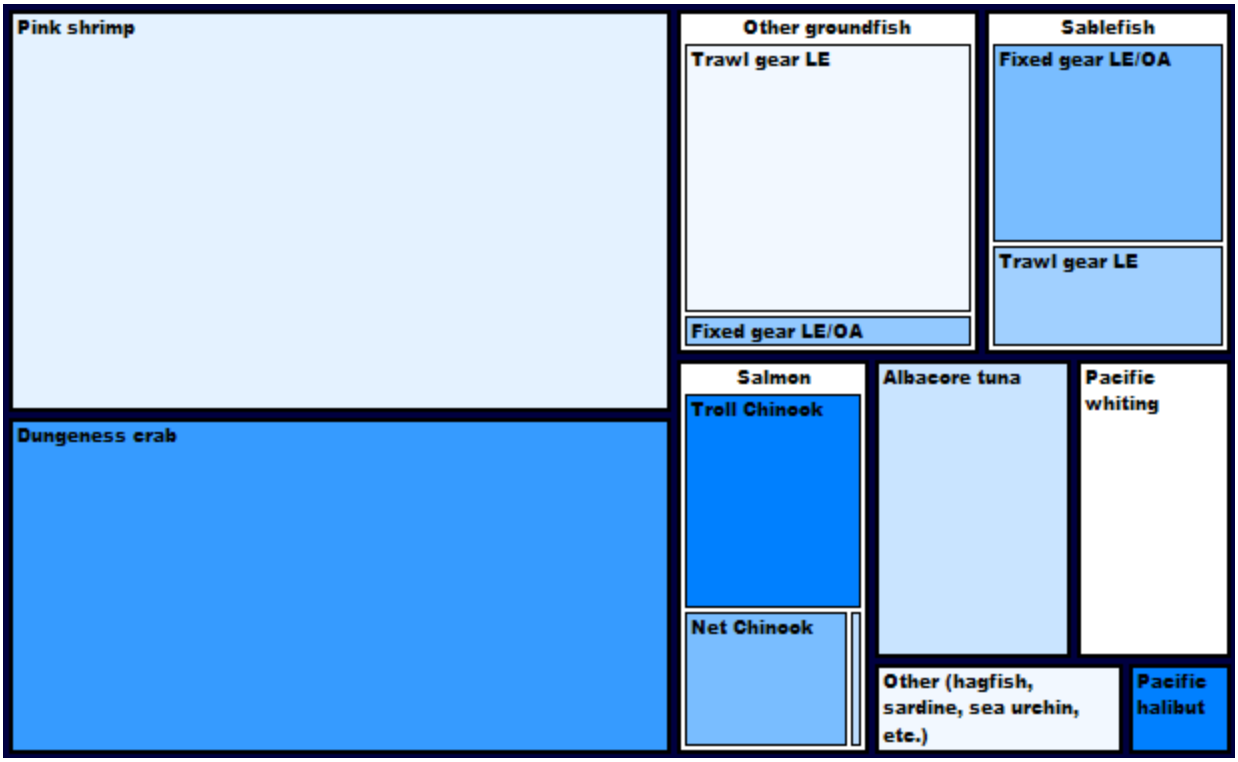
Oregon Commercial Fishing Industry in 2015
Briefing Report



Depiction of relative landed harvest value of Oregon's major fisheries in 2015 (preliminary). The fishery block size is proportional to total revenue and color shade intensity indicates relative price. The accounting period is for calendar year 2015 except the commercial ocean Dungeness crab fishery, which is the traditional season for December 1 through August 14.

Oregon Department of Fish and Wildlife

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with assistance from

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Newport, Oregon

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Preface

The Research Group, LLC, Corvallis, Oregon prepared this report for the Oregon Department of Fish and Wildlife (ODFW). Shannon Davis was the principal author. A special thanks to Gil Sylvia, Ph.D., Director of the Coastal Oregon Marine Experiment Station for his input. There were other reviewers that are thanked anonymously because permission for revealing their names was not secured.

The purpose of the report is to assess the activity level of Oregon's harvest sector commercial fishing industry in 2015 using up-to-date landing information and any available seafood market data. We also provide some preliminary analysis and compare activity levels to previous years. This quick and early look at 2015 is not intended to be a comprehensive treatment of industry economic health and resource conservation issues. The same authors provide more detailed analysis in a biennium serial publication and past reports that are hosted on the ODFW website.

For reading convenience the authors have adopted a less technical writing style. The narrative is not extensively interrupted with citations to material/communications from others. It is also assumed that the reader is somewhat familiar with Oregon's commercial fishing industry. A glossary is included, but not all fishing industry terms and economic assessment methods are defined nor explained.

Oregon harvest and processor data for this report was provided by the Pacific States Marine Fisheries Commission PacFIN program. The data should be considered preliminary since PacFIN indicates that groundfish data may not be quite complete (within 90 to 99 percent). The landings data was supplemented with data gathered from personal interviews with managers from the ODFW Marine Resources Program and Columbia River fishery, as well as industry participants.

Independent reviewers provided useful input and made comments on previous drafts for this report, however the author is responsible for entire contents including narrative, tables, and figures. The author does 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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Tables and Figures

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Glossary

Active vessel, first-purchasers	Vessel that landed over $500 of ex-vessel revenue from a fishery in Oregon, an arbitrary threshold to filter for vessels that are actively participating in a fishery. Similarly for first-purchasers, businesses (processors, buying stations, bait dealers, vessels selling to the public, etc.) that purchase $500 or more from harvesters.
BC	British Columbia, Canada
CPUE	Catch per unit effort is an aggregate productivity measure. Whenever used, the denominator (such as trips or net gear tow hours) needs to be defined. It is useful for comparing a current fishing productivity to a previous fishing event or to an average. It is sometimes used as a proxy for stock density after standardizing for catchability influencing factors, such as fish aggregation and gear selectivity. For recreational angling, the multiplicative inverse is often used which is angler success rates, i.e. how many fishing days did it take to catch a fish.
CROOS	Collaborative Research on Oregon Ocean Salmon and the West Coast Salmon Genetic Stock Identification (WCSGSI) Collaboration projects are partnerships among industry, scientists, and managers to advance the use of Genetic Stock Identification (GSI) in fishery science and management.
Data sources	Alaska Department of Fish and Game (ADFG), commercial fishing information by area and by fishery Fisheries and Oceans Canada (DFO), Statistical Services Unit Market reports from seafoodsource.com, minato-tsukiji.com, globefish.org, firstchoice.com, alaskaseafood.org, and other sources National Marine Fisheries Service (NMFS), NOAA Fisheries, Fisheries Statistics Division, Annual Commercial Landing Statistics NOAA Fisheries, West Coast Groundfish Trawl Catch Share Program online query result OANDA Corporation (OANDA), historical currency exchange rates Pacific Fisheries Information Network (PacFIN), Pacific States Marine Fisheries Commission, Portland, Oregon, fish ticket data U.S. Bureau of Economic Analysis (BEA), U.S. Department of Commerce, NIPA price indexes U.S. Department of Commerce, International Trade Administration (ITA), TradeStats Express, State Export Data
Delivery	Delivery counts are based on fish tickets issued. Ticket counts may not represent 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.
ESA	Endangered Species Act
FEAM	Fishery Economic Assessment Model used to calculate fishing industry economic contributions. The FEAM is a derivative of the IMPLAN input-output model.
GDP IPD	Gross Domestic Product Implicit Price Deflator developed by the U.S. Bureau of Economic Analysis. This index is used to convert current year dollars to constant year dollars. The adopted constant dollar year is 2015.
Harvest volume	Landings are reported by weight in round pounds. 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 (gutted, gilled, and headed) when sold to the buyer or processor. Readers are cautioned that other state and federal agencies may use dressed weight in their reports.
Harvest value	Landings are depicted in prices paid to harvesters. Payments to harvesters (sometimes called harvester revenue or ex-vessel value) are simply the amount of the transaction between the harvester and the purchaser, which is usually a seafood processor. The 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.
H&G	headed and gutted
IBQ	individual bycatch quota
IFQ	individual fishing quota
IPHC	International Pacific Halibut Commission
LE	limited entry
MSA	Magnuson-Stevens Act
MSC	Marine Stewardship Council
Multiplier effect	The economic effects from subsequent rounds of spending (indirect and induced effects) that occur before money has leaked from the economy. For example, when personal income is the economic metric, it includes the net earnings from jobs and business owner income where commercial fishing vessels purchase goods and services. It also includes the net earnings gained from businesses receiving the share of household spending that can be attributed to income from the fishing industry.
OA	open access

ODFW	Oregon Department of Fish and Wildlife
Personal income	Income accruing to households in the form of net earnings from wages, salaries, and proprietorship income.
PFMC	Pacific Fishery Management Council, headquartered in Portland, Oregon. A U.S. federal board which oversees management of marine fisheries in federal waters off Washington, Oregon and California. The PFMC recommends management measures for fisheries within the U.S. West Coast's Exclusive Economic Zone (EEZ) (200 nautical mile ocean area adjacent to Oregon) or may allow for jurisdiction by the states. In regards to the major fishery categories referenced in this report, the ODFW manages in cooperation with other states the Dungeness crab and pink shrimp fisheries. The federal National Marine Fisheries Service (NMFS) conducts research, sets regulations, and ensures compliance with all laws pertaining to protection of marine species. Seafood product safety in Oregon is under the purview of the Oregon Department of Agriculture (ODA).
Precautionary level	The precautionary level is determined by the PFMC to be below an accepted maximum sustained yield (MSY) level and above an overfished level. To determine a stock's annual catch limit (ACL), the PFMC accepts a best estimate of current stock abundance. If abundance falls below the precautionary threshold, the ACL will be reduced according to the harvest control rule for that stock. If abundance falls below the overfished threshold, the ACL will be set according to an interim rebuilding rule until the PFMC develops a formal rebuilding plan for that stock.
Regional economic impact (REI)	Economic contribution and REI are slightly different concepts, but in this report the two terms are used interchangeably. A stricter use of the term "contribution" would be for an economic activity that already exists. The use of the term "impact" would be when an economic activity is to be subtracted or added. It is the share of the regional economy supported by the expenditures made by the industry being analyzed. It can be expressed in terms of a variety of economic metrics, including personal income, equivalent jobs, business output, product added value, and taxes generated. Economic contribution estimates include the "multiplier effect" that represents the share of business activities from suppliers, provisioners, and services that sell to the harvesting and processing sector. It also includes the "induced effect" from respending generated income within an economic region. The economic level for showing economic contributions adopted for this report is the State level. The economic contribution at the community economic level is less than for the State because of trade leakage to a more diversified economic level.

Executive Summary

The Oregon commercial fishing industry is an important contributor to the State's economy as well as having high social and cultural value. Economic contribution due to the industry may be generated from many activities other than just harvesting and seafood processing – for example, tourists attracted to working waterfronts. There are also boat building and repair business services at some ports. Management, safety, research, education, and training are related economic contributors. Aquaculture operations (mainly growing oysters) have a presence in many Oregon estuaries. Commercial wild harvesting activities share natural resources with a large ocean and inland recreational fisheries sector. Complex management by federal and state agencies ensure reasonable access by both sectors, yet conserve the resource to achieve sustainability. The scope of this report is to provide brief descriptions of Oregon's commercial fisheries (including tribal commercial fisheries) that occurred in 2015.

There was a significant downturn in the value of Oregon's commercial onshore harvests in 2015. The harvest value was $136.2 million. Year 2015 was less than the 2014 harvest value of $160.3 million by 15 percent. It was nine percent less than the five-year 2010-2014 average. Year 2015 is the lowest harvest value year since 2010. (The preliminary landings reporting is based on calendar year for all fisheries except the Dungeness crab fishery which used the traditional crab season December 1 through August 14. If a calendar year is used for all fisheries, then the harvest value is $114.3 million in 2015.) The overall downturn in in 2015, as compared to previous years, masks some fisheries increased harvest value: pink shrimp landings were highest since 1973; and, non-whiting groundfish, including sablefish, showed increases. It was the important fisheries such as Dungeness crab, whiting, sardines, and salmon that lowered the overall harvest value.

The harvest value represents revenue for 1,129 different vessels making 27,021 deliveries to Oregon ports. This is down from 30,703 deliveries by 1,199 vessels in 2014. The average revenue for active vessels (harvest revenue more than $500) was $104,423 in 2015. The active vessel median revenue was $36,472 in 2014 and $25,183 in 2015. The significant differences between the average and the median indicate that the industry is highly revenue heterogeneous. There were a total of 108 processing plants, restaurants, etc. that each purchased at least $10 thousand of Oregon landings. The top five parent companies purchased 77 percent measured by harvest value in 2015.

Oregon onshore landings from harvests in the Pacific Ocean and Columbia River catch areas are processed into seafood products locally or are shipped to high volume processing and distribution centers. The seafood products enter niche or commodity markets, both domestic and global. Those commodity markets include product substitutes that influence the price paid to processors and distributors that buy from Oregon harvesters. For example, many of the species landed in Oregon also are landed in greater numbers in Alaska and British Columbia (BC). For a comparison, Oregon's harvest value in 2014 was only six percent of all U.S. West Coast, Alaska, and BC landings. Some Oregon fisheries have a higher harvest value proportion in this northern Pacific Ocean area, such as Dungeness crab at 19 percent and pink shrimp at 56 percent in 2014.

Harvest prices are the result of a complicated set of determinates filtered through negotiated ask-bid arrangements. Ultimately, the domestic market consumer and foreign market importer will influence and bound the price that processors can pay harvesters. Fish is perceived as a higher priced protein food item and consumers will turn to other protein sources when incomes are lower and/or seafood prices rise. There was an overall downward trend in per-capita consumption of seafood in the U.S. in 2006 through 2012, but it has begun to rise slightly in 2013 and 2014. At the national level, seafood retail sale consumption (about 33 percent of all U.S. consumption in 2014) slightly increased in 2014 over 2013 while food service consumption (about 67 percent in 2014) grew proportionally more in 2014 over 2013.

Oregon's seafood production is part of a global marketplace and is successful because of a reputation for quality and environmental stewardship. The largest importer of Oregon's seafood products is Canada followed in order by Japan, Ukraine, Malaysia, and China. Canadian imports are often re-exported from BC to other foreign destinations; for example, Oregon harvested Dungeness crab in live product form is trucked to Vancouver, BC and flown to China. Oregon's seafood exports totaled $53.6 million in 2015, which was down from $65.3 million in 2014.

The largest proportion of seafood consumed in Oregon is from products imported from overseas. In 2014, almost 94 percent of seafood consumed in the U.S. was derived from imported product (measured by volume). However, Oregon-harvested and processed seafood has a market presence along the coast and in central valley urban centers. It is a traditional staple for Oregon Coast visitors and sought after by discerning consumers.

The Oregon commercial fishing industry generated $205 million in total personal income in 2015 from onshore landings using calendar year accounting for all fisheries. This compares to a 2014 inflation adjusted economic contribution of $296 million. Year 2015 had a 31 percent lower economic contribution than the five-year average (2010 to 2014) of $299 million. Distant water fisheries are a significant additional component of the commercial fishing industry's total economic effects in Oregon. Year 2015 estimates for distant water fisheries economic effects are not yet available, but if 2014 effects of $284 million are used, then the total economic contribution in 2015 is estimated to be $489 million. Overall, this translates roughly into 15 thousand jobs generated by the industry (using an equivalence annual average for coastal counties of $33,000).

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I. Introduction

This report provides an Oregon commercial fishing industry Year 2015 statewide summary and includes a glimpse of nine major onshore delivered fisheries. The descriptions include tallies for onshore landings volume and harvest prices. Comparisons to previous year fishing industry activity are made. Processor production and seafood product forms are discussed, as is destination markets for the production. There are details about participant characteristics, fishing industry economic contribution estimates, and current industry challenges. More in-depth descriptions about Oregon's commercial fishing industry can be found in TRG (2015a).

Dungeness crab (Metacarcinus magister, formerly Cancer magister) *is a species of crab that inhabits eelgrass beds and sandy bottom habitat from Alaska's Aleutian Islands to Point Conception, California. The crab is tolerant of salinity changes and can be found in estuarine environments. The crab has been harvested commercially along the northern Pacific Coast since the late 1880's. Approximately 8.3 million pounds were landed in Oregon in the 2014-15 season with an average harvest price of $4.08. Oregon landings were 20 percent of all Alaska, British Columbia, and West Coast continental states for a three-year average 2012-2014. The crab is a popular seafood named after Dungeness, Washington on the Strait of Juan de Fuca. The crab is prized for its sweet and tender flesh.* (Courtesy NOAA Fisheries, picture by Florian Graner, Sealife Productions, taken on June 2nd, 2010)

II. Fisheries

In terms of volume, 209.9 million pounds of fish were delivered to Oregon ports in 2015 (Table 1 and Figure 1). This was down from 302.9 million pounds in 2014. Price differences in 2015 compared to 2014 were mixed (Figure 3). Some fisheries (such as Dungeness crab and pink shrimp) had increased prices and others (such as albacore tuna and Pacific whiting) had decreases (Table A.3). There were some notable differences, such as lingcod prices which increased by 37 percent. The decrease in volume and price differences caused an overall decrease of onshore harvest value to $136.2 million in 2015 (Figure 2). This is 15 percent less than 2014 when $160.3 million was landed.

This section of the report discusses the ups and downs in individual fisheries. There are itemizations for nine major onshore fisheries plus an "other" fisheries category. The discussions are glimpses related to landing amounts, processing, end-markets, and management issues. The ODFW (May 2015) report has more in-depth information about research and management for the fisheries categories.

1. The Oregon ocean ***salmon*** fishery harvested with troll gear in 2015 in general was crafted to take advantage of returning hatchery produced Sacramento River fall Chinook and hatchery reared lower Columbia River stocks while avoiding Endangered Species Act (ESA) listed stocks (PFMC February 2015).[1] The harvest value for the ocean troll gear Chinook fishery was about half in 2015 compared to 2014 and slightly up from the 2010-2014 five-year average, while the Columbia River net gear Chinook fishery was up in revenue and down in volume. Ocean troll gear Chinook harvest prices in 2015 were about seven percent higher

than in 2014. Revenue for the Columbia River Chinook net gear fishery by tribal and non-Indian participants was about 18 percent greater than the 2014 value, despite lower volume.[2] Troll and net caught coho in 2015 were about 85 percent less than 2014. Overall, Oregon salmon landings in 2015 produced about 42 percent less revenue than in 2014.[3]

There were 606 active salmon vessels in Oregon in 2015 versus 636 in 2014, not counting tribal fishery vessels (Table 2). Of the active number of vessels in 2015, there were 450 vessels using troll gear and 156 vessels in non-Indian fisheries using net gear. There is substantial latent capacity in the ocean salmon fishery with 979 permits issued in the troll fishery by Oregon in 2013. Similarly, for the Columbia River non-Indian net fishery, there were 292 permits issued by Oregon in 2013. There were 258 permits issued by Washington in 2004 for the Columbia River non-Indian net fishery (TRG 2006).[4] Washington's limited entry Columbia River gillnet permits also authorize harvesting in Willapa Bay or Grays Harbor.

The forecasted lower ocean salmon abundance, unstable price in the albacore troll tuna fishery, and unfavorable weather conditions led to decreased participation in the 2015 troll fishery. The total ocean salmon catch volume was down by 55 percent in 2015 from 2014 and the average volume per active vessel decreased from 6,515 to 3,053 pounds or 53 percent for troll Chinook. For the vessels making Oregon landings in the Columbia River non-Indian fishery, the average pounds of salmon (Chinook and coho) decreased from 14,956 to 7,219 pounds per active vessel across the two-year period.

2. The ***Dungeness crab*** fishery description uses reporting based on the traditional crab season December 1 through August 14. All other fisheries are based on a calendar year.[5,6,7] The 2014-2015 season got off to a late start due to meat density not meeting standards. The fishery experienced higher prices in the 2014-2015 season ($4.08) than in the 2013-2014 season ($3.53). The real dollar 2010-2014 five-year average was $2.70 per pound. Crab prices at the start of the season are at their lowest when production is oriented towards the West Coast retail market for whole-cooked product form (Figure 5). After the first of the year, prices increase and the production switches to a section product form for the national food service market. Meat production from landings of flawed crab (missing legs, backs with barnacles, etc.) occurs throughout the year including using sections left in inventory at season end. A market substitute for the section product form is snow crab and to a lesser extent Tanner crab harvested in Alaska. John Sackton (2012) estimated annual volume by product form to be: whole cooked fresh/frozen (35 percent), sections and meat (30 percent), and live (25 percent). However, the mix changes year-to-year depending on market conditions. There has been a growing market demand from Asia for a live product, however the demand decreased in 2015 due to China's faltering economy (Sackton 2015). The 2014-2015 season is estimated to have produced total harvest value of $33.8 million which was 25 percent of all onshore landed value from all fisheries (Table 1). This proportion is down from 33 percent of all onshore harvest value in the previous five years. There were 319 active vessels in the 2014-2015 season as compared to 321 vessels in the 2013-2014 season (Table 2).

3. The higher prices in the ***pink shrimp*** *(Pandalus jordani)* fishery in 2013 and 2014 continued to increase in 2015. Oregon processors willing to meet European import standards helped keep overall demand high for the coldwater shrimp product. Supplies to the European market from the Canadian Atlantic coldwater shrimp *(Pandalus borealis)* fishery harvests decreased in recent years. The lower landings bode well for West Coast harvests being available to supply the market. There has been a growing Asia export market for a frozen head-on product form. The Oregon fishery is managed for shrimp size, so harvesters attempt to catch older size classes which have higher prices. With a similar volume, but higher price in 2014, the estimated 2015 harvest value is over one and a half times the previous five-year average. There were 78 active vessels that made deliveries in 2015 and 60 active vessels in 2014. There are bycatch management concerns for the shrimp fishery because of coincident catch of the ESA threatened listed eulachon smelt species. A gear technique using net lighting devices showed experimental promise to avoid catch of the ESA threaten listed eulachon species and is now widely used by the shrimp fleet (Hannah and Jones 2015).

4. The ***albacore tuna*** fishery saw prices decrease in 2015 compared to 2014. The average price at $1.22 per pound was 22 percent less than the five-year average of $1.56 (Table 1 and Figure 3). Vessels deliver tuna in three handling categories: blast frozen (accounting for 47 percent of total volume in 2013), brine frozen (35 percent), and iced (18 percent) (Frierson 2013). Frozen product form prices have fallen lately mainly due to strong dollar and Japanese catch increases following harvesting setbacks related to the Fukushima earthquake. There are also increased supplies on the world market from Chinese subsidized non-albacore tuna fisheries. The non-albacore tuna enters the same Spanish and Asian markets as albacore tuna. The Oregon harvest in 2015 was 7.6 million pounds with a harvest value of $9.2 million, both of which are slightly lower than 2014. In 2015, there were 323 active vessels in the fishery. This compares to 2014 when 361 active vessels made landings. There are U.S.-Canada Albacore Tuna Treaty vessel reciprocity fishing grounds restrictions.[8] Canadian vessels have freezer capabilities and haul catch rather than deliver harvests to Oregon ports. There were three Canadian vessels landing $238 thousand of albacore tuna in Oregon in 2015.

5. The onshore ***groundfish*** fishery is discussed below in three parts: groundfish other than sablefish and Pacific whiting, and separately for the sablefish and Pacific whiting fisheries. The groundfish fishery other than sablefish and Pacific whiting has an approximate allocation of 90 percent for a catch share program and the balance saved for open access (OA). The sablefish allocation is complicated by a split between vessels using trawl gear and vessels using fixed gear. The Pacific whiting allocation is split between what is landed onshore (42 percent) and offshore (58 percent).

    a. The groundfish fishery other than sablefish and Pacific whiting is estimated to have a harvest volume about 12 percent higher in 2015 compared to 2014. Some species prices including thornyheads and some flatfish decreased in 2015 over 2014. With the higher harvest volume, the estimated 2015 harvest value was about 15 percent higher in 2015 than 2014. There were 246 active vessels in the fishery in 2015 and 200 in 2014.[9,10] A concern for fishery participants is not being able to harvest assigned species annual catch limits for healthy stocks due to limits being reached for stocks of concern (or so-called

choke stocks). The West Coast onshore quota pounds harvested in 2015 were 36 percent of PFMC approved total quota pounds (NOAA Fisheries 2016).

Year 2015 is the fifth year of the new limited entry (LE) trawl gear individual fishing quota (IFQ) program. A smaller number of IFQ vessels are prosecuting the fishery and per delivery volume is greater than before the program was initiated (Holland and Norman 2015). IFQ vessels also have individual bycatch quotas (IBQ) which cannot be exceeded without severe penalties. It appears from the data that vessel owners are developing successful strategies to avoid bycatch species (such as overfished species, halibut, mammals, etc.) and are using voluntary risk pools with other vessels to cover overages (Brinson and Thunberg 2013). The concern about increased effort in other fisheries (spillover effect) by vessels electing not to participate in the fishery and leasing their quota pounds has not occurred. The industry has testified about the difficulty, especially for small scale vessels, for absorbing the added costs for the program's required 100 percent observer coverage, given already high payments for the 2003 groundfish vessel buyout federal loan and NOAA Fisheries IFQ program cost recovery fees. Research is underway to determine the potential for utilizing electronic monitoring technologies for lowering observer costs.[11]

b. ***Sablefish*** demand especially from Chinese purchasers drove prices to record levels in Alaska and along the West Coast in 2011 (Coomes September 2011). The demand decreased since then due to the weakening Chinese economy, strengthened dollar over the Japanese yen, and high hold-over inventories. Prices in 2015 decreased six percent compared to the five-year average (Table 1 and Figure 3). A small but growing amount of the groundfish trawl IFQ program sablefish is now harvested with fixed gear. Sablefish caught with fixed gear fetches comparatively higher price due to higher quality. (For the IFQ vessels that switch gear and catch their sablefish quota pounds with fixed gear, the higher price is reflected on Table 1 for the trawl gear row.)

   The LE fixed gear sablefish management program is a quasi catch-share program accomplished by the use of stacked permits. Each permit type has an assigned sablefish quota, and the total amount of sablefish that can be harvested by a vessel depends on its number and type of permits. Sablefish abundance is managed at a "precautionary biomass threshold" level.[12] The harvest value in 2015 was estimated to be 58 percent higher than the 2014 value. There were 127 active vessels in Year 2015 of which 45 were trawl gear LE, 43 were fixed gear LE, and 44 were OA. In all of 2014, there were 110 active vessels.

c. The ***Pacific whiting*** price change that occurred in 2012 when the price jumped to $0.14 per pound has eroded to $0.08 in 2015 (Table 1 and Figure 3). The strong global demand (especially eastern European countries) for headed and gutted (H&G) (and sometimes tailed) product that is a lower price substitute for white flesh seafood has weakened due to international political turmoil. There is an embargo on Russian imports and eastern European economies have weakened. Some Oregon processors have returned to surimi production (estimated to be 50 percent of onshore harvests in 2015) with the lack of a H&G market. There was a market expansion in 2015 for the frozen round product form

sold to West African countries. There is industry worry that continued increasing supplies of whiting and political volatility in export markets will put additional price pressures on whiting products. Stock abundances were up in 2015 due to high recruitment from a very strong 2010 year class. The full onshore allocation was not harvested due to a number of factors including the stock being dispersed causing lower catch-per-unit effort. Catch in 2014 was a 30-year high of 168.2 million pounds, and in 2015 it was down 44 percent. There were 24 active vessels that made Pacific whiting onshore deliveries in Year 2015 and 2014. There was good news in 2012 that widow rockfish was removed from the list of overfished species. This species is caught coincidentally with the same mid-water trawl gear used in the whiting fishery. A small amount of widow will be available for an incidental fishery and Pacific whiting harvest efficiency may increase due to not having to incur avoidance costs associated with minimizing widow rockfish bycatch.

Pacific whiting (Merluccius productus) *is harvested with mid-water trawl net gear. It is Oregon's highest volume harvested species delivered onshore. In 2015, the deliveries total 43,050 metric tons. New handling techniques have allowed the species to be marketed in headed and gutted and fillet product forms rather than the manufacturing of surimi (fish paste used to mimic the texture and color of other seafood). The new product forms have a higher market value and allow for increased prices paid to harvesters than the surimi product form.* (Photo courtesy of NOAA Fisheries)

6. The ***sardine*** population is in a down cycle. There was an emergency early closure of the 2014-2015 season and suspension of the 2015-2016 season. Oregon deliveries in 2015 were 25 percent of 2014 levels. Sardine prices in 2015 were 45 percent higher than the five-year average, but lower than in 2014. The lower price produced a $0.8 million harvest value which was down from $3.6 million in 2014. The previous five-year average was $5.7 million. There were six active vessels in Year 2015 as compared to 17 active vessels in all of 2014. There was lower export foreign demand for sardine products (including canned and frozen whole) for human consumption. The export demand for sardines used as longline gear bait and tuna farm fattening supplement, however, continued to be strong. Demand for human consumption is highly dependent on fish size and quality. Belly thickness, average size, and oil content can all influence the quality of the fish and therefore price. While all of these factors reach a peak in August and September, management quotas allow harvesting prior to August.

7. The ***Pacific halibut*** volume and price in 2015 were 282 thousand pounds and $5.08 per pound, both of which are about the same as in 2014. The Oregon halibut fishery is an OA directed species fishery using longline gear with high participation by vessels that also have fixed gear groundfish permits. It is also an "incidental fishery" managed as a ratio to salmon harvests. Over the last few years in Oregon, the directed fishery has only lasted a couple of 10-hour fishing periods during summer months. The discard mortality for this species in the LE trawl groundfish fishery is a management concern.[13] The IPHC has reported that stock abundance appears to be on an increasing trend. There is a slight increase for this fishery quota in 2016.

In addition to these major fisheries, there are ***"other species"*** harvested and delivered to Oregon Coast ports. One unusually high species delivery in 2013 was ***Pacific (chub) mackerel*** at 1.0 million pounds. About two-thirds of all of the chub mackerel deliveries were "weigh-backs" that have zero revenue for harvesters. In 2014 it was up to 2.6 million pounds and in 2015 it was down to 99 thousand pounds. The five-year average is 1.5 million pounds with a $0.08 price. Chub mackerel is caught coincident with sardines. The species has a separate management quota and specific management rules which can limit the trip ratio of sardines and mackerel. This species can be sold for human consumption or is rendered and used in manufacturing as a livestock and pet food product. Another "other" fishery is ***hagfish***. About 1.8 million pounds were landed and sold at an average price of $0.83 per pound in 2015. Hagfish are dried and sold whole as a delicacy in mostly Korean markets. ***Red sea urchins*** harvested off the southern Oregon Coast by divers is another "other" species. The 2015 harvest for red sea urchin was 446 thousand pounds with an average $0.58 price.

Pacific sardine (Sardinops sagax) *is considered to be an important forage fish in the Pacific Ocean ecosystem. The commercial fishery market for Pacific sardines is mostly export. It is used as longline gear bait, tuna feed in international aquaculture operations, and a small amount for human consumption. Landings of sardine have historically fluctuated due to changing environmental conditions. The recent year record landings at ports in Washington and Oregon was 78,059 mt delivered in 2012. Because of shrinking biomass, there was an emergency closure of the fishery in 2015. Pacific sardine is managed by the Pacific Fishery Management Council.* (Photo courtesy of Astoria Riverfront Trolley Association, Astoria, Oregon)

Oregon ***aquaculture*** products such as oysters and economic effects from ***distant water fisheries*** are not included in the above brief fisheries descriptions.[14] Their estimated economic contribution is mentioned in a following section. The derived distant water fisheries income (including the multiplier effect) can add up to 40 percent or more of the total economic effects from Oregon's commercial fishing industry.

III. Participants

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 harvesters, processors, affected communities, and ultimately the public. Studies show Oregonians not only care about natural resource conservation, but have empathy and appreciate the life style of the participants. 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 and innovation is celebrated by those that enjoy Oregon seafood.

In 2015, there were 27,021 deliveries to Oregon ports by 1,129 vessels (Table 2). This is down from 30,703 deliveries by 1,199 vessels in 2014. The average revenue for active (harvest revenue more than $500) vessels was $104,423 in 2015, which is a decrease of 22 percent or $29,224 compared to 2014. The active vessel median revenue was $36,472 in 2014 and $25,183 in 2015. Most of the harvest revenue (70 to 80 percent depending on the fishery) is accomplished by a minor number (20 to 30 percent) of vessels (Figure 6). The significant differences between the average and the median indicate that the industry is highly revenue heterogeneous.

There were 4,553 vessels making deliveries to Oregon ports in 1981 and 1,129 vessels in 2015. Active vessel (more than $500 per year) annual average revenue (adjusted for inflation) was $41,475 in 1981 and $104,423 in 2015. (Photo courtesy of Oregon Trawl Commission)

The processing sector has similar heterogeneity where there are several dominant companies and many small buyers. The top five parent companies purchased 77 percent measured by harvest value of all fish landed onshore in Oregon in 2015 (Table 4). There were a total of 108 first-purchasers for at least $10 thousand of Oregon landings. There were a total of 180 first-purchase "active" businesses (purchased more than $500) in 2015 which is down from 192 in 2014. In all, there were 198 first purchasers in 2015. (A small number of counted first purchasers are bait dealers or vessels making direct sales to the public.)

There were opportunities for harvesters to be paid for research, management collaboration, and other programs in 2015. For example, participation in halibut resource survey programs, salmon genetic stock identification for the Collaborative Research Oregon Ocean Salmon (CROOS) project, and retrieval of derelict crab gear.[15]

There has been a trend over the last three decades for lesser number of vessels and consolidation of processor ownership. There is also a shift in landings and processing at small ports to those being made at the three larger "regional fisheries centers" (Figure 7).[16] The landings still occurring at small ports are purchased by large processors using little labor and requiring limited facilities at the ports. The fish is then hauled to centralized processor plants for processing and warehousing.

IV. Markets

While the Oregon commercial fishing industry production is substantial, the State and the U.S. are net importers of seafood for consumption. In 2014, almost 94 percent of seafood consumed in the U.S. was derived from imported product (measured by volume).[17] Most of Oregon's production is shipped outside of Oregon to satisfy niche and commodity markets.[18] About one-third is destined for domestic markets and two-thirds for foreign markets if market trends follow U.S. seafood production trade characteristics (NMFS 2015). Some Oregon harvested and processed seafood has a market presence along the Coast and Valley urban centers. It is a traditional staple for Oregon Coast visitors and sought after by discerning consumers.

The commodity markets include product substitutes that influence the price paid to processors and distributors that buy from Oregon harvesters. For example, many of the species landed in Oregon also are landed in greater numbers in Alaska and British Columbia (BC) (Table 5). For a comparison, Oregon's harvest value in 2014 was only six percent of all West Coast, Alaska, and BC landings. Some fisheries have a higher harvest proportion in this northern Pacific Ocean area, such as Dungeness crab at 19 percent in 2014.

The Oregon commercial fishing industry is highly regulated by government, but also receives economic development assistance from government. For example, the Oregon Department of Agriculture assists with market maintenance and development service through administration of four seafood product related commodity commissions: salmon, albacore tuna, Dungeness crab, and trawl gear fisheries. The commodity commissions are supported through ad valorem assessments on particular species landing revenues. Oregon State University administers several programs supporting the industry, including Sea Grant, Extension Service, Seafood Research and Education Center, Coastal Oregon Marine Experiment Station, and the interests from several academic departments. Local governments and coastal port districts provide public services and advocate industry causes. (Picture shows a spicy southwest Chipotle albacore tuna burger. Photo courtesy of Chef De Home.)

Oregon's seafood production is successful in global markets because of a reputation for quality and environmental stewardship. The largest importer of Oregon's seafood products is Canada followed in order by Japan, Ukraine, Malaysia, and China. Canadian imports are often re-exported from BC to other foreign destinations, such as Oregon harvested Dungeness crab in a live product form is trucked to Vancouver, BC and flown to China. Oregon's seafood exports totaled $53.6 million in 2015, which was down from $65.3 million in 2014.[19,20]

At the national level, seafood retail sale consumption (comprises about 33 percent of all U.S. consumption in 2014) slightly increased in 2014 over 2013 while food service consumption (comprises about 67 percent in 2014) increased more in 2014 over 2013 (NMFS 2015). There was an overall downward trend in per-capita consumption of seafood in the U.S. in 2006 through 2012, but it has begun to rise slightly in 2013 and 2014.[21]

There are a large number of seafood distribution chain transactions before Oregon fishery harvests reach the consumer. This shows the importance and integration of this industry with the Oregon Coast economy, national markets, and global markets. Five of Oregon's fisheries (Dungeness crab, pink shrimp, albacore tuna, Pacific whiting, and groundfish trawl) out of 275 global fisheries (as of October 2015) are certified by the Marine Stewardship Council (MSC) to be sustainably managed.[22] The certification can have benefits from consumer awareness for product quality and resource sustainability. The MSC advocates that premium prices and access to new markets can accompany the certification.

V. Economic Contributions

The Oregon commercial fishing industry is an important contributor to the State's economy as well as having high social and cultural value. Economic contribution due to the industry may be generated from many activities other than just harvesting and seafood processing – for example, tourists attracted to working waterfronts. There are also boat building and repair business services at some ports. Management, safety, research, education, and training are related economic contributors. Aquaculture operations producing oysters have a presence in many Oregon estuaries. Commercial wild harvesting activities share natural resources with a large ocean and inland recreational fisheries sector (TRG 2015b). Complex management by federal and state agencies ensure reasonable access by both sectors, yet conserve the resource to achieve sustainability.

The Oregon fishing industry (not including distant water fisheries) generated $205 million total personal income in 2015 (Table 3). This compares to a 2014 economic contribution of $296 million. Year 2015 generated an economic contribution 31.3 percent lower than the previous five-year average of $299 million. This includes the income generated by the spending from harvesting and primary processing sectors. The economic contributions also include the income generated by the expenditures from supporting industries and businesses in the region as well as re-spending by households who receive earnings from the fishing and supporting industry (or the multiplier effect).[23]

Distant water fisheries are a significant component of the commercial fishing industry's total economic effects in Oregon. These fisheries include harvests adjacent to the three West Coast continental states and delivered by catcher-vessels to motherships or caught by catcher-processors, harvests in Alaska waters, and harvests in the western Pacific. Detailed estimates are not yet available for 2015. The economic contributions in 2014 were $287 million.

The estimated total personal income generated by the Oregon commercial fishing industry (onshore and using inflation adjusted 2014 estimated distant water fisheries) in 2015 is $489 million, depending on the final modeling results for 2015 distant water fisheries. (Shellfish aquaculture is not included in these estimates. TRG (2015a) provides an estimate of $10 million economic contribution in 2014.) At a county part-time and full-time equivalent job income of $33,000, economic contribution estimate is equivalent to about 15 thousand jobs. This is about a 20 percent decrease in economic impacts over the previous five-year average. The commercial fishing industry represents about one-half percent of all Oregon net earnings and 10 percent of

Oregon Coast net earnings. In 2014, the commercial fishing industry share of local net earnings ranges from over 20 percent in Lincoln County to two percent in Tillamook County.

VI. Discussion

The commercial fishing industry is a thriving and important economic sector for many communities along the Oregon Coast, but there have been structural changes to the industry that have caused disruptions. Over the last 30 years, the Oregon fishing industry has shifted from low-volume and high-value species, such as salmon and crab, to high-volume and low-value species (Figure 4). In 2015, about 49 percent of the volume landed was Pacific whiting and sardines, but these high-volume species comprised less than one-tenth by landed value. This trend has had the effect of concentrating landings at regional fisheries center ports that have high-volume harvesting and processing capabilities. Fewer vessels are participating, and for the boats remaining active, there has been an increased trend in annual average revenues.

The fishing industry harvesting and processing characteristics discussed in this report have a business structure perspective. The fishing industry is becoming more industrialized. The fewer vessels participating require higher annual revenues to be a profitable business. There is processor ownership consolidation and centralization of operations. Landings are often hauled elsewhere, precluding the need for local labor and support businesses.

Issues that the commercial fishing industry is confronting include:

1) Pressure to set aside no-take areas for: (a) marine protection areas for research and habitat protection, (b) wave/wind energy generation, (c) other uses (e.g., underwater cables or temporary closures to minimize fishery bycatch).
2) Social policies for allocation among user groups (commercial, recreational, tribal fishermen, and communities).
3) Judicial decisions on habitat protection and incidental take issues brought to the forefront by conservation organizations, including protection of sea birds and marine mammals either impacted by fishing techniques or dependent on protein from harvested fish species; compacts and international treaties, for example 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.
4) Better understanding in the science of ecosystem interactions and improved stock assessments that may cause fishery management agencies: a) to reduce exploitation rates, control fishing gear, reduce trip limits, or have further restrictions via time/area closures through new initiatives to develop ecosystem-based fishery management plans; b) develop stock building programs calculated using variables with large uncertainties; and, c) design rebuilding programs that will take many years due to the life history characteristics of certain species.
5) 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

gear technologies and methods to share real time information among vessels to avoid hotspots where the depleted species are aggregating.

6) In general, there are not major populations of underutilized species which harvesters can exploit, but new fisheries may develop around minor opportunities for filling niche markets.

7) Increasing costs for prosecuting fisheries, including monitoring, fuel, safety equipment, insurance, moorage, etc. New, more selective management requirements 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.

8) Uncertainty about new conservation standards pending for inclusion in the Magnuson-Stevens Act (MSA) reauthorization.

9) Increasing use of catch-share programs with transferable and tradable quotas.

Newman's Fish Company in Portland and Eugene features seafood from Oregon fisheries. The business celebrated its 125 anniversary in 2015. (Photo courtesy of Newman's Fish Company.)

10) The proliferation of certification programs for seafood product quality and capture fisheries sustainability has potential benefits but also costs that may burden harvesting associations and processors. The certification concept has merit, but there is expense in trying to respond to duplicate systems. The multiple systems can confuse rather than inform consumers, which is the opposite intent of the programs.

11) Consumer concerns about quality (freshness, inclusions of toxics, etc.) will affect seafood product demands. Considerations about health and wholesomeness of wild harvested fish could be a marketing advantage to Oregon's fishing industry.

12) Climate variability has effects on fish habitat that harm some species and boost populations of other species.

13) 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 pressures on the State and ports to provide funding.

14) 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 and replacing funds with higher fishing industry fees.

Goals for the industry should include generating more value from available fishery resources, but increasing resource value has several challenges. There will be continuing price pressures on seafood products from substitute aquaculture products and substitute animal products (such as chicken). Consumer concerns about quality (freshness, toxins, bacteria, etc.) will affect seafood product demand. Considerations about health and wholesomeness of natural wild-caught, coldwater fish could be a marketing advantage to Oregon's industry. Seafood traceability systems exist for allowing source and quality information to be tracked through all steps of production, distribution, and sales. This informs the consumer about purchasing decisions and provides for rapid and complete product recall procedures. It also provides information for managing production, processing, inventories, and distribution. Modernization of vessels for better handling capabilities and modernization of processing plants will improve seafood products. Assistance through commodity commissions and other entities for developing smart marketing strategies that may gain market power for Oregon seafood products should help the industry raise value at all levels of the seafood production chain.

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Endnotes

1. *Management objectives for Chinook fisheries south of Humbug Mt. have different constraining factors than the rest of the Oregon Coast. In 2015 the south of Humbug Mt. management was mainly constrained by concerns for the Klamath Rivers' year-4 fall Chinook abundance. The Cape Falcon to Humbug Mt. area was constrained by impacts to the lower Columbia River natural tule Chinook abundance as well as the Klamath Rivers' year-4 fall Chinook abundance. The ocean catch area north of Cape Falcon management was limited by many ESA listed Columbia River stocks, and to the extent possible meet treaty Indian sharing obligations and provisions of the Pacific Salmon Treaty (PST) for Chinook stocks of concern. The primary constraint was the lower Columbia River natural tule exploitation rate. Management objectives for coho fisheries are primarily guided similar to Chinook by maximum impacts to ESA listed stocks. The lower Columbia River natural coho was a particularly vexing ESA listed stock for designing fishery seasons. For both Chinook and coho, incidental catch in other fisheries (such as the midwater trawl whiting fishery) and all inland fisheries harvests are taken into account in determining ocean management seasons.*

2. *The total value of Columbia River salmon harvested in 2015 was $15.5 million, with 29 percent from landings on the Oregon side and 71 percent from landings on the Washington side. The value of the Oregon side landings was 67 percent from non-Indian fisheries and 33 percent from tribal fisheries, and the value of the Washington side landings was 19 percent from non-Indian fisheries and 81 percent from tribal fisheries.*

3. *The combined river harvested price for spring and fall Chinook is about half of the ocean harvested price. However, the comparison between prices received for river net caught salmon and for ocean troll caught salmon should have careful financial and economic review. For example, the average weight of a net caught Chinook is much larger than the average weight of a troll caught Chinook. Troll harvesting will also have a by-catch of "shakers," whose mortality would have to be subtracted from available fish in net harvesting which is mostly retainable marketable adults. Also included in any comparison should be the semi-processing for troll caught fish and the extra egg value for net caught fish. A rule of thumb is any comparison for total value will show that net and troll harvested fish will come out to be about equal.*

4. *There were 244 non-Indian vessels landing Columbia River net salmon in 2015 on either the Washington or Oregon side of the Columbia River, with 145 landing only on the Oregon side, 71 landing only on the Washington side, and 28 on both sides.*

5. *The commercial Oregon ocean Dungeness crab fishery traditionally has a December 1 opening and runs through August 14. The fishery opening date can be delayed until a meat quality and density standard is met or if an opening season price cannot be settled. For example, the 2013-2014 season was delayed two weeks until December 16, 2013 due to crab meat density standards. The December 2015 season start was delayed to January 4, 2016 due to crab health standards.*

6. *There is a smaller commercial bay crab fishery which operates under different season and gear restrictions than does the ocean fishery.*

7. *Calendar year accounting can cause anomalies in the reporting of ocean Dungeness crab fishery season landings. If the season traditional season opening on December 1 is delayed, then higher catch rates will increase landings in January of the following year.*

8. *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.*

9. *Management quotas are assigned to a limited entry (LE) program for boats using trawl gear and separately for fixed gear (pots and longlines). The allocation assigned to an open access fishery must use fixed gear and management is accomplished by trip limits. The LE fixed gear vessels groundfish (except sablefish) harvests are also managed with trip limits.*

10. *There were eight groundfish species in an overfished status in 2011 of which six are typically found in waters off of Oregon: canary, darkblotched rockfish, Pacific Ocean perch, widow rockfish, yelloweye rockfish, and*

petrale sole. In 2012, widow rockfish was removed from this list. In 2015, petrale sole and canary were removed from the list. There is concern about stock status for blue rockfish, China rockfish, and kelp greenling.

11. *A financial issue for the industry is taking on the full cost for the 100 percent observer coverage now called for in the IFQ program design. The observer costs would be in addition to payments on a 2003 LE trawl permitted vessel buyout program loan; and, cost recovery (no more than three percent of harvest value of the shoreside sector, and estimated to be two percent in the mothership sector and one percent in the catcher-processor sector) for NOAA Fisheries administration of the IFQ program. The observer coverage accounting basis is cost per trip no matter the vessels harvest levels. The unintended consequences would be to encourage small scale vessel leasing of quota pounds to larger scale vessels that have profit margins that allow for the new trip costs.*

12. *The precautionary biomass threshold is in addition to the overfishing and overfished/rebuilding thresholds required under the Magnuson-Stevens Act (MSA). The precautionary threshold is used to trigger a precautionary management approach using reduced appropriate harvest rates. The default precautionary threshold will be 40 percent of the estimated unfished biomass level, however the PFMC may recommend different precautionary thresholds for any species or species group based on the best scientific information about that species or group.*

13. *The International Pacific Halibut Commission (IPHC) Area 2A allocated halibut bycatch mortality in the commercial West Coast trawl fishery exceeded the allocations in the commercial non-tribal directed and incidental fishery in 2011. The PFMC addressed this concern by reducing the allocations in the Groundfish FMP Amendment 21-1 to about half of previous allocations starting in the 2012 season. There will be further capped reductions after four years. The trawl fishery only attained about one-third of the allocated mortality in 2011. The attainment was 87 percent less than in 2010 (Jannot et al. September 2012). The bycatch rate of halibut in the LE trawl fishery has been two to five percent of retained fish. The mortality rate of the halibut discards ranges from 20 percent of those in excellent condition, 55 percent of those in poor condition, and 90 percent of those thought dead.*

14. *Distant water fisheries include vessels that moor at Oregon ports and deliver Pacific whiting to offshore motherships. Vessels with ties to Oregon businesses commute to participate in Alaska and western Pacific fisheries. Oregon residents own harvesting permits in Alaska, but keep vessels year around at Alaska ports. Sometimes owners will lease permits for others to harvest the permit quota shares. Oregon residents will also hire on as crewman or processor workers and return paychecks that are spent in Oregon.*

15. *The CROOS program is described in Bellinger et al. (2015).*

16. *Regional fishing centers are defined to be Astoria, Newport, and Charleston. Other coastal ports identified in the PacFIN database include (alphabetically) Bandon, Brookings, Cannon Beach, Depoe Bay, Florence, Gold Beach, Gearhart/Seaside, Nehalem Bay, Netarts Bay, Port Orford, Pacific City, Siletz Bay, Salmon River, Tillamook/Garibaldi, Winchester Bay, Waldport, Yachats, and some Washington landings transported to Oregon in some years. The PacFIN database includes deliveries made to Warrenton as deliveries made to Astoria.*

17. *A portion of this imported seafood is caught by American fishermen, exported overseas for processing and then re-imported to the U.S.*

18. *Niche markets are distinguished from commodity markets in the specificity of the consumer. An example of a niche market is a New York restaurant chain seasonal menu containing a reference to Columbia River spring Chinook. An opportunity exists for producers (in this case harvesters and processors) to become wholesalers, and sell directly to the restaurant chain. This differs from the commodity market whereby a producer sells to a distributor who may service large retailers across the U.S. There are many other examples of Oregon harvesters and processors developing and selling into niche markets: Oregon Oyster Farm exporting shucked oysters to a Taiwan buyer, and Port of Port Orford harvester joining the Port Orford Sustainable Seafood organization that delivers directly to household subscribers.*

19. *State exports are from U.S. Department of Commerce, International Trade Administration (ITA) (http://tse.export.gov/TSE/TSEhome.aspx), using NAICS code 1141 (fish, fresh/chilled/frozen & other marine products), 1125 (farmed fish and related products), and 3117 (seafood prods, prepared, canned & packaged).*

20. *The export market is highly influenced by currency exchange rates. A weakening dollar relative to other currencies will decrease foreign import prices, increase demand, and tend to raise exporter and subsequently harvester prices (Figure A.1). In contrast, a strengthening dollar – for example the decrease in value of the Japanese yen in 2014 – will mean less product can be purchased. The falling demand will contribute to falling prices such as for sablefish exported to Japan. The movement of currency exchange rates is combined with other foreign import situations, such as tariff structures and embargoes, to determine demand.*

21. *Annual per capita seafood consumption decreased in 2012 to 14.4 pounds from 15.0 pounds in 2011 and 15.8 pounds in 2010. In 2013 it increased to 14.5 pounds and in 2014 increased to 14.6 pounds.*

22. *The Oregon Dungeness Crab Commission decided not to renew the MSC certification November 2015. The certification will lapse for the 2015-2016 season.*

23. *The economic contribution estimates are from application of the Fishery Economic Assessment Model (FEAM). The FEAM was originally developed by Hans Radtke and William Jensen for the West Coast Fisheries Development Foundation in 1984. The FEAM utilizes the basic framework of a secondary input/output model combined with fishing industry information. The FEAM relies on response coefficients from IMPLAN to estimate total personal income generated from harvester and processor activities. The FEAM has been useful because much of the commercial fishing industry information is not described in published employment data. The Research Group, LLC updates the FEAM periodically using new fleet and processor structural information, changed industry cost-earnings profiles, and new data IMPLAN models. Application of the FEAM adjusts fisheries' multipliers to the current year's harvest prices. IMPLAN is a product of IMPLAN Group LLC, 16740 Birkdale Commons Parkway, Suite 212, Huntersville, NC 28078.*

Table 1
Oregon Harvested Volume and Ex-Vessel Value by Fishery
for Five-Year Average, 2014, and 2015 (Preliminary)

	2010-2015 (Preliminary)	2010-2014 Five Year Average			2014			2015 (Preliminary)		
Fishery	Value	Volume	Value	Price	Volume	Value	Price	Volume	Value	Price
Salmon		3,410	11,161	3.27	6,414	20,324	3.17	3,159	11,860	3.76
Troll Chinook		1,270	6,524	5.14	2,966	14,840	5.00	1,369	7,312	5.34
Troll coho		19	35	1.81	78	136	1.76	13	21	1.64
Net Chinook		1,504	3,737	2.49	1,846	3,590	1.95	1,562	4,222	2.70
Net coho		573	813	1.42	1,457	1,708	1.17	171	260	1.52
Other species/gear		45	52	1.17	67	50	0.74	44	45	1.03
D. crab		18,323	49,507	2.70	14,466	51,088	3.53	8,278	33,790	4.08
Pink shrimp		45,702	23,644	0.52	51,960	29,617	0.57	53,409	40,339	0.76
Albacore tuna		9,850	15,356	1.56	8,777	11,133	1.27	7,564	9,220	1.22
Groundfish (other than sablefish and whiting)		26,099	13,021	0.50	25,078	13,871	0.55	27,963	15,992	0.57
Trawl gear LE		25,467	11,582	0.45	24,523	12,537	0.51	27,234	14,381	0.53
Fixed gear LE/OA		633	1,439	2.27	555	1,334	2.40	729	1,610	2.21
Sablefish		4,651	12,543	2.70	3,297	8,156	2.47	5,101	12,869	2.52
Trawl gear LE		2,287	4,672	2.04	1,587	3,161	1.99	2,170	4,293	1.98
Fixed gear LE/OA		2,364	7,871	3.33	1,710	4,994	2.92	2,931	8,575	2.93
Pacific whiting		132,875	15,613	0.118	168,226	18,455	0.110	94,907	7,146	0.075
Pacific sardine		47,871	5,695	0.119	17,171	3,557	0.207	4,699	813	0.173
Pacific halibut		202	1,038	5.13	206	1,160	5.64	282	1,429	5.08
Other		5,164	2,735	0.53	7,319	2,940	0.40	4,500	2,708	0.60
Hagfish		2,003	1,533	0.77	1,845	1,529	0.83	1,835	1,523	0.83
Red sea urchin		512	297	0.58	505	287	0.57	446	260	0.58
Pacific (chub) mackerel		1,520	118	0.078	2,585	328	0.127	99	12	0.123
Total		294,148	150,313	0.51	302,913	160,302	0.53	209,862	136,166	0.65

Notes:
1. Volume and ex-vessel value are in thousands. Values are in 2015 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Acronyms: LE - limited entry, OA - open access.
3. D. crab is shown seasonally by December to November for each year, for example 2011 D. crab includes December 2010 to November 2011.
4. Starting in 2011 a small amount of sablefish in the LE trawl individual transferable quota (ITQ) program is harvested with fixed gear.
5. Ex-vessel price is the amount paid to fishers at the time of fish delivery. Deliveries are for onshore landings. Prices are annual and averaged across harvests made in different fisheries. Prices are expressed in round weight equivalents. Average prices for salmon are across seasons and sizes.

Source: PacFIN annual vessel summary and fish ticket data, April 2009, March 2010, July 2011, April 2013, March 2014, April 2015, and February 2016 extractions.

Table 2
Oregon Vessel Counts and Deliveries by Fishery in 2014 and 2015 (Preliminary)

	2014			2015 (Preliminary)		
	Vessel Counts		Deliveries	Vessel Counts		Deliveries
Fishery	Total	>$500	Total	Total	>$500	Total
Salmon	698	636	11,952	686	606	9,670
Troll Chinook	491	455	5,845	485	448	4,550
Troll coho	235	70	597	50	18	113
Net Chinook	178	169	5,368	169	153	4,822
Net coho	162	134	3,109	144	82	1,581
D. crab	348	321	6,351	336	319	6,057
Pink shrimp	60	60	1,033	78	78	1,283
Albacore tuna	379	361	1,290	349	323	1,288
Groundfish (other than sablefish and whiting)	340	200	5,661	363	246	5,786
Sablefish	130	110	1,010	142	127	1,514
Trawl gear LE	57	42	579	56	45	788
Fixed gear LE	42	42	303	43	43	480
Fixed gear OA	33	28	128	48	44	245
Pacific whiting	40	24	1,010	48	24	756
Pacific sardine	32	17	198	13	6	49
Pacific halibut	195	93	468	174	86	383
Other	128	49	5,173	113	42	5,293
All fisheries	1,199	1,152	30,703	1,129	1,068	27,021

Notes:
1. Vessel counts Include vessels that landed at Oregon ports, and had a valid vessel identification number. Vessels or non-vessels (such as from a dock) with identification of "NONE" or "ZZ..." are excluded. These are typically vessels delivering in tribal fisheries. Total deliveries include those with no valid vessel identification number.
2. The columns titled ">$500" show the number of vessels that landed over $500 of ex-vessel revenue from the shown fishery in Oregon, and is an arbitrary threshold to filter for vessels that are actively participating in the shown fishery. The fisheries are counted separately, so the $500 filter is applied to each. Statewide, the $500 threshold may be landed at any combination of fisheries.
3. Vessel counts and deliveries across fisheries will not sum to the statewide total because vessels can participate in more than one fishery, deliveries can include more than one fishery, and/or there are other important fisheries not itemized. For example, the Columbia River fisheries include tribal fisheries.
4. Dungeness crab is shown seasonally by December to November for each year, for example 2014 Dungeness crab includes December 2013 to November 2014.

Source: PacFIN fish ticket data, April 2015 and February 2016 extractions.

Table 3
Economic Contributions by Species Group in 1973 to 2015

	Onshore Landings								
Years	Salmon	D. Crab	Pink Shrimp	Groundfish	Pacific Whiting	Other Finfish and Shellfish	Total Landed Fish	Distant Water Fisheries	Total
1973	98.9	6.1	24.3	21.3	-	67.1	217.8	-	217.8
1974	79.4	11.8	15.4	23.8	-	86.3	216.8	-	216.8
1975	67.6	11.8	20.8	21.5	-	54.4	176.0	-	176.0
1976	116.8	18.6	20.4	27.7	-	54.8	238.3	-	238.3
1977	83.3	37.8	43.7	27.6	-	42.5	235.0	-	235.0
1978	61.7	29.2	53.2	42.8	-	83.5	270.4	-	270.4
1979	90.5	34.1	32.5	78.9	-	54.3	290.3	-	290.3
1980	43.6	35.1	42.4	60.4	-	37.8	219.3	-	219.3
1981	42.5	16.3	30.3	76.9	-	56.5	222.5	-	222.5
1982	51.4	16.6	16.4	88.0	-	30.7	203.1	-	203.1
1983	12.5	16.2	9.3	78.0	-	22.1	138.0	-	138.0
1984	20.2	15.4	4.8	62.6	-	23.0	125.9	-	125.9
1985	35.4	21.1	13.4	65.9	-	27.1	162.9	-	162.9
1986	60.0	13.5	35.8	60.5	-	38.5	208.4	128.1	336.4
1987	81.2	16.8	51.1	80.7	-	45.4	275.2	119.0	394.2
1988	128.0	21.8	37.6	82.7	-	49.5	319.5	112.1	431.6
1989	46.7	24.5	43.8	87.1	-	59.5	261.6	106.7	368.3
1990	31.5	24.7	31.4	78.0	1.3	51.8	218.7	138.4	357.1
1991	21.1	12.8	21.8	89.3	10.5	31.0	186.4	93.9	280.3
1992	9.0	30.7	48.6	75.5	27.1	24.3	215.3	91.2	306.5
1993	6.0	26.5	25.4	76.7	14.7	22.0	171.4	89.3	260.7
1994	3.4	30.7	22.0	71.2	31.1	17.6	176.0	94.6	270.6
1995	9.0	43.2	19.9	77.5	47.0	18.8	215.3	98.7	314.0
1996	8.6	60.3	22.4	75.6	43.1	25.3	235.3	109.6	344.8
1997	7.1	32.0	20.8	68.4	52.7	29.8	210.8	126.4	337.2
1998	5.8	30.0	8.3	50.4	37.2	25.2	157.0	141.0	297.9
1999	4.9	54.3	23.2	56.3	45.7	17.3	201.8	170.7	372.5
2000	11.2	55.6	28.9	62.8	39.9	41.8	240.1	143.0	383.1
2001	15.7	45.1	24.7	51.2	29.3	47.7	213.9	151.6	365.5
2002	18.2	49.7	36.1	34.6	18.9	53.4	211.1	160.8	371.8
2003	20.7	87.4	16.5	42.7	25.9	67.0	260.2	169.3	429.5
2004	26.1	98.0	12.2	39.6	38.4	90.1	304.4	161.9	466.3
2005	20.0	59.7	16.5	42.3	42.1	101.5	282.1	175.6	457.7
2006	8.8	113.8	11.2	43.9	43.2	79.3	300.2	162.5	462.6
2007	7.9	72.7	20.6	44.3	30.1	91.2	266.8	185.5	452.3
2008	7.4	53.1	26.2	51.3	21.9	65.1	225.0	277.9	502.9
2009	6.6	78.2	16.4	54.0	22.5	61.2	238.9	218.6	457.5
2010	12.8	58.7	24.5	48.3	25.9	64.1	234.4	235.1	469.5
2011	10.8	74.5	45.6	48.2	67.2	55.0	301.4	290.5	591.8
2012	10.8	45.3	45.2	40.8	52.3	97.4	291.9	288.2	580.1
2013	19.4	116.8	44.5	39.4	72.0	78.0	370.1	289.6	659.7
2014	31.9	72.4	51.0	37.3	61.9	41.6	296.1	286.7	582.7
2015	18.2	17.3	63.0	48.0	31.0	27.7	205.2	283.8	489.0
Avg10-14	17.2	73.5	42.1	42.8	55.9	67.2	298.8	278.0	576.8

Notes:
1. Economic contributions are expressed as personal income in millions of 2015 dollars. Adjustments to 2015 dollars use the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. Year 2015 is preliminary. Distant water for 2015 is not a model result and just repeats 2014.
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 2015 includes (personal income in thousands) sablefish ($20,065), flatfish ($16,630), cod/rockfish (other than sablefish) ($9,552), and sharks/skates ($1,729).
5. "Other" in 2015 includes (personal income in thousands) albacore tuna ($16,352), Pacific sardines ($3,765), Pacific halibut ($2,069), sea urchins ($361), sturgeon ($10), and other species ($5,183).
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.

Source: Study using Fishery Economic Assessment Model (FEAM).

Table 4
First-Purchaser Counts and Purchases in 2015

	Top Five Parent Companies		First-Purchasers > $10,000		Active First-Purchasers		
	Amount	Share of All	Amount	Share of All	Amount	Share of All	All First Purchasers
Purchaser count	9	4.5%	108	54.5%	180	90.9%	198
Purchases by major fishery	87,719,434	76.7%	114,029,859	99.7%	114,330,929	100.0%	114,335,605
Salmon	6,205,817	52.3%	11,816,075	99.6%	11,859,622	100.0%	11,860,486
D. crab	4,427,189	37.0%	11,922,388	99.7%	11,959,346	100.0%	11,959,346
P. shrimp	37,036,091	91.8%	40,338,997	100.0%	40,338,997	100.0%	40,338,997
A. tuna	4,717,866	51.2%	9,082,598	98.5%	9,219,563	100.0%	9,220,273
Groundfish	26,842,919	93.0%	28,818,341	99.9%	28,859,983	100.0%	28,860,269
P. whiting	7,145,944	100.0%	7,146,477	100.0%	7,146,477	100.0%	7,146,477
P. sardine	307,607	37.9%	812,527	100.0%	812,527	100.0%	812,687
P. halibut	913,882	63.9%	1,427,511	99.9%	1,429,452	100.0%	1,429,452
Other	122,119	4.5%	2,664,945	98.4%	2,704,962	99.9%	2,707,618

Notes: 1. Purchases are the payments to harvesters.
2. Parent companies may include more than one processing plant or buying station.
3. An active first-purchaser has purchased $500 or more during 2015.
4. A small number of counted first purchasers are bait dealers or vessels making direct sales to the public.

Source: PacFIN annual vessel summary data, February 2016 extraction.

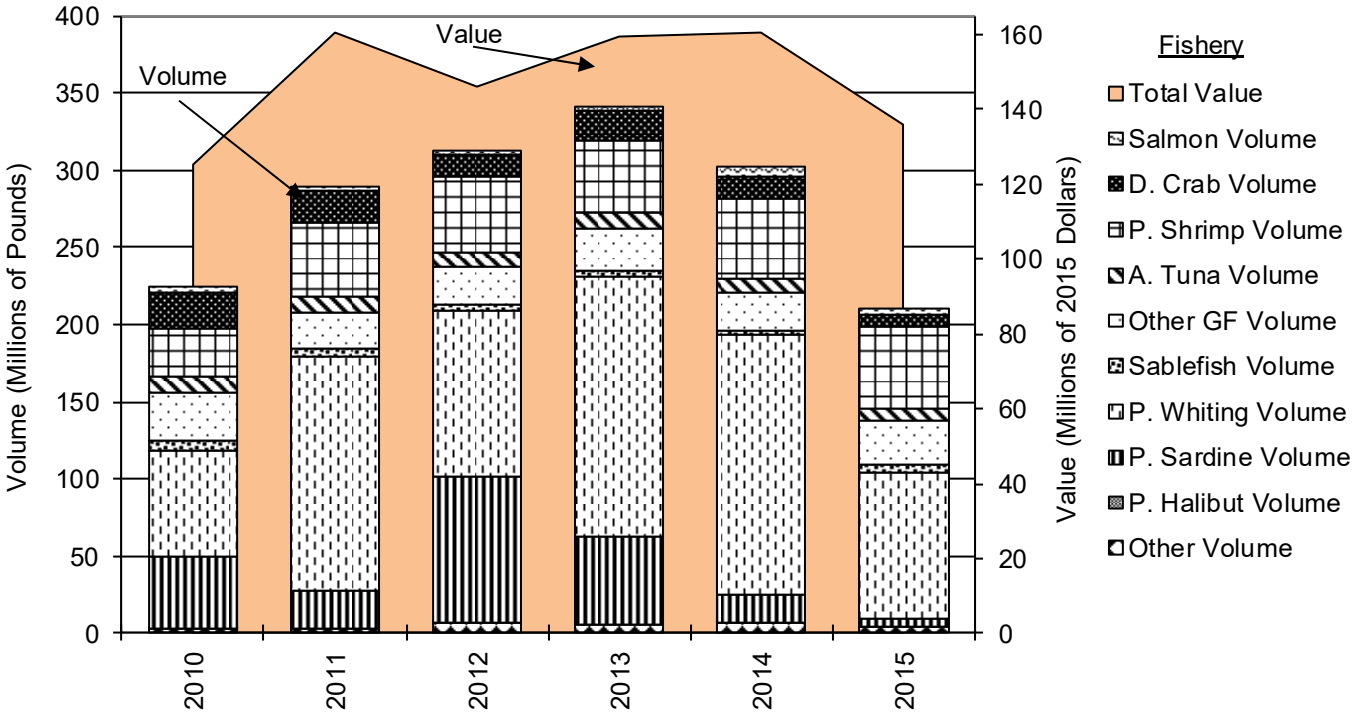
Table 5
Northern Pacific Ocean U.S. and Canada Harvest Value in 2014

	All Fisheries		Selected Fisheries					
			Salmon		Dungeness Crab		Trawl Shrimp	
Region	Amount	Share	Amount	Share	Amount	Share	Amount	Share
Alaska	1,712.2	63%	546.0	76%	16.0	6%	0.7	1%
British Columbia	353.7	13%	98.9	14%	42.3	17%	1.5	3%
Washington onshore	240.3	9%	38.9	5%	80.4	32%	16.5	31%
Oregon onshore	156.1	6%	20.1	3%	48.0	19%	29.3	56%
California onshore	233.3	9%	12.2	2%	65.1	26%	4.3	8%
West Coast at-sea	35.1	1%						
Total	2,730.8	100%	716.1	100%	251.8	100%	52.3	100%

Notes: 1. Values are in millions of U.S. dollars (nominal).
2. Alaska and Canadian at-sea fisheries harvest value are included in their respective table rows.
3. Alaska trawl shrimp is sidestriped shrimp harvested with beam trawl gear in southeast Alaska. The Alaska table's value is for harvest in the 2014-15 season using statewide price in 2014. Canadian trawl shrimp is mostly pink shrimp and sidestriped with some coonstripe shrimp and humpback shrimp. Table's values for Washington, Oregon, and California are all pink shrimp.
4. Aquaculture production is not shown in the table.
5. The all fisheries and selected fisheries harvest values except for Alaska trawl shrimp are for the calendar year.

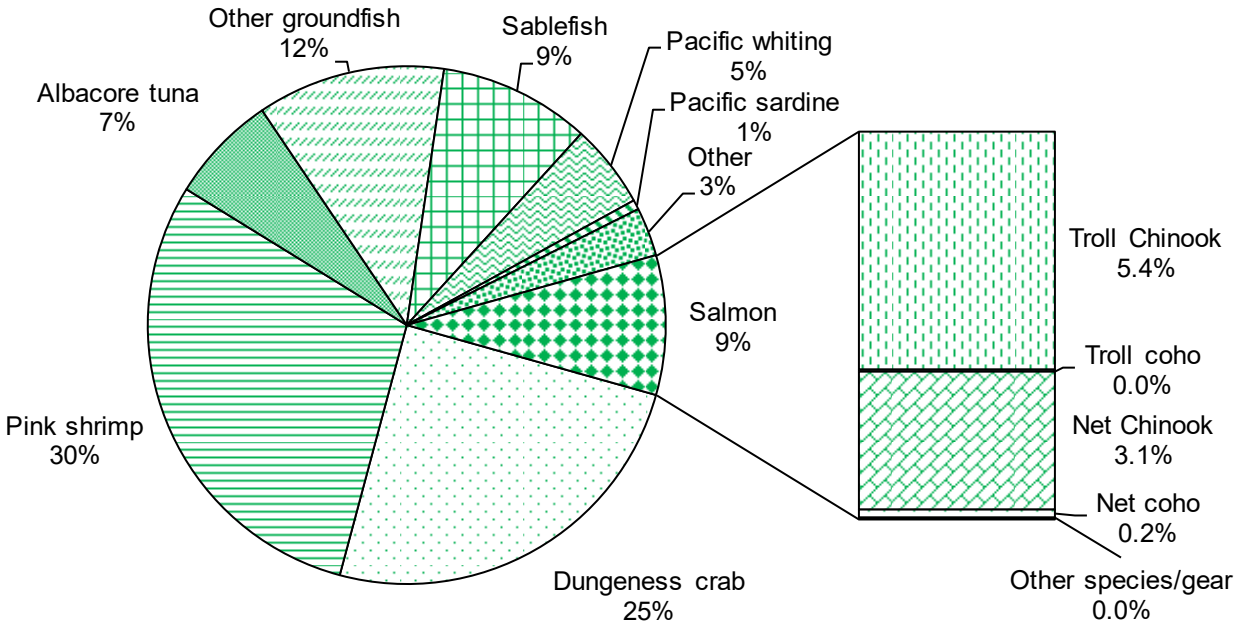
Sources: Alaska and West Coast at-sea harvest value from NOAA Fisheries, Fisheries Statistics Division, Annual Commercial Landing Statistics (NMFS 2015), except Alaska trawl shrimp from ADFG commercial fishing information by area and by fishery. British Columbia harvest value from Fisheries and Oceans Canada (DFO), Economic Analysis and Statistics, commercial fisheries landings. West Coast onshore harvest value from PacFIN fish ticket data, April 2015 extraction. British Columbia harvest value converted to U.S. dollars using Bank of Canada exchange rates.

Figure 1
Oregon Onshore Landed Value and Volume by Major Fishery in 2010 to 2015 (Preliminary)



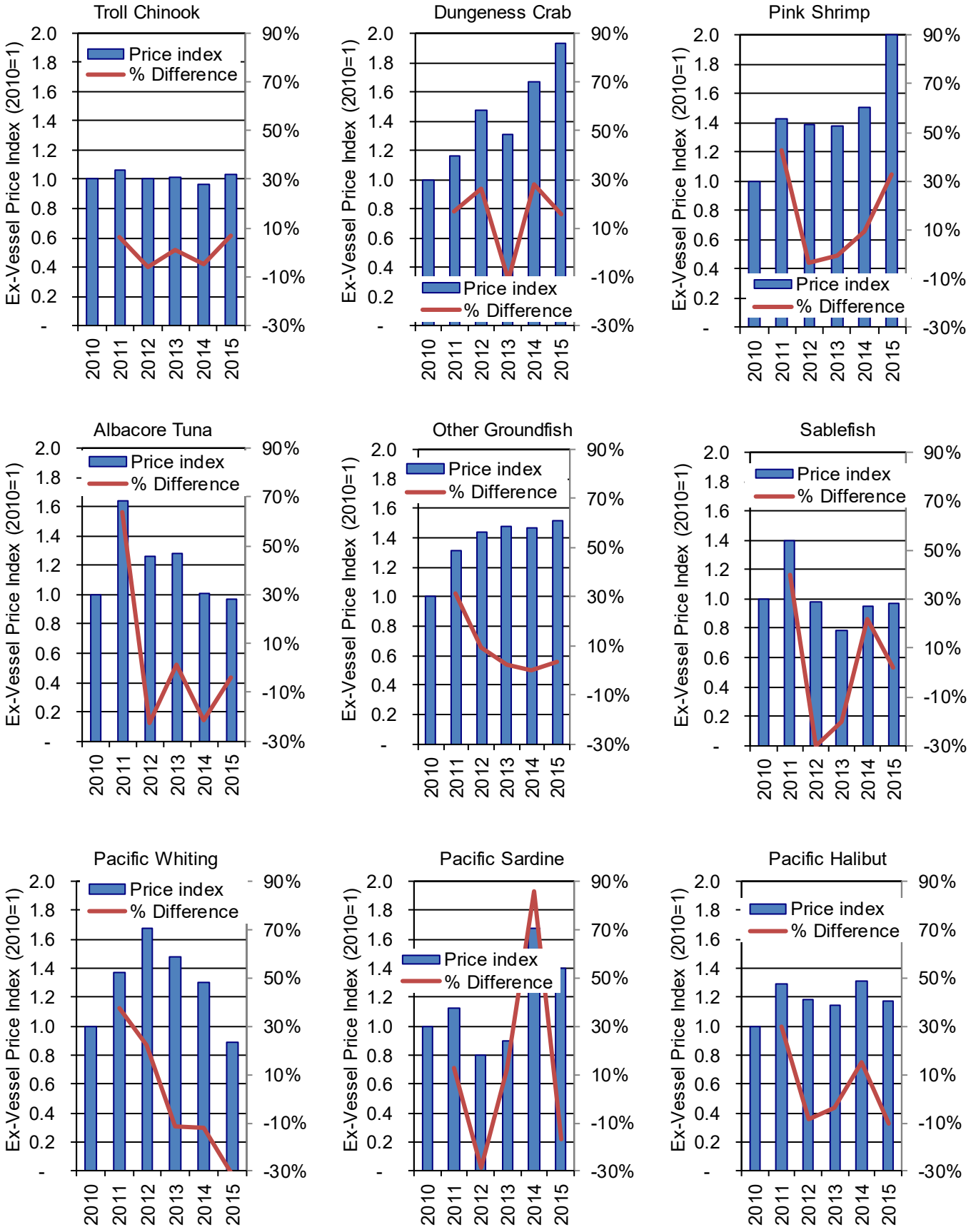
Notes: 1. Notes and sources from Table 1 also apply to this figure.

Figure 2
Oregon Onshore Landed Harvest Value in 2015 (Preliminary)



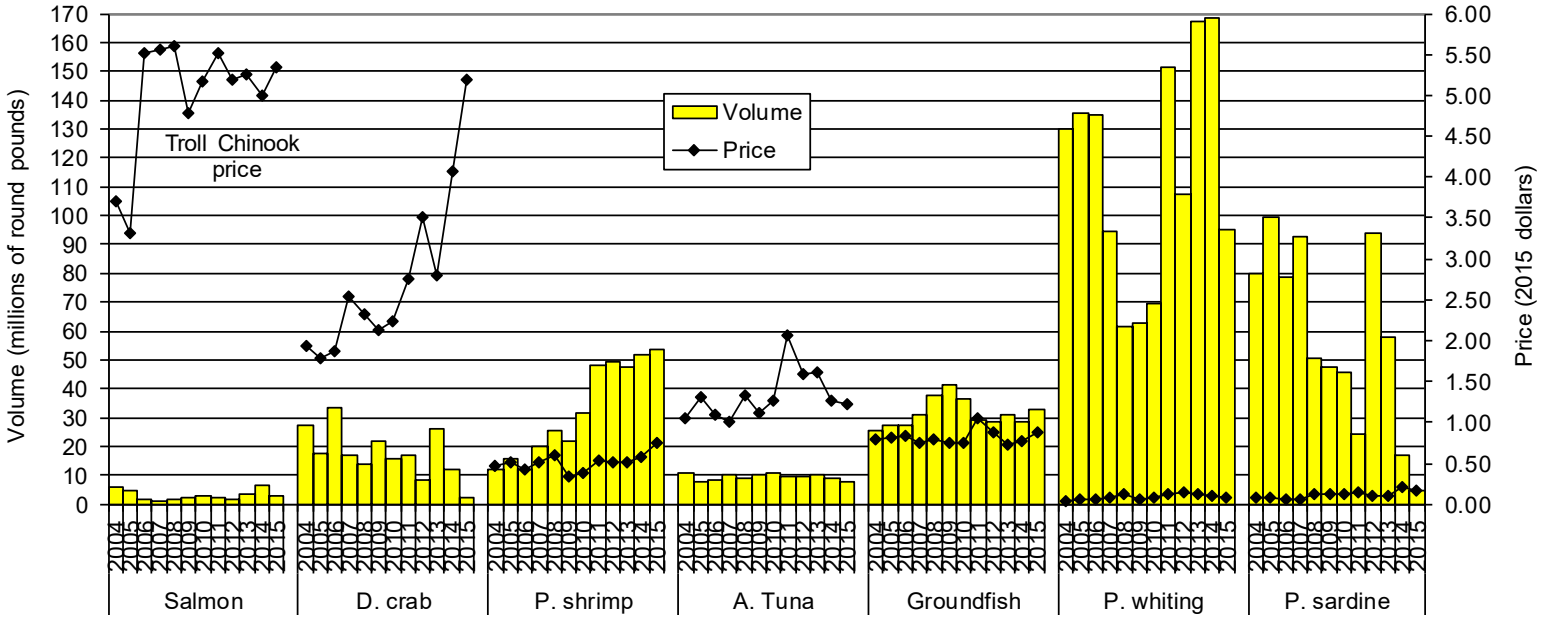
Notes: 1. Notes and sources from Table 1 also apply to this figure.

Figure 3
Selected Species Annual Ex-Vessel Price Trends in 2010 to 2015 (Preliminary)



Notes: 1. Percent difference is from previous year and not from the Year 2010 index year.
2. Notes and sources from Table 1 also apply to this figure.

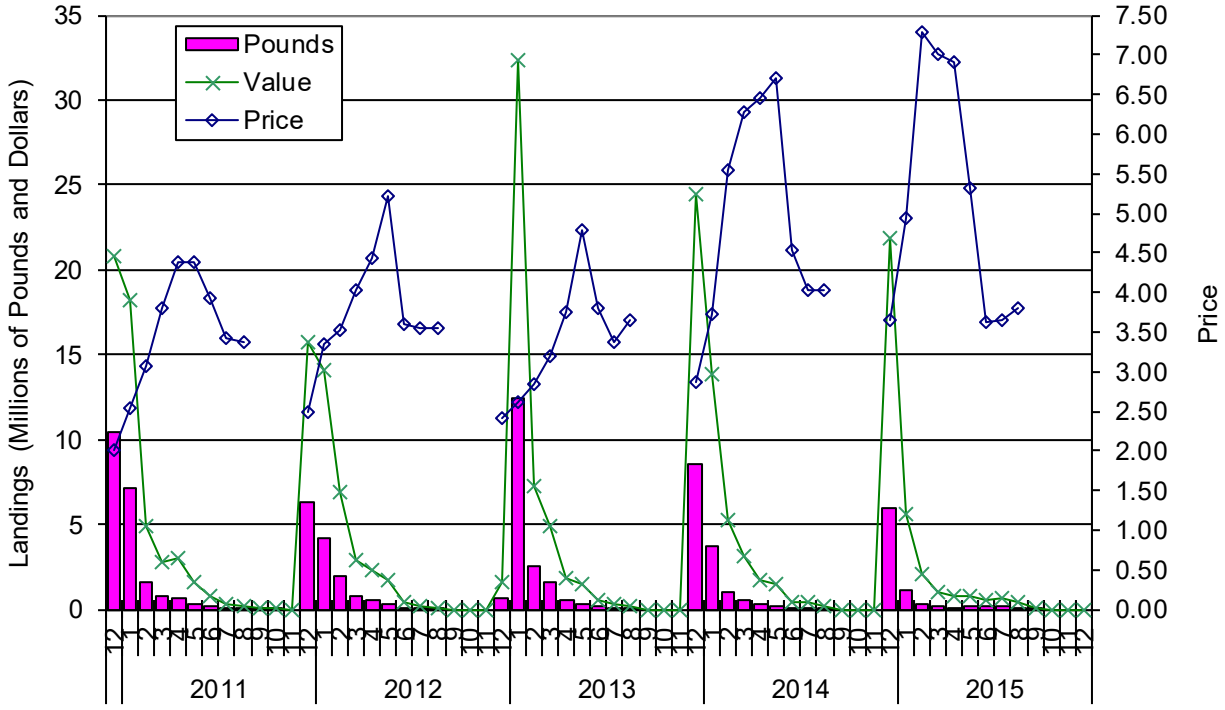
Figure 4
Volume and Price Trends in 2004 to 2015 (Preliminary) by Species Group



Notes: 1. Salmon price is for Chinook harvested with troll gear. Groundfish price is an aggregate over many species harvested with many gear types.

Source: PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, April 2015, and February 2016 extractions.

Figure 5
Dungeness Crab Ocean Fishery by Month in December 2010 to December 2015

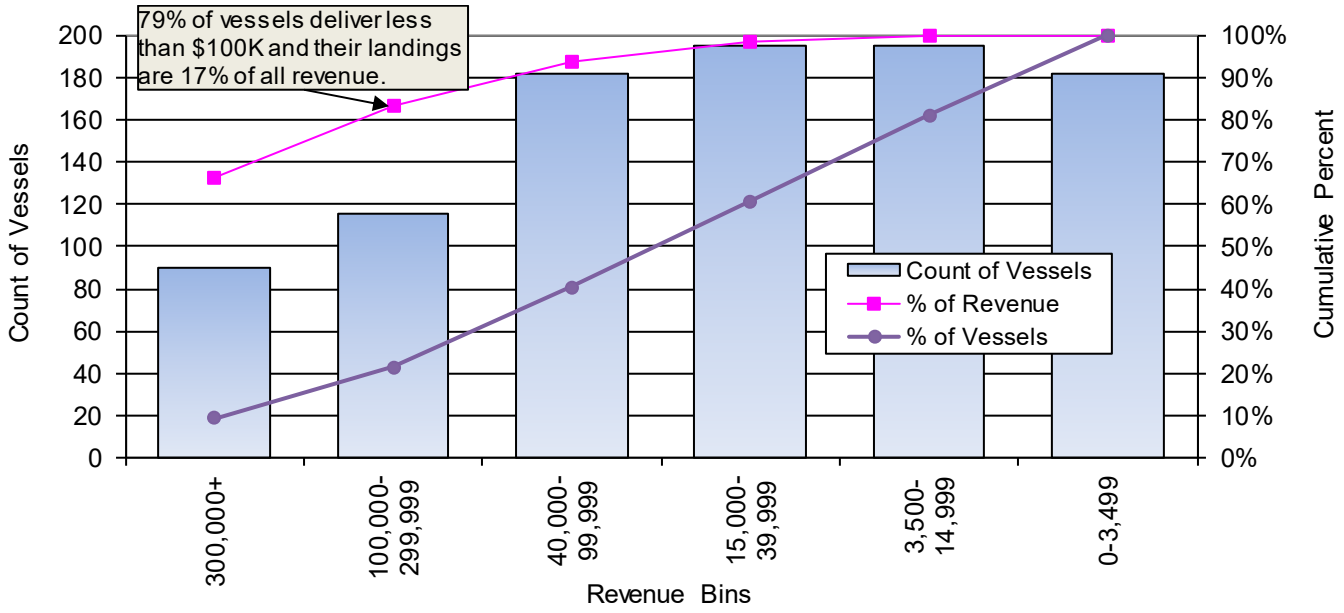


Notes: 1. Values and prices are in 2015 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.

2. The onshore landings are filtered to be the ocean catch area where crab pot gear was used. This eliminates catch in bay areas. Catch from research and discards is excluded.

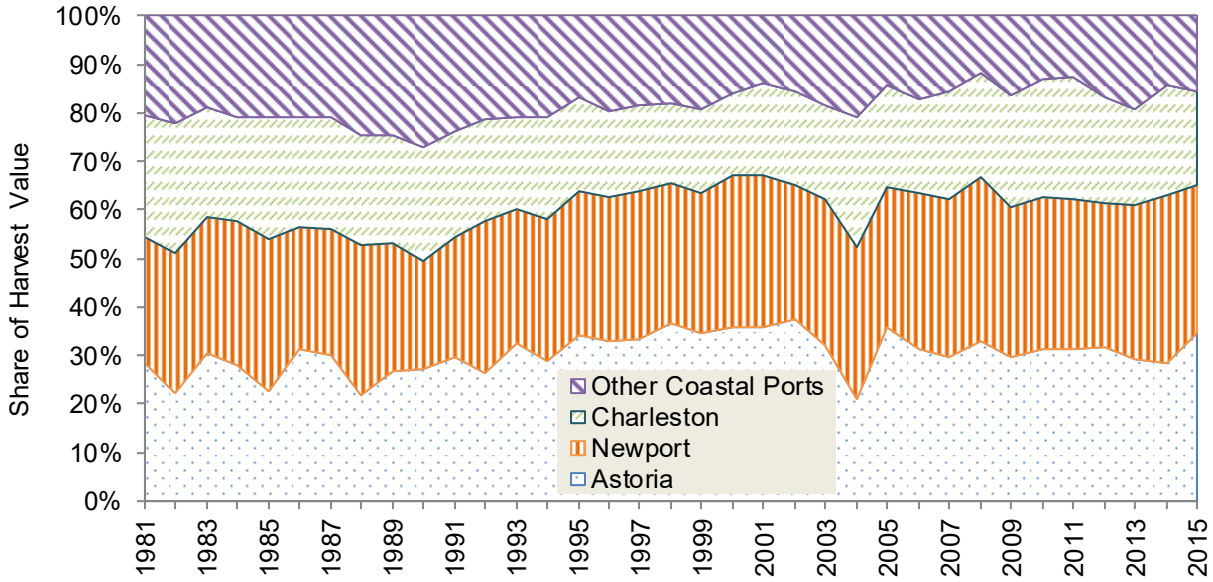
Source: PacFIN fish ticket data, July 2011, April 2013, March 2014, April 2015, and February 2016 extractions.

Figure 6
Ocean Onshore Landing Revenue Bins Showing Cumulative Revenue and Vessel Counts in 2015



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, February 2016 extraction.

Figure 7
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, April 2015, and February 2016 extractions.

Appendix A

Calendar Year Onshore Fisheries Harvest Volume, Value, and Prices

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Table A.1
Onshore Landed Volume by Species Groups in 1981 to 2015

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
2015	3,159	2,304	53,409	7,564	33,065	94,907	4,699	282	4,500	203,888
Avg10-14	3,410	15,956	45,702	9,850	30,750	132,875	47,871	202	5,164	291,781

Notes:
1. Landings are reported in thousands of round pounds. Landing data is preliminary for 2015.
2. Salmon includes landings of steelhead, which have come exclusively from the tribal 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 2015 includes (thousands of round pounds) flatfish (17,386), sablefish (5,101), thornyheads (1,581), rockfish other than thornyheads (5,566), cods other than sablefish (1,444), and other (1,986).
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 2015 includes landings (thousands of round pounds) of hagfish (1,835), northern anchovy (739), red sea urchin (446), gaper clam (266), and other species (1,215). Shellfish volume excludes aquaculture harvests.

Source: PacFIN annual vessel summary, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, April 2015, and February 2016 extractions for years 1981 to present.

Table A.2
Onshore Landed Value by Species Groups in 1981 to 2015

	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	44.3	24,923	11,047	15,136	6,709	29,406	13,034	15,018	6,657	32,703	14,496	57	25	--	--	361	160	11,765	5,215	129,370	57,344
1982	47.0	26,274	12,356	16,018	7,533	19,710	9,269	2,616	1,230	42,665	20,064	0	0	--	--	566	266	2,090	983	109,940	51,702
1983	48.9	6,220	3,040	16,182	7,910	9,530	4,658	3,854	1,884	37,540	18,349	49	24	--	--	1,290	631	3,123	1,526	77,788	38,023
1984	50.6	10,112	5,118	15,304	7,746	4,253	2,153	1,753	888	29,598	14,981	116	59	--	--	1,605	813	4,493	2,274	67,234	34,031
1985	52.2	17,338	9,056	20,396	10,654	10,024	5,236	1,568	819	32,405	16,927	332	173	--	--	1,529	798	3,682	1,923	87,273	45,587
1986	53.3	28,486	15,181	12,360	6,587	34,020	18,131	2,486	1,325	32,561	17,353	113	60	--	--	3,526	1,879	2,542	1,355	116,093	61,871
1987	54.6	49,441	26,994	15,296	8,351	55,447	30,273	3,077	1,680	44,605	24,353	63	34	--	--	2,607	1,423	2,907	1,587	173,442	94,696
1988	56.5	69,047	39,020	19,961	11,280	30,347	17,150	5,889	3,328	42,527	24,033	73	41	--	--	1,552	877	3,333	1,883	172,729	97,612
1989	58.7	24,235	14,228	23,103	13,564	30,499	17,905	1,510	887	42,959	25,221	25	15	--	--	2,217	1,301	6,926	4,066	131,474	77,187
1990	60.9	15,722	9,573	23,902	14,554	25,668	15,629	2,896	1,764	38,016	23,147	361	220	--	--	1,830	1,114	9,376	5,709	117,772	71,710
1991	62.9	9,264	5,828	11,862	7,462	19,196	12,076	1,557	979	45,804	28,814	2,178	1,370	--	--	1,624	1,022	7,203	4,531	98,689	62,083
1992	64.3	5,730	3,687	20,807	13,388	26,712	17,187	6,168	3,969	41,567	26,745	7,893	5,078	--	--	1,287	828	5,012	3,225	115,175	74,106
1993	65.9	3,681	2,425	18,061	11,898	13,528	8,912	5,894	3,883	41,955	27,638	3,475	2,289	--	--	1,309	862	4,481	2,952	92,384	60,859
1994	67.3	2,169	1,459	21,498	14,462	14,309	9,626	5,574	3,750	42,764	28,769	6,389	4,298	--	--	1,508	1,015	3,393	2,282	97,603	65,662
1995	68.7	5,203	3,574	29,185	20,044	12,521	8,599	5,897	4,050	45,099	30,974	10,193	7,000	--	--	1,370	941	3,327	2,285	112,795	77,467
1996	69.9	4,702	3,288	37,436	26,180	13,387	9,362	10,624	7,430	43,293	30,275	5,930	4,147	--	--	1,006	704	1,771	1,239	118,149	82,623
1997	71.1	3,897	2,772	20,575	14,636	11,120	7,910	10,321	7,342	39,344	27,987	9,591	6,823	--	--	978	695	1,978	1,407	97,804	69,573
1998	71.9	3,602	2,590	17,410	12,519	4,435	3,189	9,096	6,540	27,106	19,491	5,224	3,756	1	1	450	323	2,218	1,595	69,542	50,005
1999	72.9	2,800	2,042	31,682	23,107	13,122	9,571	5,188	3,784	30,426	22,192	8,113	5,917	118	86	949	692	1,439	1,050	93,837	68,441
2000	74.6	5,401	4,029	31,783	23,709	13,663	10,192	10,039	7,489	32,672	24,373	8,152	6,081	1,540	1,149	935	698	2,697	2,012	106,882	79,732
2001	76.3	7,663	5,847	25,291	19,296	9,909	7,560	9,907	7,559	26,745	20,405	5,416	4,132	2,122	1,619	632	482	2,904	2,216	90,588	69,116
2002	77.5	8,950	6,933	26,799	20,761	14,655	11,353	3,810	2,952	18,343	14,210	4,156	3,219	3,639	2,819	1,308	1,013	2,438	1,889	84,099	65,149
2003	79.0	11,225	8,869	46,977	37,117	6,393	5,051	7,808	6,169	22,368	17,673	4,610	3,642	3,722	2,941	1,089	860	1,472	1,163	105,664	83,487
2004	81.2	16,008	12,995	52,911	42,954	5,839	4,740	11,264	9,145	20,130	16,342	5,717	4,641	5,999	4,870	1,078	875	1,439	1,168	120,384	97,730
2005	83.8	12,456	10,438	31,741	26,597	8,236	6,901	10,520	8,816	22,048	18,475	8,481	7,107	7,398	6,199	1,069	896	1,835	1,538	103,784	86,965
2006	86.4	5,720	4,940	62,298	53,807	5,204	4,494	9,340	8,067	23,079	19,933	9,232	7,974	4,334	3,743	887	766	1,397	1,206	121,491	104,931
2007	88.7	5,257	4,662	43,082	38,202	10,561	9,365	10,677	9,468	23,116	20,497	7,331	6,501	5,132	4,551	957	849	1,549	1,374	107,664	95,468
2008	90.4	4,691	4,240	32,267	29,164	15,422	13,939	11,784	10,651	29,810	26,943	7,557	6,830	6,268	5,665	1,001	905	2,226	2,012	111,026	100,349
2009	91.1	3,890	3,544	46,549	42,404	7,479	6,813	11,174	10,179	30,885	28,135	4,083	3,720	5,808	5,291	736	670	1,783	1,624	112,388	102,380
2010	92.2	8,348	7,698	35,512	32,746	11,910	10,982	13,472	12,422	27,794	25,629	5,871	5,414	5,696	5,252	803	740	2,289	2,111	111,694	102,996
2011	94.1	7,159	6,737	47,484	44,690	26,146	24,607	19,939	18,766	30,217	28,439	17,550	16,518	3,391	3,192	1,212	1,141	2,545	2,395	155,645	146,485
2012	95.9	7,224	6,925	30,374	29,114	25,754	24,685	15,730	15,077	24,866	23,834	15,243	14,611	9,365	8,977	1,006	965	2,277	2,183	131,841	126,370
2013	97.4	12,748	12,418	73,100	71,209	24,794	24,153	16,506	16,079	22,915	22,322	20,947	20,405	6,467	6,299	1,009	982	3,623	3,529	182,107	177,396
2014	99.0	20,324	20,124	48,466	47,988	29,617	29,326	11,133	11,023	22,027	21,810	18,455	18,274	3,557	3,522	1,160	1,149	2,940	2,911	157,680	156,127
2015	100.0	11,860	11,860	11,959	11,959	40,339	40,339	9,220	9,220	28,860	28,860	7,146	7,146	813	813	1,429	1,429	2,708	2,708	114,336	114,336
Avg10-14		11,161		46,987		23,644		15,356		25,564		15,613		5,695		1,038		2,735		147,793	

Notes:
1. Nominal value is the revenue received by fishermen/harvesters in the landing year. Real value is in thousands of 2015 dollars adjusted using the GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
2. Groundfish in 2015 includes landings (real ex-vessel value in thousands) of sablefish ($12,869), flatfish ($9,765), thornyheads ($814), rockfish other than thornyheads ($3,026), cods other than sablefish ($1,615), and other ($772). "Other" in 2015 includes (real ex-vessel value in thousands) hagfish ($1,523), red sea urchin ($260), gaper clam ($199), basket cockle ($169), razor clam ($152), ghost shrimp ($113), other shrimp ($108), and other species ($185). Shellfish value excludes private lands harvest.
3. Notes and sources from volume table concerning species composition also apply to this table.

Table A.3
Annual Ex-Vessel Prices by Selected Species and Species Groups in 1971 to 2015

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	2015
Troll Chinook (ocean)	2.71	4.27	3.66	6.83	6.98	5.04	3.41	4.14	4.15	3.30	3.42	2.88	2.15	1.95	2.32	2.35	1.84	1.73	2.18	3.70	3.31	5.51	5.55	5.60	4.78	5.17	5.51	5.19	5.25	5.00	5.34
Troll coho (ocean)	1.66	3.26	2.72	4.20	6.13	3.27	1.70	2.51	2.75	1.58	1.37	1.49	-	-	1.23	1.24	0.90	0.85	0.94	1.33	1.94	2.93	1.87	2.60	1.95	2.09	1.85	2.00	2.23	1.76	1.64
Net Chinook (below Bonneville Dam)															1.94	1.93	1.86	1.63	1.07	2.18	2.01	2.91	3.75	3.13	2.23	3.00	2.63	2.75	2.64	1.88	2.71
Spring															3.89	3.71	3.83	4.23	3.55	4.64	4.16	4.96	6.28	6.98	5.29	5.38	5.25	6.19	6.54	5.42	5.71
Fall															1.53	1.34	0.85	0.68	0.83	1.65	1.81	2.38	2.91	2.79	2.14	2.23	2.27	2.23	2.42	1.74	2.20
Net Chinook (above Bonneville Dam)															0.74	0.86	0.53	0.38	0.33	0.92	0.72	1.79	2.30	2.20	1.47	2.06	2.37	2.40	2.16	1.84	2.26
Spring															-	2.51	1.68	1.53	1.39	2.09	2.02	2.72	4.23	4.97	3.38	4.19	3.74	5.02	4.76	4.79	4.01
Fall															0.78	0.84	0.32	0.23	0.24	0.94	0.69	1.65	2.33	1.82	1.18	1.36	2.01	1.92	1.98	1.50	1.93
Net coho (below Bonneville Dam)															1.15	0.70	0.37	0.43	0.68	1.13	1.27	1.53	1.84	1.43	1.31	1.48	1.71	1.69	1.89	1.17	1.54
Net steelhead (above Bonneville Dam)															0.57	0.38	0.20	0.13	0.10	0.26	0.33	0.58	0.74	0.78	0.67	0.91	1.20	1.26	1.10	1.12	1.32
Dungeness crab	1.31	2.37	2.79	1.71	2.00	2.17	3.03	2.77	2.55	1.98	2.41	1.73	2.44	2.65	2.57	2.84	2.61	2.15	1.96	1.94	1.79	1.87	2.53	2.32	2.13	2.24	2.75	3.50	2.80	4.07	5.19
Pink shrimp	0.56	0.91	0.47	0.72	1.03	1.14	1.46	0.68	1.24	0.62	0.88	0.50	1.03	0.57	0.64	0.54	0.35	0.35	0.31	0.48	0.52	0.43	0.52	0.60	0.34	0.38	0.54	0.52	0.52	0.57	0.76
Albacore tuna	1.27	1.48	1.11	0.81	1.42	1.95	1.13	1.03	1.34	1.40	1.24	1.24	1.17	1.13	1.14	1.15	1.11	0.87	0.85	1.05	1.30	1.09	1.02	1.33	1.11	1.26	2.06	1.59	1.62	1.27	1.22
Groundfish species group	0.38	0.50	0.49	0.65	0.73	0.40	0.49	0.52	0.66	0.53	0.57	0.52	0.82	0.75	0.69	0.83	0.85	0.87	0.86	0.79	0.81	0.84	0.75	0.79	0.75	0.75	1.04	0.87	0.74	0.78	0.87
Nearshore live fishery						-	-	-	-	-	-	-	-	2.01	3.71	4.41	4.05	4.10	3.72	3.41	3.34	3.21	3.20	3.04	2.85	3.05	3.08	3.28	3.10	2.92	2.84
Sablefish (black cod)						0.47	0.45	0.57	0.81	0.75	0.96	0.83	1.93	2.24	1.62	1.99	1.84	1.79	1.95	1.52	1.77	1.94	2.00	2.33	2.40	2.59	3.63	2.54	2.03	2.47	2.52
Trawl gear						0.33	0.35	0.43	0.62	0.63	0.68	0.65	1.77	1.76	1.35	1.65	1.59	1.33	1.59	1.20	1.39	1.57	1.71	2.06	2.04	2.09	2.55	1.81	1.67	1.99	1.93
Fixed gear						0.64	0.60	0.73	0.99	1.00	1.42	1.17	2.16	3.02	1.96	2.36	2.20	2.34	2.44	1.97	2.21	2.46	2.52	2.87	2.96	3.35	4.44	3.06	2.39	2.92	3.00
Widow rockfish						-	-	0.48	0.59	0.44	0.43	0.41	0.48	0.42	0.51	0.58	0.53	0.53	0.55	0.52	0.52	0.44	0.49	0.46	0.40	0.46	0.46	0.44	0.47	0.43	0.41
Yellowtail rockfish						-	-	0.49	0.59	0.46	0.48	0.47	0.53	0.51	0.53	0.60	0.59	0.59	0.59	0.63	0.60	0.56	0.55	0.66	0.49	0.53	0.54	0.55	0.52	0.50	0.48
Thornyhead, longspine						-	-	-	-	-	-	-	1.39	1.02	0.97	1.14	1.16	1.09	0.81	0.63	0.69	0.70	0.50	0.44	0.29	0.33	0.39	0.43	0.39	0.36	0.33
Thornyhead, shortspine						-	-	-	-	-	-	-	1.62	1.17	1.23	1.37	1.31	1.28	1.00	0.82	0.84	0.89	0.70	0.72	0.58	0.58	0.62	0.68	0.65	0.65	0.61
Thornyhead, mixed						-	-	0.48	0.60	0.63	0.72	0.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pacific Ocean perch						0.36	0.44	0.46	0.58	0.43	0.47	0.41	0.43	0.38	0.47	0.58	0.54	0.57	0.56	0.56	0.56	0.54	0.54	0.53	0.53	0.52	0.53	0.51	0.48	0.39	0.49
Lingcod						0.50	0.51	0.50	0.69	0.57	0.53	0.55	0.62	0.65	1.04	1.50	1.51	1.48	1.35	1.24	1.19	1.15	1.25	1.37	1.38	1.40	1.13	1.08	1.11	1.16	1.58
Arrowtooth flounder						0.21	0.21	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	0.10
Dover sole						0.50	0.46	0.48	0.57	0.47	0.49	0.41	0.49	0.42	0.45	0.49	0.49	0.48	0.47	0.46	0.45	0.43	0.42	0.41	0.35	0.33	0.43	0.44	0.46	0.46	0.45
English sole						0.65	0.66	0.64	0.75	0.63	0.53	0.45	0.52	0.44	0.43	0.48	0.47	0.46	0.43	0.43	0.39	0.35	0.34	0.33	0.31	0.31	0.31	0.34	0.31	0.31	0.29
Petrale sole						1.19	1.43	1.41	1.51	1.42	1.31	1.16	1.41	1.30	1.31	1.35	1.29	1.17	1.28	1.25	1.09	1.15	1.08	1.06	0.96	1.21	1.52	1.57	1.28	1.11	1.20
Cod, Pacific						0.48	0.51	0.49	0.60	0.44	0.48	0.50	0.57	0.55	0.61	0.81	0.76	0.75	0.76	0.59	0.55	0.55	0.59	0.57	0.49	0.54	0.59	0.62	0.57	0.53	0.58
Whiting, Pacific						0.158	0.341	0.170	0.156	0.128	0.075	0.044	0.069	0.059	0.050	0.054	0.046	0.058	0.057	0.044	0.063	0.068	0.078	0.123	0.065	0.084	0.116	0.142	0.125	0.110	0.075
Sardines						-	-	-	-	-	-	-	-	-	0.069	0.073	0.075	0.073	0.067	0.075	0.074	0.055	0.055	0.124	0.123	0.124	0.140	0.100	0.112	0.207	0.173
Halibut, Pacific						2.40	2.23	1.88	2.85	2.42	2.98	1.97	2.52	2.60	2.71	2.82	2.49	2.47	3.19	3.12	2.99	3.53	3.92	4.12	3.15	4.31	5.59	5.10	4.91	5.64	5.08
Sturgeon, white						2.35	2.32	2.79	3.06	3.28	3.13	2.08	2.56	1.52	1.85	2.09	2.29	2.06	2.18	2.17	2.10	2.33	2.38	2.36	2.14	2.27	2.71	2.80	3.29	3.58	3.24
Sea urchin, red						-	-	-	0.53	0.59	1.21	1.33	1.17	0.76	0.77	0.93	0.84	0.55	0.53	0.46	0.36	0.43	0.42	0.42	0.50	0.58	0.57	0.60	0.58	0.57	0.58

Notes:
1. Annual prices are in 2015 dollars. Adjustment used GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
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 in 2014, 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, April 2015, and February 2016 extractions for 1981 to 2015. PFMC "Review of Ocean Salmon Fisheries," annual in February, for inriver Chinook and coho.

Table A.4
Dungeness Crab Ocean Fishery Landings in 1981-1982 Through 2014-2015 Seasons

Season	Round Pounds	Nominal Value	Real Value	Real Price
1981-82	8,751,206	8,831,917	18,780,483	2.15
1982-83	4,338,190	5,740,729	11,744,539	2.71
1983-84	4,665,438	7,480,417	14,778,684	3.17
1984-85	4,891,225	7,711,119	14,762,353	3.02
1985-86	7,074,267	9,944,078	18,658,743	2.64
1986-87	4,681,425	6,692,504	12,257,773	2.62
1987-88	8,651,525	10,584,235	18,729,195	2.16
1988-89	11,166,023	12,817,664	21,832,470	1.96
1989-90	9,235,640	12,572,434	20,648,089	2.24
1990-91	8,248,067	13,032,700	20,717,156	2.51
1991-92	7,545,534	9,462,852	14,706,996	1.95
1992-93	10,851,013	11,376,102	17,269,053	1.59
1993-94	10,210,526	12,450,300	18,506,611	1.81
1994-95	15,018,474	24,794,711	36,102,017	2.40
1995-96	17,641,909	22,435,922	32,082,839	1.82
1996-97	7,032,467	13,346,418	18,762,205	2.67
1997-98	7,068,087	12,498,763	17,382,045	2.46
1998-99	9,107,546	16,264,698	22,300,096	2.45
1999-00	15,675,757	31,730,730	42,535,608	2.71
2000-01	7,386,163	15,643,989	20,504,076	2.78
2001-02	13,150,681	23,551,665	30,401,976	2.31
2002-03	17,260,055	25,827,750	32,688,549	1.89
2003-04	23,756,637	39,263,182	48,364,145	2.04
2004-05	33,696,383	49,593,613	59,185,072	1.76
2005-06	27,574,296	43,254,577	50,080,910	1.82
2006-07	15,210,967	33,219,800	37,463,566	2.46
2007-08	12,337,100	29,427,556	32,558,708	2.64
2008-09	13,000,350	26,057,458	28,604,575	2.20
2009-10	23,204,592	44,809,243	48,593,589	2.09
2010-11	21,237,613	48,954,309	52,015,286	2.45
2011-12	14,283,739	42,277,852	44,108,071	3.09
2012-13	18,188,431	48,896,343	50,194,941	2.76
2013-14	14,449,500	50,152,445	50,651,229	3.51
2014-15	8,229,358	33,419,765	33,419,765	4.06

Notes: 1. Prices adjusted to real 2015 dollars using the GDP implicit price deflator developed by the U.S. Bureau of Economic Analysis.
2. The onshore landings are filtered to be the ocean catch area where crab pot gear was used. This eliminates catch in bay areas. Catch from research and discards is excluded.
3. The Oregon crab season is from December 1 through August 14. Several recent season openings were delayed due to meat quality and density standards not being met. December 2011 season opening was delayed to December 15 north of Gold Beach and January 15 south of Gold Beach. December 2012 was delayed to December 31. December 2013 season was delayed to December 16. The December 2015 season start was delayed to January 4, 2016 due to Dungeness crab health standards.

Source: PacFIN fish ticket data, March 2008, April 2009, March 2010, July 2011, April 2013, March 2014, April 2015, and February 2016 extractions.

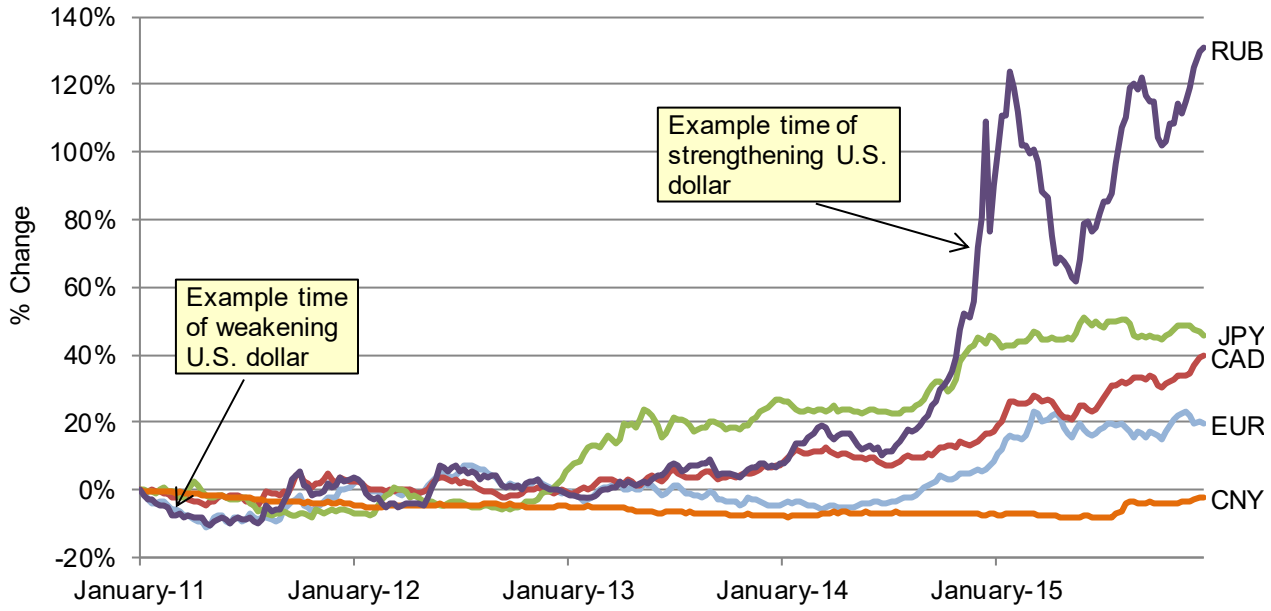
Table A.5
Onshore Landed Volume and Value by Species Groups by Port Groups in 2015

Port Group	Salmon	D. Crab	P. Shrimp	A. Tuna	Groundfish	P. Whiting	P. Sardine	P. Halibut	Other	Total
Volume										
Other Columbia River	1,759	0	0	0	0	0	0	0	18	1,777
Astoria	152	449	17,101	3,510	19,279	55,403	0	76	1,274	97,243
Tillamook	102	125	4	222	53	0	0	11	518	1,036
Pacific City	1	9	0	6	59	0	0	0	4	79
Newport	505	703	15,234	2,479	7,413	39,503	424	135	1,427	67,823
Florence	0	1	0	18	0	0	0	2	1	22
Winchester Bay	15	116	761	56	1	0	2,885	5	53	3,892
Coos Bay	476	479	13,319	1,157	3,156	0	1,390	44	776	20,798
Bandon	1	0	0	2	28	0	0	0	0	32
Port Orford	82	265	0	11	474	0	0	7	362	1,202
Gold Beach	2	11	0	4	62	0	0	0	46	125
Brookings	62	145	6,989	101	2,538	1	0	1	21	9,858
Value										
Other Columbia River	4,526	0	0	0	0	0	0	0	25	4,551
Astoria	737	2,413	12,674	4,147	13,680	4,139	0	318	235	38,342
Tillamook	580	663	2	285	134	0	0	61	425	2,150
Pacific City	9	41	0	9	124	0	0	0	5	188
Newport	2,535	3,781	11,542	3,017	7,771	3,007	64	724	1,011	33,451
Florence	0	9	0	39	0	0	0	15	1	65
Winchester Bay	96	687	536	107	1	0	505	32	6	1,971
Coos Bay	2,572	2,546	10,455	1,469	3,333	1	244	235	746	21,600
Bandon	7	0	0	2	87	0	0	0	0	96
Port Orford	460	1,103	0	17	1,221	0	0	37	218	3,056
Gold Beach	8	38	0	6	168	0	0	0	24	244
Brookings	331	678	5,129	122	2,341	0	0	8	11	8,621

Notes: 1. Landings are reported in thousands. Landing data is preliminary for 2015.
2. Astoria includes Astoria, Gearhart/Seaside, and Cannon Beach; Tillamook includes Tillamook/ Garibaldi, Netarts Bay, and Nehalem Bay; Newport includes Newport, Depoe Bay, Siletz Bay, Waldport, and Yachats.

Source: PacFIN annual vessel summary, February 2016 extraction.

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



Notes: 1. Currencies are weekly percent change from first week of January 2011 = 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.6
Gross Domestic Product Implicit Price Deflator Current to Constant Year Dollar Inflation Index

Year	Index	Year	Index	Year	Index	Year	Index
1973	24.0	1984	50.6	1995	68.7	2006	86.4
1974	26.2	1985	52.2	1996	69.9	2007	88.7
1975	28.6	1986	53.3	1997	71.1	2008	90.4
1976	30.2	1987	54.6	1998	71.9	2009	91.1
1977	32.1	1988	56.5	1999	72.9	2010	92.2
1978	34.3	1989	58.7	2000	74.6	2011	94.1
1979	37.2	1990	60.9	2001	76.3	2012	95.9
1980	40.5	1991	62.9	2002	77.5	2013	97.4
1981	44.3	1992	64.3	2003	79.0	2014	99.0
1982	47.0	1993	65.9	2004	81.2	2015	100.0
1983	48.9	1994	67.3	2005	83.8		

Notes: 1. The gross domestic product implicit price deflator (GDP IPD) developed by the U.S. Bureau of Economic Analysis is the ratio of the current dollar value to its corresponding chained dollar value, multiplied by 100. The GDP IPD is a national economic metric that accounts for inflation by converting output measured at current year dollar prices into constant year dollar prices.
Source: U.S. Bureau of Economic Analysis.