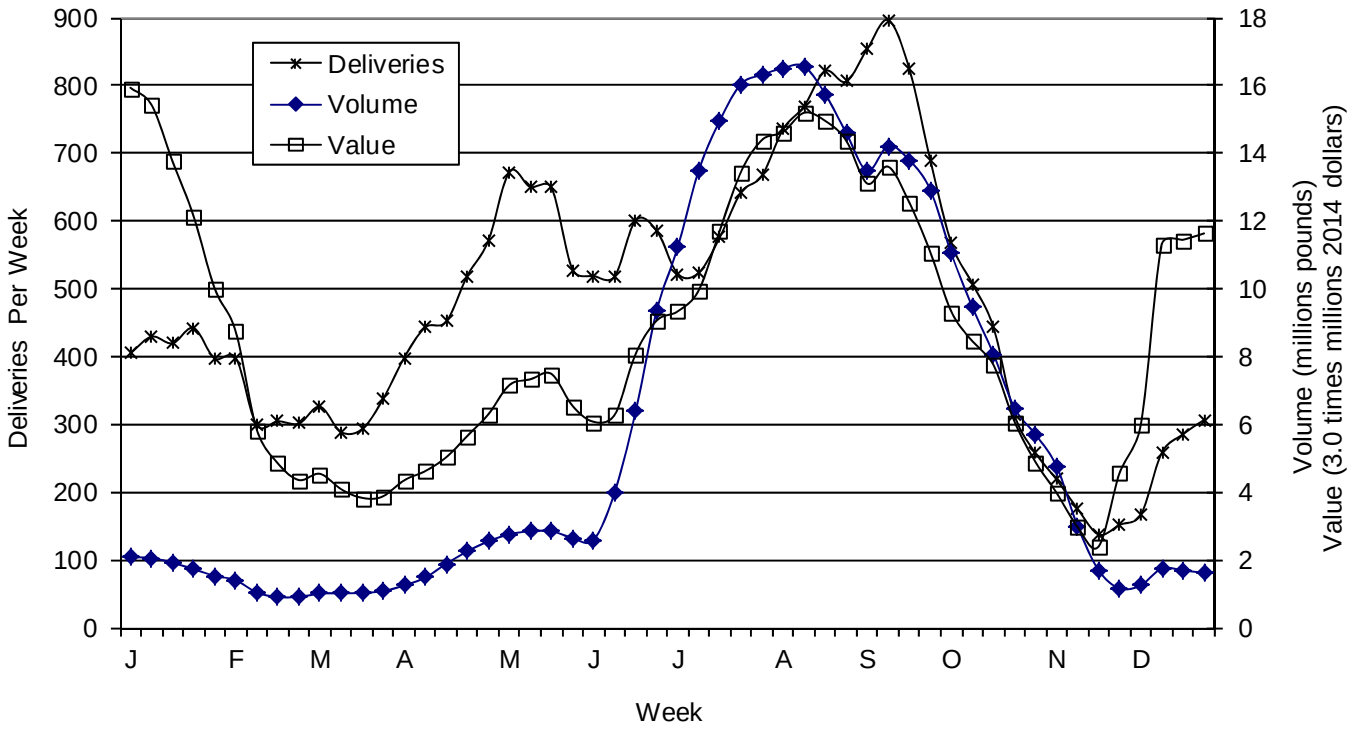
Source: PacFIN annual vessel summary, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

- Pacific halibut landed volume was steady in 2013 and 2014 as compared to the previous biennium; prices, which rose dramatically in the previous biennium, level off to $4.86 in 2013 and bumped up to $5.59 in 2014.

Over the last 30 years, the Oregon fishing industry has shifted from low-volume and high-value species, such as salmon, to high-volume and low-value species, such as Pacific whiting and sardines. In 2014, over 60 percent of the volume landed was Pacific whiting and sardines, but these high volume species comprised less than 14 percent by landed value. The ex-vessel prices for these species were $0.109 and $0.205 in 2014, respectively, as compared to over $4.00 per pound received sometimes for species like Dungeness crab, Pacific halibut, and Chinook salmon. This trend has had the effect of concentrating landings in ports that have high-volume harvesting and processing capabilities, such as Newport and Astoria. This trend, combined with the reduced number of small boats, has increased annual average revenues for the boats remaining active in commercial fishing.

There is a seasonal pattern to Oregon fisheries. However, not every active vessel participates in all fisheries in this cycle. Different species are available at different times of the year, and general fishing, processing, and marketing patterns have developed over time (Figure II.2). It is more appropriate to view the fishing year as a pattern of activities rather than in terms of individual species seasons. Individual species, when viewed in isolation, may not appear important, but these often affect the

Figure II.2
Onshore Deliveries, Volume, and Value by Week During Three Year Average of 2012 Through 2014



Notes:
1. Harvest value adjusted to 2014 dollars before calculating three year average.
2. Deliveries per week are fish ticket counts. Fish tickets issued for sales by vessels to the public are excluded, since they do not correspond to a harvest trip. This will slightly undercount the estimate of total coastwide deliveries. This will be offset by situations where a vessel delivers to more than one processor following a trip.
3. Data is adjusted using a three week moving average over a three year period to remove weather events that alter delivery schedules. However, dramatic weather and harvest management changes within the three year period will influence depictions.
4. Includes Oregon home-port vessels (home-port is defined as the port group where a vessel made the most landings by value).
5. The first week of each year starts on Sunday of the week in which January 1 occurs.

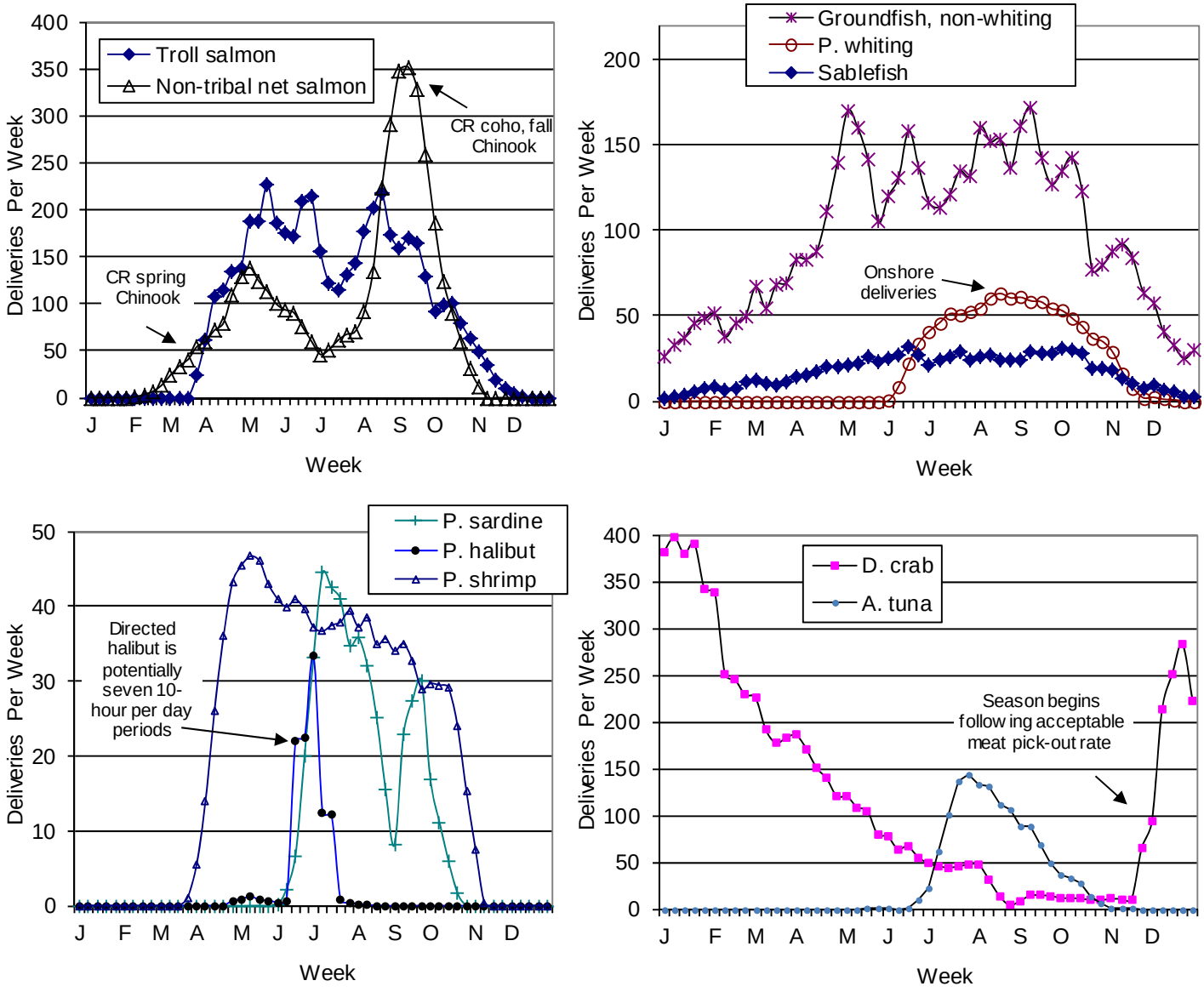
Source: PacFIN fish ticket data, April 2013, March 2014, and April 2015 extractions, with "ZZ..." and "NONE" identified vessels excluded. These vessel identifiers are usually associated with tribal fisheries and non-boat fisheries such as shellfish harvesting.

harvesting, processing, and marketing of other species and the economic health of the fishing industry as a whole (Figure II.3). Fishing vessels as well as crew members move from one fishery to another, depending on seasons and alternatives available. Table II.3 shows active vessel participation in multiple fisheries in 2014.

U.S. West Coast offshore and Alaska fisheries are also important for the total fish harvesting/processing industries in coastal communities. During the year, some crew members and fishing vessels will travel to Alaska to fish for salmon, halibut, sablefish, shellfish, and groundfish.

Harvest volume divided by deliveries and associated with a major fishery (termed

Figure II.3
Onshore Deliveries by Fishery and by Week During Three Year Average of 2012 Through 2014



Notes:
1. The figure's purpose is to show harvest seasonality characteristics, so data is adjusted using a three week moving average over a three year period to remove weather events that alter delivery schedules. The averaging will not necessarily remove dramatic weather and harvest management changes within the three year period.
2. Fishery assigned based on plurality of landing volume during a one week period. This assumes a vessel's fishing strategy will not change more than once per week.
3. One fish ticket corresponds to one delivery. This may slightly be an overestimate in the case that deliveries are sometimes made to multiple processors following a trip. Fish tickets issued for sales by vessels to the public are excluded, since they do not correspond to a harvest trip. This will slightly undercount the estimate of total coastwide deliveries. This will be offset by situations where a vessel delivers to more than one processor following a trip.
4. Several fisheries are combined on single charts because of similar vertical axis scales. It was not meant to imply comparison other than to show relative activity between fisheries.

Source: PacFIN fish ticket data, April 2013, March 2014, and April 2015 extractions, with "ZZ..." and "NONE" identified vessels excluded. These vessel identifiers are usually associated with tribal fisheries and non-boat fisheries such as shellfish harvesting.

Table II.3
Vessel Counts by Active Fisheries Participation in 2014

	Salmon					Groundfish					
Fishery	Net	Troll	D. Crab	P. Shrimp	A. Tuna	LE	OA	P. Whiting	P. Sardine	P. Halibut	Other
Salmon											
Net	173	0	c	0	0	0	0	0	0	0	11
Troll		462	118	c	185	18	48	0	0	73	c
D. Crab			348	37	106	54	33	6	c	43	11
P. Shrimp				60	6	27	c	c	c	c	4
A. Tuna					361	25	28	0	0	53	6
Groundfish											
LE						101	3	23	0	18	7
OA							144	0	0	17	c
P. Whiting								24	0	0	5
P. Sardine									17	0	15
P. Halibut										93	c
Other											49

Notes:
1. Active fisheries are defined as $500 minimum onshore harvest value for a vessel in each fishery. The $500 filter should not be interpreted as an indicator for a vessel's targeted fisheries participation.
2. Vessels with identifier that starts with "ZZ" or "NONE" are not included. This means some vessel counts, such as those used in tribal fisheries and shellfishing, are not included.
3. Column and row do not sum because a vessel may participate in more than one of the row and column defined fisheries in addition to the fishery in the diagonal counts. The table only shows counts for two single fisheries active vessels participation. For example, of the 348 vessels that harvested at least $500 D. crab, 30 percent (106 divided by 348) of them also harvested at least $500 in A. tuna, 12 percent of them also harvested at least $500 P. halibut, and 34 percent of them also harvested at least $500 troll salmon. It is not possible to discern in this table how many vessels participated in all four of these example fisheries.
4. There were 1,152 vessels making at least $500 onshore harvest value over all fisheries in Oregon in 2014, out of 1,199 total vessels with valid identifiers making any landings in Oregon. These counts include vessels that are home-ported in Oregon and vessels that home-port in other states or British Columbia.
5. Eulachon was the predominant species in the "other" fishery for the vessels active in both the "net salmon" and "other" fisheries.
6. Counts with a "c" are not shown to avoid revealing confidential information.

Source: PacFIN annual vessel summary, April 2015 extraction.

catch per unit effort or CPUE) can be descriptive of fleet harvesting characteristics (Table II.4). During the 1990 to 2014 time period, shrimp CPUE increased dramatically. Just as striking was the decrease in the groundfish fishery in the early 2000's. This indicator shows the effects of severe trip limits imposed on this fishery in recent years. The salmon fishery's CPUE has followed the increases and decreases in abundances rather than management influences on fishing strategies. The sardine fishery enjoyed steady increases in CPUE, but 2014 has started a downward trend. Technological advancements in gear and vessels when there is not imposed trip limits can also affect CPUE in fisheries.

The landed volumes and values of commercial fish harvesting are an indication of a bountiful ocean resource off the Oregon Coast. However, individual species typically follow cyclical patterns, and the large harvests seen in recent years may not be there in all years. For example, about 30 percent of the ex-vessel value in 2014 would be excluded if landings were comparable to periods of low abundances for salmon, Dungeness crab, and sardines. Every major fishery has experienced volumes, values, and prices that have increased or decreased as much as tenfold in a span of very few years (Table II.5). The distant water fisheries were nearly the same in 2014, but that revenue also depends on varying Alaska fish resource availability and the effects from foreign market pricing. (See Section III.B for a more complete description of distant water fisheries.) Oregon fisheries are managed for fish resource conservation. This means prudent sustainable harvest management protection decisions consider ecosystem key habitat and predator/prey relationships. Seafood marketing techniques that develop the greatest value for each harvested species will provide the basis for future fisheries industry prosperity in Oregon's coastal communities.

B. Fleet Characteristics

The fleet can be described in terms of vessel license counts and vessels making deliveries counts. The latter can be further disaggregated by whether they are active or inactive. An arbitrary choice of $500 harvest revenue is used to define active and inactive. The active and inactive category is an attempt to sort out whether there was a serious choice based on economic criteria to participate in a directed fishery and make landings at an Oregon port. A vessel may be licensed and not make deliveries for a variety of reasons such as breakdowns and out-of-state registrants who simply want the flexibility to make landings at Oregon ports. Table II.6 shows there were 1,413 vessels and 1,097 crew licensed in 2014. There were 1,199 vessels that made deliveries in Oregon of which 971 had home-ports in Oregon (Table II.3 and Table II.7). Of those unique vessels making deliveries, 1,152 total were active and 929 Oregon home-port were active. This is down from 3,737 home-port vessels (2,498 active) making landings in 1981. Mostly because of the return of the salmon fishery south of Cape Falcon, the number of home-port active vessels increased in 2014 over numbers in the end year of the previous biennium years. Many vessels participating solely in distant water fisheries also use Newport for moorage, provisioning, and repairs, but do not show-up in home-port vessel statistics because most of their landings are not in Oregon.

Vessels made 25.9 thousand deliveries and there were 25.0 thousand deliveries from ocean catch areas including unidentifiable vessels in 2014 to Oregon ports (Table II.8

Table II.4
Catch Per Unit Effort by Major Fishery in 1990 to 2014

Year	Troll Salmon	D. Crab	P. Shrimp	A. Tuna	Groundfish	P. Whiting	P. Sardine	P. Halibut
1990	169	958	12,984	6,017	10,621	63,609	-	8,079
1991	229	630	11,116	12,786	10,079	72,534	-	6,153
1992	247	1,150	19,556	5,442	8,583	82,537	-	5,809
1993	191	1,175	17,414	5,221	9,528	101,826	-	6,938
1994	160	1,300	10,905	5,275	8,806	87,347	-	4,669
1995	460	1,345	9,524	13,259	8,096	112,420	-	2,581
1996	470	1,938	11,671	11,174	8,344	115,791	-	2,060
1997	458	1,006	17,027	7,723	5,831	114,520	-	2,645
1998	470	1,222	8,823	14,480	5,918	119,118	-	1,224
1999	283	1,596	14,935	6,205	5,618	105,123	74,442	2,221
2000	412	1,284	19,667	10,439	5,905	136,990	64,541	1,840
2001	553	1,388	25,777	7,124	4,096	103,709	62,284	1,237
2002	579	1,825	28,048	7,003	2,675	105,504	76,997	2,329
2003	584	2,959	30,236	7,857	3,820	90,572	77,374	1,941
2004	426	3,222	22,715	7,311	4,372	83,384	84,054	2,118
2005	504	2,511	26,480	8,417	4,747	85,301	91,716	2,798
2006	223	3,687	25,419	7,885	4,830	107,587	104,460	2,123
2007	215	2,120	27,954	7,565	5,363	100,532	107,589	1,579
2008	172	2,032	31,029	9,548	5,860	98,744	105,278	1,959
2009	179	2,900	37,721	7,404	5,393	92,410	120,188	2,108
2010	255	2,524	42,693	7,883	5,569	78,910	113,157	2,960
2011	211	2,316	46,648	5,999	4,675	132,771	123,051	1,855
2012	237	1,482	43,235	6,009	4,947	132,078	122,988	1,484
2013	294	3,282	46,459	7,763	5,736	155,245	135,744	2,127
2014	531	1,822	50,051	7,009	5,779	137,150	130,199	2,558

Notes: 1. Catch per unit effort (CPUE) is calculated by dividing a vessel's volume in a one week period by the number of deliveries a vessel makes during that period, and associating all of the volume with a principal species. Weeks are defined as Sunday through Saturday, so the first and last weeks of each year are usually partial. The principal fishery is assigned based on a plurality of landing volume during the one week period. This assumes a vessel's fishing strategy will not change more than once per week. An annual CPUE is equal to the sum of the weekly landings by principal species divided by the sum of the weekly deliveries.

2. Deliveries per week are fish ticket counts. Fish tickets issued for sales by vessels to the public are excluded, since they do not correspond to a harvest trip. This will slightly undercount the estimate of total coastwide deliveries. This will be offset by situations where a vessel delivers to more than one processor following a trip.

3. Excludes CPUE for vessels when harvesting in salmon net fisheries.

Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions with "ZZ..." and "NONE" identified vessels excluded. These vessel identifiers are usually associated with tribal fisheries and non-boat fisheries such as shellfish harvesting.

Table II.5
Range of Annual Landed Volume, Value, and Prices by Major Fishery During the Period 1970 to 2014

Major Fishery		Landed Volume Amount (000's)	Year	Landed Value Amount ($000's)	Year	Prices Per Pound ($)	Year
Salmon	High	19,628	1970	68,132	1988	5.00	1979
	Low	1,285	1994	2,141	1994	1.44	2001
Dungeness crab	High	33,316	2006	72,263	2013	4.03	2014
	Low	2,350	1973	5,499	1973	1.19	1970
Pink shrimp	High	56,666	1978	54,712	1987	1.44	1983
	Low	4,844	1984	4,197	1984	0.31	2003
Albacore tuna	High	33,040	1974	47,347	1974	2.03	2011
	Low	1,080	1989	1,490	1989	0.80	1977
Groundfish	High	90,084	1982	46,220	1979	1.03	2011
	Low	21,024	1975	7,613	1970	0.36	1970
Pacific whiting	High	168,226	2014	20,707	2013	0.140	2012
	Low	61,466	2008	4,029	2009	0.033	1998
Pacific sardine	High	99,450	2005	9,245	2012	0.205	2014
	Low	17,171	2014	1,520	2000	0.054	2006

Notes: 1. Value and prices are in 2014 real dollars.
2. Pacific whiting did not emerge as a major fishery until after 1990. Onshore landing volume averaged around 150 million pounds for 1997 to 2001. Volatility range uses years 1997 to 2014.
3. Pacific sardine did not emerge as a major fishery species until 2000 in the latest abundance cycle. Volatility range uses years 2000 to 2014.

Source: ODFW Table 4 and 42 for years 1970 to 1980; PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions for years 1981 to present.

Table II.6
Oregon Vessel and Crew Licenses by County in 2014

	Vessels	Crew
Resident Boat Licenses		
Oregon addresses		
Clatsop County	216	89
Tillamook County	123	58
Lincoln County	209	142
Coastal Lane and Douglas Counties	65	37
Coos County	180	140
Curry County	172	113
Other Oregon	315	154
All Oregon	1,280	733
Non-Oregon addresses	133	
Non-Resident Boat Licenses	462	364
Total	1,875	1,097

Source: ODFW, personal communication June 2015.

Table II.7
Vessel Counts and Revenue Shares by Revenue Categories in 1981 to 2014

	<$500				$500 to $4,999				$5,000 to $49,999				>=$50,000				Total	
	Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average	Share %		Vessel	Average
Years	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue	Count	Revenue
1981	1,239	341	33.2%	0.3%	1,339	4,535	35.8%	4.7%	867	36,832	23.2%	25.0%	292	306,570	7.8%	70.0%	3,737	34,238
1982	1,041	301	30.4%	0.3%	1,308	4,299	38.2%	5.1%	820	33,955	24.0%	25.4%	251	301,771	7.3%	69.2%	3,420	32,024
1983	1,643	268	50.4%	0.6%	995	3,440	30.5%	4.5%	403	35,427	12.4%	18.6%	217	270,006	6.7%	76.4%	3,258	23,552
1984	350	335	23.2%	0.2%	526	4,072	34.9%	3.6%	460	33,382	30.5%	25.6%	171	247,872	11.3%	70.6%	1,507	39,815
1985	1,060	225	43.1%	0.3%	626	3,753	25.5%	2.9%	554	33,048	22.5%	22.3%	219	278,935	8.9%	74.5%	2,459	33,340
1986	827	239	30.9%	0.2%	840	3,914	31.4%	3.0%	757	32,726	28.3%	22.6%	251	324,344	9.4%	74.2%	2,675	40,998
1987	492	294	18.8%	0.1%	721	4,098	27.6%	1.8%	1,052	34,190	40.3%	21.8%	346	364,903	13.3%	76.4%	2,611	63,318
1988	276	374	10.5%	0.1%	620	4,061	23.7%	1.6%	1,299	34,331	49.6%	27.7%	424	268,009	16.2%	70.6%	2,619	61,418
1989	436	343	17.7%	0.1%	856	3,663	34.8%	2.6%	894	26,023	36.3%	19.1%	277	342,861	11.2%	78.2%	2,463	49,339
1990	443	293	21.1%	0.1%	720	3,466	34.3%	2.3%	641	26,685	30.6%	15.5%	293	308,146	14.0%	82.1%	2,097	52,464
1991	350	321	18.3%	0.1%	772	3,257	40.4%	2.6%	540	25,395	28.2%	14.1%	251	322,975	13.1%	83.2%	1,913	50,918
1992	293	259	20.0%	0.1%	434	3,020	29.6%	1.2%	422	28,703	28.7%	10.7%	319	312,420	21.7%	88.1%	1,468	77,085
1993	347	229	25.2%	0.1%	383	2,929	27.8%	1.2%	352	26,523	25.5%	10.2%	296	272,783	21.5%	88.5%	1,378	66,242
1994	316	240	26.1%	0.1%	327	3,100	27.0%	1.0%	285	27,943	23.5%	8.1%	283	314,635	23.4%	90.8%	1,211	81,003
1995	282	221	24.0%	0.1%	253	3,054	21.5%	0.7%	311	28,662	26.4%	7.8%	330	316,868	28.1%	91.5%	1,176	97,207
1996	184	262	15.8%	0.0%	266	2,948	22.8%	0.7%	360	27,271	30.9%	8.4%	356	300,170	30.5%	90.9%	1,166	100,781
1997	138	248	12.8%	0.0%	263	2,985	24.3%	0.8%	352	26,522	32.5%	9.4%	329	270,221	30.4%	89.7%	1,082	91,551
1998	124	244	12.7%	0.0%	251	3,124	25.7%	1.1%	332	27,147	34.1%	13.1%	268	220,535	27.5%	85.7%	975	70,698
1999	98	244	10.3%	0.0%	229	3,117	24.1%	0.8%	329	25,721	34.6%	9.1%	295	285,055	31.0%	90.1%	951	98,098
2000	88	271	8.2%	0.0%	218	3,020	20.4%	0.6%	413	25,882	38.7%	10.1%	349	269,860	32.7%	89.2%	1,068	98,832
2001	94	281	8.4%	0.0%	239	2,916	21.2%	0.8%	460	26,393	40.9%	13.3%	332	236,243	29.5%	85.9%	1,125	81,153
2002	81	261	8.0%	0.0%	208	2,913	20.6%	0.7%	426	25,109	42.2%	12.9%	295	242,503	29.2%	86.3%	1,010	82,041
2003	72	264	6.9%	0.0%	205	2,869	19.7%	0.6%	424	24,692	40.8%	10.2%	337	271,790	32.5%	89.2%	1,038	98,911
2004	81	272	7.5%	0.0%	175	2,821	16.2%	0.4%	448	24,686	41.6%	9.5%	373	282,210	34.6%	90.1%	1,077	108,486
2005	69	278	6.3%	0.0%	193	2,704	17.7%	0.5%	476	24,008	43.6%	11.3%	354	251,337	32.4%	88.1%	1,092	92,438
2006	66	227	6.9%	0.0%	189	2,699	19.6%	0.4%	352	22,215	36.6%	6.5%	355	316,703	36.9%	93.1%	962	125,545
2007	56	225	5.8%	0.0%	214	2,606	22.1%	0.5%	357	22,213	36.9%	7.8%	341	272,982	35.2%	91.6%	968	104,945
2008	48	251	5.4%	0.0%	177	2,506	20.0%	0.4%	328	24,188	37.0%	7.4%	333	296,491	37.6%	92.2%	886	120,904
2009	93	257	9.6%	0.0%	202	2,220	20.8%	0.4%	319	22,546	32.9%	6.8%	357	276,022	36.8%	92.8%	971	109,376
2010	77	251	7.9%	0.0%	166	2,371	17.0%	0.4%	369	22,926	37.8%	8.2%	363	258,469	37.2%	91.4%	975	105,330
2011	87	251	8.9%	0.0%	150	2,212	15.3%	0.2%	343	22,600	35.0%	5.3%	400	347,663	40.8%	94.5%	980	150,174
2012	49	208	5.2%	0.0%	169	2,565	17.8%	0.3%	349	20,753	36.7%	5.5%	384	323,296	40.4%	94.2%	951	138,625
2013	43	181	4.5%	0.0%	147	2,365	15.4%	0.2%	320	21,701	33.6%	3.9%	443	388,250	46.5%	95.9%	953	188,137
2014	42	272	4.3%	0.0%	149	2,279	15.3%	0.2%	345	21,638	35.5%	5.0%	435	327,953	44.8%	94.8%	971	154,970

Notes: 1. Revenue is in 2014 dollars.
2. Includes only vessels with home-port group in Oregon. Home-port group is defined as the port group where a vessel made the most landings by value.
3. Revenue excludes deliveries to offshore processors and revenues returned from distant water fisheries.
4. Excludes vessel identification codes "NONE" and "ZZ..." which are usually used to identify vessels within tribal commercial fisheries.

Source: PacFIN March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 annual vessel summary extractions.

Table II.8
Deliveries by Gear Type From Ocean Catch in 1981 to 2014

Fishery	Five Year Averages 1981-1985	1986-1990	1991-1995	1996-2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Major Gear Groups																		
Troll salmon	20,017	30,222	6,119	4,143	6,351	7,180	7,488	8,144	6,360	2,641	3,233	477	924	2,462	2,321	3,803	5,264	5,897
Albacore tuna	599	311	651	984	1,349	737	1,270	1,547	1,038	1,145	1,519	1,046	1,496	1,455	1,693	1,708	1,365	1,288
Shrimp trawl	1,641	2,645	1,830	1,260	1,165	1,534	692	535	590	476	716	821	585	733	1,032	1,124	1,017	1,033
Bottom trawl	4,139	2,891	3,365	2,456	1,853	1,632	1,659	1,164	1,198	1,304	1,342	1,466	1,691	1,382	675	682	739	633
Midwater trawl	379	448	1,287	1,606	1,434	731	902	1,578	1,595	1,259	942	629	685	878	1,153	833	1,106	1,282
P. whiting	9	24	1,019	1,057	777	468	518	816	826	781	579	355	356	448	753	569	794	798
Fish pot	360	251	334	254	292	495	388	270	324	412	285	391	381	473	512	378	434	318
Crab pot	11,266	7,950	8,372	8,048	7,100	6,805	8,196	8,237	6,748	8,900	7,950	6,897	7,645	6,225	7,352	5,729	7,872	6,487
Longline	286	563	953	1,434	1,078	612	839	649	1,013	1,073	989	1,554	2,205	1,782	1,704	1,505	1,022	670
Other hook & line	2,038	2,096	2,832	3,070	4,336	5,448	4,148	3,974	3,394	2,992	3,195	3,301	3,646	3,100	3,378	3,112	3,452	3,255
Other Gears																		
Net sardine	--	--	--	70	457	653	726	959	1,104	776	886	487	396	426	199	798	435	160
Sea urchin	--	1,711	2,412	582	948	709	109	258	421	346	396	497	587	251	510	442	502	445
Squid net	34	1	20	13	--	--	2	4	--	--	--	--	1	--	--	--	--	1
Scallop dredge	74	4	10	5	--	1	--	--	2	--	--	--	--	--	--	--	--	--
Not elsewhere specified																		
Other	3,041	5,825	4,683	2,225	1,687	3,738	2,232	3,972	2,650	2,683	2,562	2,255	4,720	4,107	3,044	2,843	4,027	3,552
Total	43,875	54,917	32,866	26,149	28,050	30,275	28,651	31,291	26,437	24,007	24,015	19,821	24,962	23,274	23,573	22,957	27,235	25,021

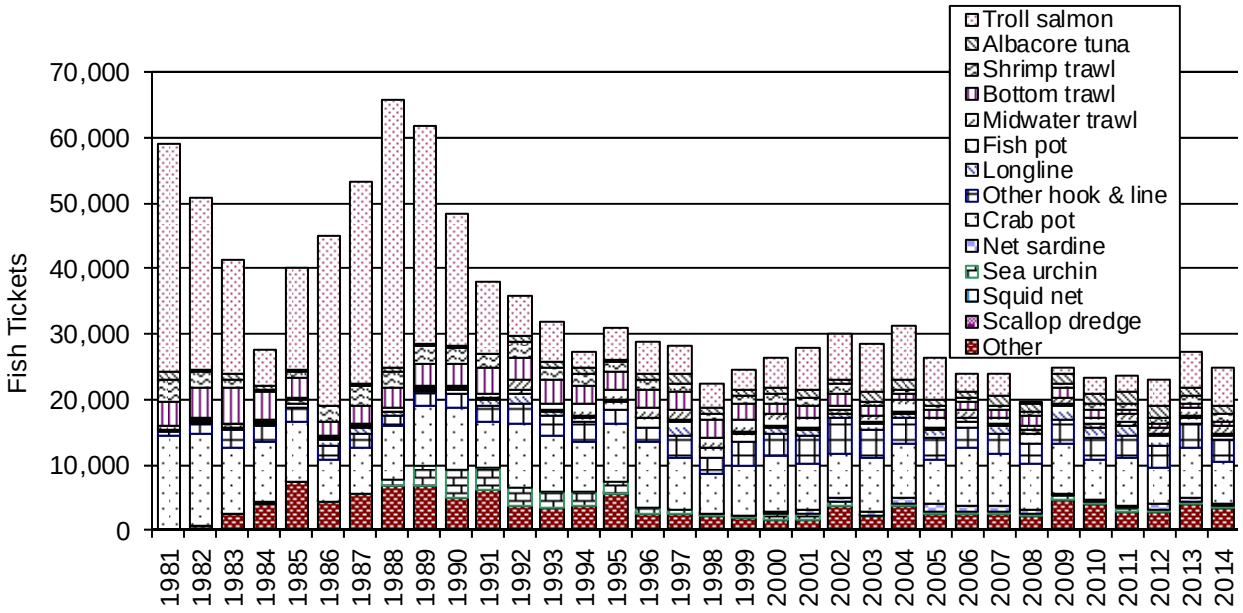
Note: 1. Deliveries are approximated using fish tickets. A fish ticket represents the landing of fish or shellfish product from one fishing trip. Ticket counts may not reflect total ocean fishing trips because some vessels may deliver to more than one dealer after returning to port. The number of these occurrences is probably less than one percent of the total and they are limited predominantly to the salmon, crab and bottom trawl fisheries.

2. Troll fish tickets with both salmon and albacore tuna are assigned to only one of those groups, based on which had more round pounds on the fish ticket.

3. Other fish tickets not elsewhere specified include clams and mussels, other shrimp, and Dungeness crab with unspecified gear, mackerel with net gear, pot gear other than fish pot or crab pot, troll gear fish tickets with neither salmon nor tuna, and other.

Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

Figure II.4
Deliveries by Gear Type From Ocean Catch in 1981 to 2014



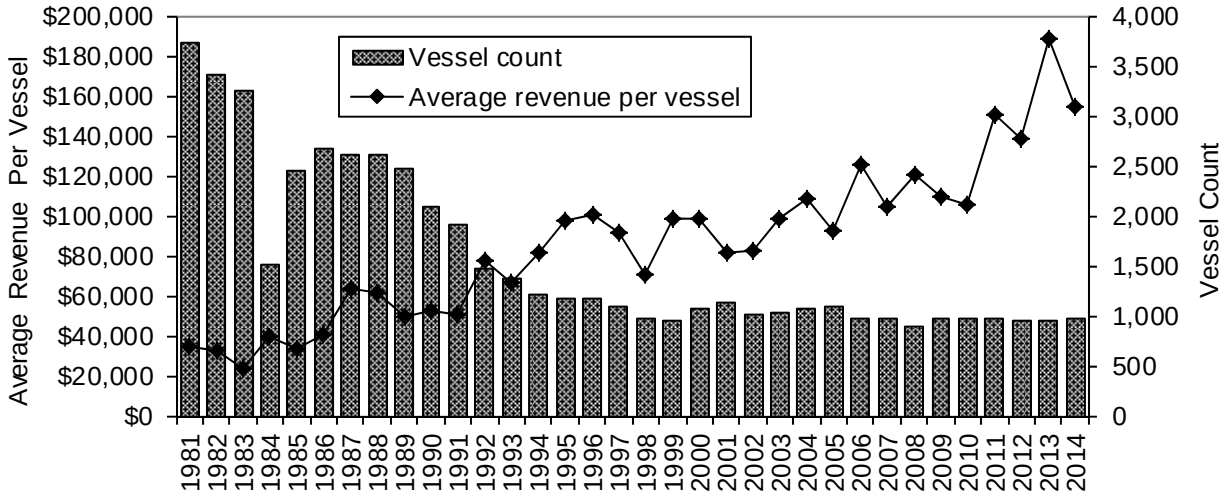
Note: 1. Table II.8 notes and sources apply.

and Figure II.4). The number of deliveries vessels make has been steady over the last five years. However, the deliveries in the last five years are about half of the 1980's averages. While the number of vessels making deliveries has mostly been decreasing in recent years, the average revenue per vessel has generally been increasing (Figure II.5). There have been increasing and decreasing years which is partially explained by participation in salmon fisheries. With increased abundance, more vessels returned to the fishery and the revenue average decreased in 2014. The revenue average increased in 2013 to the historical high of $188.1 thousand. The 2014 average decreased to $155.0 thousand because of falling overall harvest values.

Table II.9 shows the share of vessels for different revenue size categories by fisheries and gear groups in 2014. It also shows the share of vessels specializing in the various fisheries and gear groups. For vessels in the greater than $50,000 revenue category, the salmon fishery had the least representation. For this same revenue category, the trawl gear group had the highest representation. The table shows that 95 percent of all revenue in 2014 is landed by those vessels that have annual revenue greater than $50,000, but this revenue category represents 45 percent of total home-port vessel count. The overall revenue share for this category has generally been increasing as fleet numbers have dwindled. Vessels in the pink shrimp fishery had one of the highest specializations and highest annual revenues. These vessels tend to have high equipment and gear costs requiring high levels of revenue.

Most of Oregon's summed harvest value is landed by only a small share of all vessels making deliveries. For example, use Figure II.6 to find the 20 percent cumulative vessel line using the right *y*-axis scale. The line

Figure II.5
Home-Port Vessel Counts and Annual Average Revenue Per Vessel 1981 to 2014



Notes: 1. Revenues adjusted to 2014 dollars.
2. Average revenue per vessel is for onshore landings; distant water fisheries revenue is not included. The revenue may be from landings made in California and Washington as well as Oregon.

Source: PacFIN March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 annual vessel summary extractions.

encompasses vessels in the $200 thousand or more revenue categories. Then find the cumulative harvest revenue line for these vessels using the right *y*-axis scale. The exercise shows that about 75 percent is landed by these 193 top grossing vessels in 2014. The converse is that about 80 percent of all lower grossing vessels only land about 25 per of all harvest value.

Vessels enter and exit fisheries as revenue opportunities present themselves, or in some cases, to allow for permit renewals. Table II.10 and Figure II.7 show that the Pacific whiting fishery has the greatest participation longevity over the last five years and the sardine fishery the least. The annual entry and exiting of the different fisheries is shown in Figure II.8.

C. Fishery Limited Entry Programs

Major commercial fisheries are governed by federal and/or state limited entry programs. Historical landing histories before certain cut-off dates are usually used to determine the number and qualifications of permittees.[7] Table II.11 is a summary description of Oregon's limited entry programs.

For some existing fisheries and new emerging fisheries, Oregon used the Developmental Fisheries Board to determine permitting requirements. The Developmental Fisheries Program started in 1993 allowed for limited access to new commercial fisheries which were not assessed, nor documented to be economically viable. The goal of the original program was to allow for limited number of permits for newly created fisheries so that gear, market and harvest rates could be analyzed with the cooperation

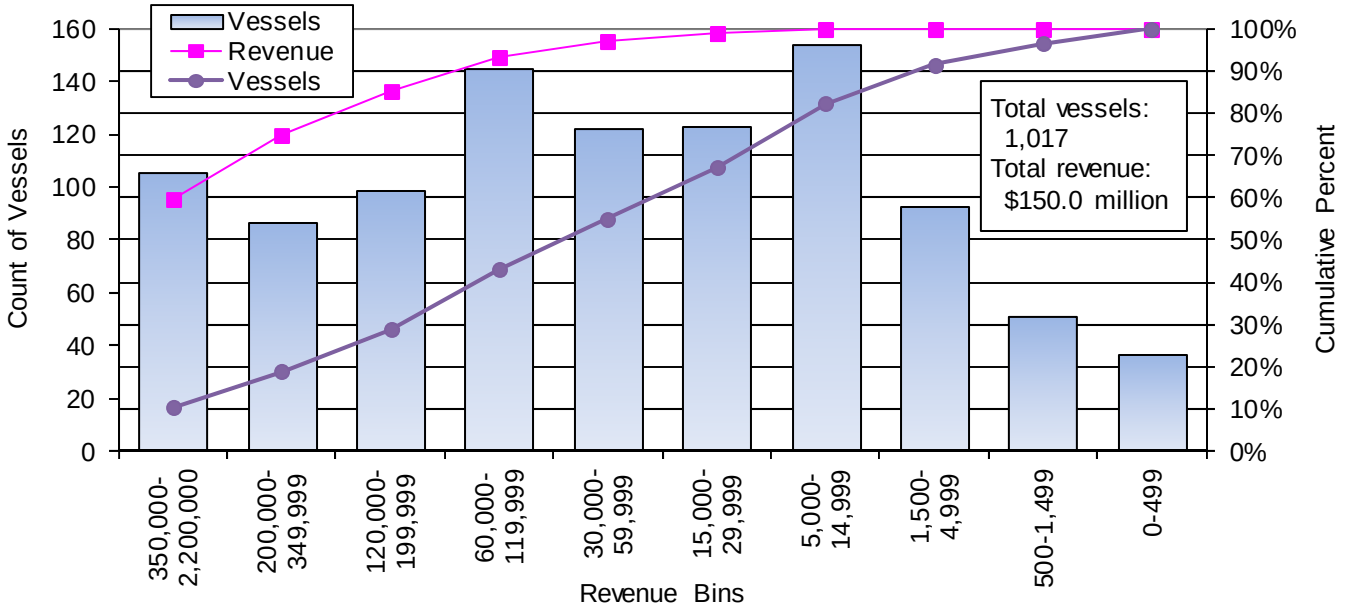
Table II.9
Count of Vessels Within Species and Gear Revenue Groups and Specialization Categories in 2014

	Sum of Revenue (thousands)	Vessel Count	Count of Vessels Within Revenue Categories				Count of Vessels Within Revenue Specialization Categories			Revenue Distribution		
			<$500	$500-$5K	$5K-$50K	>$50,000	>90%	>50%	>33%	Mean	90th Percentile	50th Percentile
Species												
Salmon	17,329	588	4%	13%	42%	41%	55%	69%	76%	29,471	70,931	19,257
Dungeness crab	46,433	328	2%	3%	13%	82%	32%	67%	82%	141,565	342,208	102,902
Pink shrimp	29,027	51	0%	0%	2%	98%	16%	75%	84%	569,155	1,026,625	602,477
Albacore tuna	11,375	318	2%	12%	26%	60%	25%	36%	45%	35,772	103,755	10,943
Groundfish	21,229	329	4%	12%	33%	52%	30%	36%	43%	64,527	137,838	4,931
Pacific whiting	18,416	34	0%	0%	0%	100%	38%	47%	53%	541,652	1,357,869	346,057
Pacific sardines	2,868	26	0%	0%	4%	96%	0%	31%	38%	110,305	374,615	2
Pacific halibut	1,146	178	1%	3%	22%	74%	1%	1%	2%	6,436	20,021	446
Other	2,652	122	2%	3%	20%	75%	7%	10%	12%	21,737	45,041	227
Gear												
Hook and line	4,367	207	5%	16%	39%	40%	42%	49%	56%	21,095	59,926	7,269
Net	8,298	173	4%	14%	61%	20%	94%	96%	97%	47,964	64,355	21,232
Other	40	22	23%	23%	36%	18%	36%	50%	50%	1,804	7,127	513
Pot	50,471	317	0%	3%	13%	84%	36%	70%	86%	159,215	370,546	115,560
Trawl	63,038	83	0%	0%	2%	98%	52%	87%	94%	759,498	1,298,142	748,362
Troll	24,262	539	4%	16%	32%	49%	60%	71%	77%	45,014	121,920	23,101

Notes: 1. Includes Oregon home-port vessels (home-port is defined as the port group where a vessel made the most landings by value), and excludes vessels with identifier "NONE" or "ZZ..."
2. Total revenue does not include deliveries to offshore processors or revenues from distant water fisheries.

Source: PacFIN annual vessel summary, April 2015 extraction.

Figure II.6
Ocean Onshore Landing Revenue Bins Showing Cumulative Revenue and Vessel Counts in 2014



Notes: 1. Excludes vessels with identification "NONE" or starting with "ZZ". This identification is usually associated with vessels making tribal commercial fisheries deliveries.
2. Revenue filtered for ocean area-of-catch.
Source: PacFIN annual vessel summary, April 2015 extraction.

and data collection mandated by the limited-permit program. Since its inception, four fisheries have moved from the Developmental Fishery Program to limited-entry fisheries: brine shrimp, nearshore groundfish, sardines, and bay clams. Species regulated under this Program were swordfish, box crab, anchovy/herring, spot prawn, and hagfish. The Developmental Fishery Program was discontinued in 2007 in favor of stakeholders involvement and legislative and administrative treatment of fisheries management practices.

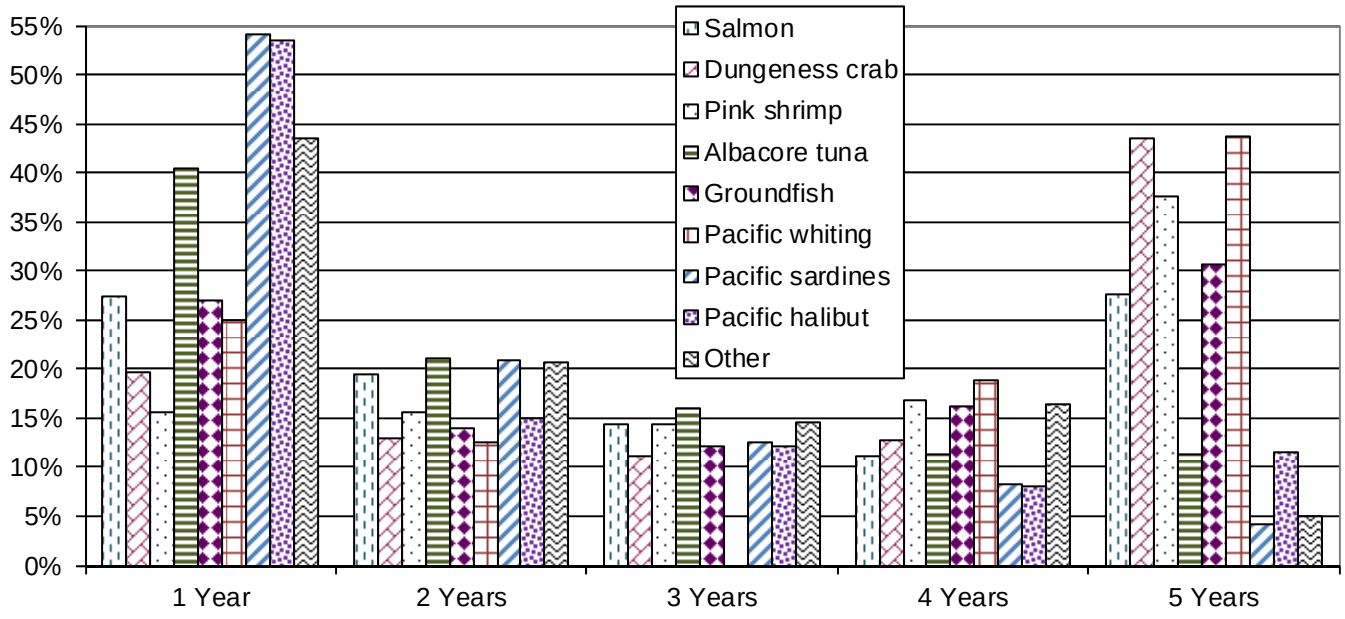
There are overlapping fishery federal limited entry programs. The programs are for salmon, groundfish trawl and fixed gear fisheries, and coastal pelagic species (CPS). Other fisheries that do not yet have limited entry requirements, but do have federal regulations such as user group allocation plans include halibut, highly migratory species (HMS) such as albacore tuna, and a portion of the groundfish fishery called groundfish open access. The latter fishery does have an Oregon limited entry program when harvesting occurs in State Territorial waters. The Pacific Fishery Management Council (PFMC) is responsible for developing plans and seasonal specifications for the federal managed fisheries as well as developing federal limited entry programs.

The PFMC management processes account for negotiation results and requirements from United States treaties with Canada addressing three transboundary stocks: Pacific salmon, Pacific whiting, and North Pacific albacore. PFMC management processes must also address other multi-state agreements, state-tribal fisheries authorities, and international agreements and forums.

Table II.10
Vessel Participation by Major Fishery During Period 2010 to 2014

	Period Participation											
	1 Year		2 Years		3 Years		4 Years		5 Years		Total	
Fishery	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Salmon	208	27%	147	19%	109	14%	85	11%	210	28%	759	100%
Dungeness crab	90	20%	59	13%	51	11%	58	13%	198	43%	456	100%
Pink shrimp	12	16%	12	16%	11	14%	13	17%	29	38%	77	100%
Albacore tuna	279	40%	145	21%	111	16%	78	11%	78	11%	691	100%
Groundfish	113	27%	58	14%	51	12%	68	16%	128	31%	418	100%
Pacific whiting	8	25%	4	13%	0	0%	6	19%	14	44%	32	100%
Pacific sardines	13	54%	5	21%	3	13%	2	8%	1	4%	24	100%
Pacific halibut	93	53%	26	15%	21	12%	14	8%	20	11%	174	100%
Other	114	44%	54	21%	38	15%	43	16%	13	5%	262	100%
Total	373	26%	209	15%	183	13%	154	11%	515	36%	1,434	100%

Figure II.7
Vessel Participation by Major Fishery During Period 2010 to 2014



Notes: 1. Includes Oregon home-port vessels (home-port is defined as the port group where a vessel made the most landings by value), excludes vessels with identifier "NONE" or "ZZ...," includes only vessels with species revenue >$500.
2. Vessels are tracked over years by their plate numbers. If a vessel is re-documented and continues participation in the same fishery, then its previous experience is omitted. Only vessels that make deliveries in each year are included in the analysis.
3. Revenue excludes offshore and distant water fisheries sources.

Source: PacFIN annual vessel summary July 2011, April 2013, March 2014, and April 2015 extractions.

Figure II.8
Vessel Participation Trends by Major Onshore Fishery and Offshore in 2000 to 2014

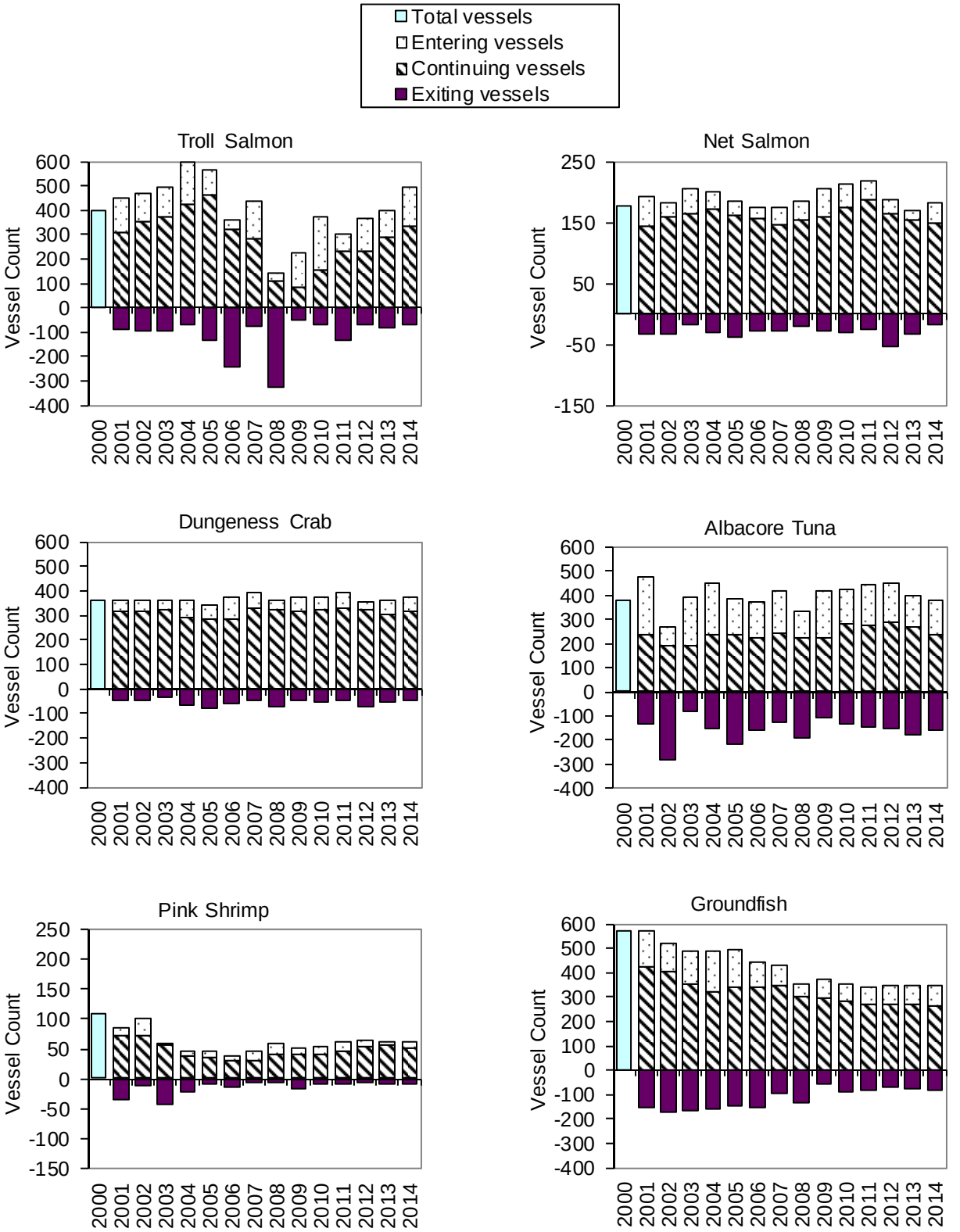
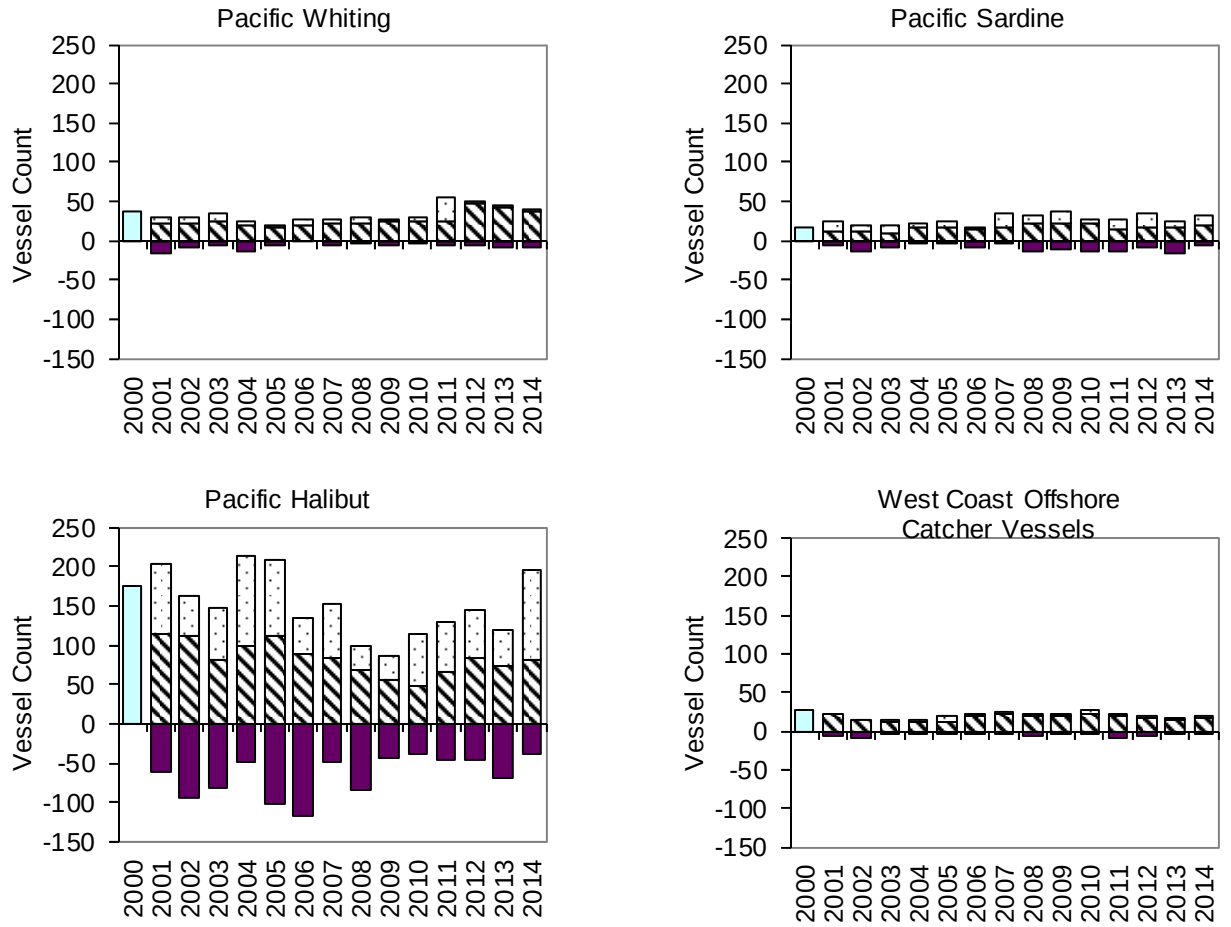


Figure II.8 (cont.)



Notes: 1. Vessel counts itemized for whether they landed in the fishery the previous year.
2. Onshore net salmon, pink shrimp, Pacific whiting, Pacific sardine, and Pacific halibut, and offshore catcher vessels *y*-axis scales are different from the other onshore fisheries.

Source: PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions; and PacFIN offshore data, April 2015 extraction.

The federal groundfish trawl and fixed gear fishery transitioned into an individual transferable quota (ITQ) program (sometimes also referred to as catch-share program) in 2011. Quotas were assigned to certain permit owner categories, based on fishing history. An assignment to processor owners (individual processor quotas or IPQ's) was also included in the program design for Pacific whiting.

The share of home-port vessels making deliveries totaling more than $500 in 2013 and 2014 that either have a federal groundfish limited entry permit or participate in the groundfish fishery as an open access vessel is shown in Figure II.9. Over 90 percent of all Oregon home-port vessels do not land more than $500 in the groundfish fishery in these years.

The PFMC HMS fishery management plan (FMP) requires a fishery permit. HMS

Table II.11
Oregon Fishery Limited Entry Programs

Program Features

Fishery	Authorizing Statutes and Rules	Transferable	Renewable
Bay clam dive fishery	OAR 635-005-0305 through OAR 635-005-0360	Yes with restrictions to another vessel - not transferrable to another individual	5 landings consisting of at least 100 lbs. each landing or an annual total of 2,500 lbs.
Dungeness crab	ORS 508.921 through 508.941	Yes with vessel length and other restrictions	Yes
Gillnet salmon	ORS 508.775 through 508.796	Yes	Yes
Pacific sardine	OAR 635-004-0380 through OAR 635-004-0440	Yes with restrictions - two times per calendar year	If harvest guideline greater than 100,000 mt, then minimum of 10 landings of sardines of a least 5 metric tons each, or landings of sardines having an aggregate ex-vessel price of at least $40,000
Rockfish nearshore	ORS 508.945 through 508.960	A transfer can only occur if the permit has been renewed five times.	Minimum of 5 landings that contained at least 15 lbs. of nearshore fish
Scallop	ORS 508.840 through 508.867	A transfer can only occur if the permit has been used in the ocean scallop fishery for three or more calendar years	5,000 lbs. landing any fish prior year
Pink shrimp	ORS 508.880 and 508.915	Yes with vessel length and other restrictions	Yes
Brine shrimp	OAR 635-005-0680 through OAR 635-005-0720		5,000 lbs. prior year
Troll salmon	ORS 508.801 through 508.828	Yes with restrictions	Yes
Sea urchin	ORS 508.760 through 508.762; OAR 635-005-0790 through 635-005-0850;	Yes with restrictions	5,000 lbs. landed sea urchins prior year
Yaquina Bay roe-herring	ORS 508.765	Yes with restrictions	Yes
Boat license	ORS 508.235 and ORS 508.260		
Developmental Fisheries	ORS 506.450 through ORS 506.465	Yes with restrictions	Depends on plans developed for new species

Active Permit Counts

Permit Type	2011	2012	2013	2014	Entry Limits
Bay clam dive fishery, coast wide	11	10	6	7	10 permits authorized
Bay clam dive fishery, south coast	5	1	2	1	5 permits authorized
Dungeness crab	427	424	429	426	Restricted with new vessels allowed in some circumstances
Gillnet salmon	297	292	292	290	200 authorized

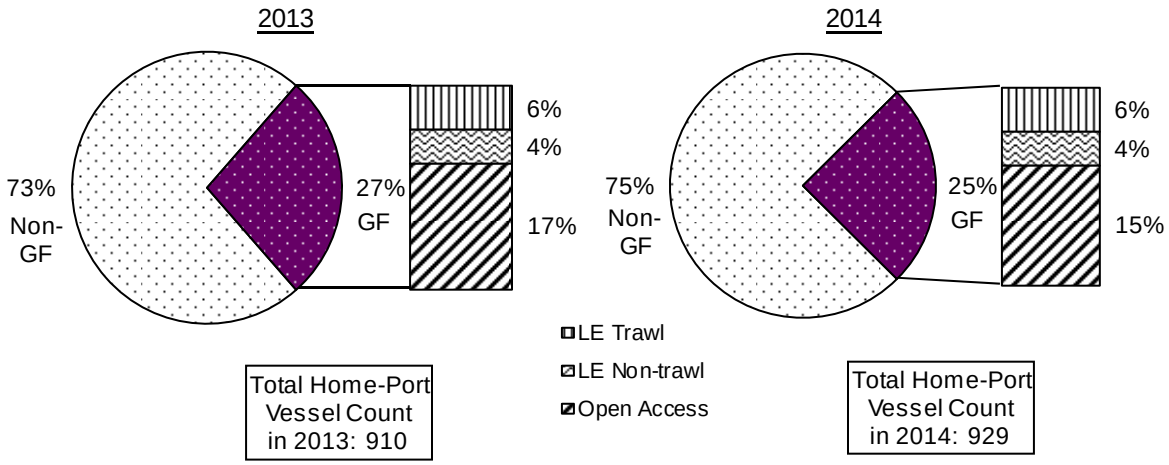
Table II.11 (cont.)

Active Permit Counts (cont.)

Permit Type	2011	2012	2013	2014	Entry Limits
Pacific sardine	25	25	25	24	26 authorized
Rockfish black/blue	53	52	51	50	80 authorized
Rockfish nearshore endorsement	70	70	70	69	50 authorized
Scallop	24	23	21	18	Restricted with 25 authorized
Pink shrimp	139	139	139	141	150 authorized
Brine shrimp	3	3	3	3	3 authorized
Troll salmon	1,010	995	998	991	1,000 authorized
Sea urchin	28	26	12	9	Restricted with 30 authorized
Yaquina Bay roe-herring	9	9	9	8	6 authorized
Resident boat license	1,214	1,158	1,132	1,097	
Non-resident boat license	364	415	424	462	
Tuna	332	310	320	316	

Notes:
1. This table should not be used for determining permit application, transfer, or renewable eligibility requirements. Its purpose is to give indicator information about current permit counts and requirements.
2. Oregon's restricted fisheries permit program is generally described in ORS Chapter 508 (2011 version) and in OAR 635 Division 3 through 6 (2013 version).
3. The table does not show all of the fisheries with limited entry status as defined through the Developmental Fisheries Program.
4. Counts show permits with active status at year-end. A permit may be inactive for several reasons, including non-receipt of renewal payments and pending transfer. Some vessels will have an active boat license, but not make deliveries.
5. All vessels making a commercial fish delivery must possess a commercial fishing boat license (ORS 508.235). All vessels five tons and over must also be federally documented.
6. Logbooks are required for the following fisheries: sea urchin, rockfish nearshore, bay clam dive, sardine, and Dungeness crab. The ODFW requires participants in the pink shrimp fishery to submit logbooks starting in 2008. Logbooks are also required for certain federal limited entry programs.
7. The rockfish nearshore permit includes permits for black and blue rockfish. The permit can have an endorsement for other nearshore rockfish.
8. The Yaquina Bay roe-herring fishery is prosecuted as a cooperative. Ten permits were initially authorized, but one was subsequently purchased in equal shares by the remaining permittees.
9. The albacore tuna fishery is not limited entry and some vessels making deliveries only hold an albacore tuna landing license. The albacore tuna landing license may be obtained in lieu of a commercial fishing and boat license when landing only albacore tuna. The table's shown active permit counts for the tuna fishery relied on the tuna landing license. There were 397 vessels that landed albacore tuna in Oregon in 2013 and 379 that landed albacore tuna in Oregon in 2014, with "ZZ..." and "NONE" identified vessels excluded. Of those, 173 landed no other species in 2013, and 123 landed no other species in 2014.

Figure II.9
Home-Port Vessels Counts by Groundfish LE Permit Status in 2013 and 2014



Notes: 1. Permit status categories are assigned in the following hierarchy: limited entry trawl and fixed gear (LE Trawl), limited entry fixed gear (LE Non-Trawl), and vessels not having limited entry permits that make landings of groundfish managed species (Open Access).
2. A vessel is classified as a groundfish vessel if it made at least $500 of landings in the limited entry or open access groundfish fishery. Vessels with less than $500 total revenue are excluded.
3. Home-port group is defined as the port group where a vessel made the most landings by value.

Source: PacFIN annual vessel summary, April 2013, March 2014, and April 2015 extractions; vessels with DRVID "NONE" and "ZZ…." are excluded.

group includes such species as albacore tuna. There were 288 home-port vessels landing greater than $500 of HMS in 2014. Another 73 that home-port in other West Coast states had landings of HMS greater than $500 in Oregon. The PFMC may consider developing a limited entry program to control excess capacity in the future and a control date of March 9, 2000 was approved.[8]

There is a federal limited entry permit system for CPS. The CPS group includes such species as market squid, sardines, and mackerels. The PFMC CPS FMP Amendment 10 defines the limited entry program and transferability requirements. The CPS group are major fisheries in California and, except for sardines in some years, are minor fisheries in Oregon.

D. Port Information

Twelve communities along the Oregon Coast are the mainstay harbors for the fishing fleet. Tables II.12 and II.13 show onshore landings, home-port vessel counts, deliveries, and processor business characteristics for the communities. Tables A.7a, A.7b, and A.8 show onshore landings by fishing strategies and area-of-catch for the communities. The harbors are geographically combined to five port groups to simplify descriptions in this report. The communities have evolved around harbors and fishing grounds with different characteristics. Each has a presence of key facilities and services that make it unique. The proportion of ocean fisheries harvest value being landed at smaller ports has been trending downward since 1990 (Figure

Table II.12
Port Group Share of Onshore Landings and Home-Port Vessels in 2010 to 2014

		2010			2011			2012			2013			2014		
		Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port	Onshore Landings		Home-Port
Port Group/Communities	Local/ Regional	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels	Volume	Value	Vessels
Astoria		52%	35%	35%	54%	34%	34%	58%	33%	31%	48%	31%	30%	44%	31%	30%
Astoria and Warrenton	R															
Tillamook		1%	3%	10%	0%	2%	10%	0%	2%	11%	1%	2%	10%	0%	2%	10%
Garibaldi	L															
Pacific City	L															
Newport		29%	30%	21%	29%	30%	21%	27%	30%	23%	37%	31%	22%	42%	34%	22%
Depoe Bay	L															
Newport	R															
Coos Bay		15%	24%	20%	14%	26%	21%	11%	23%	20%	10%	21%	21%	10%	24%	23%
Florence	L															
Winchester Bay	L															
Charleston	R															
Bandon	L															
Brookings		4%	9%	14%	3%	8%	14%	3%	12%	15%	5%	14%	17%	3%	9%	14%
Port Orford	L															
Gold Beach	L															
Brookings	R															
Total		216.6 million pounds	$110.2 million ex-vessel	975 vessels	285.8 million pounds	$153.6 million ex-vessel	980 vessels	306.7 million pounds	$130.1 million ex-vessel	951 vessels	349.4 million pounds	$180.0 million ex-vessel	953 vessels	300.4 million pounds	$156.1 million ex-vessel	971 vessels

Notes: 1. Declaration of local or regional considers presence of vessel repair businesses, fishing equipment suppliers, ice services, cold storage, delivery services from buyers and processors, moorage and landing facilities, etc.
2. Value is in millions of 2014 dollars.

Source: PacFIN annual vessel summary July 2011, April 2013, March 2014, and April 2015 extractions.

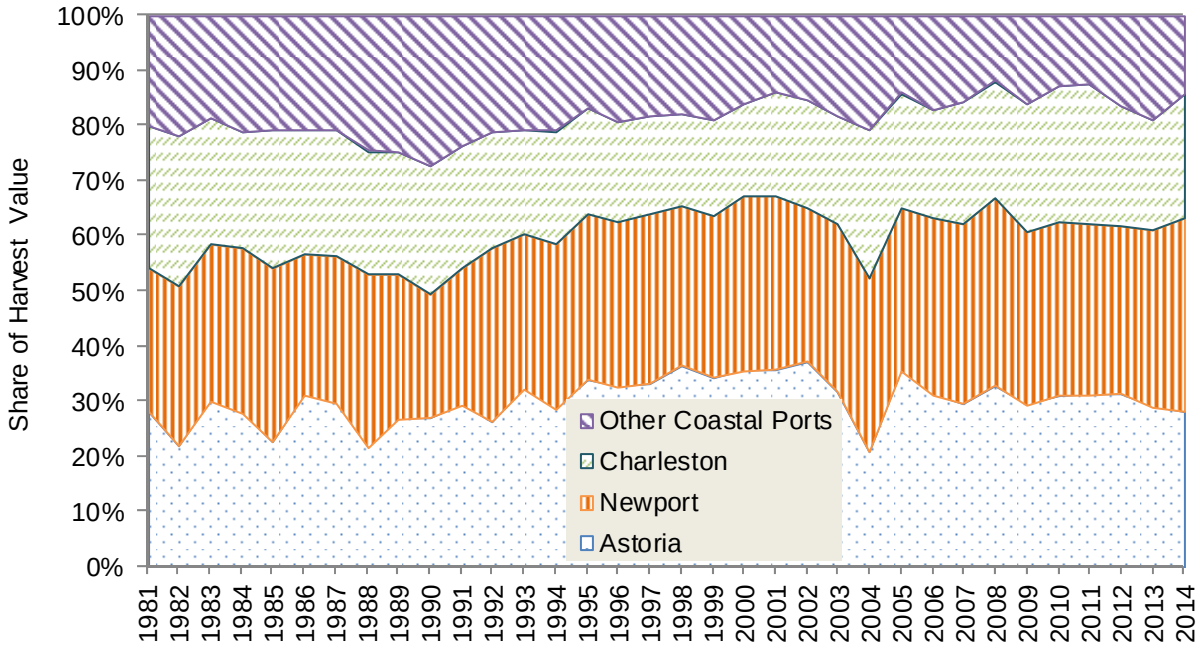
Table II.13
Landings and Participant Counts by Port in 2014

Activity	Astoria and Warrenton	Garibaldi	Pacific City	Depoe Bay	Newport	Florence	Reedsport/ Winchester Bay	Coos Bay and Charleston	Bandon	Port Orford	Gold Beach	Brookings Harbor	Statewide
Volume (millions pounds)	128.1	1.2	0.1	0.03	127.1	0.02	0.9	29.6	0.02	1.4	0.1	8.4	300.4
Value (millions ex-vessel)	$42.7	$3.6	$0.2	$0.1	$52.6	$0.1	$3.6	$34.1	$0.1	$3.4	$0.3	$9.8	$156.1
Deliveries													
Count	3,098	1,426	373	131	5,225	32	546	4,250	113	3,109	874	1,894	25,899
Unique vessels	281	142	29	14	382	6	71	380	21	79	37	141	1,199
Processor/buyer/restaurant counts													
Statewide purchase volume													
>$500 thousand	12	7	c	c	16	c	5	12	c	4	c	10	30
>$10 thousand	25	18	8	12	46	3	20	41	12	14	6	19	87
Purchases at port													
>$500 thousand	7	4	0	0	11	0	c	9	0	c	0	4	
>$10 thousand	14	8	5	c	40	c	7	26	c	8	3	12	

Notes:
1. Shown ports landings do not sum to Oregon total because of minor landings at unspecified ports. Vessel and processor counts do not sum to Oregon total because vessels may deliver to more than one port, and processors may make purchases at more than one port.
2. Deliveries exclude vessels with identification of "NONE" or "ZZ..."
3. Processor counts exclude occurrences when vessels make direct sales to the public.
4. Processing does not necessarily occur at the port where the landings are shown to be purchased. In some cases, the purchases are hauled by truck to another location for processing, cold storage, and distribution.
5. Counts with a "c" are not shown to avoid revealing confidential information.

Source: PacFIN annual vessel summary and fish ticket data, April 2015 extractions.

Figure II.10
Historical Proportion of Ocean Fisheries Harvest Value
Landed at Regional Fishing Centers and Other Coastal Ports



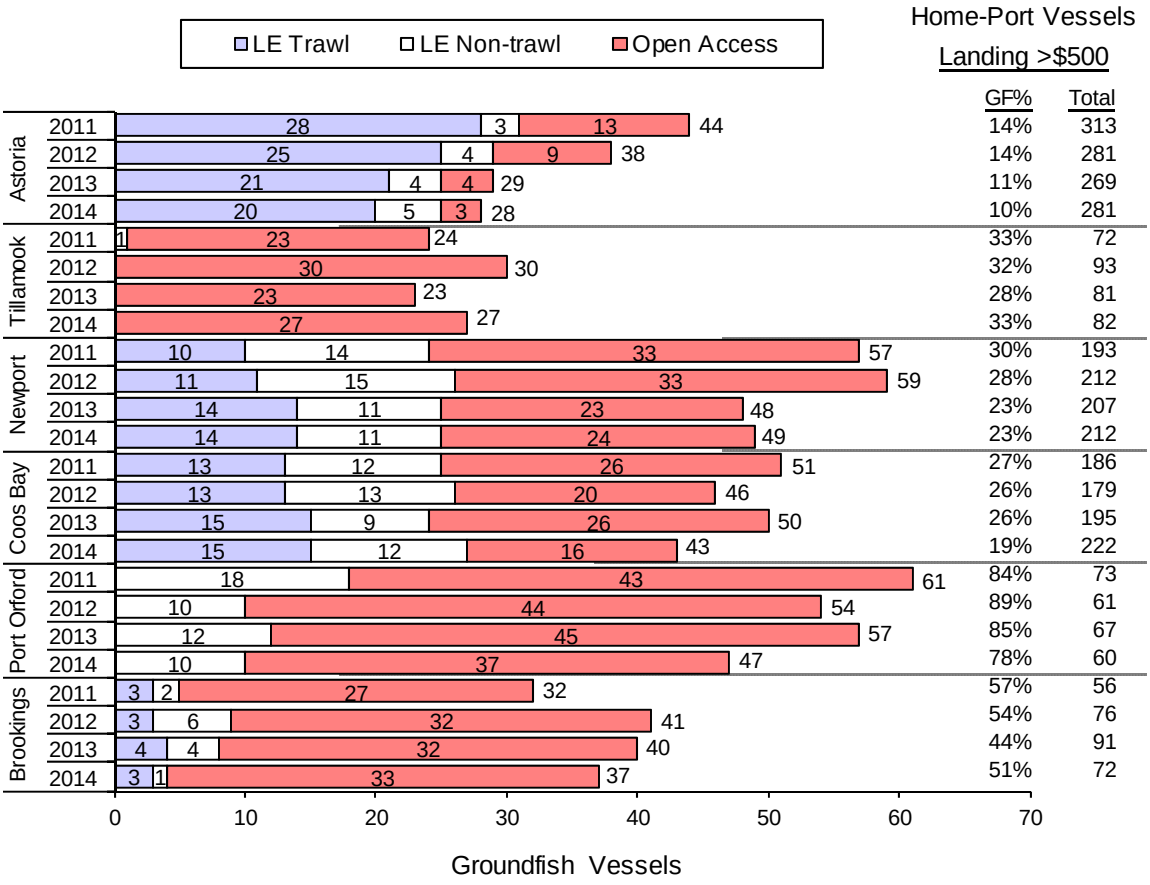
Notes: 1. Harvest value is ex-vessel revenue from ocean catch (excludes Columbia River catch).
Source: PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

II.10). Some serve a locally based fleet and others are regional fisheries centers.

The comparative size of the port groups can be described by the number of home-port vessels moored there and how much volume and value of fish is delivered there.[9] The Astoria port group has the largest share (30 percent) of home-port vessels in 2014 followed by Coos Bay (23 percent), Newport (22 percent), Brookings (14 percent), and Tillamook (10 percent) in 2014. The Tillamook port group has the least groundfish landings which is explained by comparatively less habitat in nearby fishing grounds for non-whiting groundfish species. Port Orford has a large number of groundfish deliveries, but none by vessels with groundfish LE trawl permits. Vessels are launched by a hoist system and capacity limitations preclude trawl vessels mooring at this port. Vessels at Port Orford have strong participation in fixed gear fisheries, such as the sablefish fishery (Figure II.11). Astoria had the highest landings in terms of volume and Newport had the highest landings in terms of value of any port group in Oregon in 2014. The volume landing order of ports following Astoria is Newport, Coos Bay, Brookings, and Tillamook. The value landing order of ports following Newport is Astoria, Coos Bay, Brookings, and Tillamook.

The Astoria area economy benefits from several large seafood processors and fish meal plants. Estimating the portion of the Astoria area economy benefiting from the fishing industry is complicated by additional ports being located just across the Columbia

Figure II.11
Home-Port Vessels Counts by Port Group and by Groundfish LE Permit Status in 2011 to 2014



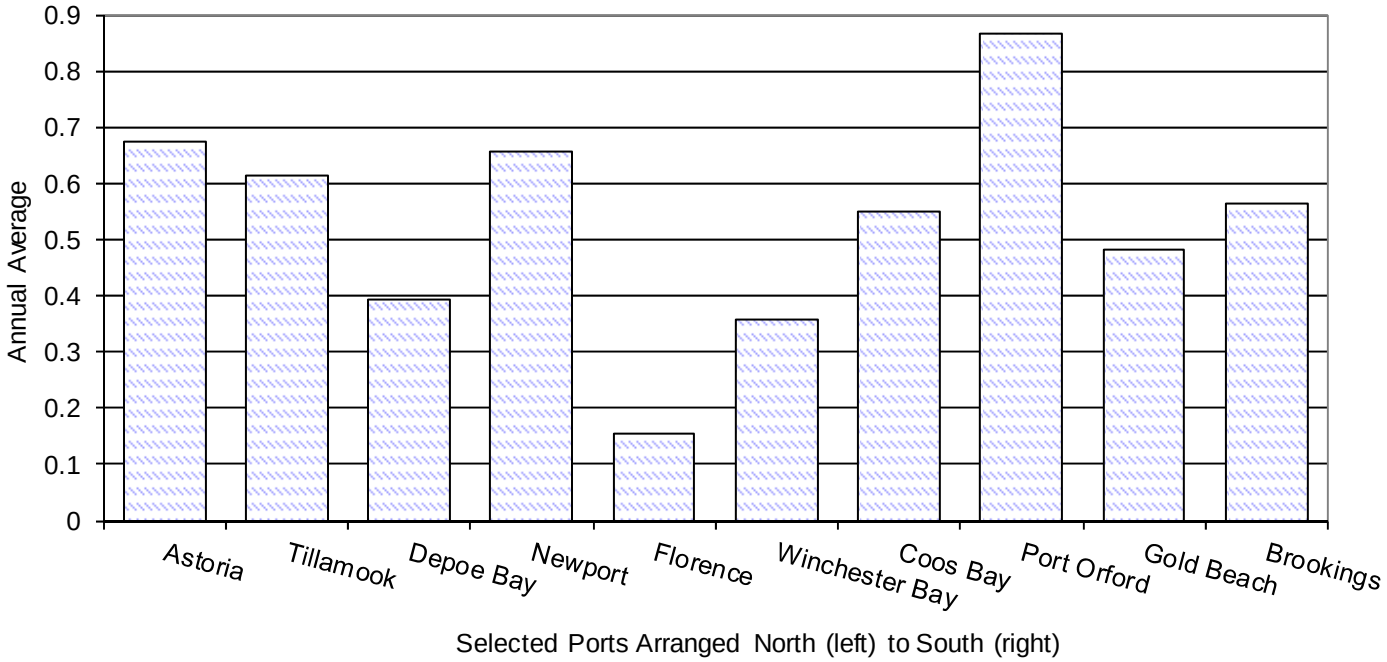
Notes: 1. Figure II.9 notes and sources apply.

River. Services and supplies for these Washington ports are generally provided by businesses located in Oregon. Economic modeling attempts to account for these purchase effects. Table A.8 in the appendix shows the rather involved sources of landings that occurred in 2014 at the Astoria and Ilwaco area ports.

Newport is also a regional commercial fisheries center with several active processors. Many vessels participating solely in distant water fisheries use Newport for moorage, provisioning, and repairs, but do not show-up in home-port vessel statistics because they do not make a majority of their landings onshore in Oregon. Other ports, such as Charleston in the Coos Bay port group area and Garibaldi in the Tillamook port group area, also have processors. Many ports have buying stations where harvests can be delivered, but the fish are trucked to regional fisheries centers for processing.

A harbor where a commercial fishing vessel moors is not necessarily where it delivers harvests. There is no statewide data series for vessel moorage locations, and federal vessel documentation information for port location is more aligned with a vessel owner location. To show a profile of the moorage and delivery differences, a ratio of active vessel deliveries at selected ports and all

Figure II.12
Ratio of Active Vessel Deliveries at Selected Ports and All Deliveries
by Active Vessels Who Delivered to the Port in 2010 to 2014



Notes:
1. An active vessel is any identifiable vessel that landed at least $500 in Oregon in a year.
2. A directed vessel is any identifiable vessel that landed at least $500 in one of the selected fisheries in Oregon in a year.
3. Vessels or non-vessels (such as from a dock) with no unique identification are called unidentifiable. Landings from unidentifiable vessels are not included.
4. The shares shown are a weighted average of 2010 to 2014.
5. Deliveries are approximated using fish tickets. A fish ticket represents the landing of fish or shellfish product from one fishing trip. Ticket counts may not reflect fishing trips; multiple tickets can be issued for a single trip when a vessel delivers to more than one dealer after returning to port, and vessels issue tickets when a sale is made directly to the public. Trip undercounts could occur in the occasion when tendering services are used because more than one vessel's harvest could be combined onto a single fish ticket. Delivery counts are not additive across fisheries because a fish ticket may include more than one species.

Source: PacFIN fish ticket data, July 2011, April 2013, March 2014, and April 2015 extractions.

vessel deliveries was developed (Figure II.12). The figure shows that Florence has the lowest ratio because many vessels that moor at the harbor deliver to Newport. The harbor with the highest ratio for "staying-at-home-port" is Port Orford.

A number of communities have recently made or are investigating the feasibility of making capital investments in the processing sector to entice private businesses to operate at their harbors. A partial example listing is as follows. The Port of Astoria entered into a partnership with Bornstein's Seafood to build a cold storage facility. The Port of Newport has upgraded its International Terminal which provides backland and dock services to the distant water fleet. Coos County and the Oregon International Port of Coos Bay facilitated the purchase of the

Peterson Plant in Charleston by a local partnership called Oregon Brand Seafood. The Port of Coos Bay has also invested in improvements at a private ice provider to make sure vessels will have this service in the future. The City of Depoe Bay has constructed a marine fuel station and has refurbished docks and buildings. The building is being advertised for a lease to a fish buyer who will provide ice and other services to the local fishing fleet. The Port of Umpqua upgraded the receiving dock and hoist at Winchester Bay and has a lease with Hallmark Fisheries for its operation. The Port of Brookings has purchased the old Eureka Fisheries seafood plant and property and has upgraded the dock for accommodating a new buying station. The Port has constructed and is operating a cold storage facility. The Port has also received State and federal assistance to repair moorage facilities damaged from a March 11, 2011 tsunami caused by the Tōhoku earthquake off the coast of Japan.

Ports own and operate moorage and provide other facilities and services for the fishing industry and are the local sponsors of dredging and waterway improvement projects paid for by the Corps of Engineers.[10] Ports are often the central advocacy and local policy coordinating entity for the fishing industry. They are major players along with commercial fishing organizations in ensuring fairness and equity in regulations and assistance programs for the fishing industry.[11]

III. MAJOR FISHERIES REVIEW

A. Onshore Fisheries

A short discussion of eight major fisheries is contained in this chapter. Included with the discussions are events and factors that are expected to influence future fisheries. Fishery characteristics (landing trends and economic contribution) and participant information for 2014 are shown in Tables III.1 and III.2. (The derivation and interpretations of economic contribution shown in Table III.1 are explained in Chapter V.) Additional information about management history and the biology of major fisheries can be found in ODFW (2007) and ODFW (2013). The Oregon Sea Grant publication for "Getting to Know Oregon's Commercial Fisheries" has rich descriptions of harvesting techniques.

There are other important ocean fisheries not discussed in this section. For example, the other fisheries category in 2014 includes $1.5 million hagfish harvest value and $0.3 million chub mackerel harvest value in 2014. The other fisheries category represents about 1.9 percent of all Oregon onshore landed harvest value in 2014.

1. Salmon

The salmon fishery includes ocean troll caught Chinook and coho, and net caught Chinook and coho fisheries in the Columbia River. The ocean Chinook salmon fisheries south of Cape Falcon were declared disasters in 2006 and 2008 and large expanses of ocean were restricted from any salmon fishing.[12,13] The restrictions were due to poor returns to the Klamath River in 2006 and Sacramento River in 2008. The Year 2007 season had many open fishing days, but catch rates were low. The Year 2009 south of Cape Falcon Chinook salmon season was closed to fishing, except there was a short (September only) limited area (north of Humbug Mt. and south of Cape Falcon) coho only salmon season. The south of Cape Falcon Chinook salmon season starting in 2010 and continuing through 2014 had traditional open days (Figure III.1). Year 2013 ocean troll Chinook volume was up at 1.5 million pounds and doubled in 2014 to 3.0 million pounds (Table A.1). However, the pre-season expectations for even higher numbers of salmon stocks that contribute to the mixed-stock ocean fisheries (such as the Sacramento River fall Chinook) did not materialize for the 2014 ocean season.

There has not been a traditional south of Cape Falcon commercial troll coho fishery since 1993, and the recreational selective (hatchery origin only) coho fishery off the central Oregon Coast only returned after years of closure in 1999. There have been small quota commercial troll coho seasons along with Chinook seasons north of Cape Falcon since 2000. The traditional day seasons for Chinook south of Cape Falcon to Humbug Mt. in 2014 additionally had a trip limit and ratio requirements September season for non-marked coho. There was also a short late season commercial Chinook salmon bubble fishery around river entrances that had healthy stock returns (includes Elk River and Chetco River in 2014).

Columbia River non-Indian and tribal fisheries had increased landings in 2013 and 2014 as compared to the previous biennium's two years (Figure III.2 and III.3). The Oregon landings went up from 2.0 million pounds in 2013 to 3.3 million in 2014.

Overall (including ocean and Columbia River catch areas) salmon landings

Table III.1
Major Fisheries Characteristics in 2014

1. SALMON FISHERY

Year 2014		
Volume (thousands pounds)		6,414
Ex-vessel value (thousands)		$20,124
Change from 2013		60%
3 year average		125%
10 year average		144%
Economic contribution (millions)		$31.58
Share onshore total		11%
	Count	Share
Vessels >$500	635	91%
Average salmon revenue	$29,488	
Salmon share		51%
Vessels 50% value	119	17%
Vessels 90% value	360	52%
Top 10 vessels	10	1%
Average salmon revenue	$152,549	
Salmon share		70%

Type: Troll

Volume (thousands pounds)	3,044	--
Price	$4.87	--
Ex-vessel value (thousands)	$14,829	--
Vessels >$500	462	94%
Average salmon revenue	$32,077	
Salmon share		45%
Vessels 50% value	87	18%
Vessels 90% value	262	53%
Permits authorized	1,000	
Permits	979	

Type: Net, Non-Tribal, Oregon Landings

Volume (thousands pounds)	2,674	--
Price	$1.51	--
Ex-vessel value (thousands)	$4,039	--
Vessels >$500	173	95%
Average salmon revenue	$22,573	
Salmon share		99%
Vessels 50% value	36	20%
Vessels 90% value	100	55%
Permits authorized	200	
Permits	289	

Type: Net, Tribal, Oregon Landings

Volume (thousands pounds)	663	--
Price	$1.90	--
Ex-vessel value (thousands)	$1,256	--

2. DUNGENESS CRAB FISHERY

Year 2014		
Volume (thousands pounds)		11,915
Price		$4.03
Ex-vessel value (thousands)		$47,988
Change from 2013		-34%
3 year average		-3%
10 year average		7%
Economic contribution (millions)		$71.70
Share onshore total		24%
	Count	Share
Vessels >$500	348	94%
Average crab revenue	$137,892	
Crab share		52%
Vessels 50% value	70	19%
Vessels 90% value	203	55%
Top 10 vessels	10	3%
Average crab revenue	$592,286	
Crab share		63%
Permits authorized	464	
Permits	424	

3. PINK SHRIMP FISHERY

Year 2014		
Volume (thousands pounds)		51,960
Price		$0.56
Ex-vessel value (thousands)		$29,326
Change from 2013		20%
3 year average		16%
10 year average		110%
Economic contribution (millions)		$50.49
Share onshore total		17%
	Count	Share
Vessels >$500	60	100%
Average shrimp revenue	$488,764	
Shrimp share		66%
Vessels 50% value	16	27%
Vessels 90% value	37	62%
Top 10 vessels	10	17%
Average shrimp revenue	$1,051,145	
Shrimp share		77%
Permits authorized	150	
Permits	139	

Table III.1 (cont.)

5. GROUNDFISH FISHERY

Year 2014		
Volume (thousands pounds)		28,375
Price		$0.77
Ex-vessel value (thousands)		$21,810
Change from 2013		-4%
3 year average		-15%
10 year average		-13%
Economic contribution (millions)		$36.96
Share onshore total		13%
	Count	Share
Vessels >$500	242	69%
Vessels 50% value	13	4%
Vessels 90% value	65	19%

Type: Limited Entry, Trawl and Fixed Gear

Volume (thousands pounds)	27,788	--
Ex-vessel value (thousands)	$20,326	--
Vessels >$500	101	97%
Average LE GF revenue	$201,238	
LE GF share		32%
Vessels 50% value	12	12%
Vessels 90% value	47	45%
Top 10 vessels	10	10%
Average LE GF revenue	$925,844	
LE GF share		75%

Type: Open Access

Volume (thousands pounds)	587	--
Ex-vessel value (thousands)	$1,484	--
Vessels >$500	144	52%
Average OA GF revenue	$10,202	
OA GF share		19%
Vessels 50% value	23	8%
Vessels 90% value	79	28%
Top 10 vessels	10	4%
Average OA GF revenue	$45,088	
OA GF share		86%

Note: Vessel counts include home-port vessels as well as out-of-state vessels making Oregon landings.

4. ALBACORE TUNA FISHERY

Year 2014		
Volume (thousands pounds)		8,777
Price		$1.26
Ex-vessel value (thousands)		$11,023
Change from 2013		-32%
3 year average		-36%
10 year average		-14%
Economic contribution (millions)		$19.35
Share onshore total		7%
	Count	Share
Vessels >$500	361	95%
Average tuna revenue	$30,517	
Tuna share		28%
Vessels 50% value	46	12%
Vessels 90% value	160	42%
Top 10 vessels	10	3%
Average tuna revenue	$185,478	
Tuna share		48%

6. PACIFIC WHITING FISHERY

Year 2014		
Volume (thousands pounds)		168,226
Price		$0.109
Ex-vessel value (thousands)		$18,274
Change from 2013		-12%
3 year average		3%
10 year average		81%
Economic contribution (millions)		$61.27
Share onshore total		21%
	Count	Share
Vessels >$500	24	60%
Average whiting revenue	$761,374	
Whiting share		72%
Vessels 50% value	7	18%
Vessels 90% value	15	38%
Top 10 vessels	10	25%
Average whiting revenue	$1,265,125	
Whiting share		89%

Table III.1 (cont.)

7. PACIFIC SARDINE FISHERY

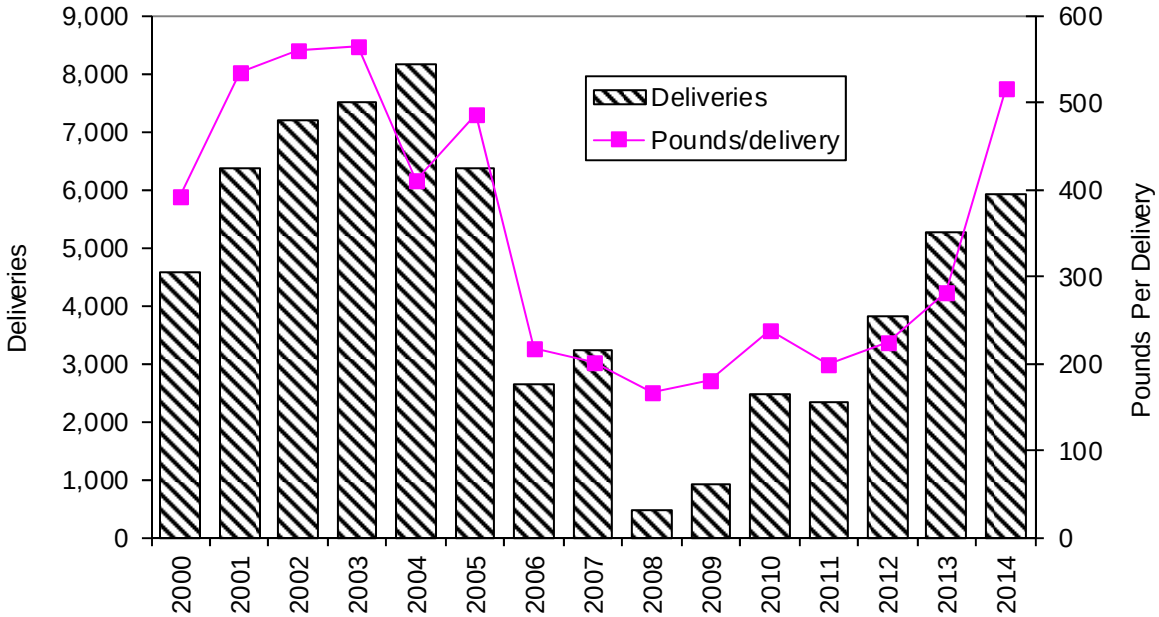
Year 2014		
Volume (thousands pounds)		17,171
Price		$0.205
Ex-vessel value (thousands)		$3,522
Change from 2013		-45%
3 year average		-44%
10 year average		-40%
Economic contribution (millions)		$14.21
Share onshore total		5%
	Count	Share
Vessels >$500	17	53%
Average sardine revenue	$207,162	
Sardine share		69%
Vessels 50% value	4	13%
Vessels 90% value	11	34%
Top 10 vessels	10	31%
Average sardine revenue	$307,560	
Sardine share		66%
Permits	24	

8. PACIFIC HALIBUT FISHERY

Year 2014		
Volume (thousands pounds)		206
Price		$5.59
Ex-vessel value (thousands)		$1,149
Change from 2013		15%
3 year average		8%
10 year average		19%
Economic contribution (millions)		$1.65
Share onshore total		1%
	Count	Share
Vessels >$500	93	48%
Average halibut revenue	$12,152	
Halibut share		6%
Vessels 50% value	9	5%
Vessels 90% value	31	16%
Top 10 vessels	10	5%
Average halibut revenue	$64,224	
Halibut share		15%

Notes: Some vessels land outside Oregon, but only Oregon landings are included.
Source: PacFIN annual vessel summary April 2015 extraction.

Figure III.1
Troll Salmon Effort Trends in 2000 to 2014



Notes:
1. Weight is round pound equivalent.
2. Deliveries include fish ticket counts when troll Chinook or coho was landed. The deliveries exclude trip counts when salmon was the target fishery, but there was no retained salmon catch.
3. Deliveries are included for both catch areas north and south of Cape Falcon.

Source: PacFIN annual vessel summary and fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

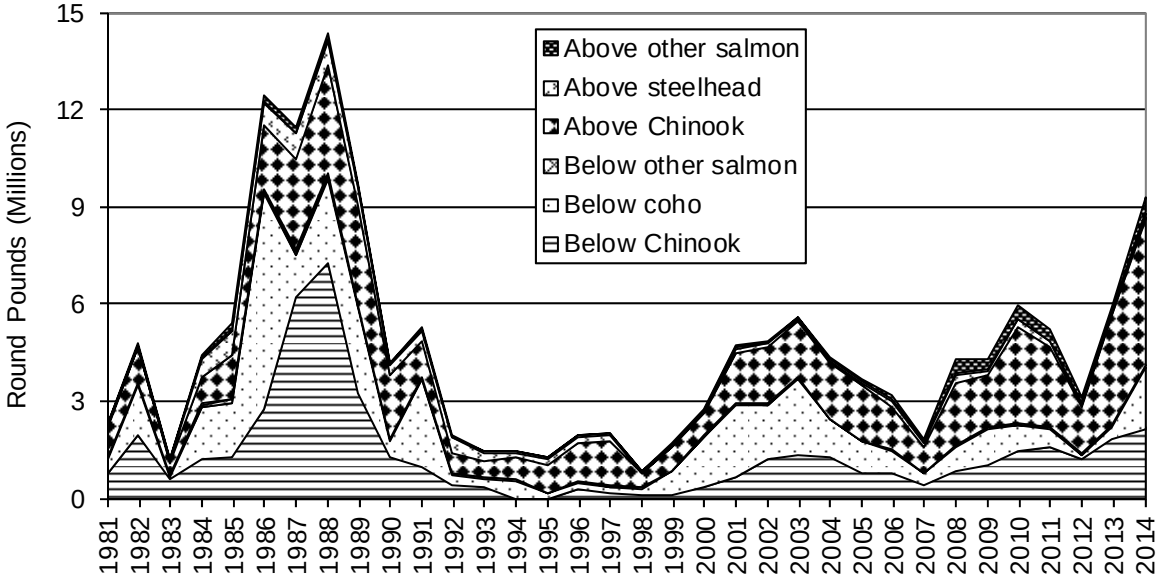
Table III.2
Vessel Participation by Major Fishery and by Port Group in 2014

	Astoria			Tillamook			Newport			Coos Bay			Port Orford			Brookings			Statewide		
Fishery	>$500	50% Value	90% Value	>$500	50% Value	90% Value	>$500	50% Value	90% Value	>$500	50% Value	90% Value	>$500	50% Value	90% Value	>$500	50% Value	90% Value	>$500	50% Value	90% Value
Salmon troll	97	20	58	88	11	45	207	35	113	259	48	149	33	6	17	84	19	51	462	87	262
Dungeness crab	88	19	45	24	6	15	121	26	73	90	16	50	26	7	16	48	8	28	348	70	203
Pink shrimp	15	4	8	0	0	0	20	5	12	24	7	16	0	0	0	12	3	6	60	16	37
Albacore tuna	84	12	40	47	8	27	143	20	69	140	17	67	5	c	3	12	3	6	361	46	160
Groundfish																					
Limited entry	31	5	14	0	0	0	36	4	15	32	6	16	10	3	7	13	c	7	101	12	47
Open access	4	c	3	31	7	19	25	5	17	29	5	21	42	9	24	39	8	22	144	23	79
Pacific whiting	18	3	8	0	0	0	14	4	10	c	c	c	0	0	0	0	0	0	24	7	15
Pacific sardine	17	4	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	4	11
Pacific halibut	8	c	5	4	c	3	58	6	17	22	4	13	6	c	5	c	c	c	93	9	31
All fisheries	451	26	147	150	12	58	383	23	125	391	23	129	76	10	34	159	10	60	1,152	77	412

Notes:
1. The column titled ">$500" is an arbitrary threshold to filter for vessels that are actively participating in the shown fishery. The fisheries in each port group are counted separately, so the $500 filter is applied to each. Statewide, the $500 threshold may be landed at any combination of port groups.
2. The vessel counts under the columns titled for percent value are the number of vessels it took to land that percent of the ex-vessel value of the fishery.
3. Some vessels participate in distant water fisheries, such as the West Coast offshore whiting fishery where deliveries are made to motherships. Only Oregon onshore landings are included in the table compilations.
4. Vessels with identification of "NONE" or "ZZ..." are excluded. These vessels are typically delivering in treaty fisheries. The statewide ex-vessel value for these vessels is $2.2 million (including $1.3 million for treaty participation group and $0.9 million for ocean and inriver commercial non-treaty participation group).
5. Vessel counts across fisheries will not sum to a port group or statewide total because vessels can participate in more than one fishery and/or there are other important fisheries not itemized. For example, the statewide ex-vessel value for Columbia River fisheries is $3.9 million or 2.6% of all Oregon landings in 2014. Other ocean fisheries not shown are $2.1 million (including $1.5 million for hagfish and $0.3 million for chub mackerel) or 1.4% of all Oregon landings. The row titled "all fisheries" includes the Columbia River fisheries and other fisheries that were not itemized.
6. Counts with a "c" are not shown to avoid revealing confidential information.

Source: PacFIN annual vessel summary, April 2015 extraction.

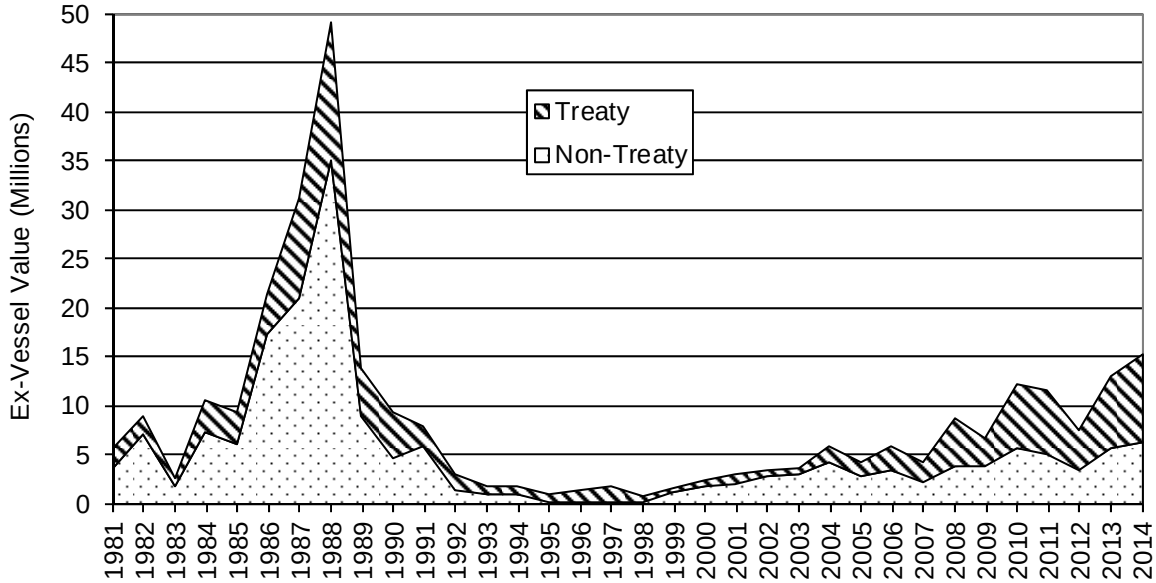
Figure III.2
Columbia River Harvest Volume Above and Below Bonneville in 1981 to 2014



Notes: 1. The determination of harvest area-of-catch used a filter for tribal fisheries. There is a very minor amount (less than 0.5%) of tribal fisheries below Bonneville in the earlier shown years.
2. Harvest information is for Columbia River area-of-catch, including Washington and Oregon landings.

Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

Figure III.3
Columbia River Net Salmon Harvest Value Trends in 1981 to 2014



Notes: 1. Value adjusted to 2014 dollars.
2. Harvest information is for Columbia River area-of-catch, including Washington and Oregon landings.

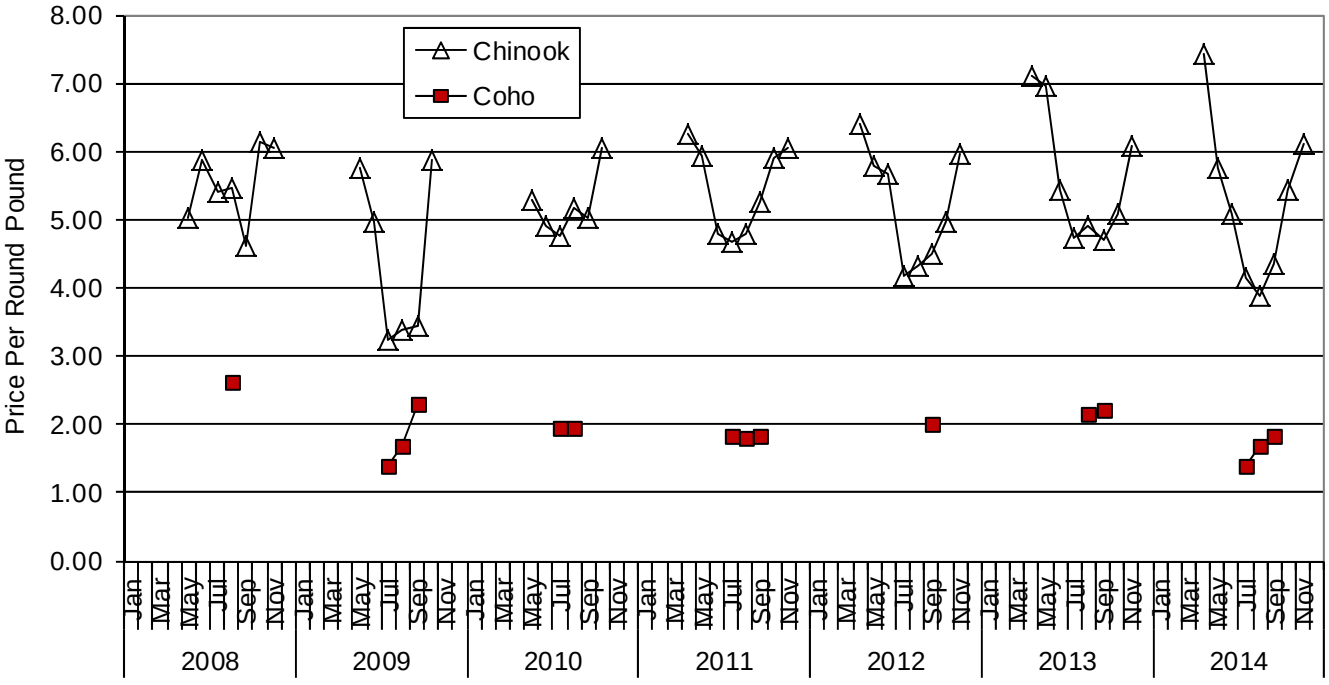
Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

increased slightly in the middle 1990's following a historic low volume and ex-vessel value in 1994. This trend was followed by declines again in 1999. Landings increased in each year from 2000 to 2003. A decline started with the 2004 season and dropped to very low levels in 2007. Landings have increased in every year following 2007, except for 2012. The Columbia River net fisheries rather than ocean troll fisheries mostly caused the declines in 2012. Landings have increased since 2012 and there has been only one year (2003) in the last 25 years that has had landings greater than 2014.

Monthly prices for ocean harvests were more volatile in 2013 and 2014 than in 2012 (Figure III.4). The resultant annual average price was slightly up in 2013 and down in 2014 (Table A.2). Prices for Columbia River spring and fall Chinook were up in 2013, but fell in 2014 (Figure III.5 and Table A.2). The higher landings despite an annual price decrease resulted in a total increase in salmon harvest value in 2014. The resulting value of all salmon landed was $12.6 million in 2013 and $20.1 million in 2014.

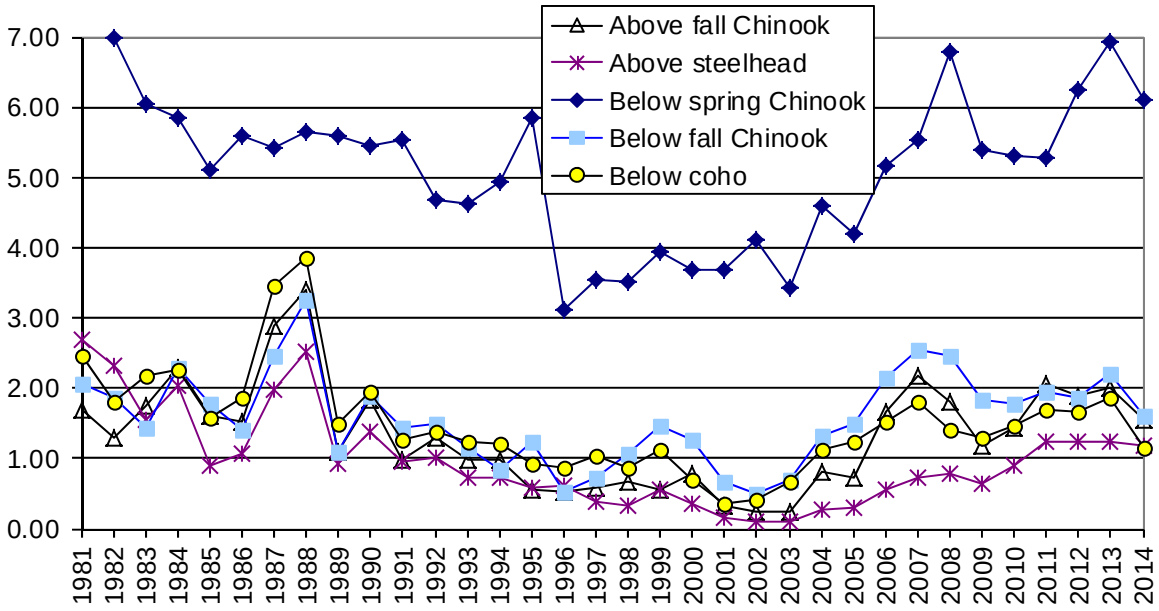
There were 462 vessels (94 percent of all vessels making troll salmon deliveries) that delivered more than $500 troll caught salmon in 2014. Their average salmon revenue was $32,077, which was about 45 percent of their total fisheries revenue. The 2007 legislature decreased the number of authorized permits from 1,200 to 1,000 starting in 2008.[14] There were 979 permits issued in 2014. The ODFW has held a

Figure III.4
Troll Coho and Troll Chinook Prices by Month, January 2008 to December 2014



Notes: 1. Prices adjusted to 2014 dollars.
2. Excludes prices in months with less than 500 round pounds landed.
Source: PacFIN fish ticket data, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

Figure III.5
Columbia River Price for Harvests Above and Below Bonneville in 1981 to 2014



Notes: 1. Prices adjusted to 2014 dollars.
2. Prices not shown in years with less than 250 pounds of landings.
3. Harvest information is for Columbia River area-of-catch, including Washington and Oregon landings.

Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

lottery to issue new permits to bring the number back up to the authorized number twice since the floor was established through legislation in 1995.

In the gillnet, non-tribal, Columbia River salmon fishery, there were 173 vessels that delivered more than $500 revenue in that fishery to Oregon in 2014 (95 percent of all vessels making net, non-tribal deliveries).[15] Of the 173 vessels, 144 are licensed in Oregon and the other 29 are licensed in Washington. (Gillnet vessels licensed in either state are permitted to make landings at either state's ports.) Of the 88 vessels delivering more than $500 of salmon to Washington side ports, four vessels were licensed in Oregon. The average salmon revenue for the Oregon side landings was $22,573, which was about 99 percent of their total fisheries revenue.

Treaty salmon fisheries landings do not identify vessels, so no vessel performance measures are available for this fishery.

The average troll salmon revenue for the top 10 troll salmon vessels was $152,549 and their dependency on troll salmon revenue was 70 percent. The top 87 (18 percent) troll salmon vessels harvested 50 percent of this fishery's total value, and the top 262 vessels harvested 90 percent of this fishery's total value. The bottom 200 vessels (i.e. 462 minus 262 vessels or 43 percent of all vessels delivering more than $500) harvested 10 percent of the total value.

The average non-tribal net salmon revenue for the top 10 net salmon vessels was $72,789 and their dependency on net salmon revenue was 97 percent. The top 36 (20 percent) net salmon vessels harvested 50 percent of this fishery's total value, and the top 100 vessels harvested 90 percent of this fishery's total value. The bottom 73 vessels (i.e. 173 minus 100 vessels or 42 percent of all vessels delivering more than $500) harvested 10 percent of the total value.

There was a general trend in price decreases starting in the early 1980's due to market influences from the availability of aquaculture raised salmon. However, troll Chinook salmon have generally increased in recent years due to consumer preferences for wild-caught salmon. Prices will generally be high when the season starts in spring, then decline during the summer, and rise again when ocean fisheries are finishing for the season (Figure III.4). There have been early ocean season openings since 2003 for large sized Chinook. These have entered the market when river caught spring Chinook have traditionally fetched very high prices. The early ocean season management restrictions on landing small grade fish plus the influence from spring Chinook prices have helped buoy the troll caught Chinook early season prices which in turn statistically increased the annual price.

Despite recent year's increases, prices are still lower than the six dollars per pound received during the late 1970's (Appendix A Table A.2). The past decline in price for salmon can mainly be attributed to the rapid increase in less expensive farmed salmon introduced to the marketplace. The recent increase in wild caught salmon price may be due to consumer preference for coldwater, ocean harvested fish. This is an indication that Oregon salmon advertised as a quality, healthy product has been able to position itself in the marketplace at a higher price level. For an example of a mass marketed substitute, frozen filleted Chilean salmon was $1.30 per pound in 2006. This market niche acceptance leading to a higher price trend has had the effect of substantially increasing Oregon troll caught salmon landed value. Fish quality for the tribal fall fisheries in the Columbia River provides a challenge to increase the total commercial value of Oregon salmon harvests.

The non-Indian Columbia River salmon fisheries catch areas are both in the mainstem and off-channel locations. The off-channel fishery is made possible by a lower river hatchery fish acclimation program. Large numbers of Chinook and coho raised in Columbia River mitigation hatcheries are transported to the Astoria area for final rearing and liberation. Adult returns are harvested off-channel to avoid impacts to natural origin stocks. The program is financially supported by the Bonneville Power Administration and Clatsop County both as a conservation and fishery economic development project (TRG November 2006). Participants (harvesters and processors) voluntarily tax themselves for also providing revenues in support of the program. While expensive, the program is likely to continue in the future given its success in protecting weak natural origin stocks and reducing conflicts with recreational fisheries. The program is also related to the 2012 ODFW and WDFW Lower Mainstem Columbia River Fisheries Management Reform Program whereby gillnet gear will be phased out in the mainstem, and hatchery production released off-channel will be increased.

Salmon commercial fisheries season management measures and allocations are decided after considering salmon fishery management plan (FMP) control rules,

impacts to Endangered Species Act (ESA) listed stocks, recreational and tribal fisheries, and inriver escapement needs. In mixed stock species fisheries, restricted salmon seasons can be expected in the future in order to protect a run that has been declared to be of concern. Management has had to address increasing allocation conflicts to meet international treaties, treaty Indian sharing obligations, and to satisfy river and ocean user group requests all the while meeting natural stock escapement objectives and hatchery brood stock needs. The tiptoeing through weak stock management and allocation conflicts can cause some hatchery origin stocks meant for harvesting being returned as surpluses.

The major component of the Oregon troll fishery north of Cape Falcon is the Columbia River stocks. The south of Cape Falcon to Humbug Mt. fishery relies heavily on Sacramento fall Chinook salmon. The major component for south of Humbug Mt. is the Klamath River fall Chinook (Table III.3). The recent ESA listing for the lower Columbia River wild coho stocks and Chinook tules will constrain troll fisheries in future years. The Sacramento River and the Klamath River fall Chinook will undoubtedly be the constraining stock for ocean troll fisheries in the near future unless there are major freshwater condition improvements. There are many other listed and stocks of concern status, but they have not constrained ocean salmon fisheries in recent years. The challenge for Oregon harvest managers is to provide access to hatchery origin fish and other healthy natural stocks while protecting weak stocks.

2. Dungeness Crab

The ocean Dungeness crab fishery typically has cyclical abundance trends.[16,17] Crab landing volumes reached a historic peak in 2006 which was somewhat due to the anomaly of shifting December 2005 season into the early months of 2006. The landings decreased through 2008 and bumped up again in 2009. Landings decreased in Year 2010 and were about the same in 2011. After dipping by about half in 2012, landings again increased to 26.1 million

Table III.3
U.S. West Coast Chinook Troll Fishery Stock Representative Contributions

	Ocean Harvest Areas			
	U.S.-Canadian Border to Cape Falcon	Cape Falcon to Humbug Mt.	Humbug Mt. to Horse Mt.	Horse Mt. to U.S.-Mexico Border
Production Region				
Puget Sound	2%	0%	0%	0%
Washington Coast	3%	5%	0%	0%
Columbia River	65%	20%	5%	1%
Oregon Coast	5%	5%	0%	0%
Klamath	5%	10%	55%	10%
Sacramento	20%	60%	40%	89%
Other	--	--	--	--
Total	100%	100%	100%	100%

Notes: 1. Stock contribution shares vary year-to-year and the table should only be considered representative of long term averages.
2. Shares were derived from management model assumptions and coded wire tag return information.

Source: Study.

pounds in 2013 before falling by nearly half in 2014. The large swing in crab landings is revealed by comparing years 2006 when 33.3 million pounds were landed to 2012 when 8.7 million pounds were landed.

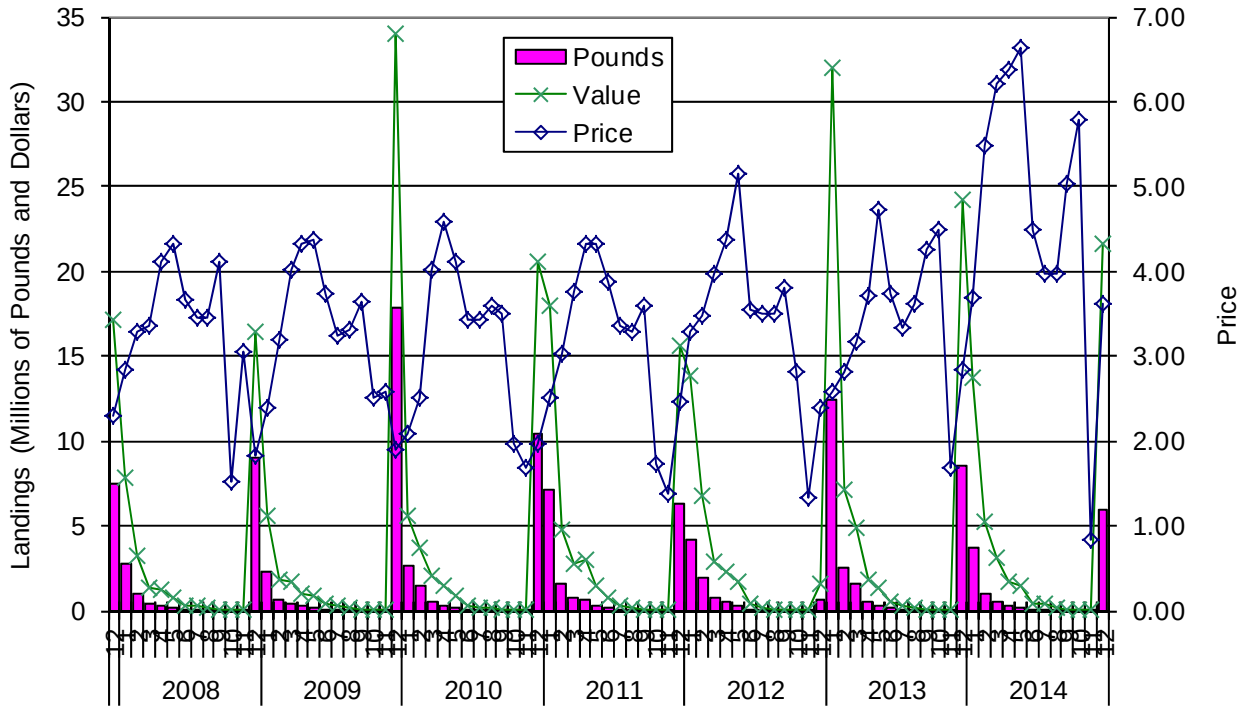
Crab prices were strong at $2.81 and $2.58 in 2000 and 2001, but decreased to less than $2.00 in the middle 2000's. Prices increased to $2.77 and $4.03 in 2013 and 2014, respectively. Crab prices also vary considerably over the season, but are opposite to salmon's variation (Figure III.6). They rise as the season progresses after the early December opening, then after peaking in April or so, fall again.

Because of the high volume of Dungeness crab, the total landed ex-vessel value was high at $61.5 million in 2006. The value increased to a record $72.3 million in 2013 and dropped to $48.0 million in 2014.

Legislation passed in Oregon in 2003 to exempt fishing organizations from anti-trust laws has been used in the crab and shrimp fisheries to negotiate a price for season openings. This has precluded strikes by harvesters used in the past for price negotiations. These pre-season agreements have assisted in stabilizing a dependable product flow to markets.

The Dungeness crab fishery is one of 265 global (as of June 2015) certified fisheries by the Marine Stewardship Council (MSC). Dungeness crab was certified in December 2010. The certification can have benefits from consumer awareness for product quality and resource sustainability. Access

Figure III.6
Onshore Landed Dungeness Crab by Month in December 2007 to December 2014



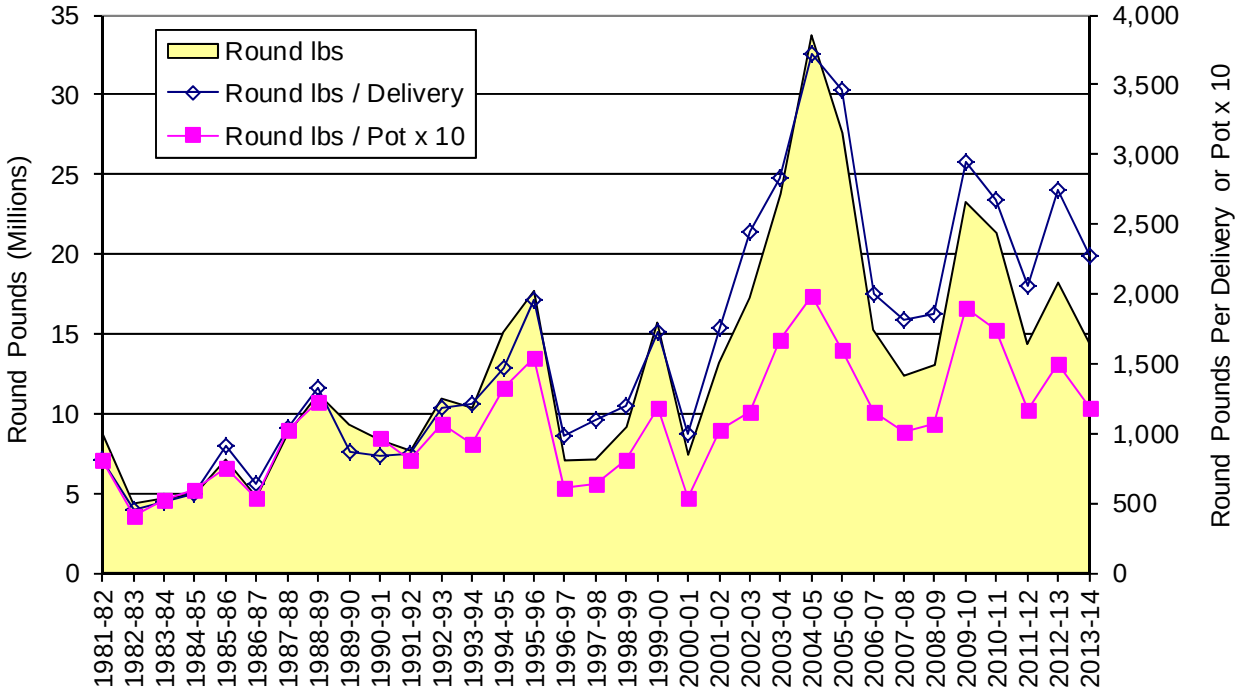
Notes: 1. Values and prices are in 2014 dollars.
Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions.

to new markets can accompany the certification. The Oregon Dungeness Crab Commission decided to drop continuing the MSC certification in 2015. The fishery receives good ratings in other certification programs, such as the Monterey Bay Aquarium Seafood Watch.

Dungeness crab is a specialty product suited for holidays and special events such as the Super Bowl game. A live product for the ethnic market has also developed. The sections product form is used by restaurant trade. Picked meat product form is used in the food service markets. Picking crab is a labor intensive undertaking. Some processors ship sections to China and Vietnam to produce crab meat products. The expectation is that when the ex-vessel price is $3.00 per pound, the picked product form price at the retailer may be about $24 per pound before shrinkage cost mark-ups are included in the price. Because the imported product is twice frozen, the final product may not be of the same quality as that which is processed on the West Coast.

The resource supply of Dungeness crab and declining access to other fisheries has put increased reliance on this species for vessels to maintain revenue streams. This resulted in an increased number of pots used to harvest crab (Figures III.7 and III.8). A three tier (200, 300, and 500) pot limitation program was instituted for the 2006-2007 season to help control the fishing pressure. The limited entry and three tiered system was designed to stabilize an overcapitalized fishery. The crab fishery along with the albacore tuna fishery has been able to "soak

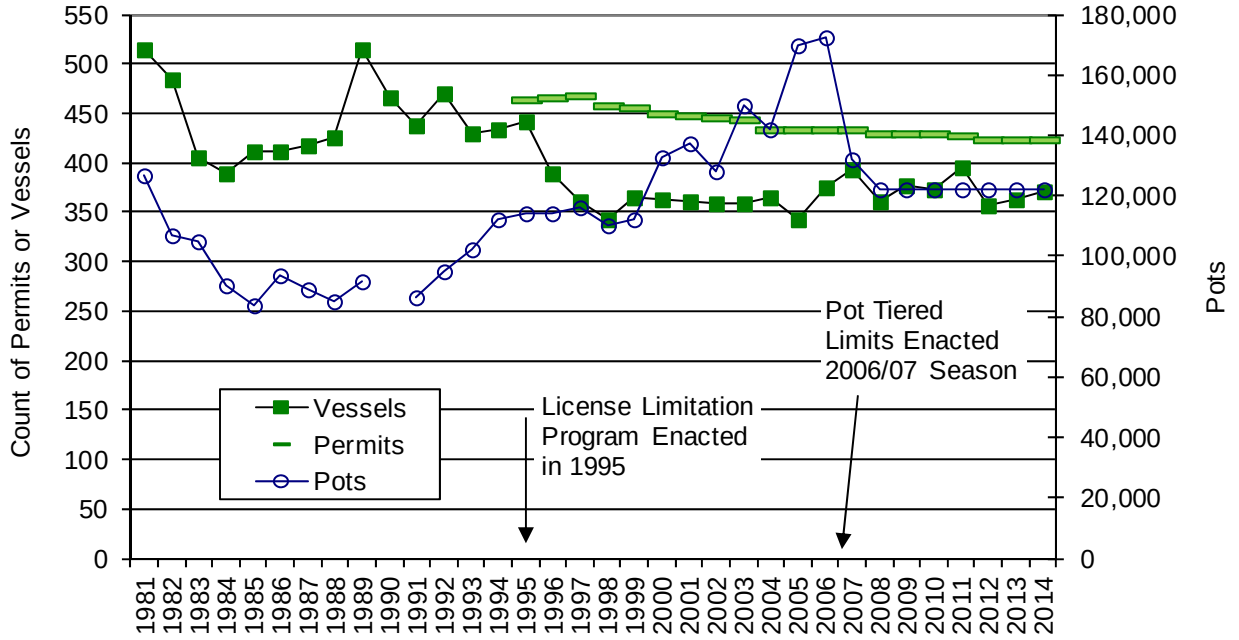
Figure III.7
Dungeness Crab Landings and Effort in 1981 to 2014



Notes: 1. Years are seasonal, from December to November.
2. Notes on Figure III.8 concerning pot counts are applicable to this figure.

Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions, and ODFW for pot declarations.

Figure III.8
Dungeness Crab Vessel Permits, Active Vessels, and Pots in 1981 to 2014



Notes:
1. Vessels are counted if they make at least one delivery that includes Dungeness crab at an Oregon port. The delivery could be from harvests in a directed Dungeness crab ocean or bay fishery or bycatch, so some vessels do not necessarily hold a limited entry permit. For example, the shown vessel count in 2008 is 361, of which 322 hold ocean limited entry permits. The number of vessels in 2008 holding permits and making at least $500 in landings is 317.
2. Pot counts are from declarations up to year 2006, including vessels that did not make landings, and are from assigned pot tier limits for vessels making landings in Year 2007 and 2008, and repeat 2008 after that. Pot counts are for all vessels permitted from 1995 to 2006, whether or not the vessel participated in the Dungeness crab fishery. The actual number of pots used in harvesting is not tracked.
3. There are pot count issues that might cause undercounts and over counts. The undercounts would occur for vessels that harvest from bays and do not posses an ocean limited entry permit. The over counts would occur if a vessel transferred a permit, causing the permit and associated pot limit to be possessed by more than one vessel during the year.
4. Years are calendar years.

Source: PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions for vessel counts. ODFW for permits and pot declarations.

up" the capital exposed from the salmon fishery lower revenue levels. A decline in the availability of this resource will create problems for the industry if other fisheries are not in a compensating upswing.

There were 348 vessels (94 percent of all vessels making Dungeness crab deliveries and 82 percent of those with permits) that delivered more than $500 Dungeness crab in 2014. Their average crab revenue was $137,892, which was about 52 percent of their total fisheries revenue. The average crab revenue for the top 10 vessels was $592,286 and their dependency on crab revenue was 63 percent. The top 70 (19

percent) vessels harvested 50 percent of this fishery's total value. The bottom 145 vessels (i.e. 348 minus 203 vessels or 42 percent of all vessels delivering more than $500) harvested 10 percent of the total value. There were initially 464 vessels qualified to hold permits when limited entry was initiated for this fishery in 1995. There are currently 424 permits.

3. Pink Shrimp

Pink shrimp, like Dungeness crab, typically has cyclical abundance trends. Shrimp volumes have been annually increasing since 2006. Shrimp volumes in 2006 were 12.2 million pounds, went up to 47.6 million pounds in 2013, then increased again to 52.0 million pounds in 2014.

Shrimp prices were in a decreasing trend in the early 2000's, dropping in 2003 to less than half of what they were in 1998 at $0.31 per pound. This trend reversed in 2004 and 2005, when landed pink shrimp prices averaged $0.47 and $0.51 per pound, before decreasing again to $0.33 in 2009. Prices increased to $0.51 in 2013 and $0.56 in 2014. The earlier decreasing Oregon shrimp prices mirror the declines for shrimp prices in the Gulf of Mexico and Atlantic. (Pink shrimp are small, often referred to as salad shrimp, as compared to larger shrimp from the Gulf.) A large increase of farmed shrimp from Thailand, Vietnam, and China and strong harvests of competing cold water shrimp off Norway and Canada depressed prices of all domestic shrimp harvests in the previous biennium years. The welcome jump in pink shrimp prices in 2011 and 2012 from the lower and middle 30 cent prices in 2009 and 2010 was due to decreased supplies in Canada for a similar species and strong demand from Europe, Japan, and China. Japan and China demand was also prompted by a weakened U.S. dollar against those countries' currencies in the previous biennium years.

The 2014 Oregon catch had a higher proportion of large sizes which receive a higher price. Establishment of new processing standards by some of Oregon's seafood companies has helped pave the way for opening up European markets and increasing price. Pink shrimp was first MSC certified in 2007 and re-certified in 2013. An extension of the MSC certification for the Washington pink shrimp fishery was attained in 2015.

The total landed ex-vessel value of pink shrimp in 2011 to 2014 was more than triple the value in the recent low year of 2009. Because the volume of pink shrimp landed increased to a historic high in 2014, and the price increased to $0.56 per pound, the total landed value increased to $29.3 million in 2014, which is a 25 year high.

The pink shrimp fishery is State managed using season and size requirements. The season is from April 1 to October 31 which avoids interference with their reproductive season. Vessels are required to deliver shrimp that average 160 per pound or larger. There is a minimum mesh size requirement when fishing south of the Oregon/California border. Pink shrimp are harvested by boats that may also be used for trawling for groundfish. A fleet reduction program of groundfish trawlers also affected the shrimp fleet because the groundfish trawlers that were bought-out surrendered their shrimp and Dungeness crab permits. The measures to reduce bycatch in shrimp harvesting have caused some harvesting cost increases. The rigid-grate bycatch reduction devices (BRD) with narrow bar spacing also reduce impacts to eulachon smelt. LED lights attached to the trawl lines to illuminate an escape path under the net have also been found to be

effective. The eulachon species was listed as ESA threatened in March 2010. NMFS must develop a recovery plan that may place additional future restrictions on the pink shrimp fishery in order to reduce eulachon smelt "take."

The powerful engines required to drag nets means fishing costs are sensitive to fuel prices. The harvest operations have higher labor costs due to tending nets, icing loads, sorting groundfish to stay within trip limits, and making sure required average 160 shrimp counts for landings over 3,000 pounds are maintained. Vessels were required to have a vessel monitoring system (VMS) onboard in 2009. The VMS ensures avoidance of federal essential fish habitat (EFH) areas and to be compatible with rockfish conservation area (RCA) groundfish regulations. Federal observers are randomly assigned to a small sample of vessel trips to monitor bycatch. The ODFW has required a logbook program for the shrimp fishery starting in 2008.[18]

The traditional product form is cooked and peeled "cocktail" shrimp. Processing involves "soaking" the product to enable the shell to be removed. Longer soaking also increases the amount of water retained by the final product. The standard recovery has been about 26 to 28 percent. The longer soak is increasing this recovery to 33 to 34 percent. This allows the price to the retailer to be reduced. This may make this product more price competitive, but there is also some consumer reluctance to receive more frozen water in their purchase. There is a growing Asian market for frozen whole cooked and frozen raw sushi grade pink shrimp.

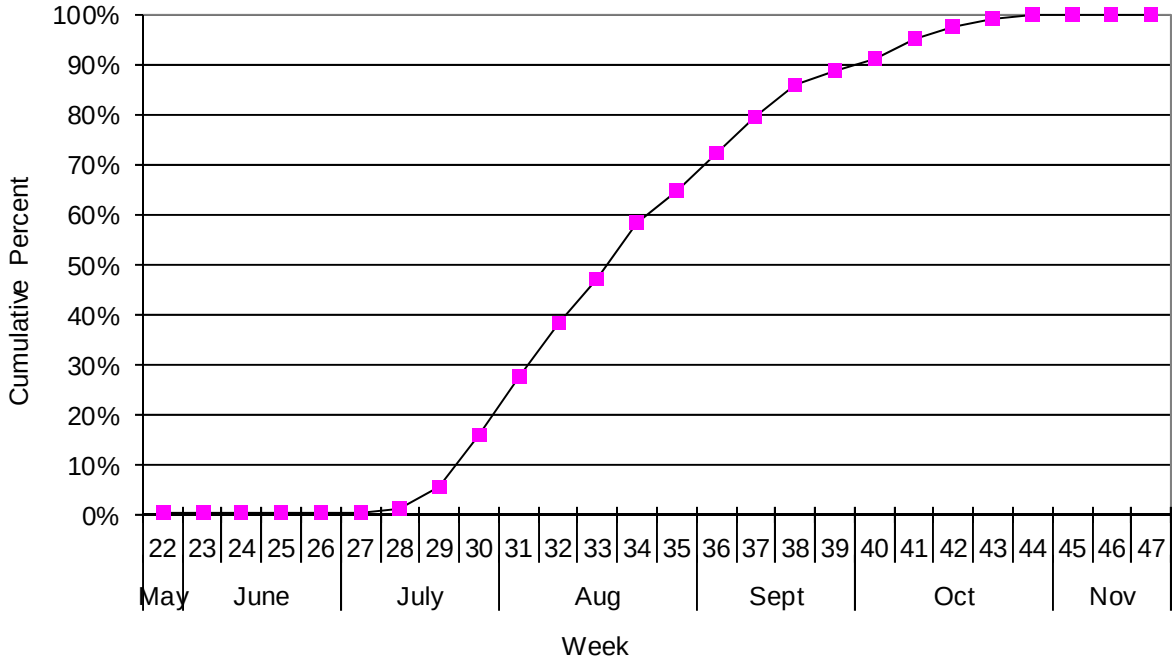
There has been some reduction in the pink shrimp harvesting fleet. The number of vessels making deliveries in 2013 and 2014 is about one-third the number in the late 1980's and early 1990's. Figure II.8 shows the trend in the 2000's. There were 60 vessels (100 percent of all vessels making deliveries and 43 percent of those with permits) that delivered more than $500 pink shrimp in 2014. Their average shrimp revenue was $488,764, which was about 66 percent of their total fisheries revenue. The average shrimp revenue for the top 10 vessels was $1.1 million and their dependency on shrimp revenue was 77 percent. The top 16 (27 percent) vessels harvested 50 percent of this fishery's total value. The bottom 23 vessels (i.e. 60 minus 37 vessels or 38 percent of all vessels delivering more than $500) harvested 10 percent of the total value. There are 150 vessels authorized to hold permits for this fishery. There are currently 139 permits.

4. Albacore Tuna

There are a few vessels and processors that specialize in the albacore tuna fishery. The vessels venture as far as necessary to fishing grounds to harvest stocks. However, this is also an opportunity fishery that occurs when other fisheries (such as salmon) may not be deemed profitable or closed and when ocean conditions displace the cold California Current bringing warmer waters closer to shore. While such conditions are deleterious to some anadromous fish species, they allow smaller vessels to make single day and overnight trips to harvest this species. Figure III.9 shows the seasonal structure of albacore tuna landings, which are 90 percent complete by about early October.

While canned tuna, mostly from larger fish caught in the high seas of the western Pacific, are receiving "bad" press because of mercury content warnings, the smaller albacore caught off Oregon provide a market opening to differentiate these less fatty fish.

Figure III.9
Onshore Landed Albacore Tuna Weekly Cumulative Volume for 2012 to 2014 Average



Source: PacFIN fish ticket data, April 2013, March 2014, and April 2015 extractions.

The albacore tuna fishery from Oregon to British Columbia is called the North Pacific fishery. American Western Fishboat Owner Association (WFOA) spearheaded an effort to get this fishery MSC certified. It was certified in May 2009. The North Pacific fishery overlaps with the fishing area for vessels in the American Albacore Fishing Association which also was MSC certified in May 2009. The dual certification was combined in February 2014.

The PFMC has adopted an HMS FMP. The FMP, as amended, is based on stock assessments for albacore tuna from the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, Albacore Working Group. As of 2014, the Working Group has stated that albacore tuna is not in an overfished or overfishing status. The albacore tuna fishery is managed through two regional fishery management organizations (RFMO's): Inter-American Tropical Tuna Commission (eastern Pacific Ocean demarcated at 150 degree longitude) and the Western and Central Pacific Fisheries Commission (western Pacific Ocean demarcated at 150 degree longitude). In addition to overfishing tuna species, there is concern for bycatch and incidental take of mammals and sea birds using driftnet and longline gear. This will not affect the Oregon fleet, because landings are typically from troll gear. There is a U.S.-Canada treaty allowing reciprocity in catch areas and deliveries, although recent treaty negotiations have resulted in amendments to reduce cross country effort. The reciprocity was allowed to elapse while treaty negotiations were occurring. Reciprocity was re-instituted for a maximum of 45 Canadian vessels to fish off the West Coast in 2013. However, there is a phase out

period for disallowing any Canadian vessels beyond 2016. There is currently no state or federal limited entry permit system for this fishery, although the PFMC has set a control date and is considering instituting a program.

Albacore tuna volume declined in 2014 over 2013, but the 10.2 million and 8.8 million pounds were still more than twice that landed in 2002. Prices dropped from the early 1990's, when $1.56 was received, until rising to $2.03 in 2011 and decreasing to $1.26 in 2014. The price in 2002 was $0.86, which made the total landed ex-vessel value $3.8 million. The recent increase in price per pound increased the total landed value to a historic high of $19.7 million in 2011 and $16.3 million in 2013, dropping to $11.0 million in 2014.

There were 361 vessels (95 percent of all vessels making tuna deliveries) that delivered more than $500 of albacore tuna in 2014. Their average tuna revenue was $30,517, which was about 28 percent of their total fisheries revenue. The average tuna revenue for the top 10 vessels was $185,478 and their dependency on tuna revenue was 48 percent. The top 46 (12 percent) vessels harvested 50 percent of this fishery's total value. The bottom 201 vessels (i.e. 361 minus 160 vessels or 56 percent of all vessels delivering more than $500) harvested 10 percent of the total value. There were West Coast states landings by two Canadian vessels in 2014, all delivered to Astoria.

Fifteen years ago, most albacore tuna (about three-quarters) brought ashore in Oregon was shipped to canneries offshore in places such as Guam. Today, there are four distribution categories, each with about one-quarter of the market: utilized domestically through custom canners, fresh markets, restaurants, off vessel sales to the public, etc.; shipped to sashimi markets in Canada, Japan and the U.S.; shipped to Spain for canning and distribution in Europe, etc.; and, exported to Vietnam for canning and then is mostly re-exported back to the U.S.

There were price increases up to 2011 because of supply disruptions. The convergence of supply problems included the Japan earthquake which significantly decreased that country's deliveries. Coupled with concerns about radiation contamination, buyers turned to the West Coast for supplies. The price increases due to the supply problems have led to price concessions as resolution occurred. Prices have fallen 30 percent since 2011 and more for sashimi blast frozen. The increase in supplies for blast frozen was caused especially by Canadian boats converting to that method of freezing in response to the 2011 high prices. Brine frozen prices fell mainly due to strong dollar and recovered catches by Japan the last two seasons. There are increased supplies from Chinese subsidized non-albacore tuna fisheries. The non-albacore tuna enters the same Spanish and Asian markets as albacore tuna.

The optimism for new fresh loin markets has been around since the 1980's. A strong European demand for frozen loin product form (Chappell 2012) has developed. Special harvesting techniques are required for these developing markets. There are interests to expand the loin market to Japan, a promising but risky venture because this can be a very volatile market.

5. Non-Whiting Groundfish

Management precautionary stock levels and rebuilding plans for several groundfish species of concern will continue to challenge allowable catch levels. Of the seven species

declared overfished as of the end of December 2014, the following were important to Oregon's groundfish fishery: canary rockfish, Pacific Ocean perch, darkblotched rockfish, yelloweye rockfish, and petrale sole. In June 2015, the PFMC declared canary rockfish and petrale sole rebuilt. The other overfished species (boccacio and cowcod) are mostly harvested in California fisheries. The ODFW has concerns about other individual species that are not individually managed by the PFMC. ODFW has placed harvest caps on these species through changes to Oregon's Nearshore Fishery Management Plan. The rebuilding plans for overfished species will also affect other fisheries that catch rockfish as a bycatch, like the shrimp fishery.

The concern for the groundfish management measures is from the multi-species nature of the fishery. Drastic economic impacts have occurred because fishing on healthy stocks has to be curtailed to protect the stocks in an overfished and depleted status. New area and time restrictions based on ocean depth were imposed in the nearshore waters in 2002 to keep vessels away from depth ranges where overfished species are more abundant. Recreational fisheries also have restrictions that reduced angler days, hence spending in coastal communities is reduced.

The new regulations have had severe impacts on small trawling vessels - especially on Oregon's north coast. On the north coast, the edge of the continental shelf is 50 miles offshore. On the south coast, the edge of the continental shelf is 20 miles offshore. Many smaller trawl vessels do not have the capacity to fish in deep water off the continental shelf. Moreover, it becomes dangerous to operate small trawl vessels far offshore. Forcing vessels to shallow waters will cause conflicts due to congestion with other commercial fishing vessels and recreational boaters. Stricter verification requirements (observers, satellite signal locational registry programs, etc.) will add costs to an already distressed industry.

The federal industry-sponsored buyout in 2003 removed close to 50 percent of trawl fishery permits on the West Coast. The remaining fleet did see modest increases in per vessel revenues.[19]

The groundfish fishery in 2009 had a substantial increase in landed volume and ex-vessel value from the mid-2000's.[20] This follows deep declines since the early 1990's. Total volume in 2009 was 41.1 million pounds and total ex-vessel value was $30.5 million. In 2013 and 2014 the volume was about 25 and 30 percent lower than 2009, while the value was 26 percent lower in 2013 and 28 percent lower in 2014. Total volume in 2014 was 28.4 million pounds and total ex-vessel value was $21.8 million. While the last two years are similar to recent years, 2014 is a 48 percent decrease from the 10 year average from 1987 to 1996 by value, and a 60 percent decrease by volume.

There were 101 vessels (97 percent of all vessels making deliveries) that delivered more than $500 limited entry trawl or fixed gear caught groundfish in 2014. Their average groundfish revenue was $201,238, which was about 32 percent of their total fisheries revenue. The average limited entry groundfish revenue for the top 10 vessels was $925,844 and their dependency on groundfish revenue was 75 percent. The top 12 (12 percent) vessels harvested 50 percent of this fishery's total value. The bottom 54 (i.e. 101 minus 47 vessels or 53 percent of all vessels delivering more than $500) harvested 10 percent of the total value. The limited entry groundfish trawl fishery was certified as sustainable by the MSC in June 2014.

There are complex management and organizational issues facing groundfish trawl fishery participants. Emphasis on rebuilding depleted stocks has curtailed the availability of groundfish for harvesting. The results from an individual transferable quota (ITQ) program (where individual quotas are assigned to groundfish permit owners) have meant that all fish quota becomes "transferable." The program started in January 2011, although quota share (QS) transfers did not start until late in 2013. The long range effect of instituting the ITQ program will reduce the total number of trawl boats operating in Oregon as vessels with small quota amounts will sell or lease to larger, more efficient vessels. All vessels holding groundfish trawl permits are paying for a portion of funds used in the 2003 buyout program. The federal government is paying for the ITQ program startup and initial years' administration and observer costs, but the program is designed for cost recovery in future years.

6. Pacific Whiting

Pacific whiting onshore volume was steady at about 160 million pounds during the late 1990's. Ex-vessel prices averaged around $0.045, but hit a low level in 1998 ($0.033 per pound). Stock assessments had put this species in an "overfished" status, and harvests under the rebuilding plan were considerably less in 2003 when only 80.6 million pounds were landed in Oregon. Average price was about $0.056. A new stock assessment information allowed this species status to be declared rebuilt in 2004. Subsequent new stock assessments increased the U.S. optimum yield (OY) following the recovery declaration. Concerns about overharvesting bycatch limits on non-whiting species interrupted the whiting harvests in both 2007 and 2008. The 2008 landing volume was about half of the 2004 to 2006 average, but the doubling of price in 2008 resulted in landing value about equaling those years. There was a price collapse in 2009 with harvesters receiving about half of 2008 prices. Low level stock assessments continued from 2008 through 2010. Strong year classes raised total allowable catch in 2011 to more than double the previous three years. Year 2012 catch was half again greater than the three year period. Year 2013 and 2014 were both historic highs in volume and value despite tumbling ex-vessel prices.

Surimi production plants along the West Coast in Washington and Oregon have the capacity to process up to 20 million pounds per week. Ex-processor prices for surimi improved somewhat starting in 2003 due to a weaker U.S. dollar and the decreased supplies to market from downturns in other historical surimi based world fisheries. The expected trend in improved prices was dampened by increased yield in both the Pacific whiting and the pollock fisheries with the use of "decanter" technology. There are also other countries, like India, that are producing a lower grade surimi. This caused downward pressure on surimi prices. In late 2004 the Indian Ocean tsunami destroyed a large part of the fish harvesting and fish processing industry that produced a low quality surimi. This had the effect for raising the expected prices for surimi products in 2005. Because of increased awareness of health aspects of fish consumption and the general decline of wild caught white fish availability in the world, and some collapses of hake resources, the prices of all Pacific whiting products increased in the late 2000's.

The surimi product form's prices are subject to the Alaska pollock surimi market and downturns in the Japanese market have lowered prices in past years. As a

consequence, more whiting was being directed to the developing fillet and H&G market. Filleting and H&G processing also require smaller capital investments.

The H&G market softened in 2013 partially due to the Ukraine conflict with Russia. It has been reported that distributors were not getting paid for inventories given that banks in the conflict regions refused lending to buyers. The U.S. and European imposed sanctions because of the conflict and Russia retaliated with a seafood import ban in 2014. This continued to weaken the fillet and H&G market. Pacific whiting processors in Washington and Oregon turned back to surimi production. Surimi production was revived at Oregon plants in 2013 and 2014. The additional costs and lower profit margins from surimi production lowered ex-vessel prices in 2013 to $0.124 and in 2014 to $0.109 from a historical high $0.140 in 2012.

Several smaller processors have moved into whiting processing, especially in the Astoria area. The use of onboard superchilling technology by motherships and factory trawlers allows for an improved H&G product for whiting in the eastern U.S. market and some parts of Europe and Israel.

Pacific whiting was MSC certified in October 2009. It was recertified in November 2014.

The fishery faced a season closure in 2014 due to bycatch limits on darkblotched rockfish and Chinook salmon. A shutdown was lifted for both the offshore and onshore fisheries with a negotiated regulation for fishing in deeper waters. There is also the good news that widow rockfish was removed from the list of overfished species in 2011. This species is caught coincidentally with the same mid-water trawl gear used in the whiting fishery. It appears that a small amount of the species will be available for an incidental fishery which can mean prosecuting will be less expensive since the species will not have to be avoided as it was in the past.

There were 24 vessels (60 percent of all vessels making deliveries) that delivered onshore more than $500 of Pacific whiting in 2014. Their average whiting revenue was $761,374, which was 72 percent of their total onshore fisheries revenue. The average whiting revenue for the top 10 vessels was $1.3 million and their dependency on whiting revenue was 89 percent. The top seven (18 percent) vessels harvested 50 percent of this fishery's total value. The bottom nine (i.e. 24 minus 15 vessels or 38 percent of all vessels delivering more than $500) harvested 10 percent of the total value.

The PFMC approved an ITQ program for the whiting offshore and onshore fishery starting in 2011. The QS assigned to onshore fishery vessels was dependent on what was caught during years that the fishery operated under a federal exempted fishing permit (EFP).[21] (A unique feature of the onshore whiting fishery ITQ program is that 20 percent of the QS was assigned to processors. Processors use their owned vessels or lease the quota pounds (QP) to other vessels for the harvests.) Non-EFP vessels could also make landings, but were subject to whiting and other groundfish trip limits, and discard of prohibited species. The EFP permitted vessels were not penalized for landing prohibited species (e.g., salmon, Pacific halibut, Dungeness crab), nor are they held liable for overages of groundfish trip limits. This allowed the fleet to conduct their fishing trips as quickly as possible, contributing to maintaining the quality of the whiting product. However,

the shoreside fleet as a whole was capped, meaning that reaching the bycatch cap for a non-whiting species meant the fishery could be closed before the entire whiting allocation was harvested. Under the new ITQ program, individual vessels are assigned bycatch limits. A single vessel must acquire bycatch QP to continue to harvest or not participate in the fishery.

The PFMC amended the groundfish FMP to reduce impacts from Alaskan vessels that are qualified under the American Fisheries Act and allow higher harvests by local vessels. The problems of lower resource availability in Alaska and higher prices for whiting products meant a "race for fish" for whiting. This resulted in a shorter total season and stress on the stocks at risk that are caught as bycatch. The PFMC ITQ program for this fishery starting in 2011 removed this consequence.[22,23]

The offshore fishery vessel counts are shown in Table III.4. Factory trawlers (vessels that both harvest and process onboard) and motherships (only process what catcher vessels bring them) that usually home-port in Seattle harvest from April through fall of each year, catch levels permitting. The tribal fishery is allocated 13.8 percent of the U.S. OY. The non-tribal commercial fisheries received 86.2 percent of the U.S. OY. Allocations of this amount were 42 percent to vessels landing at shoreside processing plants and 58 percent for the at-sea fishery (34 percent to factory trawlers and 24 percent to catcher vessels delivering to motherships). About a dozen Oregon home-port catcher vessels participate in the at-sea fishery by delivering to the motherships. The harvests are not counted in Oregon landings, but revenue returned to Oregon's economy is included in the distant water fisheries category.

The PFMC ITQ program operates as a cooperative for the offshore fishery. The At-sea Processing Association assigns quota harvesting responsibility to member motherships and catcher-processors.

None of the five motherships or nine catcher-processors in 2014 had onshore landings in any fisheries for 2014, but one mothership in 2010 did in 1982 and 1983. Of the 19 catcher vessels delivering to motherships in 2014, 14 had onshore landings in 2014. Of those 14, 11 had an Oregon home-port group, three had a Washington home-port group, and none had a California home-port group. Of the five with no onshore landings in 2014, four had onshore landings in years other than 2014. Their most recent year's home-port groups were in Washington (three) or Oregon (one).

Of the 24 catcher vessels in 2006, 14 continued in 2014, and 10 dropped out. Six did not participate in every year between 2006 and 2014. So five of the 19 catcher vessels in 2014 were new (entered) or returning (one was new in 2010, two were new in 2011, one participated prior to 2006 in 1997 and returned in 2014, and one had no offshore history prior to 2014). Thirteen of the 2008 vessels participated in 2014. Two of the other six entered or returned in 2010, two in 2011, and two did not participate between 2008 and 2013. The nine 2006 catcher-processors are the same nine that participated in 2007 and 2011 through 2014, and three of them participated in each year in between. Three of the six 2006 motherships also participated in 2007 to 2014, one dropped out in 2007, and two dropped out in 2011 with one returning in 2014. The one mothership in 2014 that did not participate in 2006 participated in 2000 and prior years, 2007, and 2009 to 2014. Of the two motherships that were new in 2010,

Table III.4
U.S. West Coast At-Sea Vessel Counts by Sector in 1990 to 2014

	Catcher Vessels and Motherships			Catcher-Processors	
	CV	MS			
Year	Count	Count	Volume	Count	Volume
1990	0	0	0.0	4	4,618.4
1991	40	8	87,172.3	13	119,996.3
1992	24	10	36,245.5	23	118,938.7
1993	10	4	14,855.7	15	79,381.7
1994	43	11	81,935.7	9	85,670.5
1995	36	8	40,263.3	9	61,646.6
1996	30	8	61,179.4	10	66,577.8
1997	30	6	75,907.9	10	71,268.2
1998	28	6	75,748.9	7	71,184.7
1999	28	6	74,880.8	6	68,832.1
2000	28	6	53,775.6	8	68,605.4
2001	23	5	42,684.1	7	59,233.7
2002	15	4	49,788.4	5	36,619.2
2003	16	4	46,724.0	6	41,433.2
2004	15	4	48,112.1	6	71,003.2
2005	21	6	73,650.7	6	79,332.8
2006	24	6	61,261.2	9	79,095.0
2007	25	6	53,260.2	9	74,303.6
2008	24	5	73,670.3	8	111,026.1
2009	24	6	38,403.8	6	38,747.2
2010	28	8	52,464.5	7	54,787.0
2011	23	6	56,768.0	9	72,758.1
2012	18	5	38,637.0	9	55,668.1
2013	18	5	52,796.1	9	78,442.6
2014	19	5	62,333.0	9	103,635.7

Notes: 1. Volume is in metric tons. Landed value for at-sea fisheries is not reported.
2. At-sea Pacific whiting is allocated to sectors, which are defined by vessel types for motherships and catcher-processors. A separate tribal allocation is usually delivered to a mothership. The table includes the sector and tribal allocations. There is also an onshore Pacific whiting allocation whose volume trends are shown in Table II.1.
3. No motherships or catcher-processors use Oregon harbors for their home-port and most declare Seattle for their documented hailing port. For the count of catcher vessels shown in 2014 and based on U.S. West Coast onshore landings, three home-port in Washington, 11 home-port in Oregon, and none home-port in California. Another five did not have U.S. West Coast onshore landings. Vessel landings in other distant water fisheries were not investigated.

Source: PacFIN offshore and annual vessel summary data, April 2015 extraction.

one dropped out in 2011 and one dropped out in 2012.

7. Pacific Sardines

An important market species in Oregon's onshore landings is sardines. There were 58.0 million pounds landed at an ex-vessel

value of $6.4 million in 2013 and 17.2 million pounds worth $3.5 million in 2014. There are about five processors in the Astoria area that handle most of the Oregon landings. Sardine abundances purportedly follow decades long cycles, so swings in landings are not expected to be as pronounced as the shorter cyclical periods for crab and shrimp. Sardines are processed into bait for mostly Japanese buyers to be used in longline fisheries. About 60 percent of the sardines are processed for this market that demands a quality product. Another 30 percent goes to human consumption, both for the fresh/frozen as well as the canned market. Because of the strong Dungeness crab market, about 10 percent of the sardines are frozen to be used in West Coast crab pots.

There were 17 vessels (53 percent of all vessels making sardine deliveries) that delivered onshore more than $500 of Pacific sardines in 2014, and all of those landed more than $500 of Pacific sardines in Astoria (Table III.2). The average sardine revenue of all 17 vessels was $207,162, which was 69 percent of their total fisheries revenue. The average sardine revenue for the top 10 vessels was $307,560 and their dependency on sardine revenue was 66 percent. The top four (13 percent) vessels harvested 50 percent of this fishery's total value. The bottom six (i.e. 17 minus 11 vessels or 35 percent of all vessels delivering more than $500) harvested 10 percent of the total value. The 17 vessels landing more than $500 of sardine in Oregon in 2014 have home-ports in Astoria (11), coastal Washington south and central ports (four), Monterey (one), and Santa Barbara (one).

There was evidence that abundances for both the northern and southern components of Pacific sardines on the West Coast were collapsing in 2013. PFMC quotas for the northern component were half and one-third of 2012 quotas in 2013 and 2014, respectively. Prices rose during these years ostensibly due to the decrease in supplies.

8. Pacific Halibut

a. Halibut Harvesting Sector

The Oregon commercial halibut fishery provides a small amount of harvest revenue to a relatively large number of participants.[24] The explanation for the large number of participants includes the low gear-up costs for participation and open access licensing. Many of directed fishery participants already have groundfish fishery longline gear deployed and it is a minor cost to switch out to halibut gear.[25] In addition to directed fishery participation, there are many participants in the incidental halibut salmon troll fishery. While the average per vessel harvest revenue is minor in recent years for the directed halibut fishery, there could be some participation motivated by wanting to continue a landing history if this open-access, derby fishery is switched to a property rights management approach in the future.

There were 205 thousand round pounds landed at an ex-vessel value of $1.0 million in 2013 and 206 thousand round pounds worth $1.1 million in 2014 (Table III.1).[26] Halibut ex-vessel prices averaged $4.86 per round weight pound in 2013 and $5.59 per round weight pound in 2014. The price in 2014 is a 30 year record inflation adjusted high (Figure II.8). There were a total of 119 vessels that landed halibut in 2013 and 195 in 2014. There were 53 vessels (45 percent of all vessels) with landings more than $500 of halibut in 2013 and 93 in 2014. The average halibut revenue of all 53 vessels was $18,650 in 2013, which was seven

percent of their total fisheries revenue. The average halibut revenue in 2013 for the top 10 vessels was $50,417 and their dependency on halibut revenue was 11 percent.[27] The top nine (eight percent) vessels harvested 50 percent of this fishery's total value. The bottom 23 (i.e. 53 minus 30 vessels or 43 percent of all vessels delivering more than $500) harvested nine percent of the total value (with one percent of total value from vessels delivering less than $500).

In addition to vessels landing halibut in the directed and incidental fisheries, there are halibut landings in the shoreside Pacific whiting fishery. This is a full retention fishery, but harvesters receive $0 for the non-whiting deliveries. Of all 94 vessels that landed greater than $0 of halibut in Oregon in 2013, there were 46 vessels that landed halibut with troll gear, 46 that landed halibut with longline gear, one that used other hook and line gear, and one research vessel. There were also 25 vessels that landed halibut with zero value, 19 that used midwater trawl, six that used roller trawl, and one that used selective flatfish trawl.[28] No vessels caught halibut with both longline and other hook and line in 2013, and they typically use only one gear for halibut during the year. There were 89 deliveries in the directed fishery, 83 deliveries in the incidental fishery, and 82 deliveries in the shoreside whiting fishery in 2013. There were other deliveries for research harvests and some illegal gear deliveries.

Of the 46 vessels that landed halibut with troll gear in 2013, all of them also landed Chinook salmon with troll gear since the incidental halibut fishery is a salmon to halibut ratio fishery. More than half of them (27 vessels) also landed albacore tuna with troll gear. Total troll halibut ex-vessel value is $15 thousand, troll Chinook ex-vessel value by these vessels is $1.2 million, and albacore tuna ex-vessel value by these vessels is $0.7 million.

Of the 195 vessels that landed halibut in Oregon in 2014, 174 had over $0, and of those 45 used hook and line gear, 127 used troll gear, one vessel landed halibut with another gear type, and one was a research vessel. There were 21 vessels that delivered halibut in the shoreside whiting fishery in 2014. There were 73 deliveries in the directed fishery, 319 deliveries in the incidental fishery, and 58 deliveries in the shoreside whiting fishery in 2014. There were other deliveries for research harvests and some illegal gear deliveries.

The halibut fishery is an opportunistic fishery given its low cost for entry and open access nature. Most of the vessels (56 percent of the vessels landing more than $500 in 2013) made landings in Newport. Newport is close to productive halibut fishing grounds and there are many home-port vessels already participating in the groundfish fixed gear (longline and pot gear) fishery and salmon troll fishery. While in past years there have been landings at Oregon ports for halibut caught in the Alaska EEZ, there were no Oregon landings with area of catch outside the U.S. West Coast EEZ in 2013 or 2014.

There have been wide fluctuations in fishery participation, however the annual exit/entry has somewhat subsided in recent years (Figure II.8). There were years in the late 2000's decade when the salmon fishery was essentially closed on Oregon's central coast that reduced participation in the incidental fishery. The improved salmon abundances in 2014 attracted many more vessels into this fishery, and consequently, participation in the incidental halibut fishery almost tripled between 2013 and 2014. Despite low

gear-up costs for participation, there does not appear to be the potential revenue incentive to attract harvesters into the directed fishery as in earlier years when stock status allowed higher catch limits. The participant tenure (Figure II.7) shows only 10 percent of all vessels that participated in the fishery in the five years ending in 2013 made landings in all five years. This can be compared to the Dungeness crab fishery's 44 percent participation in all five years.

The commercial non-tribal fishery is 20.6 percent (31.7 percent of the non-tribal share) of the West Coast catch limit in 2014. About 74 percent of the West Coast commercial non-tribal fishery catch limit was landed at Oregon ports in 2013. There are sub-allocation shares for directed (85 percent) and incidental (15 percent) fisheries. The incidental fishery is for the salmon troll fishery. (In some years of higher abundance, the sablefish longline fishery north of Point Chehalis, Washington is also an incidental fishery. However, its allocation is subtracted from the halibut recreational allocation for the subarea.) The directed fishery is managed for season open days, trip limits, area closures (subject to groundfish rockfish conservation area (RCA) boundaries to protect overfished groundfish species, and northern boundary at the U&A tribal fishery area), and 32 inches and over size. The incidental salmon troll fishery is managed as a ratio fishery with trip limits and the same size limit as for the directed fishery. Both fisheries can have inseason adjustments to pre-season announced specifications in order that allocated catch limits are not exceeded. A vessel may not participate in both the directed fishery and the incidental fishery. Vessels annually request licenses from the IPHC and may harvest anywhere in Area 2A waters. Both directed and incidental fishery participating vessels mostly use ice storage and typically deliver at ports near successful fishing grounds within a few days of harvest.

The number of 10-hour days when the directed halibut fishery is open has been reduced in recent years. In 2013 and 2014, there were two days assigned to the fishery, but the second day had drastically reduced trip limits. For example in 2013, the first day for a 45 foot vessel was 4,480 net weight pounds and the second day was 1,495 net weight pounds. The first day in 2014 was 4,480 net weight pounds and the second day was 995 net weight pounds. Of the 47 directed fishery vessels in Oregon in 2013, 42 vessels participated in the first day fishery, but only 32 vessels participated in the second day fishery. There were 27 vessels participating both days, and only five of the second day participants were not a first day participant.

The allowable landing ratio for the incidental fishery when the 2014 season began April 1 was one halibut per four Chinook salmon, plus an extra halibut per landing, with the total number of halibut per vessel per trip not allowed to exceed 12. There were in-season adjustments to the ratio. The fishery closed on September 11, 2014. The beginning season 1:4 ratio has changed from 1:2 in 2008 and 2009, and 1:3 in 2013. Salmon stock abundance has generally increased during these years causing relaxation of the ratios to preserve same halibut catch over the open salmon season.

b. Halibut Processing Sector

Thirteen processors or buyers purchased over $10 thousand of Oregon landed halibut each in 2013 and this comprised over 96 percent of all landings. The top three

processors or buyers purchased about 62 percent of all Oregon halibut landings.

Nearly the entire production of the northern Pacific halibut fishery is consumed in the U.S. market (Herrmann and Criddle 2006). The introduction of property rights system in the Alaska and B.C. fisheries elongated the "fresh" halibut domestic whole fish market to more than one-third of the production by 2004.[29] The fresh fish domestic market fetches a premium price as compared to frozen product forms.

Halibut product forms are usually fresh or frozen fletches or steaks. Steaks can be bone-in or boneless. There are about four fletches per fish, with fletches from larger fish usually cut into smaller pieces. Smaller "chicken" halibut (10 to 20 pounds) is sometimes sold whole (headed and gutted). Fletches normally run eight to 12 pounds. Steaks typically are offered in four to 10 ounces. A delicacy is halibut cheeks with size ranging from three ounces to more than a pound each. The finished pound yield for steaks is 62 percent and the yield for fletches is 41 percent from round weight pounds (Crapo et al. 2004).

The general ex-vessel price trend increased through 2011, but dropped after that year reflecting consumer resistance to table fare prices. There was price recovery in 2014 due to better consumer buying position from general economy improvement and due to a drop in harvest supplies reaching market. The processor margin (including contribution to profit) is approximately $1.00 per finished pound across a typical mix of product forms. The Pacific halibut fishery is MSC certified starting in 2006 at the request of the Fishing Vessels Owners Association. The fishery was recertified in 2015.

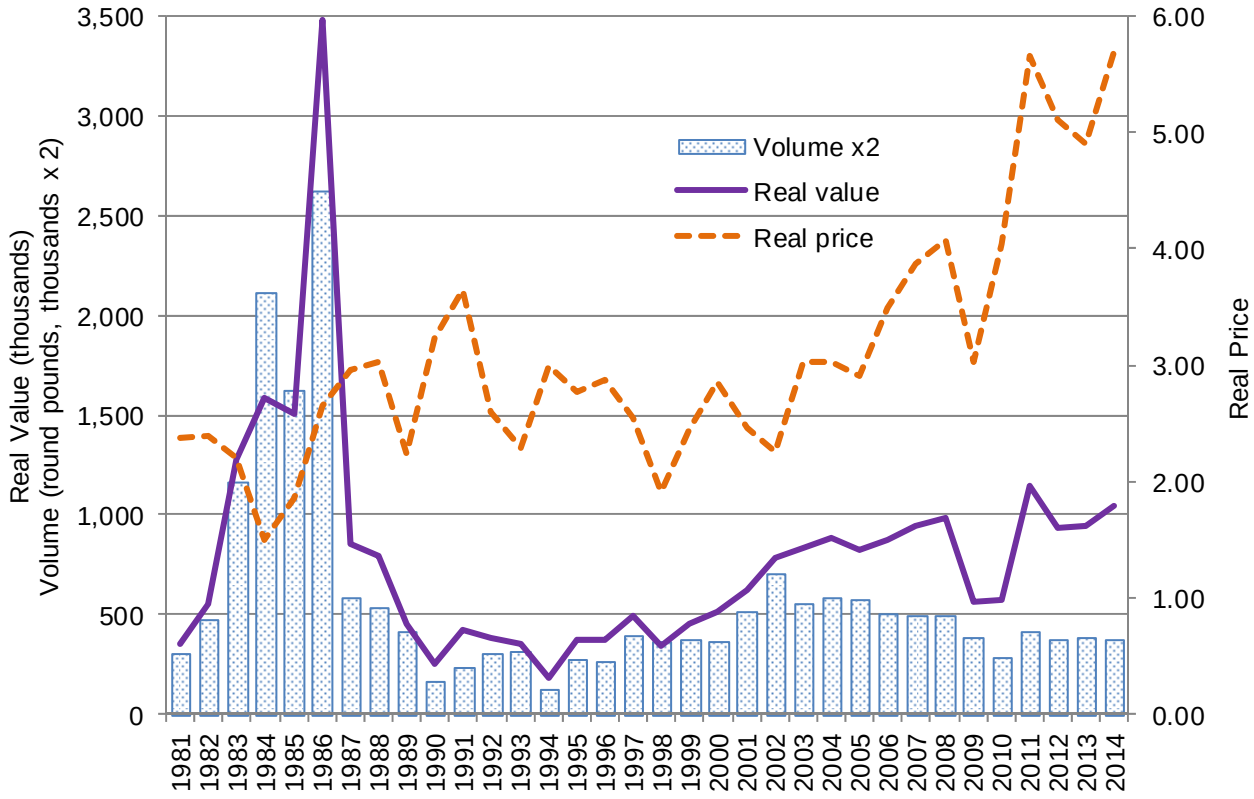
Oregon and Washington are in a price taking status from Alaska's lead in market position. Only about 2.4 percent of the halibut population that can be harvested is caught off Oregon and Washington, about 15.6 percent off British Columbia, and the remainder 82.0 percent off of Alaska (IPHC 2014a).

c. Halibut Bycatch Sector

If the number of harvesting participants was defined as those that discard halibut, the number would be much higher than what this report explains for participants in the incidental and directed halibut fisheries. There are significant discards in the trawl and fixed gear groundfish fisheries where halibut is a prohibited species (Figure III.11).[30] Groundfish fishery (includes tribal and non-tribal trawl and fixed gear) discard mortality as a share of all removals in West Coast was 11 percent or 129 thousand pounds in 2013 (IPHC 2014b). The trawl groundfish fishery share was about 58 percent which has 40 to 60 percent discard mortality for bottom trawl gear and 100 percent for mid-water trawl gear; the non-nearshore fixed gear groundfish fishery share was 36 percent which has 16 to 18 percent discard mortality for longline gear and 15 to 30 percent for pot gear; and, the share in other fisheries was about six percent. Fish excluders were implemented in the shrimp trawl fishery in West Coast in 2003 which has reduced bycatch in that fishery to zero in recent years. The halibut discard encounters (the catch discarded which are modeled to live as well as die) about equaled the commercial tribal fishery catch in 2013.

Discard mortality in the groundfish trawl fishery decreased dramatically from 2010 to 2011 following the issuance of halibut individual bycatch quota (IBQ) for the first

Figure III.10
Oregon Commercial Halibut Fishery Harvest Volume, Value, and Price in 1981 to 2014



Notes: 1. Real value is in thousands of 2014 dollars and real price is in 2014 dollars, adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Volume is in thousands of round pounds.
3. Excludes landings with research disposition (19 thousand pounds in 2014), and landings with no value reported (two thousand pounds in 2014). Excludes landings from catch areas outside the EEZ (none in 2014).

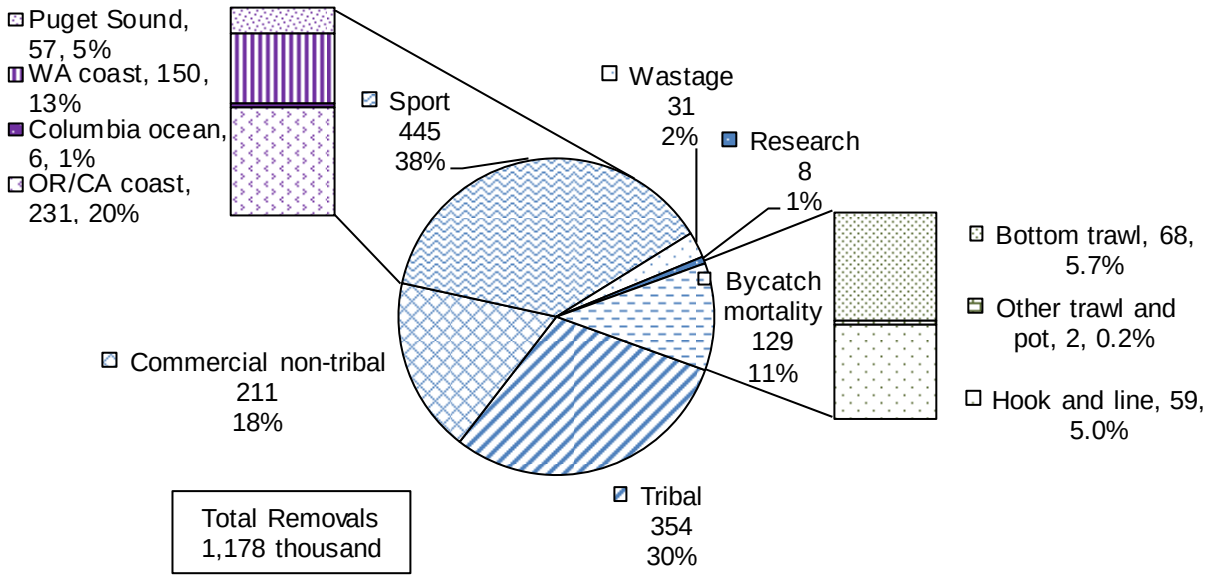
Source: TRG (2014) and Study.

year implementation of the groundfish trawl fishery individual fishing quota (IFQ) program.[31] The penalty disincentive for exceeding the assigned IBQ resulted in a remarkable decrease from 399 thousand round weight pounds in the 2010 bottom trawl limited entry fishery before the program to 68 thousand round weight pounds the first year of the IFQ program (Jannot et al. 2014). The estimated halibut discard mortality from the non-tribal 2013 trawl and fixed gear fishery was a 24 percent decrease from 2012.

B. Distant Water Fisheries

An important part of Oregon's commercial fishing industry is the distant water fishery.[32] Vessels owned by Oregon residents travel to or are located at ocean fishing areas too far away or dictated by management regulations for harvests to be landed in Oregon. Some of these boats harvest groundfish (mostly pollock) for American processor boats ("motherships") and land based processors along the Alaskan coast. Also very important are the longline fleet that harvests halibut and black cod, and

Figure III.11
Halibut West Coast Removals in 2013



Notes: 1. Removals in thousands of net pounds. Bycatch and wastage are estimated discard mortalities from non-halibut and commercial halibut (directed and incidental) fisheries respectively.
2. Tribal contains commercial (322 thousand net pounds) and C&S (32 thousand net pounds).
3. Sport includes removals when anglers are guided (24 percent) and unguided (76 percent). Shares are based on Oregon and Washington angler trips for halibut trip type.

Sources: TRG (2014).

the gillnet fleet that fishes for salmon in Alaskan waters such as Bristol Bay. There are also Oregon fishermen that land salmon and other species in California and Washington. Vessels also deliver Pacific whiting to at-sea motherships off the West Coast. Some vessels travel to the western and south Pacific Ocean to fish for pelagic species, such as tuna. The characteristics of this fleet are discussed in TRG (January 1999), Northern Economics (2002), and TRG (2006).

Tables III.5 and III.6 show vessel counts and permit earnings in Alaska onshore fisheries by Washington, Oregon, and California residents in 2014. Appendix E shows the same information for Oregon coastal county residency in 2014. In recent years, there have been around 300 vessels with ownership ties to Washington, Oregon, and California residences that made landings at U.S. West Coast ports and Alaska or other Pacific Ocean locations. There were about another two thousand vessels in 2014 with owner registration residency in West Coast states that fished in Alaska. Total onshore harvest revenue for Alaska permits held by residents of Washington, Oregon, and California was about $867.4 million in 2014 (Figure III.12). This is about 53 percent of all Alaska onshore harvest revenue in 2014. Similar distant water harvest values are not estimated for other than Alaska fisheries and the West Coast at-sea fishery. Anecdotal information is relied upon for these other fisheries.

Harvest revenue and cost indexes are used to update the various components of the

Table III.5
Vessel Counts for U.S. West Coast Fishing Fleet in 2014

Fishery	Washington	Oregon	California	Total
U.S. West Coast				
Onshore	1,105	1,199	1,920	3,793
Offshore	--	--	--	33
Motherships	--	--	--	5
Catcher-processors	--	--	--	9
Catcher vessels	--	--	--	19
Alaska	1,773	281	150	2,203
U.S. West Coast landings	181	28	13	222
Other	1,592	253	137	1,981
Other Pacific Ocean waters	74	55	79	148

Notes: 1. NA - not available.
2. Excludes vessel identifiers "ZZ.." and "NONE."
3. U.S. West Coast vessel counts among states are not unique vessels. The "total" counts for states are unique.
4. The inclusion criteria for Alaska registered vessel counts with landings at U.S. West Coast states is whether at least one landing was made at a U.S. West Coast port. This excludes vessels that may have a homeport in a U.S. West Coast state, but participate exclusively in offshore or distant water fisheries.

Source: PacFIN annual vessel summary and offshore data, April 2015 extractions; and Alaska Commercial Fisheries Entry Commission (CFEC).

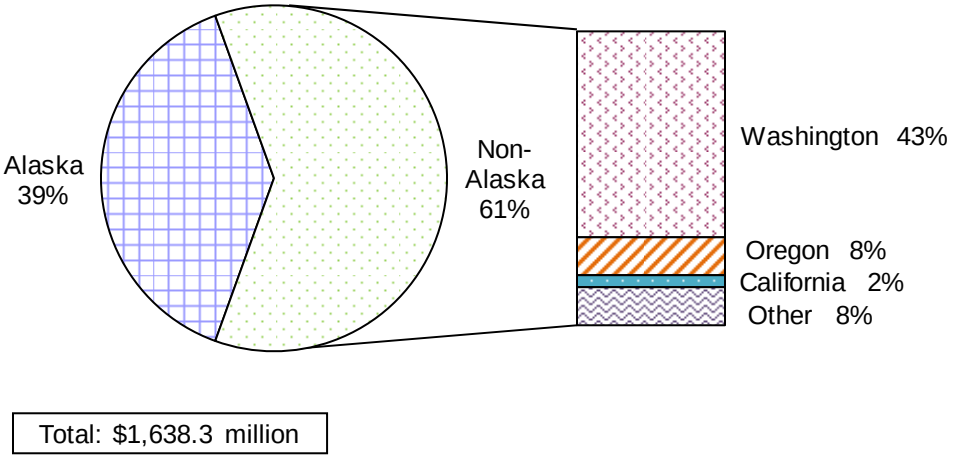
Table III.6
Estimated Gross Earnings for Alaska Permit Holders by Onshore Fisheries and Residency in 2014

Fishery Group	Residents of Alaska	Residents of Washington	Residents of Oregon	Residents of California	WOC Subtotal	Residents of Other	Non-Alaska Subtotal	Total
All fisheries combined	638.5	700.9	128.6	38.0	867.4	132.4	999.8	1,638.3
Crab	67.3	114.4	30.3	3.5	148.2	20.8	169.0	236.3
Halibut	68.4	21.5	4.7	1.2	27.4	8.4	35.7	104.2
Herring	9.5	1.7	0.0	0.1	1.7	0.3	2.0	11.5
Other finfish	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other groundfish	94.3	405.7	71.1	15.8	492.7	49.9	542.7	637.0
Other shellfish	9.4	3.7	0.4	0.3	4.4	0.9	5.3	14.7
Sablefish	40.6	30.0	4.0	0.9	34.9	6.4	41.3	81.9
Salmon	348.8	124.0	18.1	16.0	158.1	44.2	202.3	551.1
Unknown permit landings	0.0	0.0	0.0	0.0	0.0	1.6	1.6	1.6

Notes: 1. Earnings are in millions of 2014 dollars.
2. Fisheries may not sum to "all fisheries combined" due to proxy earnings being used where fisheries are confidential. Proxy earnings are assigned to some permit codes where reveal is precluded due to confidentiality rules. The assigned earnings are based on the average earnings per permit for combined permit areas or combined permit residencies.
3. Fishery group definitions are different than U.S. West Coast onshore landed fisheries.
4. Some offshore fisheries earnings are not included in the tabulations.

Source: Alaska Commercial Fisheries Entry Commission (CFEC) September 2015 extraction, preliminary.

Figure III.12
Share of Estimated Gross Earnings for Alaska Fisheries by Permit Registration Residency in 2014



Notes: 1. Notes for Table III.6 apply to this figure.
Source: Alaska Commercial Fisheries Entry Commission (CFEC) September 2015 extraction, preliminary.

Oregon distant water fisheries economic model (Appendix C). Harvest revenue from the West Coast at-sea fishery and revenue from delivering to other West Coast states is known through available data sources. The Alaskan and other distant water fisheries are estimates based on predetermined applicable indexes of harvest revenue and fishing cost trends.

IV. PROCESSING BUSINESSES AND MARKETING PROGRAMS

This chapter reviews the fish processing segment of the commercial fishing industry. Background information is provided about raw product purchases, finished products, business trends, ownership, and seafood markets. Processors and buyers are described in terms of the amount of raw product purchased and degree of dependence on particular fisheries. Other information about processor businesses such as ownership and plant capacities is not as readily available as processor purchase information. Only Year 2014 profiles are used to have most consistent and complete information about processor businesses. Processor counts are for both the first buying entity identified on an issued fish ticket and how many of these entities are under single ownerships. Data sources for the purchases only show where the purchase occurs; not all landings are processed at their geographical location of deliveries. Purchased fish are transported to processors in other locations and there is cross hauling of species between processor facilities.

A. Processor Characteristics

There were 207 unique names of processors or buyers for Oregon landings in 2014. These businesses include operators of processing plants, buyers that may do little more than hold the fish prior to their shipment to a primary or secondary processor, and consumers buying directly from vessels. Table IV.1 shows the characteristics of 102 purchasers filtered for vessels selling directly to the public and businesses who had only minor activity (less than $500 each). The 105 filtered purchasers only represent about one percent of total purchases.

There are a relatively small number of processors and buyers that handle most of the deliveries in Oregon. Out of the 102 businesses used to compile information for Table IV.1, 18 percent of the 102 purchased 90 percent of the harvests.

Processing is being centralized to occur at plants in only a few regional commercial fisheries centers. The expense for equipment and refrigeration to meet new quality standards balanced against business risk makes it unlikely this trend will change. Large processors (annual purchases of over $1 million) tend to be year-around operations with product forms from all species harvested in Oregon fisheries. Smaller processors (less than $100 thousand) specialize in products from single seasonal fisheries. Buyer only operations are located at smaller ports and daily purchases are hauled to the central plants for processing.

Many licensed processors and buyers received salmon, Dungeness crab, pelagics, migratory, and groundfish (other than Pacific whiting) in 2014. However, only the larger volume firms took deliveries of pink shrimp (eight firms, of which 100 percent had purchases greater than $1 million), Pacific whiting (seven firms, of which 100 percent had purchases greater than $1 million), and Pacific sardines (five firms, of which 100 percent had purchases greater than $1 million). The species causing greatest specialization was Dungeness crab and the second highest specialization was caused by Pacific sardines (Table IV.1).

There are a number of harvesters (85 in 2012 and 82 in 2014) selling whole, dressed (cleaned and gutted) salmon, crab, and tuna directly to the consumer from vessels. This direct marketing concept is not without

Table IV.1
Counts and Purchase Distribution of Major Processors or Buyers by Species Groups in 2014

Species	Count Total	Processor Counts Within Purchase Categories <=$10K	<=$100K	<=$1,000K	>$1,000K	Counts Within Purchase Specialization Categories >90%	>50%	>33%
Salmon	62	10%	44%	27%	19%	15%	34%	44%
Dungeness crab	64	9%	30%	33%	28%	25%	41%	56%
Pink shrimp	8	0%	0%	0%	100%	0%	0%	13%
Albacore tuna	62	8%	37%	32%	23%	13%	18%	27%
Groundfish	60	13%	38%	22%	27%	10%	13%	27%
Pacific whiting	7	0%	0%	0%	100%	14%	29%	43%
Pacific sardines	5	0%	0%	0%	100%	20%	40%	40%
Pacific halibut	30	3%	30%	37%	30%	0%	0%	0%
Other	38	5%	16%	42%	37%	13%	18%	24%
Total	102	15%	35%	30%	20%			

Species	Sum of Purchases (thousands)	Purchases Within Purchase Categories <=$10K	<=$100K	<=$1,000K	>$1,000K	Purchase Distribution (thousands) 90th Percentile	50th Percentile	Mean
Salmon	$19,053	0.1%	2.3%	6.4%	91.2%	$877	$25	$307
Dungeness crab	47,952	0.0%	0.7%	11.6%	87.7%	3,036	56	749
Pink shrimp	29,326	0.0%	0.0%	0.0%	100.0%	7,960	2,822	3,666
Albacore tuna	10,492	0.1%	3.0%	30.7%	66.2%	559	21	169
Groundfish	21,788	0.1%	1.0%	2.2%	96.7%	687	11	363
Pacific whiting	18,274	0.0%	0.0%	0.0%	100.0%	4,736	2,216	2,611
Pacific sardines	3,522	0.0%	0.0%	0.0%	100.0%	1,171	700	704
Pacific halibut	1,061	0.0%	1.4%	9.9%	88.7%	86	2	35
Other	2,491	0.4%	2.4%	64.3%	32.9%	197	4	66
Total	$153,959	0.1%	0.9%	7.9%	91.2%	$2,453	$101	$1,509

Notes: 1. Purchases are in thousands of 2014 dollars.
2. Purchases exclude vessels selling fish directly to the public and processors or buyers whose activity is less than $500.
3. Table shows counts of unique processors or buyers for >50% specialization, but counts are repeated in species groups for <=50% specialization.

Source: PacFIN annual vessel summary, April 2015 extraction.

controversy, since participating vessels would be in competition with the local retail markets for customers. Harvesters can receive about double the price from what is received when delivering to processors. While the direct sale price appears to be an attractive return, there are costs (advertising, packaging, spoilage, etc.) and legal risks for this type of sale. In addition, there can be lost fishing effort while the vessel is used as a base for sales.

B. Processor Trends

Tracing back to the early 1990's, there are four significant trends taking place in the fish processing industry where Oregon

harvesters traditionally deliver their landings (Grays Harbor, Washington to Ft. Bragg, California).

The following is a detailed explanation of each trend.

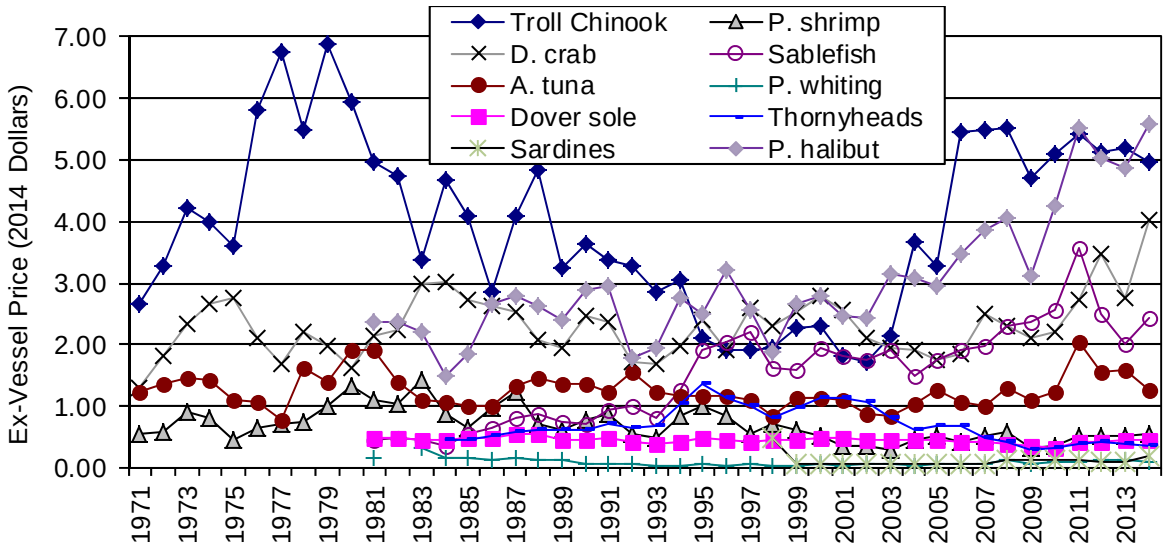
(1) Owner consolidation and general plant centralization in limited locations. There have been dramatic changes in processor business ownership and where fish processing occurs. Ownerships are being consolidated to a few major companies and landings are being hauled to general processing plants at a few locations along the central West Coast.[33,34] In south central Washington, the Westport area has one major processing company that specializes in Pacific whiting. Ilwaco has one major processing company that operates a general plant. There were only two major companies in the Astoria area processing year-around multi-species products in 2012. Several other companies specialized in sardines or other species. Newport has two large general processing plants and another plant specializes in whiting. Several smaller processors concentrate on salmon, tuna, and crab. One major company also owns a multi-species processing plant in the Coos Bay area. In northern California, there are two general processing plants operating: one in the Eureka area and one in Fort Bragg.

    Ownership consolidation has typically been accomplished by purchasing seafood buying or seafood processing facilities that are in financial difficulties. At times, this has meant only buying the name of the distressed company. Other times it has involved purchasing working capital and inventory from ongoing businesses. Processing employment was then moved out of smaller ports and replaced by buying stations. Most of the other landings go to specialty buyers or are landed in one port to be hauled to regional processing plants in another location.

(2) Vertical integration into distribution and harvesting operations. Vertical integration has been witnessed for both harvesters and processors. Harvesters are participating in direct marketing of their landings to consumers, and large processing companies have acquired vessel ownership positions. One major processing company is becoming more involved in distribution as its capacity to fill large orders grows.

(3) Seafood product wholesale prices. With several exceptions, there have been stable harvest price trends since the early 2000's. One exception is salmon prices have shot up to nearly late 1970's levels (Figure IV.1). While longer trend price stabilities have eliminated valuable product lines and in some cases led to the demise of some processors, the effects mostly are the earnings power of harvesters. Processors will continue to purchase salmon, shrimp, crab, and other species as long as their margins are covered. Vessels sometimes will continue to harvest at losses in order to protect their investment and permits. To remain in business, operation losses for both harvesters and processors in single

Figure IV.1
Selected Species Annual Ex-Vessel Price Trends in 1971 to 2014



Notes:
1. Prices adjusted to real 2014 dollars.
2. Ex-vessel price is the amount paid to fishers at the time of fish delivery. Deliveries are for onshore landings. Landings are not filtered for harvests from research, illegal fishing activities, full retention fisheries, weigh backs, confiscated overages, and personal use.
3. Thornyheads prices are for longspine from 1995 to present, and prior years are mixed longspine and shortspine.
4. Prices are annual and averaged across harvests made in different fisheries. Prices are expressed in round weight equivalents, except for troll Chinook prior to 1981 which are based on dressed weight. Average prices for salmon are across seasons and sizes.

Source: Oregon Department of Fish and Wildlife for years prior to 1981. PacFIN March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions for 1981 onward.

fisheries will have to be covered by other fisheries.

(4) Return of small processors to offering particular products in niche markets. There is a trend is for some small processors to return to particular product and species specialization. Salmon, live groundfish, albacore tuna, and Dungeness crab are species used in these markets. There is a minimum amount of investment needed to set up a buying station and ship products to consumer markets. A number of small ports have policies for assisting in this marketing technique.

The process of ownership consolidation has resulted in three major processing groups buying 73 percent by volume of all fish landed at Oregon ports in 2014. Adding the next two highest processor groups (five in all) raises the proportion to 85 percent. The share of certain species groups like Pacific whiting is even more concentrated. The end result of this trend is that there are only a few general fish processing plants left operating. The smaller competing fish buyers specialize in products for which they have established niche markets. This leaves harvesters with very limited markets in any geographic area.

The relationship between harvesters and processors that results in a harvester "having a market" is largely determined by the relative bargaining power of the two sectors. The main constraints for harvesters is incomplete market information (De Silva 2010). There is an Oregon process passed by the legislature in 2003 that allows collective bargaining for an initial price at season opening. Negotiations are benefited by market assessment information being presented at meetings. Negotiations are used in the pink shrimp and Dungeness crab fisheries. Using a fishery harvester cooperative approach provides another method for collective bargaining that case law and Fishermen's Collective Marketing Act (FCMA) interpretations resolve anti-competitive behavior concerns. Cooperatives are used for the at-sea Pacific whiting fishery (Kitts and Edwards 2003).

C. Processed Product Value

The value added from processing landed fish differs depending on the final seafood product form. Some seafood products are exported fresh or frozen from Oregon with a minimal amount of processing, such as fresh salmon, tuna, and whole crab. Some of the fish products shipped out of Oregon include a fair amount of processing, such as filleting. (Appendix B shows the relative size of the international export market value for Oregon, West Coast, and Alaska seafood products.) Intensive processing, such as smoking and canning, is also carried out by smaller processors. Another very intensive type of processing that used to occur at plants on the Oregon Coast is Pacific whiting "surimi" production. Pacific whiting is purchased from harvesters at around $0.10 per pound and surimi sells for close to one dollar per pound at the ex-processor level. The changed value is because labor and capital is used to modify the fish resource. However, in recent years it has been more profitable to use Pacific whiting in an H&G product form. The more intensive the processing, the higher contributions are being made to local economies from worker wages and other processing costs.

The modeled value of primary seafood products produced in Oregon can be generated using sales price of product forms and the landed species group finished product poundage. The ex-processor price was determined using either financial information about five components of product cost or published sales price for product forms.

- Raw product purchase = average price ÷ product form yield
- Labor = cost for labor associated with product form processing
- Tax/fee = costs for ad valorem and poundage taxes and fees paid on deliveries of raw product by the processor
- Other = fixed plant costs, etc.
- Contribution = profit, etc.

The estimated ex-processor value for all species groups, excluding non-edible products such as fish meal, is $223 million in 2014, which is about 1.5 times the ex-vessel value (Table A.3). Harvester-to-wholesale-to-retail price conversion models for several product forms are shown in appendix Tables A.5a to A.5e. Ex-processor value is not a reported statistic for West Coast processors as it is in Alaska. Therefore the modeled value cannot be verified other than by surveying individual processors. Some spot checking with processors and food service businesses was undertaken and favorable comparison with actual annual averages was found.

D. Major Seafood Processing Companies

Large processing companies often own several processing plants under different names, usually the names of former companies. Table A.9 shows existing buying/processing facilities and parent companies representation at port groups in Oregon for 2014. The information includes those facilities with annual landing purchases (ex-vessel values) greater than $100,000 in a port group, and indicates each port group with purchases greater than $10,000. There are some other significant buyers and processors in local areas that are not shown on this table. Many of these small companies are especially important in adding value via canning, smoking, etc. to local fish harvests. Parent company assignment is from personal communication or other investigation of cross ownership. Parents are assigned to subsidiaries groups by interpretations and evidence of various legal arrangements that include ownership ties, lease contracts, and purchasing arrangements.

The distribution of companies by port groups can be made. Table IV.2 shows species group purchases by purchase size categories for the ownerships. These counts are refined for being a "major" company. A major company is defined to be a purchaser of at least $5 million in any state's landings. There are general processing plants not in this table, because they are not located at ports where vessel deliveries are made. For example, general processing plants are or recently have been located in Woodland, Washington; Portland, Oregon; Sacramento, California; and Watsonville, California. There are also several large custom cutting and cold storage businesses which are primary seafood processors; however, they do not make vessel purchases so are not represented in this table. Landing data at the port group level was used to verify the thresholds for the table's processor categories and interviews with processing company representatives were used to determine plant capacity.

Ownership of seafood processing has changed along the Oregon Coast. The rise of the Columbia River salmon industry by European settlers was historically centered in the Astoria area. Later other species, such as tuna and sardines, also were included in this growth. As the salmon fishery expanded to the ocean, Newport and Coos Bay received an ever increasing part of the landings. Vessel technology and market demand led to the development of the groundfish fishery at Newport and Coos Bay. The decline of the abundance of salmon and groundfish species negatively affected these port groups greatly. Coos Bay processors continued using shrimp and crab resources, while Newport continued to be a center for whiting and other groundfish processing.

The Astoria area is again becoming the dominant port area for seafood processing. Besides salmon and Dungeness crab (which are landed all along the Oregon Coast), the Astoria area is receiving a large proportion of the Pacific whiting landings and most of the sardine landings.

E. Marketing Programs

Harvesters are becoming more interested in participating in seafood product marketing programs that may lead to higher delivery prices. Marketing of Oregon seafood is a challenge and an opportunity. Geographic labeling and quality/sustainability certifications are hoped to make Oregon seafoods distinct in world markets and translate from higher ex-processor prices to

Table IV.2
Purchases at Port Groups and Statewide by Species Groups in 2014

Processor Category	Ownership/ Count	Port Group Purchase Share	Major Company	Processing Buyer/ General	Processing Buyer/ Specialized	State	Port Group	Species Group Purchases at Port Group: Groundfish	Whiting	Salmon	Crab/Lobst	Shrimp	Sardine	Pelagic	H. Migratory	Halibut	S.Urchin	Other
Astoria																		
>$1.5M	6	92%	2	3	3	55,678,994	44,276,719	9,482,270	8,054,927	4,703,301	10,117,427	5,720,472	2,676,682	266,846	3,164,310	54,298	0	36,186
$500K-$1.5M	3	6%	0	0	3	6,504,047	2,721,603	0	0	886,374	645,830	0	845,077	202,184	142,138	0	0	0
$50K-$500K	6	2%	0	0	6	924,631	914,665	0	0	708,944	83,314	0	0	0	28,481	254	0	93,672
$10K-$50K	10	1%	0	1	9	759,525	247,248	2,155	0	99,713	36,906	12,703	0	0	60,185	1,081	0	34,505
<$10K	28	0%	1	7	21	28,720,709	94,615	1,876	0	37,375	5,545	0	0	0	26,412	5,761	0	17,646
Subtotal	53	100%	3	11	42	92,587,906	48,254,850	9,486,301	8,054,927	6,435,707	10,889,022	5,733,175	3,521,759	469,030	3,421,526	61,394	0	182,009
Tillamook																		
>$1.5M	0	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$500K-$1.5M	4	85%	1	0	4	18,364,099	3,191,681	72,392	0	807,887	1,998,611	88	0	0	229,483	82,591	0	629
$50K-$500K	4	8%	0	0	4	287,411	286,116	64,989	0	18,485	25,992	0	0	0	24,590	94	0	151,966
$10K-$50K	11	5%	0	3	8	2,971,734	200,260	44,325	0	40,427	32,204	0	0	0	42,425	6,163	0	34,716
<$10K	27	3%	0	6	21	2,084,236	98,117	24,826	0	14,761	5,256	26,008	0	0	15,224	192	0	11,850
Subtotal	46	100%	1	9	37	23,707,480	3,776,174	206,532	0	881,560	2,062,063	26,096	0	0	311,722	89,040	0	199,161
Newport																		
>1.5M	5	83%	4	3	2	81,532,254	43,620,935	4,136,633	10,218,585	3,738,997	12,120,324	11,171,556	0	3,638	1,648,622	582,518	0	62
$500K-$1.5M	6	10%	0	4	2	5,450,445	5,380,067	12,936	0	810,647	3,012,408	0	0	0	1,460,232	83,844	0	0
$100K-$500K	13	5%	0	0	13	5,687,747	2,687,018	115,082	0	416,799	973,369	0	0	0	400,265	70,255	0	711,248
$50K-$100K	6	1%	0	1	5	2,496,719	433,483	2,405	0	150,653	125,721	73,320	0	0	77,707	3,677	0	0
$10K-$50K	24	1%	0	5	19	1,846,702	541,441	6,482	0	122,387	145,041	16,548	0	0	208,718	39,640	0	2,625
<$10K	39	0%	0	8	31	799,787	92,779	23,400	0	23,740	6,740	10,436	0	0	26,050	2,392	0	21
Subtotal	93	100%	4	21	72	97,813,654	52,755,723	4,296,938	10,218,585	5,263,223	16,383,603	11,271,860	0	3,638	3,821,594	782,326	0	713,956
Coos Bay																		
>$1.5M	3	80%	2	2	1	36,268,220	30,468,437	3,089,781	1	4,550,343	10,937,800	10,275,512	0	409	1,474,601	139,965	0	25
$500K-$1.5M	6	13%	0	1	5	9,582,668	5,081,539	383	0	647,409	2,984,938	0	0	0	660,521	1,183	0	787,105
$100K-$500K	4	3%	0	1	3	1,459,611	1,215,067	14,419	0	207,315	358,223	0	0	0	634,077	851	0	182
$50K-$100K	7	1%	0	0	7	1,996,451	524,602	25,233	0	61,880	127,454	47,653	0	0	238,328	5,366	0	18,688
$10K-$50K	18	1%	0	3	15	2,269,213	454,268	31,588	0	163,675	53,061	48,933	0	0	136,334	8,353	0	12,324
<$10K	40	0%	1	11	29	27,442,254	151,635	17,815	0	49,743	19,370	1,060	0	0	57,646	5,701	0	300
Subtotal	78	100%	3	18	60	79,018,417	37,895,548	3,179,219	1	5,680,365	14,480,846	10,373,158	0	409	3,201,507	161,419	0	818,624
Brookings																		
>$1.0M	5	94%	2	0	5	53,304,597	12,630,010	4,354,370	0	1,747,777	3,901,338	2,158,273	0	0	195,840	14,390	257,783	239
$500K-$1.0M	0	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
$50K-$500K	5	4%	0	0	5	9,600,893	511,128	207,453	0	33,908	213,849	0	0	0	23,886	5,279	26,727	26
$10K-$50K	11	2%	0	2	9	2,397,299	253,895	64,504	0	62,576	44,818	0	0	0	46,839	35,154	0	4
<$10K	14	0%	0	2	12	1,617,008	49,497	14,252	0	18,859	15,372	0	0	0	1,014	0	0	0
Subtotal	35	100%	2	4	31	66,919,797	13,444,530	4,640,579	0	1,863,120	4,175,377	2,158,273	0	0	267,579	54,823	284,510	269
Oregon Statewide																		
>$5M	6	69%	6	6	4	108,121,882	108,121,882	18,201,392	14,919,558	13,120,944	27,338,837	27,211,833	587,522	73,196	5,782,392	851,753	0	34,455
$1.5M-$5M	8	16%	0	2	7	24,427,972	24,427,972	2,247,121	3,353,955	2,537,642	11,132,360	2,113,980	2,089,160	197,697	752,110	1,892	0	2,055
$500K-$1.5M	17	10%	0	6	14	15,833,395	15,833,395	703,566	0	2,699,869	7,700,426	51,305	845,077	202,184	2,474,403	111,046	257,783	787,736
$100K-$500K	23	3%	0	8	22	5,104,694	5,104,694	402,098	0	1,116,813	1,423,457	0	0	0	1,165,888	81,292	26,727	888,419
$50K-$100K	15	1%	0	4	15	1,029,786	1,029,786	92,874	0	241,578	138,400	133,495	0	0	259,294	75,041	0	89,104
$10K-$50K	56	1%	0	13	46	1,354,835	1,354,835	130,852	0	353,541	228,744	27,920	0	0	488,210	25,394	0	100,174
<$10K	82	0%	0	28	55	254,261	254,261	31,666	0	53,588	28,687	24,029	0	0	101,631	2,584	0	12,076
Subtotal	207	100%	6	67	163	156,126,825	156,126,825	21,809,569	18,273,513	20,123,975	47,990,911	29,562,562	3,521,759	473,077	11,023,928	1,149,002	284,510	1,914,019

Source: PacFIN annual vessel summary data April 2015 extraction, and ownership information from interviews with company representatives used in TRG (September 2006).

higher ex-vessel prices. Harvesters would be willing to invest in onboard equipment for improved handling if justified through increased revenues and regulations were changed to allow for processing and freezing. There are several organized efforts underway to promote quality assurance programs that are linked between the two industry sectors. The efforts include instituting traceability programs for which end consumers can track the supply chain-of-custody back to source of harvests. Oregon State University, Oregon Sea Grant Extension Service, Oregon Seafood Laboratory, and Coastal Oregon Marine Experiment Station (COMES) are involved in product and market research as well as education to bring about the modernization that is necessary for harvester and processor quality assurance programs. Third party certification and eco-labeling for sustainable fisheries is a growing practice in response to consumer awareness about environmental impacts from harvesting and health concerns.

V. ECONOMIC CONTRIBUTION

Economic contribution estimates are discussed in separate sections at the statewide and port group level in this chapter. The end section in this chapter provides discussion about commercial fishing industry fiscal analysis matters.

Oregon's commercial fisheries are unique and diverse. They have historically played a role in the development of Oregon's coastal waterfronts and other inland areas. Fishing vessels, seafood processors, and support businesses that participate in Oregon fisheries are also involved in Alaska and other distant water fisheries. The working waterfronts serving both Oregon and distant water fisheries are integrated with restaurants, retail stores, and offices (Kirby and Kellner 2009). The waterfronts attract visitors wanting to experience and see lively commerce activities in a backdrop of expansive harbor views. Many Oregon waterfronts are experiencing gentrification. This sometimes causes conflicts where fishing industry interests feel threatened that their way of life may be lost in favor of higher private sector returns gained from different shoreline land uses (Hall-Arber et al. 2001). But the mix of waterfront uses can help educate and safeguard fishing heritage which helps preserve the industry.

The economic analysis in this section is about commercial fishing activities, but it is acknowledged that a more comprehensive economic study would include the associated uses of waterfronts that are dependent on historical and existing fishing activity. The more thorough analysis would also address the indirect economic contributions for special fishery management and enforcement centers, marine observation operations, fish resource education and research institutions, etc.

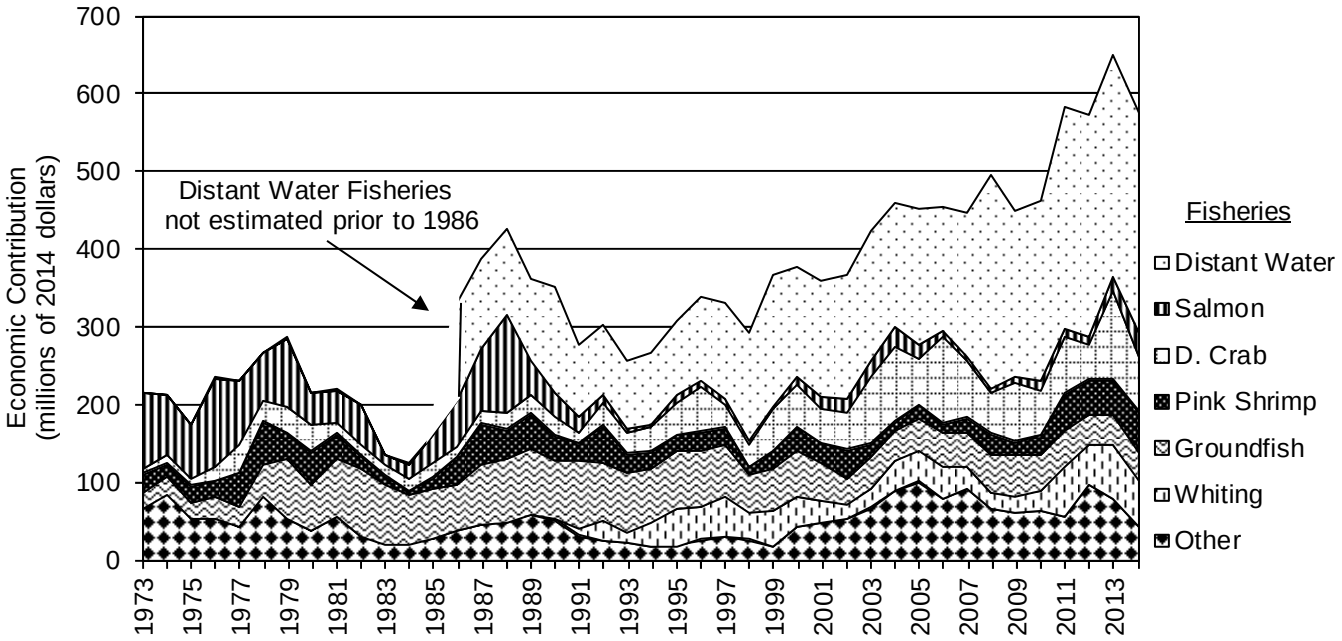
A. Statewide Economic Contribution Estimates

Economic contribution estimates for this report are measured by the increment of personal income received by households in Oregon due to the fishing industry. The estimates include wages and proprietary income made by crewmen, captains, and vessel owners during harvesting and workers and owners at processing plants. It includes income earned by people working at suppliers for fishing industry businesses. It also includes the respending of wages throughout the economy, therefore is inclusive of the "multiplier effect" of the industry.[35]

Using economic contribution for describing the industry simplifies details, and is a more revealing measure of the economic importance of certain fisheries within the industry. It is also useful for comparing the size of the fishing industry to other industries. Direct measurements, such as harvest revenue, can distort the importance of the industry in communities. For example, some fish have a higher labor cost per pound to harvest and process (like groundfish made into fillets) and therefore have higher economic impacts (generate more personal income) on the economy. Other fish (like salmon) are sold whole-fresh and have lower labor costs per pound, and hence have lower economic impacts.

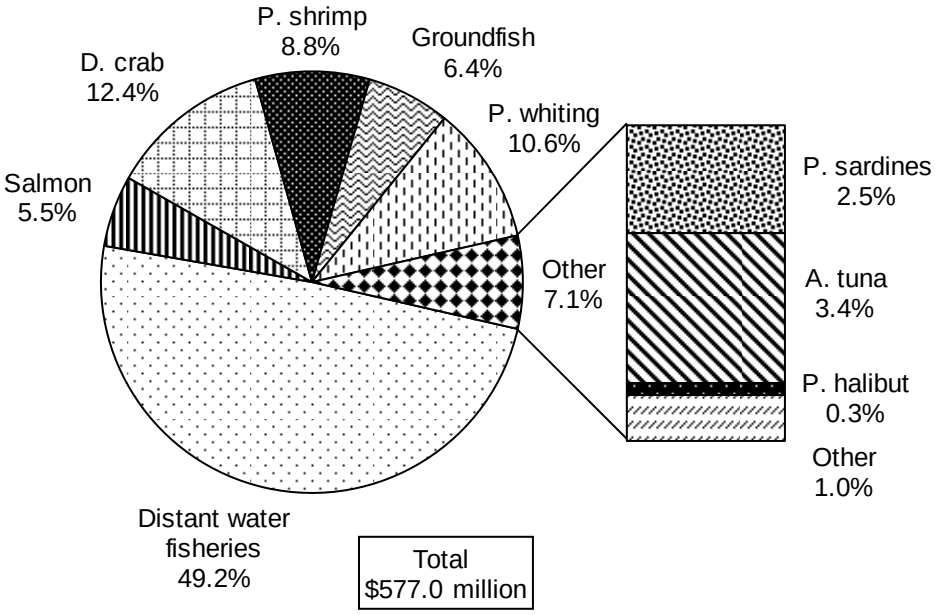
Overall, the Oregon fishing industry generated about $293 million in total personal income from fish landed in Oregon in 2014 (Figure V.1 and V.2 and Table V.1). Another $284 million of personal income was generated in the Oregon economy by the distant water fleet making landings to at-sea processors and onshore processors in other West Coast states, Alaska, southern Pacific Ocean, and elsewhere. The $577

Figure V.1
Economic Contributions From Onshore Landings in 1973 to 2014
and Distant Water Fisheries in 1986 to 2014



Notes: 1. Economic contributions are expressed as total personal income in millions of 2014 dollars.
2. Years 2013 and 2014 are preliminary estimates.
Source: Study.

Figure V.2
Economic Contributions by Major Fishery in 2014



Notes: 1. Economic contributions are expressed as total personal income in millions of 2014 dollars.
2. Year 2014 is preliminary estimates.
Source: Study.

Table V.1
Economic Contributions by Major Fishery in 1981 to 2014

	Onshore Landings								
Years	Salmon	D. Crab	Pink Shrimp	Groundfish	Pacific Whiting	Other Finfish and Shellfish	Total Landed Fish	Distant Water Fisheries	Total
1981	42.0	16.1	29.9	75.9	-	55.7	219.6	-	219.6
1982	50.7	16.4	16.1	86.9	-	30.3	200.4	-	200.4
1983	12.3	16.0	9.2	77.0	-	21.8	136.2	-	136.2
1984	19.9	15.2	4.7	61.7	-	22.7	124.3	-	124.3
1985	35.0	20.8	13.2	65.0	-	26.7	160.7	-	160.7
1986	59.2	13.3	35.3	59.7	-	38.0	205.6	126.4	332.0
1987	80.1	16.6	50.4	79.6	-	44.8	271.6	117.4	389.0
1988	126.3	21.5	37.1	81.6	-	48.8	315.3	110.6	425.9
1989	46.1	24.2	43.2	86.0	-	58.7	258.1	105.3	363.4
1990	31.1	24.4	30.9	77.0	1.3	51.1	215.8	136.6	352.4
1991	20.8	12.6	21.5	88.1	10.4	30.6	183.9	92.7	276.6
1992	8.9	30.2	48.0	74.5	26.8	24.0	212.4	90.0	302.4
1993	5.9	26.2	25.1	75.7	14.5	21.7	169.1	88.1	257.2
1994	3.4	30.3	21.7	70.3	30.7	17.4	173.7	93.3	267.0
1995	8.9	42.6	19.7	76.4	46.3	18.6	212.5	97.4	309.8
1996	8.5	59.5	22.1	74.6	42.5	25.0	232.1	108.1	340.3
1997	7.0	31.6	20.5	67.5	52.0	29.5	208.0	124.7	332.7
1998	5.7	29.6	8.2	49.8	36.8	24.9	154.9	139.1	294.0
1999	4.8	53.6	22.9	55.6	45.1	17.1	199.1	168.4	367.5
2000	11.0	54.9	28.5	61.9	39.3	41.3	236.9	141.1	378.1
2001	15.5	44.5	24.4	50.6	28.9	47.1	211.0	149.6	360.6
2002	18.0	49.1	35.6	34.2	18.7	52.7	208.3	158.6	366.9
2003	20.5	86.2	16.3	42.2	25.5	66.1	256.8	167.0	423.8
2004	25.8	96.7	12.1	39.1	37.9	88.9	300.4	159.7	460.1
2005	19.8	58.9	16.2	41.8	41.6	100.1	278.3	173.3	451.6
2006	8.7	112.3	11.0	43.4	42.6	78.2	296.2	160.3	456.5
2007	7.8	71.7	20.4	43.7	29.7	90.0	263.3	183.1	446.3
2008	7.3	52.4	25.8	50.6	21.6	64.3	222.0	274.2	496.2
2009	6.5	77.1	16.2	53.3	22.2	60.4	235.7	215.7	451.4
2010	12.7	57.9	24.2	47.7	25.5	63.3	231.3	232.0	463.2
2011	10.7	73.5	45.0	47.6	66.3	54.3	297.4	286.6	584.0
2012	10.6	44.8	44.6	40.3	51.7	96.2	288.1	284.5	572.6
2013	19.2	115.5	43.9	39.0	71.1	77.1	365.9	286.3	652.2
2014	31.6	71.7	50.5	37.0	61.3	41.2	293.2	283.8	577.0

Notes:
1. Economic contributions are expressed as personal income in millions of 2014 dollars.
2. Years 2013 and 2014 are preliminary.
3. The economic contributions from salmon fisheries include ocean troll and Columbia River gillnet fisheries, so the estimates will be greater than ocean salmon fisheries as reported by the PFMC.
4. Groundfish in 2013 and 2014 includes (respectively, real dollars in thousands) flatfish ($17,596, $15,053), sablefish ($12,559, $12,681), and other species ($8,835, $9,227).
5. 'Other' in 2013 and 2014 includes (respectively, real dollars in thousands) Pacific sardines ($41,783, $14,215), albacore tuna ($26,619, $19,346), Pacific halibut ($1,451, $1,650), and other species ($7,236, $5,954).
6. Economic contributions from fish meal production are included in Pacific whiting. The largest source of fish carcasses in past years has been mostly from surimi production. Pacific whiting demand has shifted to H&G and fillet product forms which have higher resource yields and lesser material available for fish meal production.
7. The economic contribution from distant water fisheries includes the effects of vessel revenue returned to Oregon's economy from U.S. West Coast at-sea fisheries, Oregon home-port vessels landing in other U.S. West Coast states and Alaska, southern Pacific Ocean, and other fisheries. New fishing vessel construction, fishery management, and fishery research and training are not included.
8. Years 2013 and 2014 use 2011 IMPLAN response coefficients, Years 2008 to 2012 use 2007, and prior years use 1998.

Source: Study.

million in 2014 is down from $652 million in 2013.

Four decade averages are shown on Table V.2. Two interesting interpretations from the table are the somewhat consistent effects in the 10 year average economic contributions from onshore fisheries over the four decades and the increasing economic effects from participation in distant water fisheries. While the sum has consistency, the contributions from each of the major fisheries have changed over the table's duration.[36]

Fisheries other than what is itemized in Tables V.1 and V.2 also have measurable economic contributions. For example, sardines alone contributed about $14 million in 2014. Albacore tuna contributed another $19 million in 2014. Shellfish aquaculture is not included in these estimates since it is typically classified as an agriculture product. It has been estimated to have generated about $9 million in 2003 (TRG March 2006). More recent investigations on shellfish production in Oregon can be found in Northern Economics (2013).

B. Port Group Economic Contribution Estimates

Up until the 1980's, the three major port areas (Astoria, Newport, and Coos Bay) have been very similar in the value of their total landings and in total personal income generated from fishing activity in Oregon (Table V.3 and Figure V.3). However, the Coos Bay area is losing its standing to Newport and Astoria. This is partly because Pacific whiting processing has not continued in the Coos Bay area. The Astoria and Newport areas also have a substantial amount of economic impacts generated by distant water fisheries. Astoria has also benefited from a resurgence in the sardine fishery and a rebound in inriver salmon fisheries.

Table V.2
Preliminary 2014 and Historical Period Annual Average Economic Contributions by Major Fisheries

	Historical Period				2010-	Preliminary	Preliminary
Fishery	1970's	1980's	1990's	2000's	2012	2013	2014
Salmon	84.3	51.5	10.5	14.1	11.3	19.2	31.6
Dungeness crab	21.1	19.5	34.1	70.4	58.7	115.5	71.7
Pink shrimp	29.6	28.1	24.1	20.7	37.9	43.9	50.5
Groundfish	34.3	73.3	70.9	46.1	45.2	39.0	37.0
Pacific whiting	na	na	30.6	30.8	47.8	71.1	61.3
Other	62.4	38.5	26.0	68.9	71.3	77.1	41.2
Subtotal onshore	231.8	210.8	196.2	250.9	272.2	365.9	293.2
Distant water	na	114.9	113.8	178.3	267.7	286.3	283.8
Total	na	377.6	310.0	429.2	539.9	652.2	577.0

Notes: 1. Economic contributions are expressed as personal income in millions of 2014 dollars.
2. The 1970's include 1973 to 1979. Distant water and total in the 1980's includes 1986 to 1989.
3. The fishery titled "other" in the most recent year includes Pacific sardines ($14 million), albacore tuna ($19 million), Pacific halibut ($2 million), sea urchins ($0.4 million), and many other species.

Source: Study.

Table V.3

Area and Statewide Economic Contributions From Onshore Landed Fish and Distant Water Fisheries in 1986 to 2014

	Astoria and Columbia R. Area			Tillamook Area			Newport Area			Coos Bay Area			Brookings Area			All Coastal Communities			Total State Level Contributions		
Year	Landed	Distant	Total	Landed	Distant	Total	Landed	Distant	Total	Landed	Distant	Total	Landed	Distant	Total	Landed	Distant	Total	Landed	Distant	Total
1986	73.8	25.8	99.6	10.8	0.0	10.8	38.3	51.9	90.2	39.2	10.8	49.9	8.5	0.0	8.5	170.6	88.4	259.1	205.6	126.4	332.0
1987	90.7	23.6	114.4	12.6	2.6	15.2	52.9	53.4	106.3	58.3	9.1	67.5	10.8	1.5	12.4	225.4	90.3	315.7	271.6	117.4	389.0
1988	99.0	26.2	125.2	15.5	2.5	18.0	63.2	52.0	115.2	64.9	13.3	78.2	19.1	1.3	20.5	261.7	95.3	357.0	315.3	110.6	425.9
1989	78.6	14.0	92.7	10.6	2.8	13.5	53.4	55.0	108.4	49.8	12.1	61.8	21.8	1.7	23.5	214.2	85.6	299.9	258.1	105.3	363.4
1990	62.1	26.9	89.0	7.0	2.3	9.3	37.0	74.3	111.3	49.0	7.5	56.5	24.1	1.5	25.6	179.1	112.6	291.7	215.8	136.6	352.4
1991	54.5	19.5	73.9	7.6	2.3	9.9	42.4	42.4	84.8	34.7	6.0	40.6	13.4	1.3	14.8	152.7	71.3	224.0	183.9	92.7	276.6
1992	51.1	17.5	68.5	6.1	2.5	8.6	59.4	49.0	108.4	39.9	6.2	46.1	19.8	1.2	21.0	176.3	76.3	252.6	212.4	90.0	302.4
1993	49.4	17.3	66.7	6.6	2.4	9.0	41.4	47.5	88.9	30.3	6.1	36.3	12.6	0.9	13.5	140.4	74.2	214.6	169.1	88.1	257.2
1994	46.7	17.1	63.8	4.0	2.4	6.4	47.5	50.1	97.6	28.8	5.9	34.7	17.2	1.1	18.3	144.2	76.6	220.8	173.7	93.3	267.0
1995	62.7	16.8	79.5	4.3	2.3	6.6	59.6	58.2	117.7	35.2	5.8	41.0	14.5	1.1	15.6	176.3	84.1	260.5	212.5	97.4	309.8
1996	70.8	11.9	82.7	5.5	1.4	6.9	61.3	38.3	99.6	34.5	2.0	36.5	20.6	0.5	21.1	192.7	54.1	246.8	232.1	108.1	340.3
1997	67.3	12.1	79.4	2.6	1.7	4.3	56.8	49.9	106.7	29.2	2.2	31.4	16.8	0.7	17.4	172.6	66.5	239.2	208.0	124.7	332.7
1998	51.6	13.2	64.8	1.4	2.2	3.6	44.4	55.0	99.4	21.8	2.5	24.2	9.3	0.7	10.0	128.5	73.5	202.1	154.9	139.1	294.0
1999	68.8	16.8	85.6	2.9	2.6	5.6	49.8	63.1	112.9	31.6	3.1	34.7	12.1	0.8	12.8	165.3	86.4	251.6	199.1	168.4	367.5
2000	86.2	13.1	99.3	4.0	2.3	6.3	60.1	55.6	115.7	33.6	2.7	36.3	12.7	1.0	13.7	196.6	74.7	271.3	236.9	141.1	378.1
2001	77.9	13.0	90.9	3.6	2.9	6.5	52.7	61.8	114.5	31.5	2.9	34.3	10.0	1.3	11.3	175.6	81.8	257.5	211.0	149.6	360.6
2002	88.2	13.3	101.5	5.6	3.0	8.6	42.2	67.1	109.3	29.5	2.9	32.5	7.8	1.4	9.1	173.3	87.7	261.0	208.3	158.6	366.9
2003	96.7	14.9	111.5	6.1	3.1	9.2	55.6	67.5	123.1	32.2	3.2	35.4	12.2	1.3	13.5	202.8	90.0	292.8	256.8	167.0	423.8
2004	97.5	15.1	112.6	6.4	3.0	9.4	67.9	62.8	130.7	43.6	3.1	46.7	18.6	1.2	19.9	234.0	85.3	319.3	300.4	159.7	460.1
2005	122.0	15.8	137.8	5.3	3.1	8.4	55.6	70.3	125.9	31.5	3.3	34.8	8.8	1.4	10.2	223.2	93.9	317.1	278.3	173.3	451.6
2006	114.4	14.8	129.2	6.1	2.9	8.9	65.7	64.7	130.4	34.4	3.1	37.6	14.7	1.4	16.1	235.3	86.9	322.2	296.2	160.3	456.5
2007	106.6	17.3	123.9	5.3	3.1	8.5	55.0	69.4	124.4	34.4	3.7	38.1	10.6	1.4	12.0	211.9	95.0	306.9	263.3	183.1	446.3
2008	82.3	26.0	108.3	3.7	4.6	8.3	52.2	102.8	155.0	33.5	5.8	39.3	7.7	1.8	9.5	179.4	141.0	320.4	222.0	274.2	496.2
2009	80.2	21.8	101.9	3.6	3.9	7.6	53.1	77.6	130.7	39.2	4.5	43.7	13.0	1.3	14.3	189.1	109.1	298.2	235.7	215.7	451.4
2010	82.1	24.4	106.5	3.4	3.8	7.2	51.9	79.3	131.2	38.6	4.9	43.5	9.3	1.3	10.6	185.3	113.7	299.0	231.3	232.0	463.2
2011	100.7	28.8	129.5	3.7	5.2	8.9	68.4	104.8	173.2	53.0	5.8	58.8	12.6	1.7	14.3	238.5	146.2	384.7	297.4	286.6	584.0
2012	110.8	29.8	140.6	2.9	5.2	8.1	59.0	102.2	161.3	40.2	5.9	46.1	15.3	1.6	16.9	228.2	144.8	373.0	288.1	284.5	572.6
2013	114.2	29.8	143.9	5.2	5.3	10.5	84.9	105.7	190.6	52.5	5.7	58.2	24.8	1.5	26.3	281.5	148.0	429.6	365.9	286.3	652.2
2014	87.2	29.5	116.7	4.3	5.0	9.3	74.4	103.6	178.1	49.1	5.6	54.7	12.9	1.4	14.3	228.0	145.2	373.2	293.2	283.8	577.0

State level averages (landed)

Last 29 years	'86-'14	241.3
90's decade	'90-'99	196.2
Last 5 years	'10-'14	295.2

Notes: 1. Economic contributions are expressed as personal income in millions of 2014 dollars.

2. Economic contributions are calculated with the Fisheries Economic Assessment Model (FEAM) originally developed by Hans Radtke and William Jensen for the West Coast Fisheries Development Foundation in 1988. The estimates include direct, indirect, and induced impacts, therefore include "multiplier effects."

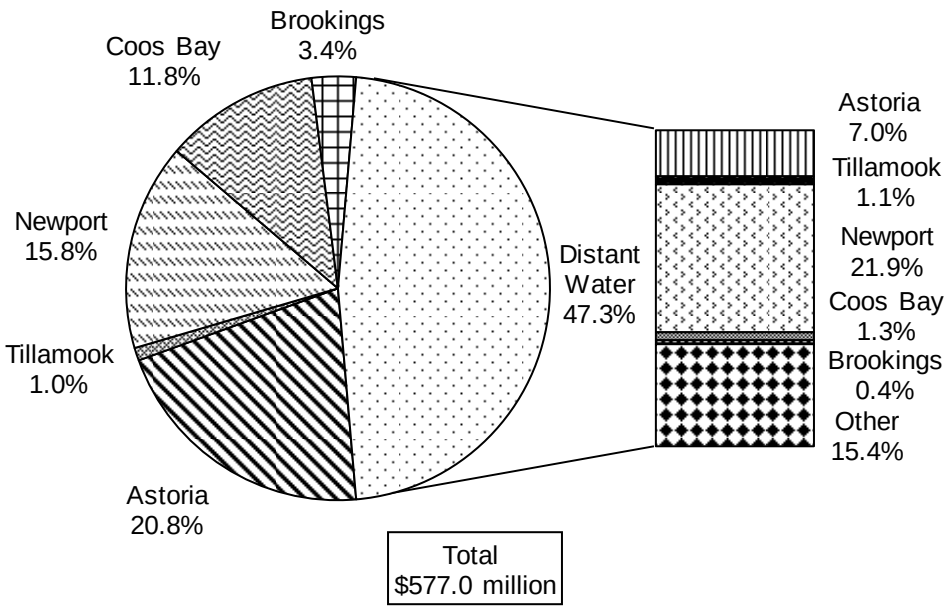
3. The economic contributions for areas listed includes smaller ports: Astoria area includes all Columbia River; Tillamook area includes Pacific City; Newport area includes Depoe Bay; Coos Bay area includes Florence, Reedsport and Bandon; Brookings area includes Port Orford and Gold Beach.

4. The economic contributions at the port group area level do not sum to the statewide level because of trade leakages to the larger economy. The sum of distant water fisheries economic contribution in coastal communities has the additional consideration that some of the revenue is returned to Willamette Valley and Eastern Oregon communities, so is only reflected in the State economy.

5. Years 2013 and 2014 use 2011 IMPLAN response coefficients, 2008 to 2012 use 2007, and prior years use 1998.

Source: Study.

Figure V.3
Economic Contribution by Port Groups in 2014



Note: Astoria port group includes Warrenton; Tillamook port group includes Garibaldi and Pacific City; Newport port group includes Depoe Bay; Coos Bay port group includes Florence, Winchester Bay, Charleston, and Bandon; and Brookings port group includes Port Orford and Gold Beach.
Source: Study.

Landed fish in Astoria generated about $87 million income in 2014. Harvested and processed fish landed in Newport generated a total of about $74 million income in 2014. When income generated by the distant water fleet is included, a greater amount of income is generated in the Newport area ($178 million). Astoria's income is $117 million when distant water fisheries effects are included. For all Oregon coastal communities, a total of $373 million in total personal income was generated by the fishing industry in 2014, from both landed fish and revenue returned from distant water fisheries. Because a portion of the revenues returned "leaks out" to the total Oregon economy and about one-third of distant water fisheries revenue is returned to non-coastal communities, an additional $204 million of personal income was received in 2014 by residents of Oregon outside the Oregon coastal economies

The fishing industry generates about one half percent of earned income in the State's economy and about 10 percent of the coastal economy earned income (Table V.4). At the local level, the fishing industry ranges from 21 percent in the Newport port group to two percent in the Tillamook port group in 2014. At average statewide net earnings per year ($46 thousand), the industry represented about 15,334 annual part and full-time equivalent jobs in Oregon in 2014. At county level net earnings per year ($34 thousand), the industry represented 10,882 part and full-time equivalent jobs in the coastal economy in 2014.

Table V.4
Representation of the Commercial Fishing Industry in Area Economies in 2010 to 2014

Area	2010		2011		2012		2013		2014	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
Astoria, Columbia River, and Other										
All income sources	1,329.4	8.0%	1,397.2	9.3%	1,422.5	9.9%	1,435.8	10.0%	1,405.2	8.3%
Earned income	746.2	14.3%	781.1	16.6%	797.6	17.6%	795.4	18.1%	778.5	15.0%
Fishing income	106.5	100.0%	129.5	100.0%	140.6	100.0%	143.9	100.0%	116.7	100.0%
Equivalent jobs	2,995		3,603		3,920		3,973		3,271	
Tillamook Area										
All income sources	900.5	0.8%	921.2	1.0%	933.5	0.9%	945.6	1.1%	907.6	1.0%
Earned income	449.9	1.6%	458.0	1.9%	461.4	1.8%	464.7	2.3%	446.0	2.1%
Fishing income	7.2	100.0%	8.9	100.0%	8.1	100.0%	10.5	100.0%	9.3	100.0%
Equivalent jobs	212		261		237		306		276	
Newport Area										
All income sources	1,630.8	8.0%	1,709.0	10.1%	1,729.9	9.3%	1,744.1	10.9%	1,684.2	10.6%
Earned income	800.6	16.4%	858.6	20.2%	863.3	18.7%	859.3	22.2%	829.8	21.5%
Fishing income	131.2	100.0%	173.2	100.0%	161.3	100.0%	190.6	100.0%	178.1	100.0%
Equivalent jobs	3,939		5,178		4,774		5,611		5,320	
Coos Bay Area										
All income sources	3,048.7	1.4%	3,153.5	1.9%	3,171.6	1.5%	3,185.9	1.8%	3,087.9	1.8%
Earned income	1,453.6	3.0%	1,530.5	3.8%	1,535.6	3.0%	1,525.5	3.8%	1,478.6	3.7%
Fishing income	43.5	100.0%	58.8	100.0%	46.1	100.0%	58.2	100.0%	54.7	100.0%
Equivalent jobs	1,252		1,704		1,329		1,659		1,581	
Brookings Area										
All income sources	749.3	1.4%	770.1	1.9%	784.0	2.2%	786.1	3.3%	763.8	1.9%
Earned income	289.2	3.7%	300.0	4.8%	309.1	5.5%	304.9	8.6%	296.3	4.8%
Fishing income	10.6	100.0%	14.3	100.0%	16.9	100.0%	26.3	100.0%	14.3	100.0%
Equivalent jobs	322		431		506		784		434	
All Coastal Areas										
All income sources	7,658.7	3.9%	7,951.1	4.8%	8,041.6	4.6%	8,097.5	5.3%	7,848.8	4.8%
Earned income	3,739.4	8.0%	3,928.1	9.8%	3,966.9	9.4%	3,949.9	10.9%	3,829.2	9.7%
Fishing income	299.0	100.0%	384.7	100.0%	373.0	100.0%	429.6	100.0%	373.2	100.0%
Equivalent jobs	8,720		11,176		10,766		12,334		10,882	
Statewide Contributions										
All income sources	147,400.5	0.3%	152,914.0	0.4%	157,677.0	0.4%	158,924.6	0.4%	165,483.9	0.3%
Earned income	89,665.4	0.5%	92,967.1	0.6%	96,246.8	0.6%	96,435.4	0.7%	100,093.9	0.6%
Fishing income	463.2	100.0%	584.0	100.0%	572.6	100.0%	652.2	100.0%	577.0	100.0%
Equivalent jobs	12,351		15,540		15,081		17,125		15,334	

Notes: 1. Economic contributions are measured as total personal income in millions of 2014 dollars.
2. Earned income is the sum of wages and salaries, proprietors' income. Earned income does not include transfer payments, or dividends, interest, and rent.
3. County average annual earnings per job are computed by dividing the economies all industry earnings estimates by total full-time and part-time jobs estimates. Average earnings per job within industries involving more part-time work is lower than industries involving more full-time work, although there could be little difference in the underlying wage of full-time workers. Since average earnings per job are just a simple average, it does not account for variations in the distribution of earnings among high-pay vs. low-pay jobs. Equivalent jobs at the statewide level include jobs within all coastal communities plus jobs in the rest of the state computed using the difference in fishing income at the state level and fishing income within coastal communities.
4. Personal income and average wage data is from U.S. Department of Commerce, Bureau of Economic Analysis. The most recent year personal income at the county level is a forecast using linear regression over the shown years. The share of earned personal income for the most recent year is the same as the preceding year. The personal income for all coastal communities are for the counties of Clatsop, Tillamook, Lincoln, Coos, Curry, and the coastal areas of Lane and Douglas counties. The methodology used to calculate the amount of personal income for portions of counties is explained in TRG (March 2006). The 1990 and 2000 decennial census information is used with the methodology to calculate the partial county estimates.

Source: Study.

C. Fiscal Contribution Estimates

There are other economic measurements that can be used to characterize the commercial fishing industry (see Section I.C.2 and 3). This section discusses and provides some indicator estimates for fiscal contribution measures. The indicator measures include generation of government fees and taxes. At the local government level, the fishing industry pays fees for moorage, rental of upland property, landing poundage fees, etc. The industry's general and personal tangible assets would add to the local property assessed value.[37] Industry participants and businesses pay State personal and corporate income taxes and fees. There are a host of State level harvest landing and license fees and marine fuel taxes. The fees and taxes offset State and local government costs for services provided to the industry.[38] Government not only provides physical infrastructure (maintained navigation channels and jetties, wharves, moorages, upland storage and work areas, launch facilities, etc.), but also provides other services such as fish hatchery programs. Local governments and port districts serve as advocates for the industry so as to ensure its continued viability.

Using the assumption that there is a causal and integral relationship to personal income generated from the industry, the state and local tax contributions in 2014 are estimated to be $58 million.[39] State and local taxes includes personal and corporate income taxes, property taxes, selective sales taxes, etc. General revenue from fees, special charges, and government enterprises are not included.

The harvest and processing sectors are assessed ad valorem fees and license/permit fees at the state level. The ad valorem fees are for contributions to the Commercial Fish Fund (CFF) and for support of commodity commissions. The CFF ad valorem rates in 2014 ranged from 1.09 percent for albacore tuna to 5.00 percent for black/blue and other nearshore rockfish. The ad valorem fee for most finfish and shellfish is 2.25 percent. The ad valorem fee on salmon landings was 3.15 percent. A special restoration and enhancement fee is another $0.05 per pound (salmon landed in the round and adjusted for salmon landed in other forms). There are many vessel, crew member, limited entry fishery permit, processor, and other fees. The CFF revenue generated in calendar year 2014 was $4.7 million (Table D.1). The three-year most recent period average for the CFF is about $4.5 million. The revenue is deposited in a State CFF account to help reimburse the ODFW costs for management, enforcement, and research.

A significant portion of the CFF receipts are used to fund the ODFW Marine Resource Program (MRP). (The MRP administers the regulation, harvest and management of commercial and recreational fisheries and management of other marine species, such as marine mammals.) The expected CFF revenue receipts represent less than half of the MRP Legislative Approved Budget (LAB) for the biennium.[40] The balance of the MRP LAB funds come from federal sources, State general funds, and other funds. The other funds include sport angling and shellfish license fees and lottery dollars. There are more ODFW commercial fishing oriented programs and services costs other than reflected in MRP expenditures. The CFF also is used in the other ODFW programs, especially propagation. Associating the projected CFF revenue with the MRP expenditures is to illustrate the importance of the revenue source for providing management and research that benefit both recreational and commercial fisheries.

Marketing support and information services for the industry are provided through four commodity commissions. The Oregon Department of Agriculture authorizes the activities of the commissions. Revenue is raised using landing value assessments (ad valorem rates) on deliveries of specific species harvested with specific gear for the Salmon Commission (1.5 percent ex-vessel value troll caught salmon assessed to harvester), Trawl Commission (0.5 percent ex-vessel value of groundfish and shrimp caught with trawl gear assessed to harvester), Albacore Commission (0.75 percent ex-vessel value of albacore tuna whose payment is split evenly by harvesters and processors), and Dungeness Crab Commission (one percent ex-vessel value assessed to harvester). Total expected revenue raised by the assessments is about $1.3 million in 2013 and $1.1 million in 2014 (Table D.2). The commodity commissions can also use funds from other sources to provide services.

The fishing industry payments for fees and taxes can be viewed in a larger picture for receiving government services, offsets, and in some cases direct payments. What is received is sometimes referred to an industry subsidy, although definitions of what constitute subsidies differ with each study. Khan et al. (2006) identified 11 types of fisheries subsidies ranging from fisheries management programs and services to vessel buyback programs.[41] Sharp and Sumaila (2009) attempt to quantify fishing industry subsidies at a national level. They found that fishing industry's state and U.S. subsidies averaged $713 million (2007 dollars) annually which were about one-fifth of the harvest value.[42] They make a connection between subsidies and a build-up of capital and capacity that leads to industry economic instability. They cite the FAO (1999) and WWF (1998) studies that found the number of vessels worldwide is 2.5 times the needed number to prosecute sustainable catch. NMFS (2008) found that 12 of 25 U.S. commercial fishing operations it examined had 50 percent more boats than needed to bring in each operation's total fish catch for the year. Related findings by the Federal Fisheries Investment Task Force Report to Congress (1999) were incorporated into the 2006 Magnuson-Stevens Fishery Conservation and Management Act (MSA) requiring reduction and elimination of overfishing in U.S. commercial fisheries and correcting management approaches through designs that lead to fleet rationalization.

A more general context of subsidies suggests that subsidies through incentives and deterrents can either throttle back or accelerate industry activity as might be necessary for economy influences. Direct and indirect assistance to recipients can be welcome relief to adversarial market conditions or resource failures.[43] A defense of U.S. subsidies is that countries worldwide assist their fishing industry and a level playing field for the industry is needed in order to participate in the global marketplace.

Related to subsidies is mitigation for lost fishing opportunities due to adverse impacts from other ocean and freshwater activities. There are already examples of mitigation in Oregon from the placement of undersea cables. The Bandon Submarine Cable Council and the Oregon's Fisherman Cable Committee oversee distributions of funds for communication, research, and damaged gear settlements. The Northwest Power and Conservation Council (NPCC) reports over $3 billion has been spent on fish and wildlife restoration programs (including foregone hydropower sales) since 1982 (NPCC 2014).

The annual expenditure was $644 million in 2012. The amount does not include other federal and state taxpayer supported programs. The issue for compensatory direct payments to industry or indirect fishery benefit payments for mitigating lost fishing opportunity may become more important as alternative uses for ocean space increase, such as for energy generation sites and restricted energy transmission and navigation corridors. Questions will have to be addressed on impact assessment methods and how long term costs are included in mitigation. There may be lost or gained society values from potentially affected resources and ecosystem services. Whether perceived benefits are lesser or greater will influence permitting and political support for the impact activities (NRC 2001).

VI. FISHING INDUSTRY CHALLENGES

The commercial fishing industry is a thriving and important economic sector for many communities along the Oregon Coast, but there are certain segments of the industry that are experiencing severe disruption. This chapter discusses trends and offers a near-term outlook for how the trends might change. More general structural issues the industry is facing are listed. Lastly, challenges for raising net economic value are explained.

General worldwide economic conditions can bring down demand for seafood products (and ultimately influence harvest level prices) because consumers view seafood as a discretionary purchase. Improving general economic conditions and certain situations of fish supply constraints helped increase Oregon fisheries prices in 2011. Some of the increases faded (for example sablefish and albacore tuna) in 2013 and 2014. The expanded markets for Pacific whiting fillets were not as great as expected, and gains in the eastern European market for H&G products were diminished in 2014. The strong U.S. dollar currency exchange in 2014 reduces demand for U.S. harvests and lowers prices when there are international fisheries that have product substitutions

A point of optimism may come from demand for some specialty products from Oregon fisheries. Using the market demand for the specialty products along with traceability technology address consumer concerns for food safety and awareness about fish resource conservation (Petersen and Green 2006). The traceability technology allows seafood product to be marketed according to where, when and how they were caught. The authenticity of claims or certifications, such as wild fish harvested only from sustainable stocks, is backed-up with proper and easily accessed documentation about the product's supply chain.

Issues that the commercial fishing industry is facing are:

- Pressure to set aside areas for: (1) no-take marine protection areas for conducting research and/or preserving their intrinsic values, and (2) other conflicting spatial uses of the ocean, such as wave/wind energy generation.

- Allocations among user groups (commercial, recreational, and tribal fishermen) and communities to meet legal requirements and social objectives.

- Judicial decisions on habitat protection and incidental take issues brought to the forefront by conservation organizations, including protection of sea birds and mammals either impacted by fishing techniques or dependent on protein from the same fish species now being exploited; compacts and international treaties, including treaties with Canada for allocation of Pacific whiting, salmon, and tunas; and, multi-national interests in highly migratory fish stocks in the western and central Pacific Ocean.

- Better understanding in the science of ecosystem interactions and improved stock assessments that may cause fishery management agencies to reduce exploitation rates, control fishing gear, reduce trip limits, or additional restrictions including time/area closures through new initiatives to develop an ecosystem

fishery management plan. Stock building programs calculated using variables with large uncertainties; rebuilding programs will take many years for slow growing rockfish species to return to maximum sustainable harvest levels because of life cycle characteristics of these fish.

- Restrictions on harvests for species in a healthy stock status condition due to fishing techniques that have unavoidable mortalities on species in a depleted stock status where species occupy the same space at the same time. There is a need to develop innovative methods to share real time information among vessels to avoid hotspots where the depleted species are congregating.

- For the most part, there are not major populations of underutilized species which harvesters can exploit, but new fisheries may develop around some minor opportunities for developing niche markets.

- Increasing costs for prosecuting fisheries, such as for fuel, safety equipment, insurance, moorage, etc. New, more selective management tools requiring different gear, area/time closures related to ocean depth, and more intrusive harvest verification techniques (log books, observers, satellite signal location registry programs, etc.) will add to operation costs.

- Implementation of the 2006 Magnuson-Stevens Act reauthorization, which included new definitions and processes for avoiding species overfishing; and, anticipation of new provisions in a future reauthorization since the present Act expires September 30, 2013.

- Expanded use of ITQ and IPQ programs with transferable quotas for vessels, processors, and cooperatives. Additional fisheries being managed using property rights approaches, such as now is being used in the trawl groundfish fishery. The management approach has the potential for greater individual economic profits and greater community benefits. However, poorly crafted rights may result in unintended consequences, including over-consolidation, unbalanced bargaining power favoring one sector over another, or asymmetrical redistribution of vessels and processors among coastal communities.

- The proliferation of certification programs for seafood product quality and capture fisheries sustainability has burdened harvesting associations and processors. The certification concept has merit, but there is considerable expense in trying to meet certifying conditions and science and management requirements. There may also be confusion on the part of consumers given duplicate and conflicting certification systems.

- Consumer concerns about quality (freshness, inclusions of toxics, etc.) will affect seafood product demands. Considerations about health and wholesomeness of natural coldwater fish could be a marketing advantage to Oregon's industry. There is a major consumer concern from contamination of migratory fish

stocks by the 2011 Fukushima, Japan nuclear power plant radioactive plume. Although contamination levels have been "no detect" or dose rates far below levels of concern, state, federal, and international agencies and organizations continue to test fish to address the public concerns.

- Climate variability, as tracked by the Pacific Decadal Oscillation (PDO), El Niño/Southern Oscillation (ENSO), and Oceanic Niño Index (ONI) indexes, has effects on fish habitat that harm some species and boost populations of other species.

- Vessels in Oregon depend on public agencies to provide adequate moorage, upland facilities, and safe passage from harbors to the ocean. Decreased federal funding of the Corps of Engineers operation and maintenance budgets will mean smaller ports not meeting waterborne commerce volume standards will not be dredged. Public ports have increasing demands for devoting scarce revenue sources for other than commercial fishing industry uses.

- Federal budgets for fishery management and science are challenged, and attendant federal support of state agency programs are being more closely scrutinized for cost savings. Some federal programs have opportunities for cost-recovery assessments on industry, but states can be locked into statutory limits on industry assessments.

The Oregon commercial fishing industry is mature, having beginnings in the late 1800's utilizing the amazing salmon returns to the Columbia River. In consideration of this report's landing trends and in light of the above mentioned current issues, it is a prudent assessment that commercial harvesting and processing of marine resources will not be a major growth industry in Oregon. Goals for the industry should include extracting more value from the fishery resources that are available through better resource management, utilization, and marketing.

Raising resource value has several challenges. There will be continuing price pressures on seafood products from substitute aquaculture products. The fall-out from lower values will be disruptive to a fleet where profitability already suffers due to, among other influences, excess capacity.

Net economic value increases for the industry can be obtained through efficiency gains at the individual business level. One way this gain can be fostered is through changed management practices to allow tradable and transferable individual, industry cooperative, and/or community property rights assigned for effort, catch quota shares, and/or territory. This property rights based fishery management (RBFM) approach can help reduce capacity, provide remaining vessels a better chance for increased rewards for entrepreneurial behavior, long term incentives for conservation, higher levels of self governance, and stronger participation in science and management. The design of RBFM programs has to address equity concerns about income and geographical concentrations. It is not insurmountable that State managed fisheries can implement property rights programs. State managed fisheries take place in both the State territorial sea and federal managed waters, so there would need to be state/federal partnerships in developing RBFM approaches. Further, there would have to be industry recognition of the management

benefits and strong consensus for adopting RBFM. Lastly, it would have to be shown that fish resource conservation benefits are preserved or increased with the new approach.

Vessels can receive revenue from participating in cooperative research projects and exempted fishing permits. Pursuing such private-government collaborative programs can be of immediate and long term benefit to the industry.

Modernization of vessels for improved gear selectivity, better handling capabilities, modernization of processing plants that will improve seafood products, and assistance through commodity commissions and other entities for developing marketing strategies should help the industry raise value at all levels of seafood production.

Under the auspices of the Oregon Department of Agriculture, there are four seafood commodity commissions (trawl, Dungeness crab, albacore tuna, and salmon). Oregon State University administers several programs supporting the industry, including Sea Grant Extension Service, Astoria Seafood Laboratory, Coastal Oregon Marine Experiment Station, Food Innovation Center Agricultural Experiment Station, and the interests from several academic departments. The State has provided funds for the Community Seafood Initiative to further intelligence and market development programs with a major accomplishment being a seafood traceability system called Fish Trax Systems, Inc. Local governments and coastal port districts provide public services and advocate causes. There have been enormous efforts from government and many watershed protection groups to restore anadromous fish freshwater habitat and passage. There have been commitments to research and improvements in hatchery operations to lower impacts from artificial propagation on wild stocks.

The OCZMA has assisted and advocated unified marketing efforts, such as Seafood Oregon. Industry trade associations like the Western Fishboat Owners Association, Fishing Vessel Owners Association, Fishermen's Marketing Association, West Coast Seafood Processor's Association, Newport Fisherman's Wives Association, Coos Bay Trawlers Association, Midwater Trawlers Cooperative, and other associations and cooperatives are all working on behalf of the industry. Research agencies (like those located at the Hatfield Marine Science Center in Newport and the Oregon Institute of Marine Biology located at Charleston) provide support for better management, science, and development of seafood products. These marketing, management, and research efforts are needed to assist the industry compete in constantly changing harvest management regimes and changing seafood markets.

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End notes:

1. *Revenue received from harvest sales is not necessarily a good indicator of the economic value of the fishery as it does not include any consideration of a harvester's costs. For fishing vessel businesses and fish dealers, net revenues are measured as the difference between their gross revenues and economic costs. The returns to owners and investors are estimated for these fishery sectors when before tax profits are calculated. The economic contribution modeling accounts for all labor and returns to owners and investors.*

2. *Revenue generated from vessel deliveries in Oregon are referenced in this report as onshore landing revenue. Revenue returned in the form of wages and salaries or profits from deliveries to non-Oregon locations and revenue derived from expenditures made in Oregon for repairs, provisioning, or moorage is referenced in this report as distant water fishery revenue. For example, the revenue generated from the at-sea deliveries for the Pacific whiting fishery is categorized as distant water fishery revenue.*

3. *When landing and participation data is not complete for a full year, expansion factors have been used. The factors are derived from previous years partial landings for the same period as compared to a full year.*

4. *CPUE can be a measure of species abundance given constant fishing power. However, the statistic used in this report should be considered a general CPUE surrogate indicator, and it is not appropriate to use it for judging stock density. The CPUE statistic is more revealing about harvest efficiencies. Variable costs (labor, fuel, etc.) are generally directly proportional to effort. Higher CPUE will dilute variable costs and increase net income.*

5. *The ratio in this report that is used to show indicators of State personal and corporate income taxes, selective excise taxes, etc. is the most current year of the tax amount divided by the State's total personal income. This ratio is then applied to the fishing industry economic contributions.*

6. *The downstream estimates would include valuation of other fishing industry participants (processors and ancillary businesses such as moorage providers, fishing gear businesses, etc.) and the share of valuation attributed to the general economy included in the multiplier effect.*

7. *Permit counts are the number issued, which may be more or less than the number authorized to be issued. Not all permits are used for making landings in any given year.*

8. *Control dates are established to minimize the rush of new entrants into a fishery that often occurs when limited entry is being considered.*

9. *The dependency of the fishing industry in each community on the groundfish fishery is also explained by showing the share as compared to all landings. The groundfish fishery share for a vessel or buyer is when a majority of landing revenues or purchases is from that fishery. The purchasing entities may be processors, restaurants, etc. Purchase entities are not distinct across port groups. The same entity may issue tickets at several ports. The threshold value of $500,000 was assigned to show where processors may have facilities that include processing lines and inventory handling. The threshold value of $10,000 was assigned to filter vessel owners that sell retail from their boats. There are instances where processor and buyer counts are indicated as "c" when confidentiality rules (three or less entities) apply.*

10. *Concerns about federal funding for Corps maintenance projects prompted the State to authorize $5 million ($3 million legislative appropriation and $2 million from the Marine Navigation Improvement Fund) in 2013 to supplement available Corps funds to make sure southern Oregon small ports maintenance dredging was accomplished. The State has purchased a small harbor portable suction dredge and accessory equipment at a cost of $1.1 million in 2015 for operation and maintenance by local ports.*

11. *The Business Oregon Infrastructure Finance Authority sponsored a ports economic benefit study (FCS Group 2014). The study describes port commercial fisheries economic contributions. However, there is difference in methodology and scope which clouds a comparison of study results.*

12. *Secretary of Commerce Carlos M. Gutierrez on August 10, 2006 declared the 2006 salmon fishery to be a commercial fishery failure. Secretary Gutierrez declared a 2008 salmon fishery failure on May 1, 2008. Direct payment assistance programs were appropriated through federal legislation for both years. The appropriated amount for the 2006 disaster was $60.4 million to be distributed in Oregon and California. The appropriated amount for the 2008 disaster was $170 million to be distributed in Washington, Oregon, and California. Oregon also offered direct assistance payments and other social assistance for both disaster declarations. The assistance package for the 2006 disaster was $3.2 million of which $1 million was direct assistance payments. The direct assistance payments for the 2008 disaster were $1 million. The distribution formulas were different for the two years' federal and State programs. Some program eligibility was only harvesters and other programs were for any affected business including seafood processors and sportfishing services.*

13. *The fishery disaster direct assistance funds distributed to salmon permit holders could be considered net income (i.e. there was no variable cost of fishing associated with generating the income). The Research Group (2007) used econometric modeling to show approximately 40 percent of salmon harvest revenue is "return to owner" after considering fishing, crew, and fixed costs. For example, the 2006 State disaster assistance disbursements (including direct assistance payments and payments for participating in research programs) are comparable to about $3 million of effective ex-vessel value. This addition would make the 2006 Oregon salmon actual and effective ex-vessel value about $8 million. Oregon harvesters, processors, and other businesses received about 40 percent of the $60.4 million 2006 federal disaster assistance funds. The harvester share of the disbursements equates to about $40 million of effective ex-vessel value. The total effective ex-vessel value when added to the State assistance effective ex-vessel value and the landed value would make the 2006 season comparable $48 million ex-vessel value exceed any previous landed value since 1988. The 2008 disaster assistance disbursements to Oregon fisheries are about $19 million (State and federal programs) for troll salmon permittees and about $2 million to gillnet salmon permittees. (Total disbursements of the $170 million congressional appropriation for the 2008 disaster were about $32 million to Oregon businesses.) The effective ex-vessel value is about $50 million. It might be argued that the payments should cover foregone harvest opportunities for a multiple year period whose length is associated with past and future restricted seasons that are in place to allow for weak stock recoveries.*

14. *The salmon limited entry program was established with a floor of 3,158 permits in 1979 (which was the number of permits in 1978). The floor was changed in 1987 to be 2,400 permits, 1993 to be 1,800 permits, 1995 to be 1,200 permits, and 2007 to be 1,000 permits.*

15. *There were 571 Oregon gillnet permits grandfathered when a limited entry system went into effect in 1980. There have been 133 Oregon licenses retired through buyout programs and there has been attrition for other reasons since then. There are 200 Oregon authorized permits.*

16. *A University of Oregon report (Ross 2007) discusses the low Dungeness crab larvae production that the waters off Oregon experienced in 2007. This foreshadowed the adult recruitment into the fishery in recent years.*

17. *There is a smaller commercial bay crab fishery which operates under different season and gear restrictions than does the ocean fishery. Any commercial vessel can participate in the bay crab fishery. The 21 vessels making bay crab landings in 2014 include: one vessel in Depoe Bay, two vessels in Yaquina Bay, 10 vessels in Alsea Bay, three in Winchester Bay, eight at Coos Bay, and one at Bandon.*

18. *Results and compliance status for the logbook program is discussed in Hannah and Jones (2012).*

19. *There is a federal limited entry permit system for the groundfish fishery. As of April 2004, there were 406 groundfish limited entry fishing permits and 312 registered vessels operating with fishing permits on the U.S. West Coast. (Seventeen trawl permits, eight longline permits, and one trap permit were not associated with any particular vessel.) Of the total permits, 176 were endorsed only for limited entry trawl, 194 were endorsed for longline only, 27 were endorsed for trap gear only, four were endorsed for both trawl and longline gear, one was endorsed for both trawl and trap gear, and four were endorsed for both longline and trap gear. Of the total longline and trap permits, 164 were endorsed for sablefish. Limited entry permits may be sold and leased*

out by their owners, so the distribution of permits between the three states often shifts. As of April 2004, 35 percent of limited entry permits were registered to California operators, 37 percent to Oregon operators and 27 percent to Washington operators.

A federal/industry partnership buyback program in 2003 resulted in 91 (34 in Oregon) trawl permits removed from the fishery. The buyback program also resulted in permanently retiring 10 Dungeness crab permits and 40 pink shrimp permits. The Oregon home-port active LE trawl vessels (vessels that had more than $500 in LE trawl gear harvests) decreased from 94 to 69 from 2003 to 2004. Their average revenue from non-whiting groundfish onshore landings increased by 29 percent and their onshore revenue from all fisheries increased by 34 percent during the period. This was mostly due to slightly relaxed trip and period limits, a small increase in prices for certain species, and higher OY's for especially whiting. The home-ports of vessels and the resulting economic conditions were not equally distributed along the coast. Some communities, such as Brookings, Oregon, where vessels depended on the groundfish fishery, were hit harder than others.

20. *The groundfish fishery includes over 80 individual species, including cods, rockfish, and soles. The species Pacific whiting is managed as a groundfish species, but the domestic Pacific whiting fishery did not develop until after 1989. The fishery after that date is usually discussed separately because of its high-volume and low-value characteristics.*

21. *Thirty-one EFP's were approved in 2004 but only 26 midwater trawlers actually made EFP landings. A similar number was approved for the 2009 and 2010 fishery. The EFP requires vessels to monitor what is harvested so that information for evaluating bycatch and discards can be collected. Revenue from marketable species delivered to processors is advanced to the ODFW and used to reimburse for program costs.*

22. *Individual transferable quotas (ITQ's) can be assigned to vessels and other entities, such as communities, crewmen, and processors. ITQ's are a means for reducing derby fisheries and allowing harvesters to target their catch for available markets. IPQ's would have the effect of tying a certain harvest share to identified processors. In such cases, an assigned share of the harvested share would have to be delivered to a specific processor (sometimes referred to as the two pie system).*

23. *A special concern is the amount of concentration that exists in Pacific whiting processing. Only three companies received delivery of about 90 percent of the Pacific whiting landed in the U.S. Pacific Northwest. An ITQ program that supports such consolidation may mean that any one company could control and may actually introduce constraints on the trade between harvesters, processors, and ultimately the consumer.*

24. *The Pacific halibut fishery is internationally managed. The IPHC promulgates regulations governing the fishery under the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea. Regulations proposed by the IPHC are subject to approval by the Secretary of State with concurrence from the Secretary of Commerce according to provisions of the Northern Pacific Halibut Act of 1982 (NPHA). (The NPHA is the Convention's implementing legislation in the U.S.) The NPHA authorizes the U.S. regional fishery management councils (e.g. the North Pacific Fishery Management Council (NPFMC) for Alaska and the PFMC for the West Coast) to develop regulations that are in addition to, and not in conflict with, approved IPHC regulations. The councils' regulation rule making is handled by the National Marine Fisheries Service (NMFS). Due to fishery data acquisition programs and the overlap of halibut and non-halibut fishing, councils and NMFS collaborate with the affected states in the management of halibut fisheries.*

    The economic contribution analysis described in this report is the Oregon portion of the 20.6 percent Area 2A catch limit for the commercial non-tribal allocation in 2013 and 2014. The Area 2A non-tribal catch limit was allocated 44.4 percent to sport fisheries in 2013 and 2014. Sport fisheries take place in Puget Sound and ocean catch areas. The tribal portion is 35 percent in 2013 and 2014. Thirteen tribes, including four coastal Washington tribes, utilize the allocation by harvesting commercially in Puget Sound and ocean catch areas. Tribes utilize a small portion of the allocation in a year-around ceremonial and subsistence fishery.

25. *Many vessels use the same groundlines and it is only necessary to use different snap-on gangions and hooks for the halibut fishery.*

26. *Fishery statistics include research vessel counts and a small amount of catch that was harvested for research purposes. Fishery statistics also include vessel participation and catch when halibut is landed with groundfish gear categories. This gear is related to the shoreside whiting fishery being a 100 percent retention fishery. The halibut is delivered to processors, but the harvesters do not receive payment for the landings. There was one research vessel that landed 11 thousand round pounds of halibut in 2013 and 19 thousand round pounds in 2014, and 25 vessels landed 2,365 round pounds of halibut with zero harvest value in the shoreside groundfish fishery in 2013, and 23 vessels landed 2,074 round pounds in 2014.*

27. *Dependency is defined to be the share of a vessel's total harvest revenue.*

28. *The shoreside whiting fishery is a trawl gear fishery that is maximized retention. The halibut catch using the trawl gear is landed, but the vessels do not receive revenue. The halibut is processed and distributed usually to food banks or destroyed.*

29. *Harvesters are paid by fish grade which corresponds to size. Grades are in 20 pound increments starting with 20 pounds. It is typical in recent years that each successive grade has a 25 cent price differential. The higher ex-vessel price is due to higher yields from larger fish.*

30. *Discard mortalities are from Stewart (2014) and Jannot et al. (2014). Jannot et al. (2014) used information from the West Coast Groundfish Observer Program (WCGOP). Expansion factors are used to account for fisheries that do not have observers. The WCGOP data takes into account potential survival after being discarded. An observer notes size and physical condition (excellent, poor, dead) of the discard. A modeled mortality rate that depends on gear and other variables is applied. For example, the bottom trawl fishery assumed discard rates are 20 percent for excellent, 55 percent for poor, and 90 percent for dead. The pot gear fishery discard rates are zero percent, 100 percent, and 100 percent for the three conditions.*

31. *The shoreside trawl fishery north of 40º10' N latitude is managed using a system of IBQ's. For 2012 through 2014, 15 percent of the Area 2A total constant exploitation yield (TCEY) for legal sized halibut and not to exceed 130,000 net weight pounds is subtracted from the TCEY to account for expected trawl bycatch mortality. Beginning in 2015, the amount to be subtracted will be capped at 100,000 net weight pounds. A set-aside for 10 mt is to cover bycatch mortality in the at-sea whiting fishery and trawl fishery south of 40º10' N latitude. The remainder is issued as IBQ.*

32. *The distant water fisheries components are: (1) revenue returned to West Coast economies through vessels that make West Coast landings <u>and</u> also landings in Alaska, southern Pacific Ocean, or elsewhere; (2) revenue returned by vessel owners, captains, or crewmen whose vessels hail from ports elsewhere on the West Coast, but don't harvest and deliver in the West Coast fishery; (3) Alaska fishery permits owned by companies or individuals with addresses in West Coast states that may be leased by other vessel owners; (4) vessels and processors who buy from provisioning, repair, and services businesses, but whose owners, captains, and workers live elsewhere; and (5) West Coast residents that work as crewmen, skippers, and at processors in Alaska whose vessels and businesses are not registered in Washington, Oregon, or California.*

33. *A "major" company is defined to be a purchaser of at least $5 million Oregon or other state's landings. A processing plant is defined to be "general" if it has the capacity (such as fillet lines and refrigeration equipment) to process multiple species on a year-around basis. These definitions exclude companies and plants that specialize in offering product forms or packaging services for only salmon, tuna, and sardines. Landing data was used to verify the purchase threshold and interviews with processing company representatives were used to determine capacity.*

34. *The Pacific Seafood Group has become the dominant processing/distribution entity in the Pacific Northwest. It has grown from a small, local fish peddler in Portland, Oregon to a major aquaculture, fish harvesting, fish buying, fish processing, and food distribution company on the West Coast, in the U.S., and also in the export*

market. By its own press releases, the Pacific Group has more than 38 working facilities throughout the West Coast and other states (seven states overall) employing over 2,500 people.

35. *The multiplier effects are calculated using the Fishery Economic Assessment Model (FEAM). The FEAM is based on economic response coefficients generated from the IMPLAN input-output model. IMPLAN models are available for various U.S. geographic levels, states, national economy, and international economies. The models were originally developed by the U.S. Forest Service. They are now maintained and distributed by IMPLAN Group LLC, 16740 Birkdale Commons Parkway, Suite 212, Huntersville, NC 28078.*

36. *The economic contribution estimates do not include effects from money that was received by salmon fishermen through the Oregon and federal disaster assistance programs. A regional economic impact model would have to account for different types of spending. The direct assistance payment receipts might not be spent in the same way as if it was received through fishing industry business operations. There are not research results available about such spending information. A survey of assistance recipients would be needed to determine categories of direct and induced spending. Direct spending might include, for example, vessel fixed costs. Induced spending might occur, for example, if vessels participated in other fisheries at changed efficiencies than might normally occur if it was not for displaced opportunities in salmon fisheries. Similar changed spending might have occurred for processors and other businesses receiving assistance.*

37. *Vessel hull and equipment may be taxed as personal property if valued at less than $1 million and is taxed as industrial property if equal or greater than $1 million. Corporate excise tax rates on income are six percent net income.*

38. *In Oregon, moorage and other marina services are mostly provided by local and special district government.*

39. *The applied 10.1 percent rate is state and local taxes divided by total personal income. The ratio can be found in Oregon Legislative Revenue Office (2015).*

40. *The ODFW budget references are from Legislature Ways and Means documents. The Legislative approved budget and resulting actuals may differ from the projections. Any previous biennium balance may be used to augment or defer the actual performance of ad valorem revenue generation. (This means that leftover CFF dollars become part of Other Fund and may not be used in the biennium when collected.)*

41. *The Khan et al. (2006) eleven types of subsidies are : (1) fisheries management programs and services; (2) fishery research and development; (3) tax exemption programs; (4) foreign access agreements; (5) boat construction, renewal, and modernization programs; (6) fishing port construction and renovation programs; (7) fishery development projects and support services; (8) marketing support, processing, and storage infrastructure programs; (9) fisher assistance programs; (10) vessel buyback programs; and (11) rural fishers' community development programs.*

42. *The study years were between 1996 and 2004.*

43. *Based on Khan et al. (2006) and Sharp and Sumaila (2009) who evaluate beneficiary positive and negative subsidy effects, effective subsidies can be: (1) Subsidies that promote a conservation goal. (2) Subsidies that promote the productivity and competitiveness of the industry, such as through research and investment in technology. (3) Subsidies that promote market diversity and growth opportunities. (4) Subsidies that provide relief when necessary to maintain an otherwise healthy industry in the face of high resource variability.*

APPENDIX A

Harvesting and Processing Detail

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Table A.1
Annual Landed Pounds by Selected Species and Species Groups in 1971 to 2014

Species	1971	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Troll Chinook (ocean)						1.8	0.8	2.3	6.0	4.1	0.8	0.9	2.2	1.8	0.8	1.7	3.3	4.0	4.2	3.3	3.1	0.6	0.5	0.1	0.0	0.6	0.5	0.9	1.5	3.0
Troll coho (ocean)						3.8	1.3	0.6	2.2	2.3	1.6	0.0	-	-	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.1
Net Chinook (below Bonneville Dam)															0.1	0.3	0.6	1.2	1.3	1.3	0.7	0.8	0.4	0.8	1.0	1.3	1.5	1.1	1.7	2.0
Spring															0.0	0.1	0.3	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.5	0.3	0.2	0.2	0.2
Fall															0.2	0.2	0.3	0.6	1.0	0.7	0.5	0.5	0.2	0.6	0.7	0.7	1.0	0.8	1.5	1.7
Net Chinook (above Bonneville Dam)															0.7	0.7	1.6	1.8	1.8	1.8	1.7	1.3	0.8	2.0	1.6	2.6	2.4	1.3	3.0	4.6
Spring															-	0.0	0.2	0.2	0.1	0.2	0.1	0.2	0.0	0.3	0.2	0.7	0.5	0.2	0.2	0.5
Fall															0.7	0.6	1.3	1.6	1.6	1.3	1.6	1.1	0.8	1.5	1.3	1.7	1.8	1.1	2.7	4.1
Net coho (below Bonneville Dam)															0.7	1.5	2.3	1.7	2.3	1.1	1.0	0.7	0.3	0.7	1.1	0.8	0.6	0.1	0.4	1.9
Net steelhead (above Bonneville Dam)															0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1
Dungeness crab	14.9	2.3	4.0	19.9	15.6	7.0	5.3	7.4	6.0	11.7	4.9	10.5	12.0	7.8	12.3	11.2	9.7	12.4	23.9	27.3	17.7	33.3	17.0	13.9	21.9	15.9	17.3	8.7	26.1	11.9
Pink shrimp	9.1	24.5	24.1	48.6	29.6	25.9	6.5	14.8	44.6	49.1	21.7	26.9	12.1	19.6	20.5	25.5	28.5	41.6	20.5	12.2	15.8	12.2	20.1	25.5	22.2	31.5	48.3	49.1	47.6	52.0
Albacore tuna	13.1	24.4	23.6	9.9	8.8	7.7	3.4	1.5	2.3	1.1	1.3	4.8	5.0	9.2	4.6	8.8	9.0	4.4	9.2	10.8	8.1	8.5	10.5	8.9	10.1	10.7	9.7	9.9	10.2	8.8
Groundfish species group	22.0	21.9	21.0	23.4	64.4	81.8	77.4	61.9	67.2	81.0	80.8	81.3	55.1	52.7	44.1	39.3	31.6	21.1	25.9	25.6	27.2	27.4	30.9	37.9	41.4	36.9	28.9	28.5	31.1	28.4
Nearshore live fishery						-	-	-	-	-	-	-	-	0.1	0.2	0.2	0.3	0.4	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3
Sablefish (black cod)						5.2	10.2	11.6	11.6	8.7	8.7	8.7	7.0	6.5	6.6	6.3	5.7	3.2	4.8	5.6	5.8	5.8	5.4	6.5	7.3	6.3	5.1	4.7	3.8	3.3
Trawl gear						3.0	6.1	6.3	5.6	5.8	5.4	5.5	4.1	4.1	3.7	3.3	3.4	1.7	2.8	3.3	3.1	3.4	3.4	4.3	4.4	3.8	2.2	2.0	1.9	1.6
Fixed gear						2.2	4.1	5.3	5.9	2.9	3.2	3.1	2.9	2.5	2.9	2.9	2.3	1.4	2.0	2.3	2.7	2.4	1.9	2.2	2.9	2.5	2.9	2.8	1.9	1.7
Widow rockfish						-	-	9.5	14.0	15.2	9.7	14.7	8.6	11.1	6.6	6.0	3.7	0.6	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.8	1.2
Yellowtail rockfish						-	-	3.0	3.7	4.1	3.9	6.3	6.7	2.8	3.5	4.4	2.4	0.8	0.1	0.2	0.2	0.2	0.1	0.0	0.1	0.2	1.3	1.3	1.3	2.0
Thornyhead, longspine						-	-	-	-	-	-	-	5.8	4.0	1.6	1.7	1.4	1.8	1.6	0.5	0.3	0.5	0.7	1.3	1.3	1.8	0.8	0.7	0.8	0.5
Thornyhead, shortspine						-	-	-	-	-	-	-	1.6	1.1	0.7	0.6	0.5	0.6	0.7	0.7	0.6	0.7	1.2	2.0	2.1	1.7	0.9	0.8	1.1	0.8
Thornyhead, mixed						-	-	2.4	1.5	5.6	7.7	9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pacific Ocean perch						4.4	5.2	3.9	3.1	4.6	5.1	6.0	2.8	2.7	1.4	0.2	0.4	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Lingcod						2.3	3.8	2.3	1.6	2.6	3.3	1.8	1.4	1.7	0.4	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.4	0.6	0.6	0.5
Arrowtooth flounder						1.3	1.2	1.5	1.6	2.5	4.6	3.7	3.1	2.6	5.0	2.6	2.3	1.1	1.8	2.1	2.9	3.0	3.6	4.8	6.3	5.1	3.7	3.3	3.6	2.4
Dover sole						11.7	18.7	12.6	13.4	19.6	19.4	14.3	7.8	8.7	10.0	10.4	8.2	6.0	8.0	8.4	8.8	7.8	12.2	16.0	16.4	15.2	10.5	9.8	11.3	9.4
English sole						1.6	2.0	1.0	1.3	1.5	1.9	1.6	0.7	1.2	0.8	0.5	0.9	1.0	0.8	0.8	0.9	1.0	0.8	0.3	0.4	0.3	0.2	0.2	0.3	0.3
Petrale sole						1.9	2.4	1.3	1.9	1.9	2.1	1.7	1.8	1.8	1.5	1.9	2.0	2.0	2.5	2.1	3.2	3.5	2.5	2.5	2.2	1.1	1.2	1.5	3.1	3.3
Cod, Pacific						0.1	0.2	0.1	1.5	1.7	1.1	1.1	0.2	0.1	0.1	0.0	0.1	0.1	0.6	1.2	0.6	0.4	0.0	0.0	0.1	0.1	0.6	0.9	0.3	0.4
Whiting, Pacific						0.4	0.1	2.0	0.4	0.2	29.1	79.0	147.4	162.8	161.0	151.5	117.7	71.2	80.6	130.2	135.5	135.2	94.4	61.5	63.0	69.5	151.5	107.7	167.5	168.2
Sardines						-	-	-	-	-	-	-	-	-	1.7	21.0	28.2	50.1	55.7	79.6	99.4	78.6	92.9	50.6	47.4	46.0	24.3	94.0	58.0	17.2
Halibut, Pacific						0.2	0.6	0.8	0.9	0.9	0.5	0.7	0.5	0.4	0.4	0.3	0.3	0.5	0.3	0.3	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sturgeon, white						0.3	0.3	0.3	0.4	0.2	0.1	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0
Sea urchin, red						-	-	-	0.2	7.8	4.7	2.2	1.5	0.5	0.2	1.0	1.3	0.8	0.1	0.3	0.5	0.4	0.4	0.6	0.8	0.3	0.6	0.6	0.7	0.5

Notes:
1. Landings are onshore, round pounds, in millions. Landings are not filtered for harvests from research, illegal fishing activities, full retention fisheries, weigh backs, confiscated overages, and personal use.
2. Inriver salmon includes Oregon and Washington side landings.
3. Pounds where landings are less than $500 annually are shown with a dash.
4. The nearshore live groundfish fishery includes seven indicator species that are typically landed live in Oregon. These include cabezon, lingcod, black and blue rockfish, greenling, and other unspecified rockfish (not uniquely identified on a fish ticket).

Source: Oregon Department of Fish and Wildlife for years prior to 1981. PacFIN March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions for 1981 to 2014. PFMC (February 2015) for inriver Chinook and coho.

Table A.2
Annual Ex-Vessel Prices by Selected Species and Species Groups in 1971 to 2014

Species	1971	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Troll Chinook (ocean)	2.68	4.21	3.61	6.74	6.88	4.97	3.36	4.09	4.10	3.26	3.37	2.84	2.12	1.92	2.29	2.31	1.81	1.71	2.15	3.65	3.26	5.44	5.48	5.52	4.72	5.11	5.43	5.12	5.19	4.95
Troll coho (ocean)	1.63	3.22	2.68	4.14	6.05	3.23	1.68	2.48	2.71	1.56	1.35	1.47	-	-	1.21	1.22	0.89	0.84	0.92	1.31	1.92	2.89	1.84	2.56	1.92	2.06	1.83	1.97	2.20	1.74
Net Chinook (below Bonneville Dam)															1.91	1.91	1.83	1.61	1.05	2.15	1.98	2.87	3.70	3.09	2.20	2.96	2.59	2.72	2.61	1.86
Spring															3.84	3.66	3.78	4.18	3.50	4.58	4.10	4.89	6.20	6.89	5.22	5.31	5.18	6.11	6.47	5.37
Fall															1.51	1.32	0.84	0.67	0.82	1.62	1.78	2.34	2.87	2.75	2.11	2.20	2.24	2.20	2.39	1.73
Net Chinook (above Bonneville Dam)															0.73	0.85	0.53	0.37	0.32	0.91	0.71	1.76	2.27	2.17	1.45	2.04	2.34	2.37	2.13	1.82
Spring															-	2.47	1.66	1.51	1.37	2.06	1.99	2.69	4.18	4.90	3.33	4.14	3.69	4.96	4.71	4.75
Fall															0.77	0.83	0.31	0.23	0.24	0.92	0.68	1.63	2.30	1.80	1.17	1.34	1.99	1.90	1.95	1.48
Net coho (below Bonneville Dam)															1.13	0.69	0.37	0.43	0.67	1.11	1.25	1.51	1.81	1.41	1.29	1.46	1.69	1.67	1.87	1.16
Net steelhead (above Bonneville Dam)															0.56	0.37	0.20	0.13	0.10	0.26	0.33	0.57	0.73	0.77	0.67	0.90	1.18	1.24	1.09	1.11
Dungeness crab	1.29	2.34	2.76	1.68	1.97	2.14	2.99	2.74	2.52	1.95	2.38	1.70	2.41	2.61	2.53	2.81	2.58	2.13	1.94	1.91	1.77	1.85	2.50	2.29	2.10	2.21	2.71	3.46	2.77	4.03
Pink shrimp	0.55	0.90	0.46	0.71	1.02	1.12	1.44	0.67	1.23	0.61	0.87	0.50	1.02	0.56	0.63	0.53	0.34	0.35	0.31	0.47	0.51	0.42	0.52	0.60	0.33	0.37	0.53	0.52	0.51	0.56
Albacore tuna	1.25	1.46	1.10	0.80	1.40	1.93	1.12	1.02	1.33	1.38	1.22	1.22	1.16	1.11	1.12	1.13	1.09	0.86	0.84	1.03	1.28	1.08	1.01	1.31	1.09	1.24	2.03	1.57	1.60	1.26
Groundfish species group	0.37	0.49	0.49	0.65	0.72	0.39	0.48	0.52	0.66	0.52	0.56	0.51	0.81	0.74	0.68	0.82	0.83	0.86	0.85	0.78	0.80	0.83	0.74	0.78	0.74	0.74	1.03	0.86	0.73	0.77
Nearshore live fishery						-	-	-	-	-	-	-	-	1.99	3.66	4.35	3.99	4.05	3.67	3.36	3.29	3.17	3.16	3.00	2.81	3.01	3.04	3.24	3.06	2.89
Sablefish (black cod)						0.46	0.45	0.56	0.80	0.74	0.95	0.82	1.91	2.21	1.59	1.96	1.81	1.76	1.92	1.50	1.75	1.91	1.97	2.30	2.37	2.56	3.58	2.50	2.00	2.45
Trawl gear						0.33	0.35	0.42	0.61	0.62	0.67	0.64	1.75	1.74	1.33	1.63	1.57	1.31	1.57	1.19	1.37	1.55	1.68	2.03	2.01	2.06	2.51	1.78	1.65	1.97
Fixed gear						0.63	0.59	0.72	0.98	0.98	1.40	1.15	2.13	2.98	1.93	2.33	2.17	2.30	2.41	1.94	2.18	2.43	2.49	2.84	2.92	3.30	4.38	3.02	2.36	2.89
Widow rockfish						-	-	0.47	0.58	0.43	0.43	0.40	0.47	0.41	0.51	0.58	0.53	0.53	0.55	0.51	0.51	0.43	0.49	0.45	0.40	0.46	0.46	0.43	0.46	0.43
Yellowtail rockfish						-	-	0.48	0.58	0.45	0.47	0.47	0.53	0.50	0.52	0.59	0.58	0.59	0.59	0.63	0.59	0.55	0.54	0.65	0.48	0.52	0.54	0.54	0.52	0.50
Thornyhead, longspine						-	-	-	-	-	-	-	1.38	1.00	0.96	1.13	1.14	1.08	0.80	0.62	0.68	0.69	0.50	0.43	0.29	0.32	0.39	0.42	0.38	0.35
Thornyhead, shortspine						-	-	-	-	-	-	-	1.60	1.16	1.22	1.35	1.29	1.27	0.99	0.81	0.83	0.87	0.69	0.71	0.58	0.57	0.61	0.67	0.64	0.65
Thornyhead, mixed						-	-	0.47	0.59	0.62	0.72	0.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pacific Ocean perch						0.36	0.43	0.46	0.57	0.43	0.46	0.41	0.42	0.38	0.46	0.57	0.53	0.56	0.55	0.56	0.55	0.53	0.53	0.52	0.52	0.52	0.52	0.51	0.48	0.39
Lingcod						0.49	0.50	0.49	0.68	0.56	0.52	0.55	0.61	0.64	1.02	1.48	1.49	1.46	1.34	1.22	1.18	1.13	1.23	1.36	1.36	1.38	1.12	1.07	1.10	1.14
Arrowtooth flounder						0.20	0.20	0.19	0.27	0.16	0.18	0.15	0.16	0.14	0.13	0.16	0.15	0.16	0.15	0.15	0.12	0.12	0.11	0.11	0.11	0.10	0.10	0.12	0.11	0.10
Dover sole						0.49	0.46	0.47	0.57	0.47	0.48	0.41	0.48	0.42	0.44	0.48	0.48	0.47	0.46	0.46	0.44	0.42	0.41	0.40	0.35	0.32	0.43	0.43	0.45	0.45
English sole						0.65	0.65	0.63	0.74	0.62	0.52	0.45	0.51	0.43	0.42	0.48	0.46	0.45	0.43	0.42	0.38	0.34	0.33	0.33	0.30	0.31	0.31	0.33	0.31	0.30
Petrale sole						1.17	1.41	1.39	1.49	1.41	1.29	1.15	1.39	1.28	1.29	1.33	1.27	1.15	1.26	1.23	1.07	1.13	1.06	1.05	0.94	1.20	1.50	1.55	1.27	1.10
Cod, Pacific						0.47	0.50	0.48	0.59	0.44	0.47	0.49	0.56	0.54	0.61	0.80	0.75	0.74	0.75	0.58	0.54	0.55	0.59	0.57	0.48	0.53	0.58	0.61	0.56	0.52
Whiting, Pacific						0.156	0.337	0.168	0.154	0.126	0.074	0.043	0.068	0.058	0.050	0.053	0.045	0.058	0.056	0.043	0.062	0.067	0.077	0.121	0.064	0.083	0.114	0.140	0.124	0.109
Sardines						-	-	-	-	-	-	-	-	-	0.068	0.072	0.074	0.072	0.066	0.074	0.073	0.054	0.055	0.122	0.121	0.122	0.138	0.098	0.110	0.205
Halibut, Pacific						2.37	2.20	1.86	2.81	2.39	2.94	1.95	2.49	2.56	2.67	2.79	2.46	2.44	3.15	3.08	2.95	3.48	3.87	4.06	3.11	4.25	5.51	5.04	4.86	5.59
Sturgeon, white						2.32	2.29	2.76	3.01	3.24	3.08	2.05	2.52	1.50	1.83	2.07	2.26	2.03	2.15	2.14	2.07	2.30	2.35	2.33	2.11	2.24	2.68	2.76	3.25	3.54
Sea urchin, red						-	-	-	0.52	0.58	1.19	1.31	1.16	0.75	0.76	0.92	0.82	0.55	0.53	0.45	0.35	0.42	0.41	0.41	0.49	0.57	0.56	0.59	0.57	0.56

Notes:
1. Annual prices are in 2014 dollars.
2. Prices are for onshore landings. There will be differences for the same species, such as Pacific whiting, when delivered offshore. Landings are not filtered for harvests from research, illegal fishing activities, full retention fisheries, weigh backs, confiscated overages, and personal use. Excluding zero value landings will cause average annual price to be higher in some species. For example, the price of Pacific Ocean perch in 2014 would be $0.12 higher with zero value landings excluded. The difference for that species is due to 12 thousand pounds of discards and five thousand pounds of the research landings having zero value. Dungeness crab and pink shrimp would each be less than half a cent higher with zero value landings excluded. The difference for Dungeness crab is due to five thousand pounds of discards and four thousand pounds of research, and pink shrimp is due to 232 thousand pounds of discards.
3. Prices are for round pound equivalents, except for troll Chinook and troll coho prior to 1981 which are based on dressed weight.
4. Prices where landings are less than $500 annually are shown with a dash.
5. Inriver salmon prices include Oregon and Washington side landings.
6. The nearshore live groundfish fishery includes seven indicator species that are typically landed live in Oregon. These include cabezon, lingcod, black and blue rockfish, greenling, and other unspecified rockfish (not uniquely identified on a fish ticket).

Source: Oregon Department of Fish and Wildlife for years prior to 1981. PacFIN March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, and April 2015 extractions for 1981 to 2014. PFMC (February 2015) for inriver Chinook and coho.

Table A.3
Ex-Processor Value by Species Groups in 2014

Species Group	Round Pounds (thousands)	Ex-Vessel Price	Product Analysis Form	Yield	Use	Processor Costs/Sales Price Per Finished Pound Raw	Labor	Tax/Fee	Other	Contrib.	Sales Price	Finished Pounds (thousands)	Ex-Processor Sales (thousands)
Salmon	6,281	$3.14	Gutted	84%		3.69	0.20	0.14	0.02	0.40	4.45	5,261	23,417
Dungeness crab	11,357	$4.03	Mixed1	58%		6.94	0.61	0.10	0.02	0.40	8.07	6,587	53,184
Pink shrimp	50,041	$0.56	Cooked	31%		1.82	0.25	0.34	0.01	0.40	2.82	15,513	43,755
Albacore tuna	8,717	$1.26	Mixed2	85%		1.48	0.20	0.05	0.01	0.40	2.14	7,409	15,838
Groundfish	26,239	$0.77	Mixed3	31%		2.36	0.33	0.11	0.01	0.40	3.22	8,151	26,208
Pacific whiting	84,113	$0.109	Surimi	25%	50%	0.43	0.17	0.25	-	0.10	0.95	21,028	20,071
	65,496	$0.109	H&G	61%	50%	0.18	0.10	0.08	-	0.19	0.55	39,953	21,897
Pacific sardine	17,183	$0.205	Bait	95%		0.22	0.15	0.20	-	0.19	0.76	16,324	12,337
Pacific halibut	202	$5.59	Mixed4	74%		7.55	0.15	0.11	0.02	0.40	8.23	150	1,233
Other	7,307	$0.40	Mixed4	29%		1.49	0.19	0.14	0.01	0.40	2.24	2,086	4,671
Fish meal	137,620			10%		-	0.04	0.09	-	0.10	0.23	13,762	3,165
Total												136,225	225,776

Notes: 1. Round pounds shown are net processed pounds, which is landed less haul-outs. Ex-processor sales include this effect.

2. Sales price is estimated using cost calculation from the FEAM model or using published market sales price information for the product form.

3. Ex-vessel prices are in round pound or round pound equivalents. Processor costs/sales price are per finished pound.

4. There are many final product forms manufactured within species groups. The following discusses how some of these forms affect species group yields.

Mixed1. Crab tends to start out "whole" during the year-end holidays and then move to "picked" meat later in the season. Over the last few years, "sections" have also become a product form. Final product proportions for landed weight have a weighted average of 58% yield.

Mixed2. Albacore tuna assumes 75% "whole frozen" yield, 25% "fillet" yield, or about 85% mixed yield.

Mixed3. Groundfish generally is processed as a fillet; however, several species, such as sablefish and thornyheads are marketed fresh, whole. Example yields are lingcod and rockfish fillet yield 29%; sablefish and thornyheads H&G yield 55%; and sharks and skates fillet yield 60%. The shown mixed yield is a weighted average for all of these different products.

Mixed4. Other species have many end products, including frozen and fresh whole, fillets, and eggs for the species sea urchin. Example yields are sea urchins eggs yield 7%; other crab and shrimp, clams and mussels, other echinoderms, and shad whole yield 100%; mackerel, market squid, and herring frozen yield 99%; other sharks fillet yield 60%; octopus frozen yield 100%; sturgeon fillet yield 64%; and halibut fillet yield 72%. This category also includes oysters and other shellfish in 2003 at $3,609 thousand. Because "other" includes a variety of different products, the throughput is evaluated on an ex-vessel basis.

Pacific whiting. The two primary products using Pacific whiting are headed and gutted and surimi. Surimi processing requires expensive equipment and established marketing channels. There are a few central ports with processors that produce surimi. Pacific whiting landings at ports without this processing capability are hauled to the processors that have the equipment or the product is processed locally for headed and gutted.

5. Fish meal volume is estimated from non-yield of groundfish and Pacific whiting landed volume.

Source: Study.

Table A.4
Economic Contribution Factors by Fisheries in 2013

FEAM Group No	Resources	Resource Distribution	Landed Round Pounds and Vessel Revenue: Volume	Value	Aggregate Price	Adjusted Price	Price Adjust	Hauled Round Pounds or Revenue: Hauled In	Hauled Out	Net Processed	Product Yield	Processor Costs and Sales Price Per Finished Pound: Raw	Labor	Other	Contribution	Sales Price
Oregon 2013																
1	Troll Coho		2,968	6,433	2.17	2.17				2,968	0.87	2.49	0.15	0.17	0.40	3.21
2	Troll Chinook		1,487,183	7,600,640	5.11	5.11			73,393	1,413,790	0.87	5.87	0.15	0.12	0.40	6.54
4	Albacore Tuna		10,205,275	16,078,899	1.58	1.58			78,979	10,126,296	0.85	1.85	0.20	0.06	0.40	2.51
5	GN/PS Coho		271,692	496,803	1.83	1.83				271,692	0.80	2.29	0.25	0.17	0.40	3.11
6	GN/PS Fall Chinook	78%	1,355,310	3,152,405	2.33	2.33	*			1,355,310	0.80	2.91	0.25	0.18	0.40	3.74
7	GN/PS Tule	13%	222,034	129,692	0.58	0.58	*			222,034	0.75	0.78	0.25	0.17	0.40	1.60
9	Pink/Steel/Chum/Sock		12,523	11,232	0.90	0.90				12,523	0.80	1.12	0.25	0.89	0.40	2.66
11	GN/PS Spring Chinook	9%	161,753	1,020,704	6.31	6.31	*			161,753	0.80	7.89	0.25	0.31	0.40	8.85
12	Sturgeon		46,446	148,790	3.20	3.20				46,446	0.64	5.01	0.25	0.12	0.40	5.78
13	Pacific Halibut		205,273	982,448	4.79	4.79			2,077	203,196	0.74	6.47	0.15	0.13	0.40	7.15
14	Cod/Rockfish		6,019,236	4,238,803	0.70	0.70			247,183	5,772,053	0.29	2.43	0.25	0.18	0.40	3.26
15	Sole/Flounder		19,503,247	9,853,819	0.51	0.51			1,227,321	18,275,926	0.24	2.11	0.38	0.09	0.40	2.98
16	Blackcod Trawl		1,924,592	3,127,015	1.62	1.62			190,102	1,734,490	0.55	2.95	0.25	0.11	0.40	3.71
17	Blackcod Fixed Gear		1,919,679	4,466,660	2.33	2.33			160,480	1,759,199	0.55	4.23	0.25	0.30	0.40	5.18
19	Pink Shrimp		47,628,780	24,152,582	0.51	0.51			2,214,143	45,414,637	0.31	1.64	0.25	0.35	0.40	2.64
20	Dungeness Crab		26,072,694	71,208,556	2.73	2.73			3,545,334	22,527,360	0.58	4.71	0.61	0.12	0.40	5.84
23	Herring/Sardine		57,956,064	6,299,324	0.11	0.11				57,956,064	0.95	0.11	0.15	0.20	0.19	0.65
24	Shark/Skates		1,737,777	634,479	0.37	0.37			56,925	1,680,852	0.50	0.73	0.25	0.10	0.40	1.48
25	Smelt/Shad/Mack $		4,506,740	3,015,934	0.67	1.00	*		6,186	3,009,748	1.00	1.00	0.15	0.10	0.40	1.65
26	Sea Urchin		651,297	365,787	0.56	0.56				651,297	0.07	8.02	0.75	0.87	0.40	10.04
33	Whiting-Surimi/shore	25%	41,874,872	5,101,156	0.122	0.122			0	41,874,872	0.25	0.49	0.17	0.25	0.10	1.01
37	Whiting H&G/shore	75%	125,624,616	15,303,468	0.122	0.122			17,950,154	107,674,462	0.61	0.20	0.10	0.08	0.19	0.57
38	Fish Meal	70%	139,022,813							139,022,813	0.10	0.00	0.04	0.09	0.10	0.23
	Total		488,412,864	177,395,629												
	Oregon Landings		349,390,051	177,395,629												

Notes:
1. Fish meal pounds are the average lost yield from cod/rockfish, sole/flounder, blackcod, sharks/skates, and onshore whiting.
2. The asterisk in the landing price adjustment column means price is either from other source material or economic impacts are calculated using revenue rather than landed pounds.
3. FEAM prices and marginal impacts are from 2009 model that uses 2011 response coefficients.
4. Landings do not include private aquaculture.
5. The factor for adjusting between marginal and average economic contribution is 0.89.
6. Distant water economic contributions are not shown.
7. Small amounts of salmon reported as midwater trawl at mid-coast ports with no value are shown with smelt/shad/mackerel group.

Source: PacFIN March 2014 extraction; and study for adjustments and economic contributions.

Table A.4 (cont.)

FEAM Group No	Resources	Processor Revenue	FEAM Marginal Impacts Price	Processor/ Buyer	Harvester	Total	Current Year Price Adjusted Marginal Impacts Factor	Harvester	Total	Adjusted Total Impacts Local	State	State Level Economic Factor
Oregon 2013												
1	Troll Coho	8,292	1.77	0.89	2.58	3.47	1.22	3.16	4.05		10,696	1.00
2	Troll Chinook	8,049,645	4.35	0.83	6.65	7.47	1.17	7.81	8.64		11,439,821	
4	Albacore Tuna	21,635,316	1.01	0.86	1.30	2.16	1.56	2.03	2.89		26,230,213	
5	GN/PS Coho	675,033	1.20	0.94	1.48	2.42	1.52	2.26	3.20		772,622	
6	GN/PS Fall Chinook	4,052,331	1.71	0.95	2.29	3.24	1.36	3.11	4.06		4,903,176	
7	GN/PS Tule	266,243	0.47	0.88	0.28	1.16	1.24	0.35	1.23		242,661	
9	Pink/Steel/Chum/Sock	26,660	0.54	0.81	2.55	3.36	1.66	4.24	5.05		56,233	
11	GN/PS Spring Chinook	1,144,931	4.21	1.04	6.34	7.37	1.50	9.50	10.54		1,517,753	
12	Sturgeon	171,679	1.95	0.81	2.55	3.36	1.64	4.19	5.00		206,652	
13	Pacific Halibut	1,074,758	2.87	0.72	4.26	4.98	1.67	7.10	7.82		1,429,397	
14	Cod/Rockfish	5,454,067	0.65	0.34	0.93	1.27	1.08	1.01	1.35		7,219,047	
15	Sole/Flounder	13,049,741	0.32	0.32	0.43	0.75	1.58	0.68	1.00		17,339,076	
16	Blackcod Trawl	3,543,161	1.86	0.61	2.92	3.53	0.87	2.55	3.16		5,413,940	
17	Blackcod Fixed Gear	5,012,440	2.69	0.71	3.89	4.59	0.86	3.36	4.07		6,961,753	
19	Pink Shrimp	37,108,326	0.31	0.40	0.38	0.78	1.64	0.62	1.02		43,305,534	
20	Dungeness Crab	76,290,133	1.94	0.99	2.78	3.77	1.41	3.91	4.90		113,789,253	
23	Herring/Sardine	36,030,785	0.11	0.65	0.15	0.80	0.99	0.15	0.80		41,172,672	
24	Shark/Skates	1,244,015	0.20	0.56	0.22	0.78	1.83	0.40	0.96		1,487,263	
25	Smelt/Shad/Mack $	4,966,085	1.00	0.95	1.44	2.39	1.00	1.44	2.39		6,415,193	
26	Sea Urchin	457,880	0.46	0.17	0.58	0.75	1.22	0.71	0.88		509,018	
33	Whiting-Surimi/shore	10,544,889	0.06	0.15	0.08	0.23	2.03	0.17	0.32		11,846,331	
37	Whiting H&G/shore	37,418,924	0.06	0.32	0.08	0.40	2.03	0.17	0.49		54,545,997	
38	Fish Meal	3,197,525	0.00	0.03	0.00	0.03	1.00	0.00	0.03		3,711,909	
	Total	271,422,858									360,526,210	
	Oregon Landings											

Table A.5a
Salmon Troll and Net Fishery Product Price Conversion Model

Fishery: Troll Chinook, Net Chinook	Fresh or Frozen					
Product Form: Whole - Head Off, Fillets - Skin On	Troll Chinook			Net Chinook		
	Whole - Head Off		Fillets - Skin On	Whole - Head Off		Fillets - Skin On
Ex-vessel price /2,3	5.46	5.46	5.46	0.93	1.86	1.86
Fish fees:						
.0315 ad valorem management fee	0.172	0.172	0.172	0.029	0.059	0.059
.05 per lb restoration and enhancement	0.05	0.05	0.05	0.05	0.05	0.05
.05 per lb marketing assessment /4	0.05	0.05	0.05	0.05	0.05	0.05
Total fees	0.272	0.272	0.272	0.129	0.159	0.159
Tendering cost or buyer /5	0.00	0.00	0.00	0.15	0.15	0.15
Total landed cost	5.73	5.73	5.73	1.21	2.17	2.17
Egg yield (percent) /6	0%	0%	0%	4%	4%	4%
Green egg credit @ $5.00/lb coho, $4.50/lb Chinook and chum, $2.50/lb steelhead /7	0.00	0.00	0.00	0.18	0.18	0.18
Waste product sale @ $0.06 lb /8	0.00	0.01	0.02	0.02	0.02	0.03
Yield for primary product (percent)	98%	82%	65%	72%	72%	55%
Raw product cost of primary product	5.85	6.99	8.82	1.68	3.02	3.95
Variable costs:						
Direct labor	0.10	0.15	0.50	0.15	0.15	0.50
Packaging and material	0.05	0.05	0.10	0.05	0.05	0.10
Other costs	0.05	0.05	0.05	0.05	0.05	0.05
Total variable costs	0.20	0.25	0.65	0.25	0.25	0.65
Raw product and variable costs	6.05	7.24	9.47	1.93	3.27	4.60
Contribution margin to fixed costs /9	0.40	0.40	0.40	0.40	0.40	0.40
Primary ex-processor price of product	6.45	7.63	9.85	2.13	3.47	4.79
Sales of green eggs and waste /10	0.00	0.01	0.02	0.20	0.20	0.21
Total revenues (equals total variable plus fixed costs) /11	6.45	7.64	9.87	2.33	3.67	5.00
Marketing margins						
Brokerage (2%)	0.13	0.15	0.20	0.04	0.07	0.10
Distribution (10%)	0.64	0.76	0.98	0.21	0.35	0.48
Retailer (40%)	2.58	3.05	3.94	0.85	1.39	1.92
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	9.80	11.60	14.97	3.24	5.27	7.28

Notes:
/1 Raw egg prices have declined sharply in recent years. For example, pink and steelhead prices presently are about $1.00 per pound and in some cases were as low as $0.10 per pound.
/2 All calculations are based on round pound equivalents rather than delivery weight. Delivery weight is round pounds for net caught and dressed pounds for some troll caught. Net caught ex-vessel prices use example non-Indian Columbia River fishery (combined landings to Oregon and Washington side) in 2014. Troll caught uses ex-vessel annual prices for deliveries to Astoria in 2014.
/3 Ex-vessel prices are expected long-term prices based on historic prices of similar species.
/4 Assessment fee $0.05 paid by harvester is included in ex-vessel price. Another $0.05 paid by processor. These charges may not be appropriate in all cases, so reduce costs by this amount if no assessment fees.
/5 Not all inland fisheries include a tender or buyer/gatherer. If not, reduce costs by this amount.
/6 Egg yield is on average fish (male and female).
/7 Eggs are a credit which is worth $4.50 and $5.00 per lb. green. Egg credit per lb. ($0.25 for coho, $0.18 for fall Chinook) is adjusted for overall yield.
/8 Some processed waste products sold for $0.06 per pound. At 75% overall yield, on a round pound basis, this would generate $0.015 of revenues, at 50% yield these sales would generate $0.03, etc. This may not be appropriate in every area.
/9 Contribution margin includes financing, administrative costs, marketing and sales staff, etc. This item is sometimes called "plant overhead costs."
/10 Eggs' primary product is for the Japanese market. There are also European markets. Bait eggs may also have a market. Increased yield of 5% is used to offset the bait egg gain.
/11 In general, the processing plant sells its goods at the processor's door. If a broker is involved, this adds about 2% to the cost of the product. The distributor will add 8% to 15%, depending on the cost of transportation. The retailer margin is generally 35% to 40% of the distributor price for fresh products and specialty canned or vacuum packed products. General canned goods retail margins may be as low as 16%, but will generally be about 20%.
/12 Processing derived from variable and fixed costs from FEAM.

Source: TRG (September 2006) and Study.

Table A.5b
Salmon Specialty Product Price Conversion Model

Fishery: All Net Caught Product Form: Specialty Products	Specialty Products			
	Canned (7 1/2 oz) or Vacuum Packed		Smoked and Vacuum Packed	
	Net Coho	Net Chinook	Net Coho	Net Chinook
Ex-vessel price /2,3	1.16	1.86	1.16	1.86
Fish fees:				
.0315 ad valorem management fee	0.037	0.059	0.037	0.059
.05 per lb restoration and enhancement	0.05	0.05	0.05	0.05
.05 per lb marketing assessment /4	0.05	0.05	0.05	0.05
Total fees	0.137	0.159	0.137	0.159
Tendering cost or buyer /5	0.15	0.15	0.15	0.15
Total landed cost	1.45	2.17	1.45	2.17
Egg yield (percent) /6	5%	4%	5%	4%
Green egg credit @ $5.00/lb coho,	0.25		0.25	
$4.50/lb Chinook and chum,		0.18		0.18
$2.50/lb steelhead /7				
Waste product sale @ $0.06 lb /8	0.03	0.03	0.03	0.03
Yield for primary product (percent)	45%	45%	43%	43%
Raw product cost of primary product	3.21	4.82	3.36	5.05
Variable costs:				
Direct labor	1.10	1.10	1.75	1.75
Packaging and material	0.60	0.60	0.50	0.50
Other costs	0.30	0.30	0.50	0.50
Total variable costs	2.00	2.00	2.75	2.75
Raw product and variable costs	5.21	6.82	6.11	7.80
Contribution margin to fixed costs /9	0.40	0.40	0.40	0.40
Primary ex-processor price of product	5.33	7.01	6.23	7.98
Sales of green eggs and waste /10	0.28	0.21	0.28	0.21
Total revenues (equals total variable plus fixed costs) /11	5.61	7.22	6.51	8.20
Marketing margins				
Brokerage (2%)	0.11	0.14	0.12	0.16
Distribution (10%)	0.53	0.70	0.62	0.80
Retailer (40%)	2.13	2.80	2.49	3.19
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	8.10	10.66	9.47	12.14

Notes: 1. Ex-vessel prices are from net caught, non-Indian, Columbia River fishery (combined landings to Oregon and Washington side) in 2014.
2. Other notes from Table A.5a also apply to this table.

Source: TRG (September 2006) and Study.

Table A.5c
Dungeness Crab Product Price Conversion Model

Fishery: Dungeness Crab Product Form: Three Primary	Whole Cooked	Section	Picked
Ex-vessel price /2,3	4.03	4.03	4.03
Yield for primary product (percent)	90%	50%	25%
Raw product cost of primary product	4.48	8.06	16.11
Variable costs:			
Direct labor	0.61	0.61	5.43
Packaging and material	0.05	0.05	0.60
Other costs (including taxes)	0.10	0.10	0.30
Total variable costs	0.76	0.76	6.33
Raw product and variable costs	5.24	8.82	22.44
Contribution margin to fixed costs /9	0.40	0.40	0.40
Primary ex-processor price of product	5.64	9.22	22.84
Marketing margins			
Brokerage (2%)	0.11	0.18	0.46
Distribution (10%)	0.56	0.92	2.28
Retailer (40%)	2.25	3.69	9.14
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	8.57	14.01	34.72

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2014.
2. Other notes from Table A.5a also apply to this table.
3. Dungeness crab are sold primarily by processors in three forms: whole cooked, sections, and picked meat. The costs and margins are a weighted average of all three forms.

Source: TRG (September 2006) and Study.

Table A.5d
Pink Shrimp Product Price Conversion Model

Fishery: Pink Shrimp Product Form: Frozen	Frozen (IQF) /2
Ex-vessel price /2,3	0.56
Yield for primary product (percent)	26%
Raw product cost of primary product	2.17
Variable costs:	
Direct labor	0.25
Packaging and material	0.31
Other costs (including taxes)	0.06
Total variable costs	0.62
Raw product and variable costs	2.79
Contribution margin to fixed costs /9	0.40
Primary ex-processor price of product	3.19
Marketing margins	
Brokerage (2%)	0.06
Distribution (10%)	0.32
Retailer (40%)	1.28
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	4.85

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2014.
2. Other notes from Table A.5a also apply to this table.
3. Pink shrimp are primarily sold as individually quick frozen blocks.

Source: TRG (September 2006) and Study.

Table A.5e
Groundfish Product Price Conversion Model

Fishery: Groundfish	Groundfish Fillet	
Product Form: Skinless Fillet	Lingcod	Petrale Sole
Ex-vessel price /2,3	1.14	1.10
Yield for primary product (percent)	35%	30%
Raw product cost of primary product	3.27	3.65
Variable costs:		
Direct labor	0.25	0.38
Packaging and material	0.05	0.05
Other costs (including taxes)	0.07	0.07
Total variable costs	0.37	0.50
Raw product and variable costs	3.64	4.15
Contribution margin to fixed costs /9	0.40	0.40
Primary ex-processor price of product	4.04	4.55
Marketing margins		
Brokerage (2%)	0.08	0.09
Distribution (10%)	0.40	0.46
Retailer (40%)	1.62	1.82
Customer price for primary product (primary ex-processor price plus marketing margins before shrinkage cost markups)	6.14	6.92

Notes: 1. Ex-vessel price example is from annual deliveries to Oregon in 2014.
2. Other notes from Table A.5a also apply to this table.
3. Groundfish is primarily sold as fresh fillets.

Source: TRG (September 2006) and Study.

Table A.6
Annual U.S. Per Capita Consumption of Seafood Products in 1996 to 2014

	Primary Product			
Year	Fresh and Frozen	Canned	Cured	Total
1996	10.0	4.5	0.3	14.8
1997	9.9	4.4	0.3	14.6
1998	10.2	4.4	0.3	14.9
1999	10.4	4.7	0.3	15.4
2000	10.2	4.7	0.3	15.2
2001	10.3	4.2	0.3	14.8
2002	11.0	4.3	0.3	15.6
2003	11.4	4.6	0.3	16.3
2004	11.8	4.5	0.3	16.6
2005	11.6	4.3	0.3	16.2
2006	12.3	3.9	0.3	16.5
2007	12.1	3.9	0.3	16.3
2008	11.8	3.9	0.3	16.0
2009	12.0	3.7	0.3	16.0
2010	11.6	3.9	0.3	15.8
2011	10.9	3.8	0.3	15.0
2012	10.5	3.6	0.3	14.4
2013	10.5	3.7	0.3	14.5
2014	10.9	3.4	0.3	14.6

	Species					
Year	Salmon	Sardines	Tuna	Shellfish	Other	Total
1996	0.5	0.2	3.2	0.3	0.3	4.5
1997	0.4	0.2	3.1	0.3	0.4	4.4
1998	0.3	0.2	3.4	0.3	0.2	4.4
1999	0.3	0.2	3.5	0.4	0.3	4.7
2000	0.3	0.2	3.5	0.3	0.4	4.7
2001	0.4	0.2	2.9	0.3	0.4	4.2
2002	0.5	0.1	3.1	0.3	0.3	4.3
2003	0.4	0.1	3.4	0.4	0.3	4.6
2004	0.3	0.1	3.3	0.4	0.4	4.5
2005	0.4	0.1	3.1	0.4	0.3	4.3
2006	0.2	0.2	2.9	0.4	0.2	3.9
2007	0.3	0.2	2.7	0.4	0.3	3.9
2008	0.1	0.2	2.8	0.4	0.4	3.9
2009	0.2	0.2	2.5	0.4	0.4	3.7
2010	0.2	0.2	2.7	0.4	0.4	3.9
2011	0.2	0.2	2.6	0.4	0.4	3.8
2012	0.2	0.2	2.4	0.4	0.4	3.6
2013	0.4	0.2	2.3	0.4	0.4	3.7
2014	0.1	0.2	2.3	0.4	0.4	3.4

Table A.6 (cont.)

Year	Secondary Product: Fillets and Steaks	Secondary Product: Sticks and Portions	Secondary Product: Shrimp, including all Preparations
1996	3.0	1.0	2.5
1997	3.0	1.0	2.7
1998	3.2	0.9	2.8
1999	3.2	1.0	3.0
2000	3.6	0.9	3.2
2001	3.7	0.8	3.4
2002	4.1	0.8	3.7
2003	4.3	0.7	4.0
2004	4.6	0.7	4.2
2005	5.0	0.9	4.1
2006	5.2	0.9	4.4
2007	5.0	0.9	4.1
2008	4.8	1.0	4.1
2009	4.6	0.7	4.1
2010	5.0	0.9	4.0
2011	5.0	0.9	4.2
2012	5.6	0.7	3.8
2013	5.9	0.6	3.6
2014	5.9	0.6	4.0

Notes: 1. The calculation of per capita consumption is based on a disappearance model. The total U.S. supply of imports and landings is converted to edible weight and decreases in supply such as exports and inventories are subtracted out. The remaining total is divided by a population value to estimate per capita consumption. Data for the model are derived primarily from secondary sources and are subject to incomplete reporting; changes in source data or invalid model assumptions may each have a significant effect on the resulting calculation.

Source: NMFS (September 2015).

Table A.7a
Harvest Pounds by Fishery by Port for Ocean Area-of-Catch in 2014

Fishery	Astoria and Warrenton	Garibaldi	Pacific City	Depoe Bay	Newport	Florence	Reedsport/ Winchester Bay	Coos Bay and Char-leston	Bandon	Port Orford	Gold Beach	Brookings Harbor
Salmon	246,382	188,870	3,016	570	1,106,758	1,799	97,100	1,081,809	4,869	108,112	1,560	236,935
Dungeness crab	2,885,065	488,994	7,174	533	3,993,594	2,634	615,891	2,887,518	3	366,547	3,855	663,335
Pink shrimp	10,165,425	0	0	0	19,176,307	0	0	18,780,298	0	0	0	3,838,015
Albacore tuna	2,734,144	204,440	8,481	3,593	3,060,089	19,063	98,329	2,436,508	3,577	18,353	2,245	187,878
Groundfish non-whiting	16,202,748	45,146	49,113	22,312	4,672,672	0	43,724	3,366,132	15,066	416,867	85,165	3,456,000
Trawl gear	15,910,004	0	0	0	4,159,087	0	0	3,078,943	0	0	0	2,962,283
Fixed gear LE	283,421	0	0	0	481,999	0	42,408	255,084	0	169,777	0	448,569
Non-sablefish	2,977	0	0	0	20,669	0	4,077	9,710	0	24,157	0	602
Longline or setline	1,529	0	0	0	19,978	0	3,861	7,724	0	21,780	0	83
Other hook and line	0	0	0	0	281	0	0	265	0	2,377	0	0
Fish pot	1,448	0	0	0	410	0	216	1,721	0	0	0	519
Sablefish	280,444	0	0	0	461,330	0	38,331	245,374	0	145,620	0	447,967
Longline or setline	39,177	0	0	0	238,017	0	36,742	141,402	0	145,620	0	5,738
Other hook and line	0	0	0	0	16,708	0	0	2,125	0	0	0	0
Fish pot	241,267	0	0	0	206,605	0	1,589	101,847	0	0	0	442,229
Fixed gear OA	9,211	44,261	49,086	20,367	28,482	0	1,244	29,307	14,606	245,225	85,165	45,054
Non-sablefish	1,129	43,068	49,086	20,367	10,598	0	13	16,736	14,606	198,966	85,165	41,599
Longline or setline	1,049	219	0	0	572	0	0	988	159	22,660	15,795	3,942
Other hook and line	23	40,168	49,086	20,367	9,991	0	0	15,748	14,447	176,306	69,370	37,657
Fish pot	57	2,681	0	0	35	0	13	0	0	0	0	0
Sablefish	8,082	1,193	0	0	17,884	0	1,231	12,571	0	46,259	0	3,455
Longline or setline	1,061	402	0	0	9,479	0	0	12,201	0	46,259	0	3,455
Other hook and line	39	0	0	0	2,385	0	0	0	0	0	0	0
Fish pot	6,982	791	0	0	6,020	0	1,231	370	0	0	0	0
Non-trawl gear and non-fixed gear LE	0	0	0	0	62	0	0	554	62	992	0	0
Non-sablefish	0	0	0	0	62	0	0	554	62	992	0	0
Non-trawl gear and non-fixed gear OA	112	885	27	1,945	3,042	0	72	2,244	398	873	0	94
Non-sablefish	112	885	27	1,945	3,042	0	72	2,244	398	873	0	94
Pacific whiting	74,466,674	0	0	0	93,759,411	0	0	26	0	0	0	100
Pacific sardine	17,170,533	0	0	0	129	0	0	0	0	0	0	0
Halibut	11,499	15,559	0	110	139,061	0	8,463	20,185	192	3,438	0	7,167
Sea urchin	1	0	0	0	0	0	0	0	0	449,364	55,547	0
Hagfish	10,812	9,163	0	0	882,790	0	0	942,520	0	0	0	0
Other	4,248,506	262,865	55,216	1,220	312,612	1,060	0	42,680	0	486	8	13
Total	128,141,789	1,215,037	123,000	28,338	127,103,423	24,556	863,507	29,557,676	23,707	1,363,167	148,380	8,389,443

Notes: 1. Astoria includes Cannon Beach and Gearhart/Seaside; Garibaldi includes Tillamook and Nehalem Bay; Pacific City includes Netarts Bay; Depoe Bay includes Siletz Bay; Newport includes Waldport and Yachats.

Source: PacFIN annual vessel summary, April 2015 extraction.

Table A.7b
Harvest Revenue by Fishery by Port for Ocean Area-of-Catch in 2014

Fishery	Astoria and Warrenton	Garibaldi	Pacific City	Depoe Bay	Newport	Florence	Reedsport/ Winchester Bay	Coos Bay and Char-leston	Bandon	Port Orford	Gold Beach	Brookings Harbor
Salmon	1,140,294	869,676	11,884	2,864	5,260,359	7,613	481,215	5,167,193	24,344	517,057	6,701	1,339,362
Dungeness crab	10,889,022	2,033,330	28,648	3,082	16,379,308	10,796	2,817,903	11,651,011	11	1,459,048	16,624	2,699,705
Pink shrimp	5,720,472	0	0	0	11,171,556	0	0	10,275,512	0	0	0	2,158,273
Albacore tuna	3,421,394	298,698	12,789	4,657	3,816,860	53,276	140,450	3,002,303	5,478	26,549	2,961	238,069
Groundfish non-whiting	9,486,376	106,151	100,382	53,287	4,243,684	0	125,014	3,007,494	46,747	1,099,586	219,321	3,321,678
Trawl gear	8,722,184	0	0	0	2,760,379	0	0	2,054,346	0	0	0	2,006,606
Fixed gear LE	742,602	0	0	0	1,410,262	0	121,732	879,542	0	418,041	0	1,207,772
Non-sablefish	1,736	0	0	0	24,968	0	2,299	6,616	0	40,656	0	376
Longline or setline	914	0	0	0	24,574	0	1,975	4,540	0	33,825	0	66
Other hook and line	0	0	0	0	127	0	0	92	0	6,831	0	0
Fish pot	822	0	0	0	267	0	324	1,984	0	0	0	310
Sablefish	740,866	0	0	0	1,385,294	0	119,433	872,926	0	377,385	0	1,207,396
Longline or setline	132,930	0	0	0	762,905	0	110,195	404,265	0	377,385	0	12,839
Other hook and line	0	0	0	0	50,409	0	0	5,886	0	0	0	0
Fish pot	607,936	0	0	0	571,980	0	9,238	462,775	0	0	0	1,194,557
Fixed gear OA	21,503	104,450	100,303	49,800	69,188	0	3,164	69,988	45,440	679,274	219,321	107,109
Non-sablefish	668	101,680	100,303	49,800	19,821	0	3	38,126	45,440	554,445	219,321	97,923
Longline or setline	579	145	0	0	481	0	0	1,459	413	50,500	41,656	10,473
Other hook and line	15	90,789	100,303	49,800	19,312	0	0	36,667	45,027	503,945	177,665	87,450
Fish pot	74	10,746	0	0	28	0	3	0	0	0	0	0
Sablefish	20,835	2,770	0	0	49,367	0	3,161	31,862	0	124,829	0	9,186
Longline or setline	2,649	1,038	0	0	26,633	0	0	31,084	0	124,829	0	9,186
Other hook and line	118	0	0	0	6,710	0	0	0	0	0	0	0
Fish pot	18,068	1,732	0	0	16,024	0	3,161	778	0	0	0	0
Non-trawl gear and non-fixed gear LE	0	0	0	0	41	0	0	725	155	1,286	0	0
Non-sablefish	0	0	0	0	41	0	0	725	155	1,286	0	0
Non-trawl gear and non-fixed gear OA	87	1,701	79	3,487	3,814	0	118	2,893	1,152	985	0	191
Non-sablefish	87	1,701	79	3,487	3,814	0	118	2,893	1,152	985	0	191
Pacific whiting	8,054,927	0	0	0	10,218,585	0	0	1	0	0	0	0
Pacific sardine	3,521,759	0	0	0	0	0	0	0	0	0	0	0
Halibut	61,394	89,040	0	672	781,654	0	48,308	111,950	1,161	19,669	0	35,154
Sea urchin	0	0	0	0	0	0	0	0	0	255,375	29,135	0
Hagfish	6,552	9,163	0	0	711,130	0	0	787,105	0	0	0	0
Other	594,366	186,269	30,144	1,952	106,073	1,060	0	129,603	0	252	4	7
Total	42,896,556	3,592,327	183,847	66,514	52,689,209	72,745	3,612,890	34,132,172	77,741	3,377,536	274,746	9,792,248

Notes: 1. Astoria includes Cannon Beach and Gearhart/Seaside; Garibaldi includes Tillamook and Nehalem Bay; Pacific City includes Netarts Bay; Depoe Bay includes Siletz Bay; Newport includes Waldport and Yachats.

Source: PacFIN annual vessel summary, April 2015 extraction.

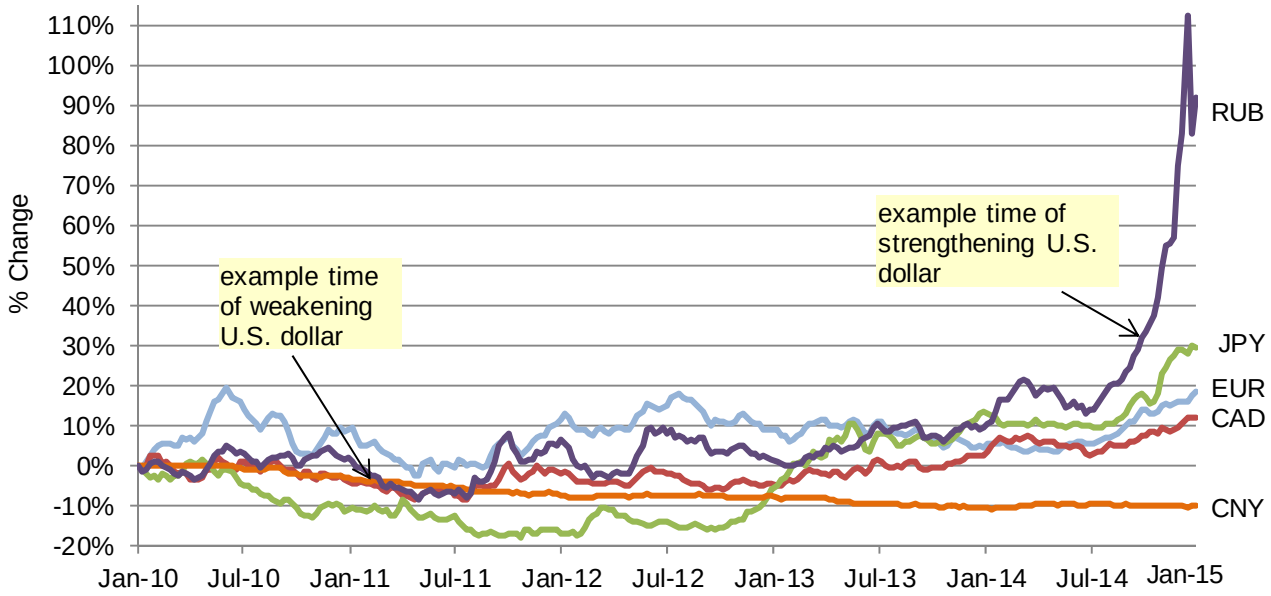
Table A.8
Harvest Revenue Delivered to Lower Columbia River and Other Ports Itemized for Area-of-Catch in 2014

Landing Location	Area-of-Catch ($000)				
		Columbia River		Other Harvest	
Gear and Species	Ocean	Lower	Upper	Locations	Total
Salmon Net					
Astoria	0	4,034	0	0	4,034
Ilwaco	0	2,184	0	1,163	3,347
Other ports		13	9,006		9,019
Salmon Troll					
Astoria	1,140	0	0	0	1,140
Ilwaco	770	0	0	0	770
Groundfish					
Astoria	9,486	0	0	0	9,486
Ilwaco	3,255	0	0	0	3,255
Pacific Whiting					
Astoria	8,055	0	0	0	8,055
Ilwaco	1,140	0	0	0	1,140
Dungeness Crab					
Astoria	10,889	0	0	0	10,889
Ilwaco	14,080	0	0	0	14,080
Pacific Sardine					
Astoria	3,522	0	0	0	3,522
Ilwaco	979	0	0	0	979
Pink Shrimp					
Astoria	5,720	0	0	0	5,720
Ilwaco	714	0	0	0	714
Albacore Tuna					
Astoria	3,421	0	0	0	3,421
Ilwaco	6,288	0	0	0	6,288
White Sturgeon					
Astoria	0	0	0	0	0
Ilwaco	0	0	0	0	0
Other ports		0	156		156
Pacific Halibut					
Astoria	61	0	0	0	61
Ilwaco	190	0	0	0	190
Shellfish					
Astoria	110	0	0	0	110
Ilwaco	15,135	0	0	0	15,135
Other Species River					
Astoria		23	0	0	23
Ilwaco		5	36	0	42
Other ports		0	14		14
Other Species Ocean					
Astoria	491				491
Ilwaco	101				101
Total					
Astoria	42,897	4,057	0	0	46,954
Ilwaco	42,651	2,190	36	1,163	46,040
Total Astoria/Ilwaco	85,548	6,247	36	1,163	92,994
Total other ports		13	9,176		9,190

Notes:
1. Fish ticket information for Columbia River salmon area-of-catch is assigned to two general river landing codes. One code is for Washington side landings and one code is for Oregon side landings. It is assumed the lower Columbia River area-of-catch landings on the Washington side are delivered to Ilwaco purchasers and landings on the Oregon side are delivered to Astoria. Fish ticket information for area-of-catch when not made at a river location (i.e. deliveries to a Seattle area purchaser) does not have this limitation and is assigned to "other ports." The same assumption for upper river treaty harvests is not valid. About a quarter of the upper river harvests are purchased by the same processors and buying stations that purchase from lower river harvests. This means there will be a slight undercounting of business activity for Astoria and Ilwaco processing businesses.
2. For ocean area-of-catch, Astoria includes Cannon Beach and Seaside landing locations. Ilwaco includes Willapa Bay and Chinook locations. Other ports include other Columbia River points of landing as well as out-of-region locations such as the Seattle area. Other areas-of-catch include Willapa Bay, Grays Harbor, and Puget Sound.
3. Salmon net gear includes gillnet, in some years a very minor amount of set net in the lower Columbia River, and set net, dip net, and other net in the upper Columbia River.
4. Salmon troll includes a very minor amount harvested in the ocean with other non-net and net type gear.
5. There is a minor amount of groundfish showing on fish tickets for being caught in the upper Columbia River and landed at Oregon side Columbia River ports. No attempt was made to resolve inconsistencies in fish ticket information.
6. Shellfish includes Washington aquaculture shellfish.
7. "Other species river" includes anchovy ($36 thousand), eulachon ($27 thousand), and unspecified sturgeon ($11 thousand). "Other species ocean" includes chub and jack mackerel ($537 thousand), spotted prawn ($23 thousand), and other shrimp ($13 thousand).

Source: PacFIN annual vessel summary and fish ticket data, April 2015 extraction.

Figure A.1
Currency Exchange Rate for U.S. Dollar and Countries that Import U.S. Seafood Production



Notes:
1. Currencies are weekly percent change from first week of January 2010 = 0%.
2. USD = U.S. dollar; EUR = Euro; CAD = Canadian dollar; JPY = Japanese yen; CNY = Chinese yuan renminbi; RUB = Russian rouble.

Source: OANDA.

Table A.9
Location and Parent Company of Major Seafood Processing Groups as of 2014

Landing Processor or Buyer Name	Identification Code	Parent Company	Out-of-State Presence	Facility Location (Port Group Area)					
				Astoria	Tillamook	Newport	Coos Bay	Port Orford	Brookings
AIR FRESH SEAFOODS MADRAS OR	0936			X			X		X
AMERICAN ALBACORE FISHING ASSOCIATION ASTORIA O	0989					X			
ARGONNAUT OFFLOAD	1156					X			
ASTORIA HOLDINGS INC ASTORIA OR	0728	Astoria Holdings Inc.		X					
BANDON PACIFIC INC CHARLESTON OR	0698	Pacific Seafood Group	(A)(W)(C)				X		
BELL BUOY SEASIDE OR	0769	Bell Buoy Crab Co. Inc.	(W)	X					
BILLS SEAFOOD II LLC MCMINNVILLE OR	0884				X	X	X		
BLAINE CRAB, BC FISHERIES LLC HARBOR OR	0940					X			X
BOATHOUSE SEAFOOD LLC GARIBALDI OR	0726				X				
BORNSTEIN SEAFOODS INC ASTORIA OR	0646	Bornstein Seafoods	(W)	X		X			X
CBTA MARKETING DIVISION CHARLESTON OR	0961						X		
CHUCKS SEAFOODS INC CHARLESTON OR	2020						X		
CODYS SEA TO YOU SEAFOODS NEWPORT OR	0871					X			
CSFPDX LLC	1152				X	X		X	
DA YANG SEAFOODS INC ASTORIA OR	0891			X					
DEEPWATER SEAFOODS LLC GARIBALDI OR	0853				X				
DEEPWATER SEAFOODS LLC GARIBALDI OR	4528				X				
DEPOE BAY FISH CO INC SILETZ OR	0016					X			
FISHHAWK FISHERIES ASTORIA OR	0385	Fishhawk Fisheries	(A)(W)	X					
HALLMARK FISHERIES CHARLESTON OR	1505	California Shellfish Co.	(C)			X	X	X	X
HAPPY CRAB SEAFOODS INC PORTLAND OR	0403					X			
HEUKER BROTHERS INC CASCADE LOCKS OR	0096			X					
KRAB KETTLE FISHERIES INC FLORENCE OR	0422					X	X		
LIVING PACIFIC SEAFOOD LLC	1151					X			
LIVING PACIFIC SEAFOOD SILETZ OR	0627					X			
LOCAL COAST SEAFOOD LLC	1153					X	X		
LOCAL OCEAN SEAFOODS INC NEWPORT OR	0777					X			
LUTZ SEAFOOD BRIGHTWOOD OR	1128					X			
MONTGOMERY OFFLOADING SERVICE LLC LINCOLN CITY (	1133					X			
NEWELL SEAFOODS LLC NEWPORT OR	0954				X	X	X		X
NEWPORT QUALITY SEAFOOD SEAL ROCK OR	1141			X		X	X		
NOR-CAL SEAFOODS INC PORT ORFORD OR	0684	Nor-Cal Seafoods	(C)				X	X	X
NORTHWEST WILD PRODUCTS ASTORIA OR	1022			X					
OCEAN BEAUTY SEAFOODS LLC PORTLAND OR	0029			X					
OCEAN GOLD SEAFOODS CHARLESTON OR	0908					X	X		
OPAC SEAFOODS LTD/STARVIN MARVINS CHARLESTON (	0807	Starvin Marvin's Seafood	(W)				X		
OREGON SEAFOODS LLC COOS BAY OR	1061						X		
PACIFIC CHOICE SEAFOODS BROOKINGS OR	0736	Pacific Seafood Group	(A)(W)(C)						X
PACIFIC COAST SEAFOODS COMPANY WARRENTON OR	0081	Pacific Seafood Group	(A)(W)(C)	X	X				

Table A.9 (continued)

Landing Processor or Buyer Name	Identification Code	Parent Company	Out-of-State Presence	Facility Location (Port Group Area)					
				Astoria	Tillamook	Newport	Coos Bay	Port Orford	Brookings
PACIFIC SHRIMP COMPANY NEWPORT OR	0654	Pacific Seafood Group	(A)(W)(C)			X			
PERNULA, BRIAN NORTH BEND OR	1081					X	X		
POINT ADAMS PACKING CO - HAMMOND HAMMOND OR	0242	California Shellfish Co.	(C)	X					
ROGUE KING SEAFOOD GOLD BEACH OR	0651						X	X	X
SEA WATER SEAFOODS CO NEWPORT OR	1113					X	X		X
SEAFOOD PRODUCERS COOPERATIVE CHARLESTON OR	0776	Seafood Producers Co-op,	(W)(C)			X	X		
SOUTH BEACH FISH MARKET INC SOUTH BEACH OR	0943				X	X			
TARABOCHIA, BRIAN ASTORIA OR	0672			X					
TRIDENT SEAFOODS CORP NEWPORT OR	0714	Trident Seafoods Corp.	(A)(W)			X			
UNIVERSAL FISHERIES CORP NEWPORT OR	1143					X			
WEST BAY MARKETING LLC ASTORIA OR	1132			X					
WILD PLANET FOODS INC NEWPORT OR	0907					X			
WINGS FOOD MARKET PORTLAND OR	0976						X	X	

Notes: 1. Landing processor or buyer name and identification code is from fish dealer license information. Blank parent companies identify small, independent, local processing plants. Processor or buyer names that have more than one type of license are listed separately, such as Deepwater Seafoods and Stickrods, which each have a bait type license.
2. Parent company assignment is from personal communication or other investigation of cross ownership. Parents are assigned to subsidiaries groups by interpretations and evidence of various legal arrangements that include ownership ties, lease contracts, and purchasing arrangements.
3. Only named processors or buyers making substantial purchases in any port group area are shown.

Source: PacFIN annual vessel summary April 2015 extraction, TRG (September 2006), and ODFW personal communication.

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APPENDIX B

Exports

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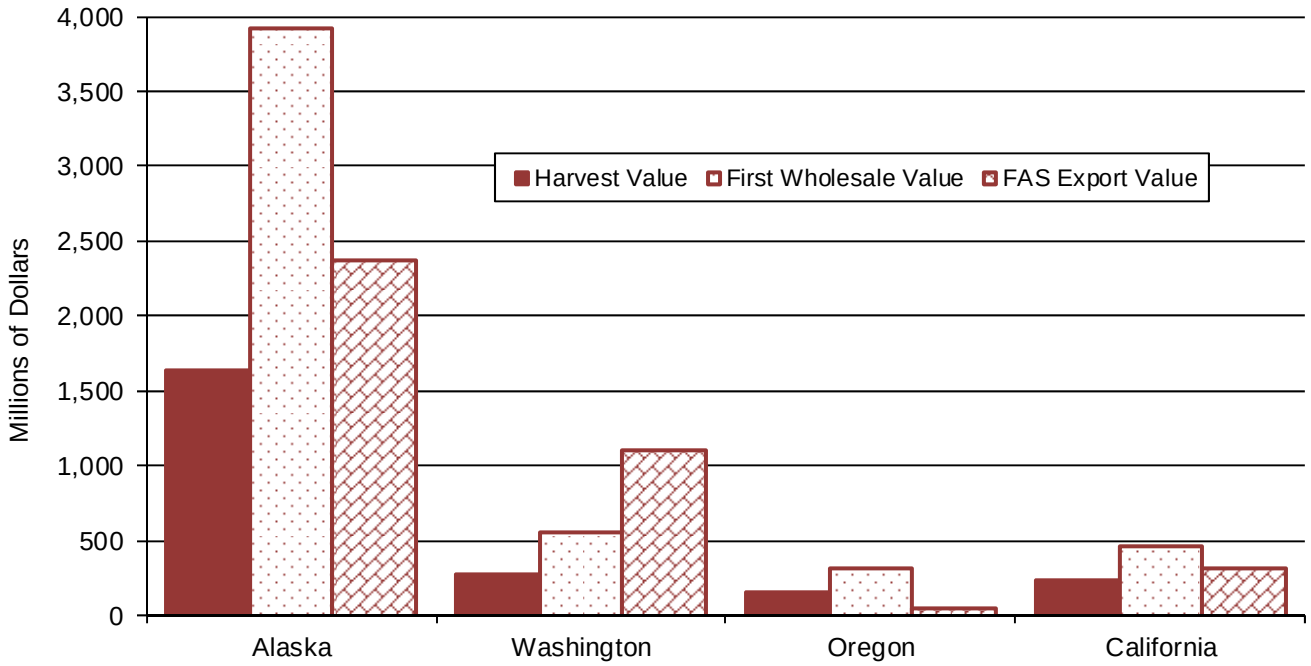
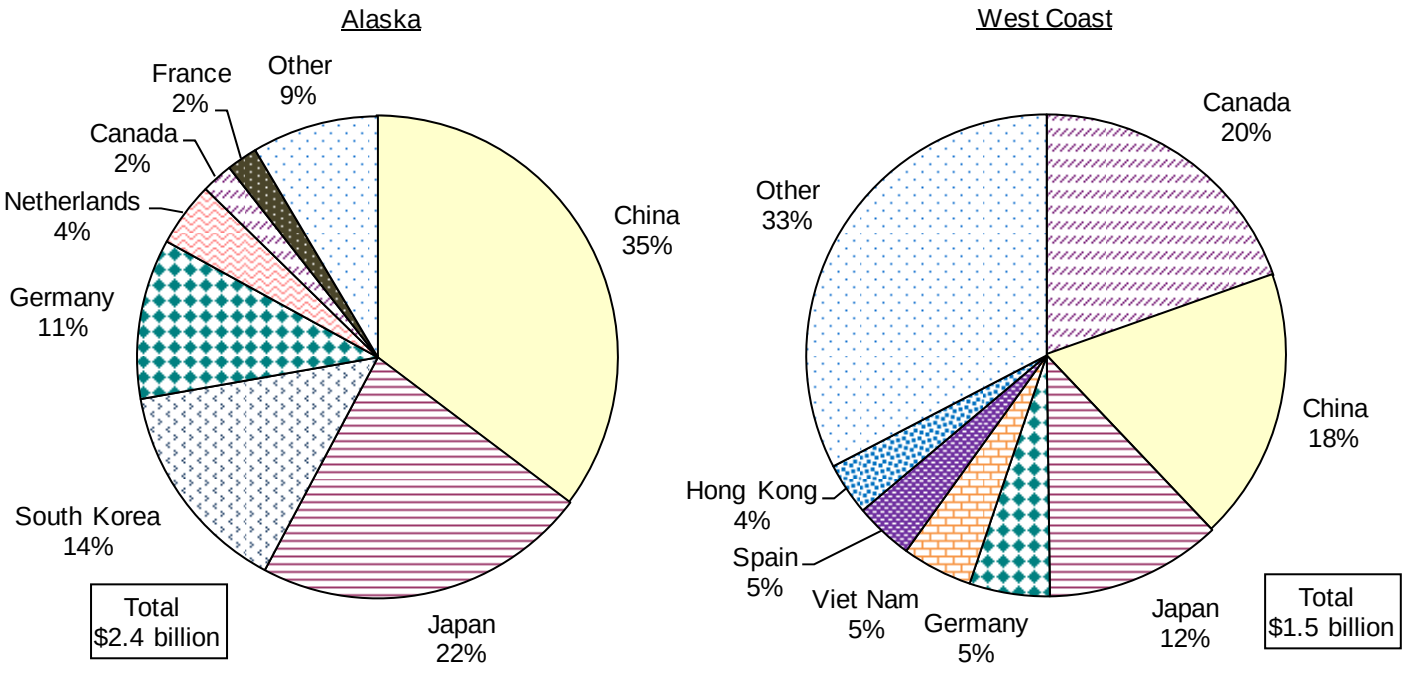
Figure B.1
Alaska and West Coast Seafood Product Flows: Harvest Value,
First Wholesale Value, and Processed Product International Exports in 2014



Notes:
1. Washington harvest value includes all West Coast offshore fishery.
2. First wholesale value for Alaska is reported by ADFG, and 2010 ratio is applied to 2014 harvest value. West Coast states use a rule-of-thumb for factor of 2 of harvest value.
3. Export value basis is FAS (Free Alongside Ship). FAS is value measured in USD at country of origin. It is the transaction price and includes delivery to the port or airport of departure approved and ready for export. It does not include licensing, inspection, custom/duties, loading, transport, off-loading, carriage spoilage, nor insurance costs.

Sources: U.S. Bureau of Census.

Figure B.2
Processed Product International Exports for the Top Seven Countries in 2014



Notes: West Coast includes Washington, Oregon, and California.
Sources: U.S. Bureau of Census.

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APPENDIX C

Distant Water Fishery Index

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Table C.1
Distant Water Fishery Index

	West Coast Offshore Pacific Whiting			Oregon Home-Port Vessels Revenue From Other West Coast States		Alaska Offshore Pollock			Alaska Onshore													Fuel Price Index	
									Salmon			Halibut		Sablefish		Halibut Sablef.	Crab						
	Pounds					Pounds			Pounds			Pounds		Pounds		Wt.Avg.	Pounds			Diesel	
Year	(000's)	Price	Index	Revenue ($000)	Index	(000's)	Price	Index	(000's)	Price	Index	(000's)	Price	(000's)	Price	Index	(000's)	Price	Index	Retail	Index
1996	132,423	0.023		6,083		1,278,668	0.08		907,770	0.40		33,295	2.16	58,154	1.46		97,239	1.75		1.36	
1997	163,111	0.036	1.86	5,968	0.98	1,289,691	0.10	1.56	630,410	0.48	0.69	47,981	2.12	36,813	2.28	1.12	145,290	1.17	0.96	1.28	1.06
1998	161,184	0.021	1.07	3,932	0.65	1,437,399	0.07	1.76	712,810	0.38	0.53	49,270	1.31	36,551	1.49	0.82	279,666	0.77	1.70	1.08	1.25
1999	160,135	0.031	1.57	4,475	0.74	1,424,172	0.09	1.78	890,840	0.45	0.86	56,585	2.04	30,536	1.89	1.25	216,189	1.41	2.17	1.20	1.13
2000	116,406	0.034	1.25	4,964	0.82	1,518,969	0.12	2.76	710,980	0.41	0.62	52,907	2.63	34,777	2.28	1.76	52,348	2.67	1.13	1.50	0.90
2001	91,645	0.028	0.82	5,379	0.88	1,801,158	0.12	4.16	768,840	0.33	0.45	56,616	2.13	32,267	2.05	1.66	47,342	2.67	0.92	1.37	0.99
2002	106,265	0.035	1.19	4,409	0.72	1,871,705	0.12	4.23	624,069	0.29	0.37	59,143	2.39	33,192	2.11	1.61	57,950	2.72	1.11	1.27	1.07
2003	99,470	0.034	1.09	5,544	0.91	1,891,547	0.11	3.85	799,428	0.30	0.47	58,925	3.13	38,198	2.38	1.79	57,170	3.32	1.56	1.43	0.95
2004	104,650	0.027	0.90	8,307	1.37	1,884,933	0.12	3.85	803,702	0.39	0.66	57,981	3.39	39,168	2.20	1.67	52,841	3.38	1.44	1.75	0.78
2005	158,947	0.037	1.89	7,102	1.17	1,933,434	0.15	4.83	961,343	0.42	0.84	56,073	3.53	38,286	2.44	2.01	57,185	3.24	1.21	2.15	0.63
2006	133,494	0.041	1.75	8,604	1.41	1,915,797	0.16	4.68	731,355	0.59	0.80	53,770	4.53	36,610	2.78	2.30	69,250	2.27	0.89	2.34	0.58
2007	115,817	0.048	1.78	5,869	0.96	1,706,360	0.16	4.42	948,121	0.56	1.00	51,495	5.34	36,033	2.96	3.12	70,919	3.15	1.58	2.40	0.57
2008	159,702	0.070	3.57	8,636	1.42	1,269,850	0.26	5.14	707,805	0.83	1.06	114,528	4.65	31,652	3.56	5.85	99,561	3.23	3.85	2.99	0.45
2009	82,690	0.038	1.00	6,913	1.14	1,049,390	0.24	4.09	731,023	0.74	1.23	58,970	3.02	34,396	3.15	2.30	89,771	2.68	2.86	1.97	0.69
2010	114,446	0.045	1.65	6,445	1.06	1,097,891	0.21	3.53	818,604	0.97	1.74	57,322	4.68	28,313	4.33	3.09	79,875	3.67	3.30	2.37	0.57
2011	123,473	0.066	2.61	8,947	1.47	1,565,266	0.22	5.85	797,604	1.11	1.82	43,368	6.41	28,811	6.07	3.26	80,565	4.85	4.50	2.97	0.46
2012	84,478	0.086	2.34	15,428	2.54	1,615,972	0.24	5.38	659,330	1.19	1.85	34,054	5.82	32,946	4.84	3.11	111,941	3.78	4.67	3.04	0.45
2013	115,100	0.075	2.77	15,691	2.58	1,660,064	0.21	5.52	1,154,674	0.92	1.87	30,072	5.21	29,720	3.62	2.17	87,089	4.07	4.62	2.91	0.47
2014	136,360	0.065	2.87	11,631	1.91	1,748,654	0.21	4.96	789,100	1.13	2.02	22,778	6.45	25,204	4.59	1.97	84,391	3.95	4.66	2.79	0.49

Notes:
1. Ex-vessel prices and revenues are adjusted to 1996 dollars.
2. West Coast fisheries indexes are current year fishery revenue divided by fishery revenue in 1996. Alaska fisheries indexes are current year fishery revenue times Oregon share, divided by fishery revenue in 1996 times Oregon share. Oregon share is declared residence of permit holder. Fisheries harvested predominately by longline gear use halibut and sablefish revenue weighted average index. Indexes are used as a factor to estimate current year economic impacts for a particular component of Oregon's distant water fisheries. All previous years data is refreshed with latest data available before index calculations are made.
3. The current year indexes are preliminary because assumptions are sometimes used to make complete year estimates of landings from partial year data. Alaska pollock and West Coast Pacific whiting volume and price are only for catcher vessel retained harvests. The catcher vessel price for the previous year is assumed to be the same as in the current year for pollock. West Coast Pacific whiting observer data may be complete; price is based on onshore price less 15%. Crab landings are summed over several species, for example the shares of pounds in 2005 are king (42%), tanner (6%), snow (44%), Dungeness (8%), and other (<0%).
4. Home-port state is defined as the state of the port group where a vessel makes the most landings by revenue.
5. The fuel price index is the inverse of the of the inflation adjusted price of West Coast diesel fuel highway retail price.

Sources: PacFIN offshore and annual vessel summary extractions up to April 2015, North Pacific Fishery Management Council for pollock, and Alaska Department of Fish and Game (ADFG) for Alaska salmon. Halibut, sablefish, and crab from CFEC, NOAA Fisheries, and ADFG. Fuel prices from U.S. Energy Information Administration.

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APPENDIX D

Landing and License Fees and Assessments

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Table D.1
Estimated Commercial Fish Fund Fees in 2012 to 2014

COMMERCIAL FISHING LANDING FEES a/	2012	2013	2014	Average
SALMON	$218,810	$391,382	$634,645	$414,946
SHRIMP	$561,544	$549,879	$659,817	$590,414
CRAB	$655,665	$1,602,183	$1,079,941	$1,112,596
ALBACORE	$164,331	$176,490	$123,747	$154,856
SARDINE	$207,780	$141,723	$79,246	$142,916
SABLEFISH	$259,532	$170,882	$181,700	$204,038
SOLE/FLOUNDER	$165,785	$243,823	$220,495	$210,034
GROUNDFISH, MISC	$147,162	$86,077	$411,159	$214,799
WHITING	$338,226	$459,098	$88,813	$295,379
OTHER	$73,730	$75,872	$67,638	$72,413
TOTAL LANDING FEES	$2,792,564	$3,897,408	$3,547,201	$3,412,391
EST XFER TO R&E	$96,310	$165,927	$299,177	$187,138
EST XFER TO NEARSHORE	$54,091	$52,271	$48,141	$51,501
EST XFER TO DEVO	$0	$0	$0	$0
NET REV LANDINGS FEES	$2,738,473	$3,845,137	$3,499,060	$3,360,890
XFER TO GEN FUND	$0	$0	$0	$0
RETAIN IN CFF	$2,738,473	$3,845,137	$3,499,060	$3,360,890
COMMERCIAL FISHING LICENSE & PERMIT FEES				
FISHING	$200,014	$206,886	$219,862	$208,921
CREW FISHING	$139,125	$154,756	$157,869	$150,583
JUVENILE	$1,344	$1,312	$1,440	$1,365
BAIT FISHING	$5,814	$3,774	$2,856	$4,148
TUNA LANDING	$15,010	$18,065	$16,402	$16,492
BOAT	$532,582	$530,012	$532,516	$531,703
SHRIMP PERMIT	$19,453	$19,503	$19,553	$19,503
TROLL PERMIT	$113,228	$113,014	$113,608	$113,283
GILLNET PERMIT	$32,284	$32,384	$32,428	$32,365
SCALLOP PERMIT	$3,071	$2,767	$2,336	$2,725
CRAB PERMIT	$58,798	$59,275	$59,425	$59,166
URCHIN PERMIT	$3,002	$3,104	$2,694	$2,933
BLACK/BLUE	$5,304	$5,202	$5,100	$5,202
NEARSHORE	$7,140	$7,140	$7,038	$7,106
CLAM	$1,020	$1,122	$1,122	$1,088
SARDINE	$2,550	$2,550	$2,448	$2,516
SINGLE DELIVERY	$381	$508	$127	$339
WHOLESALE FISH DEALER	$67,348	$66,896	$71,416	$68,553
FISH CANNER	$1,356	$904	$904	$1,055
SHELLFISH CANNER	$904	$452	$452	$603
FISH BAIT DEALER	$5,304	$4,794	$4,794	$4,964
LIMITED FISH SELLER	$5,460	$5,502	$5,082	$5,348
FISH BUYER	$24,444	$25,200	$30,240	$26,628
DUPLICATES	$1,665	$2,054	$2,276	$1,998
TOTAL LICENSES & PERMITS	$1,246,601	$1,267,176	$1,291,988	$1,268,588
EST XFER TO R&E	$85,893	$84,748	$84,331	$84,991
TRANSFER TO NEARSHORE	$12,444	$12,342	$12,138	$12,308
NET REV LICS AND PERMITS	$1,148,264	$1,170,086	$1,195,519	$1,171,289
XFER TO GF	$0	$0	$0	$0
RETAIN IN CFF	$1,148,264	$1,170,086	$1,195,519	$1,171,289
EST CONFISCATED	$30,645	$8,471	$7,855	$15,657
GRAND TOTAL (TOTAL INCLUDES NS, R&E, DEVO)	$4,069,810	$5,173,054	$4,847,043	$4,696,636
GRAND TOTAL TO COMM FISH FUND	$3,917,382	$5,023,694	$4,702,433	$4,547,836
Total Transfer to R&E	$182,203	$250,675	$383,508	$272,128
Total Transfer to NEARSHORE	$66,535	$64,613	$60,279	$63,809
Total Transfer to DEVO	$0	$0	$0	$0

Notes: a/ Landing fees are based on landings and value data reported on fish tickets and not actual dealer remittances. Actual dealer landings fee remittances are very close to the estimates based on fish ticket pounds and values.

b/ Effective July 1997, all commercial fishing industry fees are retained by ODFW; no transfer is made to the General Fund.

c/ Effective October 23, 1999, all proceeds from sales of confiscated fish are retained by ODFW; no transfer is made to the General Fund.

d/ The Salmon Limited Fish Seller license was combined with the regular Limited Fish seller license after action by the 1999 legislature.

e/ Transfers to DEVO were discontinued effective January 1, 2010.

Source: ODFW.

Table D.2
Estimated Commodity Commission Assessment Revenue in Fiscal Years 2013 and 2014

Year	Species	Gear	Round Pounds (thousands)	Harvest Value (thousands)
2013	Pink shrimp	Trawl	47,629	$24,153
2013	Groundfish	Trawl	28,547	$16,371
2013	Pacific whiting	Trawl	167,499	$20,405
2013	Other	Trawl	246	$6
	Total		243,921	$60,934
2014	Pink shrimp	Trawl	51,960	$29,326
2014	Groundfish	Trawl	26,110	$15,544
2014	Pacific whiting	Trawl	168,226	$18,274
2014	Other	Trawl	689	$18
	Total		246,985	$63,161

Year	Species	Round Pounds (thousands)	Harvest Value (thousands)	Assessment Rate	Producer/ Handler Assessments
2013	Salmon troll	1,490	$7,607	1.50	$114,107
2013	Albacore tuna	10,205	$16,079	0.75	$120,592
2013	Dungeness crab	26,073	$71,209	1.00	$712,086
2013	Trawl	243,921	$60,934	0.50	$304,671
	Total	281,689	$155,829		$1,251,455
2014	Salmon troll	3,044	$14,829	1.50	$222,428
2014	Albacore tuna	8,777	$11,023	0.75	$82,676
2014	Dungeness crab	11,915	$47,988	1.00	$479,885
2014	Trawl	246,985	$63,161	0.50	$315,804
	Total	270,721	$137,001		$1,100,794

Notes: 1. Annual landings are for fiscal year months ending in the table's shown year.
2. Trawl gear category includes any species landed with the following trawl gears: flatfish, groundfish (otter), midwater, roller, selective FF (small footrope), shrimp (double rigged or single rigged), or other trawl gear.
3. The four commodity commissions are the Salmon Commission (1.5 percent ex-vessel value troll caught salmon assessed to harvester), Trawl Commission (0.5 percent ex-vessel value of groundfish and shrimp caught with trawl gear assessed to harvester), Albacore Commission (0.75 percent ex-vessel value of albacore tuna whose payment is split evenly by harvesters and processors), and Dungeness Crab Commission (one percent ex-vessel value assessed to harvester). Actual producer/handler assessments accruing to commodity commission budget revenue may be different because it depends on harvest value exemptions that can differ from fish ticket reported harvest value.
4. Trawl assessment estimates starting in year 2011 exclude some non-trawl gear groundfish harvest allowed with the LE trawl permit ITQ program.

Source: Study.

APPENDIX E

Oregon Resident Participation in Alaska Fisheries

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Table E.1
Oregon Resident Participation in Alaska Fisheries for Vessel and Permit Registrants, Crewmember Licenses, and Major Fisheries Earnings in 2014

		Vessel Permits		Crew
Residency	Vessels	Count	Registrants	Licenses
Clatsop County	59	101	83	153
Tillamook County	0	5	5	14
Lincoln County	28	56	48	153
Coastal Lane and Douglas Counties	3	4	4	7
Coos County	5	17	16	55
Curry County	3	16	10	8
Other Oregon	184	417	347	968
All Oregon	281	616	512	1,358

Permit Fisheries	Fishery Permits	Earnings (thousands)	Earnings per Permit (thousands)
Crab	21	30,325	1,444
Other groundfish	63	71,144	1,129
Halibut	55	4,682	85
Sablefish	28	3,991	143
Salmon	233	18,067	78
Herring, shellfish, other	13	375	29
All fisheries	413	128,583	311

Notes:
1. Earnings are the same as harvest value.
2. Unique registrants are determined by unique occurrences of the permit file "name" field, which includes first name, last name, and middle initial of permit holders.
3. Registrant declared resident zip codes are used to compile Oregon locations. An undetermined number of participants not included in this table's counts may maintain principal residency in Alaska and live part-time in Oregon.
4. Permit fishery groups for herring and other shellfish are not available due to confidentiality, so they are estimated by the residual of the total earnings and other fishery groups.
5. The permits shown by county include all issued permits, and the permits shown by statewide fisheries are permits fished.
6. Not all columns are additive, for example permits can't be in more than one permit fishery group, so permit count is additive by permit fishery groups, but permits can have more than one zip code, so permit counts are not additive for the counties. A summation underline is used for columns that are additive, and no underline for columns that are not additive.

Sources: Alaska Commercial Fisheries Entry Commission (CFEC) for vessel, permit, and fishery earnings data, downloaded September 2015 from http://www.cfec.state.ak.us/; and, Alaska Department of Fish and Game (ADFG) for crewmember license data, personal communication October 2015.

Table E.2
Oregon Registrant Alaska Fisheries Permit Estimated Earnings by Selected Regions in 2014

	Clatsop County			Lincoln County		
Permit Fisheries	Permits	Registrants	Earnings (thousands)	Permits	Registrants	Earnings (thousands)
Crab	2	2	1,685	10	8	8,424
Other Groundfish	3	2	3,006	34	33	34,069
Halibut	13	13	1,014	2	2	156
Sablefish	7	7	901	1	1	129
Salmon	66	66	3,359	7	8	356
Herring, shellfish, other	10	10	59	2	2	12
All fisheries	101	83	10,025	56	48	43,145

	Other Coastal			Other Oregon		
Permit Fisheries	Permits	Registrants	Earnings (thousands)	Permits	Registrants	Earnings (thousands)
Crab	3	2	2,527	21	13	17,689
Other Groundfish	2	2	2,004	32	30	32,065
Halibut	5	5	390	40	39	3,121
Sablefish	3	3	386	20	19	2,575
Salmon	19	18	967	263	262	13,385
Herring, shellfish, other	10	9	59	41	37	244
All fisheries	42	35	6,334	417	347	69,079

Notes: 1. Estimated earnings are calculated from Oregon statewide average earnings per permit issued, times the number of permits issued for each county.
2. Other coastal region includes Tillamook, Coos, and Curry counties and coastal portions of Lane and Douglas counties.
3. See Table E.1 for other notes and sources.