STOCK ASSESSMENT AND FISHERY EVALUATION REPORT FOR THE GROUNDFISH FISHERIES OF THE GULF OF ALASKA AND BERING SEA/ALEUTIAN ISLANDS AREA:

ECONOMIC STATUS OF THE GROUNDFISH FISHERIES OFF ALASKA, 2014

by

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The authors of the Groundfish SAFE Economic Status Report invite users to provide feedback regarding the quality and usefulness of the Report and recommendations for improvement. AFSC's Economic and Social Sciences Research Program staff have begun an initiative to revise the SAFE Economic Status Reports for Alaska Groundfish and BSAI Crab to incorporate additional analytical content and synthesis, improve online accessibility of public data in electronic formats, and otherwise improve the utility of the reports to users. We welcome any and all comments and suggestions for improvements to the SAFE Economic Status Reports, and have developed an online survey to facilitate user feedback. The survey is available at:
http://www.afsc.noaa.gov/REFM/Socioeconomics/Contact/SAFE_survey.php

This report will be available at:
http://www.afsc.noaa.gov/refm/docs/2015/economic.pdf

Time series of data for the tables presented in this report (in CSV format) are available at:
http://www.afsc.noaa.gov/refm/Socioeconomics/SAFE/groundfish.php#data

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Contents

List of Figures

List of Tables

1. EXECUTIVE SUMMARY

The commercial groundfish fishery off Alaska catch totaled 2.3 million tons (t) in 2014 (including catch in federal and state waters). This amount was up 4.2% from 2013, and was roughly five times larger than the combined catch of Alaska's other commercial domestic species (Fig. 1 and Table 1). Groundfish accounted for 85% of Alaska's 2014 total catch, which was slightly greater than typical because of lower Pacific salmon catch (Table 1A), reduced halibut catches (Table H1A) and increased Gulf of Alaska groundfish harvest. In addition, the groundfish fishery off Alaska is an important segment of the U.S. fishing industry. In 2013, it accounted for 48% of the weight of total U.S. domestic landings (Fisheries of the United States, 2013)

Alaska's FMP fisheries can be broadly divided into two sectors: catcher vessels which deliver their harvest to shoreside processors, and the at-sea processing sector, whose processed product sells directly to the first-wholesale market. In 2014, catcher vessels accounted for 49% of the ex-vessel value of the groundfish landings compared to 45% of the total catch because catcher vessels take larger percentages of higher-priced species such as sablefish (Table 18). The ex-vessel value of the at-sea sector is imputed from observed first-wholesale value to exclude the value added by at-sea processing.

Total catches of FMP groundfish fisheries increased for the majority of species (complexes) in 2014 (Table 2).[1] Alaska pollock, Pacific cod and rockfish complex catches increased 5.4%, 0.68% and 6.9% respectively, with a notably large 26% increase in Atka mackerel. Sablefish total catch decreased 15% and total catch in the flatfish complex decreased 0.63%. The contributions of the major groundfish species or species groups to the total catch are depicted in Fig. 1. Alaska pollock, the dominant species in terms of catch, accounted for 65% of FMP groundfish with a catch of 1.4 million t (Table 2). The majority of the Alaska pollock harvest occurs in the Bering Sea and Aleutian Islands (BSAI) (90% in 2014) where catches increased slightly over last year. However, the 50% increase in Gulf of Alaska (GOA) pollock brought catches in that region to the highest level observed over the last decade. The second most abundantly harvested species in Alaska is Pacific cod with a catch of 297 thousand t in 2014. Changes in Pacific cod total catches differed regionally as catch increased significantly in the GOA but not the BSAI. Rockfish catch totaled 62 thousand t in 2014 and increased most notably in the GOA Pacific ocean perch fishery (Table R1). The 2014 increase in Atka mackerel total catch to 29 thousand t comes after a precipitous decrease in 2013 catches, and in 2014 remained below the 2010-2012 average. Sablefish catch was 11 thousand t in 2014, down from 13 thousand t in 2013 with the decrease occuring in the GOA. The flatfish total catch decrease was concentrated in the BSAI, with the rock sole trawl catch decreasing by 13% (Table 4). GOA flatfish catches increased significantly, which was most notable in the arrowtooth trawl fishery where catch increased 68% (Table 3) as a result of regulatory changes to sideboard limits.[2] The increase in halibut prohibited species catch (PSC) in 2014 appears to be largely attributable to the

[1] An FMP fishery is one that is managed under a Federal Management Plan. Pacific halibut is not an FMP groundfish.

[2] In 2014, Amendment 95 (regulations to reduce GOA halibut PSC limits) implemented changes to the accounting of halibut PSC sideboard limits for Amendment 80 vessels that allowed the fleet to increase their groundfish catch, mostly arrowtooth flounder. Also, Amendment 95, revised halibut PSC limit apportionments used by trawl catcher vessels from May 15 through June 30 that extended the deep-water species fishery allowing for an increase in arrowtooth flounder catch for this fleet. For details see `http://alaskafisheries.noaa.gov/frules/79fr9625.pdf`

increased catch of GOA arrowtooth as flatfish PSC rates did not change appreciably (Tables 11-15). Halibut PSC on most other target species decreased between 2013 and 2014 (Tables 12 and 13).

The aggregate ex-vessel value of the FMP groundfish fisheries off Alaska was $934 million, which was 51% of the ex-vessel value of all commercial fisheries off Alaska in 2014 (Tables 17 and 19) and 17% of the ex-vessel value of total U.S. domestic landings (NMFS, 2013).[3] Groundfish made up a larger share of the ex-vessel value from the fisheries off Alaska than last year, in part, because of the decrease in salmon. Nominal ex-vessel value of FMP groundfish increased $64 million in 2014 (Table 19). After adjustment by the Personal Consumption Expenditure Index (PCE), real ex-vessel value increased $48 million (Table 16).

The ex-vessel market of the FMP groundfish fisheries off Alaska showed healthy growth in 2014 with a 7.3% increase in aggregate value, retained catch increased 4.3% to 2,110 thousand t, and the aggregate ex-vessel price increased 2.9% to $0.201 per pound of retained catch (Tables 2, 6 and 19). Ex-vessel prices for individual species (complexes) were generally increasing and changes tended to be modest in magnitude. Because of this both movement in catch and price were critical in determining changes in aggregate value for individual species (complexes). There was some variation in the way in which ex-vessel value accrued to regions, sectors or gear types. At times changes in one sector would mitigate changes in another, generally resulting in (sometimes small) aggregate net increase in ex-vessel value. Ex-vessel value increased for all species (complexes) except flatfish. The largest percentage increases in ex-vessel value were for Atka mackerel and Pacific cod, and to a lesser extent for the rockfish complex (Table 19).

The ex-vessel value of Alaska pollock was $474 million in 2014 (Table 19). Pollock prices fell slightly in the GOA but rose slightly in the BSAI. Together with the increase in catches, the net effect was a 4.1% increase in pollock ex-vessel value (Table 19). However, the largest gains in ex-vessel value came from Pacific cod with a increase of 22% to $204 million in 2014. This increase was supported by a small but significant price increase in Pacific cod that occurred broadly across regions and gear types (Table 18). The substantial increase in ex-vessel value in the rockfish complex to $30 million in 2014 was largely the result of increased catch in the BSAI catcher-processor (CP) sector. The impact of decrease in sablefish catch on ex-vessel value was offset by an increase in the ex-vessel price resulting in a small increase in ex-vessel value. At $95 million in 2014 sablefish ex-vessel value is higher than last year but remains below recent levels because of reduced catch levels. The decrease in aggregate flatfish ex-vessel value to $94 million in 2014 was the result of decreased catches in the BSAI. Flatfish ex-vessel value for GOA increased with catch. In particular, flatfish ex-vessel value for GOA CPs more than doubled, based in large part on the increase in arrowtooth catch. The resumption of Atka mackerel catch to a more typical level was supported by an increase in prices which brought ex-vessel value to $25 million, which was close to levels observed in 2010-2012.

The gross value of the 2014 groundfish catch after primary processing (first wholesale) was $2.35 billion (Table 31), an increase of 7.6% from 2013. This was slightly more than the first-wholesale value of Alaska's non-FMP groundfish fisheries which totaled $1.94 billion (Table 30). Most of the non-FMP groundfish product value comes from Pacific salmon which totaled $ 1.4 billion, and was down 24% in 2014 as a result of low catch levels. Halibut, which comes mostly from the Gulf of Alaska, continued to declined in 2014 with reductions in the allowable catch and in 2014 the first-wholesale value was $109 million, 43% of its level in 2010. Aggregate first-wholesale production

[3]The data required to estimate net benefits to either the participants in fisheries or the Nation, such as cost or quota value (where applicable) data, are not available. Unless otherwise noted value should be interpreted as gross revenue.

grew 6.3% to 973.5 thousand t and aggregate prices stayed roughly constant at $1.092 per pound in 2014 (Table 25 and 26). Most species (complexes) saw increasing first-wholesale total value in 2014 with the exception of flatfish. In percentage terms the most significant change in value were in Atka mackerel and rockfish, which grew 60.7% and 19.8% respectively. First-wholesale prices across species (complexes) increased for all except pollock and the flatfish complex. Price changes tended to be modest (Table 26).

Pollock first-wholesale value increased 5.4% in 2014 to $1.41 billion, primarily due to a 6.2% increase in production (Tables 25 and 26). Value increased for two of three of pollock's primary product forms: surimi and roe, which made up a combined 41.9% of pollock total first-wholesale value. The largest value increase (28.2%) came from pollock roe where production increased 49.6%. The increase in surimi value (16.9%) was the result of moderate increases in both production (7.9%) and price (8.4%). Pollock fillets (all forms) had a 39.6% value share in 2014. Pollock fillet value decreased 1.3% despite a 4.1% increase in production as prices fell 5.2%. Pacific cod aggregate first-wholesale value increased 18.6%. The most critical change in was a 31.7% increase in 'head and gut' (H&G) first-wholesale value. This change was driven by a 20.1% increase in H&G prices to $1.257 per pound which largely reversed the significant decline in the 2013. Pacific cod fillets are primarily produced by the shoreside sector where value decreased 3.8%, with small decreases in both fillet prices and production. Pacific cod roe is a comparatively small product form, but has seen substantial increases in both value and production over the last three years. Sablefish production was down but an 20.4% increase in price resulted in a small net 2.9% increase in first-wholesale value. The Atka mackerel 12.1% price increase, coupled with the 43.3% increase in Atka mackerel production, resulted in a 60.7% increase in Atka mackerel value. Prices in the rockfish complex increased 8.2% while production increased 10.7%, resulting in a 19.8% increase in value in the rockfish complex. The flatfish complex is the only species group that showed decreased first-wholesale value (7%) in 2014. The decrease in flatfish value can be attributed to a 10.3% decrease in prices, while first-wholesale production was relatively stable. While flatfish H&G (83% value share) prices only decreased marginally all other product forms saw significant decreases in prices. Whole fish production increased substantially although whole fish prices decreased. Some of the changes in the aggregate flatfish complex may be a reflection of changes in the relative proportion of species produced within the complex which can command different prices for a given product type.

A significant portion of the products produced from the commercial fisheries off Alaska are exported. Since 2005 exports of pollock originating from Washington and Alaska have risen from 293 thousand t to 392 thousand t and value has risen from $892 million to $1,072 million (Table E.2). Pollock fillet and surimi accounted for 69.6% of the export value. Germany, South Korea and Japan were the primary markets from which export value came with $263 million, $237 million and $235 million, respectively, while the export value of products going to China totaled $129 million in 2014 (Table E.2). Globally, pollock, Pacific cod and sablefish from Alaska accounted for 10% of the worlds 6.5 million t production of 'cod, hake, and haddock' species in 2012 (Tables 25 and E.1). Alaska's first first-wholesale value from pollock, Pacific cod and sablefish was $2.1 billion relative to the world's total 'cod, hake, and haddock' species (as defined by the FAO) product value of $7.6 billion. Between 2009 and 2012 Alaska's share of production in the global 'cod, hake, and haddock' market has increased from 8.5% to 10.4%, while value has increased from 23.6% to 27.5%. The higher rate of change in value relative to production indicates that Alaskan products are competitive in global markets.

NOAA fisheries collects only limited data on employment in the fisheries off Alaska. The most direct measure available is the number of 'crew weeks' on at-sea processing vessels of FMP groundfish. These data indicate that in 2014, crew weeks totaled 104,453 with the majority of them (100,319) occurring in the BSAI groundfish fishery (Table 50). In 2014, the maximum monthly employment peaked in March with 16,869 crew weeks. Relative to 2013, annual crew weeks increased in 2014 by 4.8%, which comes after a decline of 10% in 2013 from 2012. Statewide average monthly employment in fish processing (of any species) was 10,400 in 2014, up slightly from previous years (Table E.3). Statewide average monthly employment in groundfish harvesting between 2008 and 2012 (the most recent data currently available from the Alaska Department of Labor) was 1,552 and comprised 20% of the total fish harvesting employment in Alaska (Table E.4).

1.1. Economic Summary of the Alaska commercial groundfish fisheries

These following summaries were prepared for the Groundfish Plan Team Meeting (Nov. 2015). The information below are excerpts from the introductions in the BSAI and GOA Groundfish Plan Team reports. Some values may differ from those found in the rest of the report.

The real ex-vessel value of all Alaska domestic fish and shellfish catch, including the estimated value of fish caught almost exclusively by catcher/processors, decreased from $1,950.6 million in 2013 to $1,845.8 million in 2014. The first wholesale value of 2014 groundfish catch was $2,345.6 million. The 2014 total groundfish catch increased by 4.2% and the total first-wholesale value increased by 7.6% relative to 2013.

The groundfish fisheries accounted for the largest share (50.8%) of the ex-vessel value of all commercial fisheries off Alaska, while the Pacific salmon (*Oncorhynchus spp.*) fishery was second with $546.0 million or 29.6% of the total Alaska ex-vessel value. The value of the shellfish fishery amounted to $244.1 million or 13.2% of the total for Alaska and exceeded the value of Pacific halibut (*Hippoglossus stenolepis*) with $106.7 million or 5.8% of the total for Alaska.

The Economic SAFE report (appendix bound separately) contains detailed information about economic aspects of the groundfish fisheries, including figures and tables, catch share fishery indicators, product price forecasts, a summary of the Alaskan community participation in fisheries, an Amendment 80 fishery economic data report (EDR) summary, market profiles for the most commercially valuable species, a summary of the relevant research being undertaken by the Economic and Social Sciences Research Program (ESSRP) at the Alaska Fisheries Science Center (AFSC) and a list of recent publications by ESSRP analysts. The figures and tables in the report provide estimates of total groundfish catch, groundfish discards and discard rates, prohibited species catch (PSC) and PSC rates, the ex-vessel value of the groundfish catch, the ex-vessel value of the catch in other Alaska fisheries, the gross product value of the resulting groundfish seafood products, the number and sizes of vessels that participated in the groundfish fisheries off Alaska, vessel activity, and employment on at-sea processors. Generally, the data presented in this report cover the years 2010 through 2014, but limited catch and ex-vessel value data are reported for earlier years in order to illustrate the rapid development of the domestic groundfish fishery in the 1980s and to provide a more complete historical perspective on catch. Several series have been discontinued and new price/revenue tables from an alternative source are presented in Appendix A: Ex-vessel Economic Data Tables: alternative pricing based on CFEC fish tickets.

The Economic SAFE report updates the data associated with the market profiles for pollock, Pacific cod, sablefish, and yellowfin sole that display the markets for these species in terms of pricing, volume, supply and demand, and trade. In addition, the Economic SAFE contains links to data on some of the external factors that impact the economic status of the fisheries. Such factors include foreign exchange rates, the prices, and price indices, of products that compete with products from these fisheries, domestic per capita consumption of seafood products, and fishery imports.

The Economic SAFE report also updates a section that analyzes economic performance of the groundfish fisheries using indices. These indices are created for different sectors of the North Pacific, and relate changes in value, price, and quantity across species, product and gear types to aggregate changes in the market.

Decomposition of the change in first-wholesale revenues from 2013-14 in the BSAI

The following brief analysis summarizes the overall changes that occurred between 2013-14 in the quantity produced and revenue generated from BSAI groundfish. According to data reported in the 2015 Economic SAFE report, the ex-vessel value of BSAI groundfish increased from $689.4 million in 2013 to $726.3 million in 2014 (Figure 1.1), and first-wholesale revenues from the processing and production of groundfish in the BSAI fell from $1,851.3 million in 2013 to $1,957.8 million in 2014, an increase of 5.6% (Figure 1.2).

The total quantity of groundfish products from the BSAI increased from 818.2 thousand metric tons in 2013 to 843.7 thousand metric tons in 2014, a difference of 25.5 thousand metric tons. These changes in the BSAI account for part of the change in first-wholesale revenues from Alaska groundfish fisheries overall which increased by $165.1 million, a relative difference of 7.6% in 2014 compared to 2013 levels.

By species group, a positive quantity effect of $79.8 million for pollock, and positive price effect of $47.3 million for cod, were the largest changes in first-wholesale revenues from the BSAI for 2013-14 (Figure 1.3). A negative quantity effect for pollock of $20.8 million partially offset the positive quantity effect for a net effect of $59.0 which was the largest change in first-wholesale revenues in the BSAI area. Other notable changes in the BSAI were negative price and quantity effects for flatfish that produced a negative net effect of $30.4 million, and positive price and quantity effects for Atka mackerel which implied a positive net effect of $23.9 million. By product group, positive quantity effects were distributed among surimi, whole head & gut and roe which were complemented by positive price effects for surimi and whole head & gut products. In contrast, fillets experienced a negative price effect of $29.3 million in the BSAI first-wholesale revenue decomposition for 2013-14.

In summary, first-wholesale revenues from the BSAI groundfish fisheries increased by $106.5 million from 2013-14. Major drivers were a positive quantity effect for pollock and a positive price effect for cod. In comparison, first-wholesale revenues increased by $58.6 million from 2013-14 in the GOA, due primarily to positive quantity effects for pollock., cod, and flatfish.

Decomposition of the change in first-wholesale revenues from 2013-14 in the GOA

The following brief analysis summarizes the overall changes that occurred between 2013-14 in the quantity produced and revenue generated from GOA groundfish. According to data reported in the 2015 Economic SAFE report, the ex-vessel value of GOA groundfish increased from $181.0 million in 2013 to $207.6 million in 2014 (Figure 1.4), and first-wholesale revenues from the processing and production of groundfish in the Gulf of Alaska (GOA) grew from $329.3 million in 2013 to

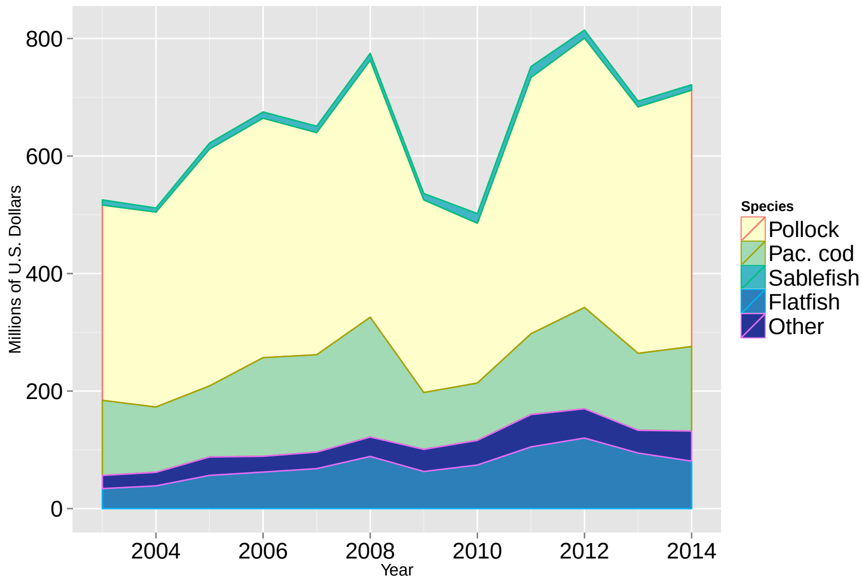


Figure 1.1: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries in the BSAI area by species, 2003-2014 (base year = 2014).

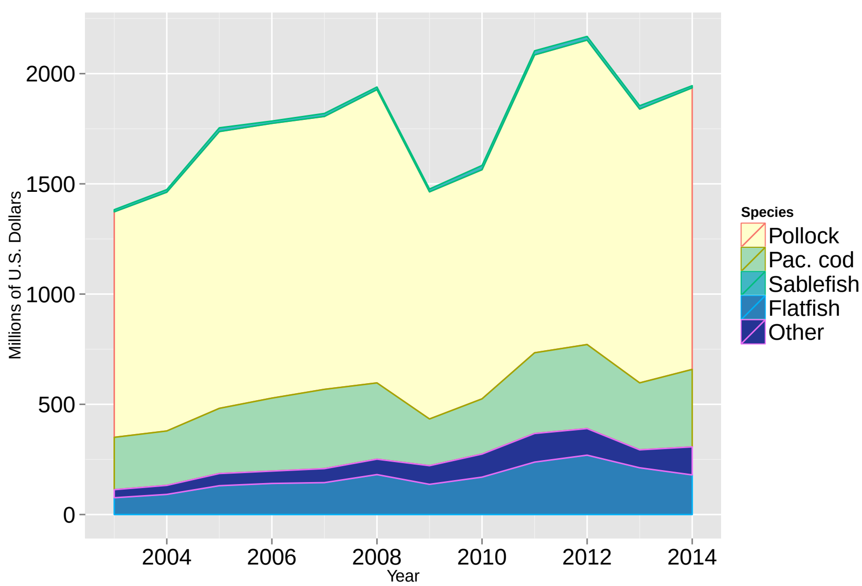
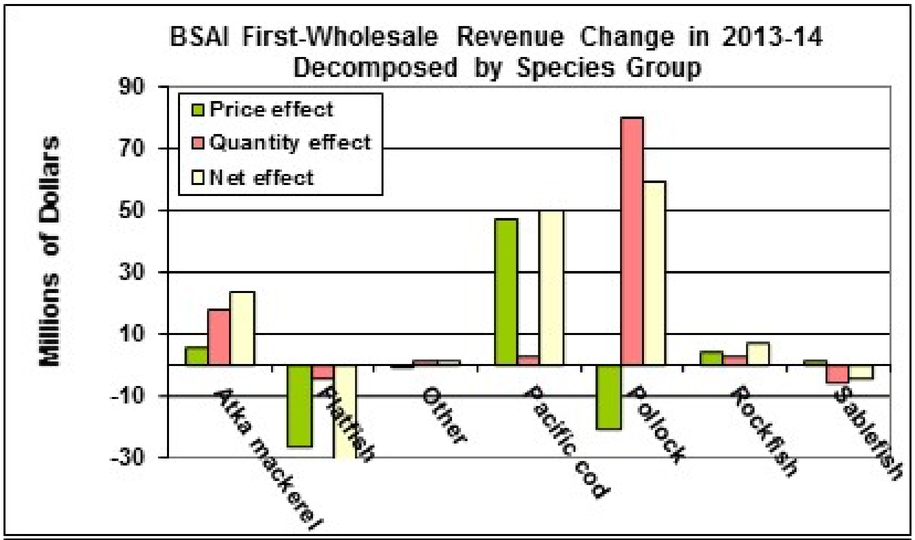


Figure 1.2: Real gross product value of the groundfish catch in the BSAI area by species, 2003-2014 (base year = 2014).

$387.9 million in 2014, an increase of 17.8% (Figure 1.5). At the same time, the total quantity of groundfish products from the GOA increased from 99.4 thousand metric tons to 131.1 thousand metric tons, a difference of 31.7 thousand metric tons. These changes in the GOA account for part of the change in first-wholesale revenues from Alaska groundfish fisheries overall which increased by $165.1 million, a relative difference of 7.6%, in 2014 compared to 2013 levels.

By species group, a positive price and quantity effects combined for a net effect of $23.9 million for cod which was the largest change in first-wholesale revenues from the GOA for 2013-14 (Figure 1.6).



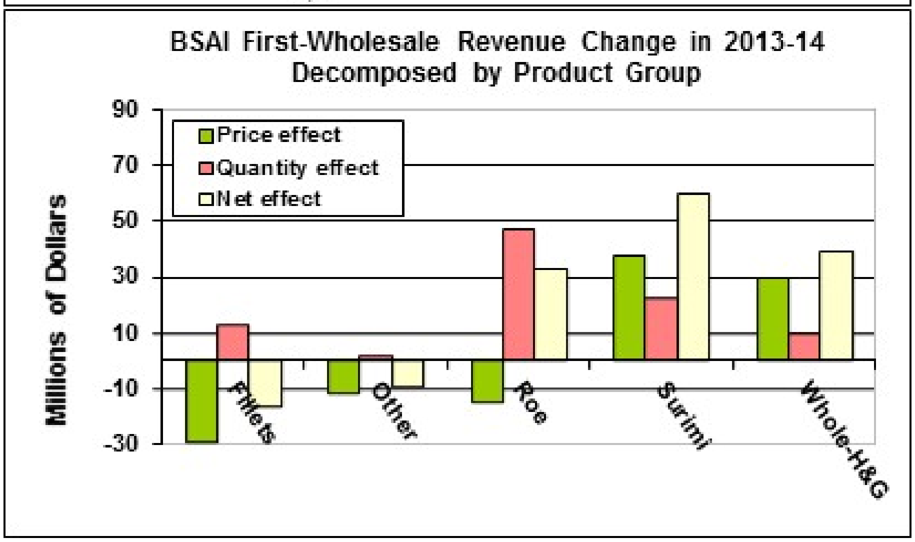


Figure 1.3: Decomposition of the change in first-wholesale revenues from 2012-14 in the BSAI area. **Notes:** The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the change in the first-wholesale price index (current dollars per metric ton) for each group. The quantity effect refers to the change in revenues due to the change in production (in metric tons) for each group. The net effect is the sum of price and quantity effects. Year to year changes in the total quantity of first-wholesale groundfish products include changes in total catch and the mix of product types (e.g., fillet vs. surimi).

Pollock experienced a large quantity effect of $34.3 million, but that effect was mostly offset by a negative price effect of $22.2 million, and the net effect for pollock was $12.1 million, which was only slightly higher than the net effect for flatfish. For sablefish, a relatively strong price effect of $16.9 million exceeded the negative price effect of $9.6 million for a positive net effect of $7.2 million. By product group, positive price and quantity effects were concentrated in the whole head & gut category in the GOA first-wholesale revenue decomposition for 2013-14.

In summary, first-wholesale revenues from the GOA groundfish fisheries increased by $58.6 million from 2013-14. The main driver of this increase was positive quantity effects for pollock, cod, and to a lesser degree, flatfish. These positive quantity effects were highest in the head & gut product group though fillets, roe, and surimi also contributed. In comparison, first-wholesale revenues increased by

$106.5 million from 2013-14 in the BSAI due to a large quantity effect for pollock, and a large price effect for cod.

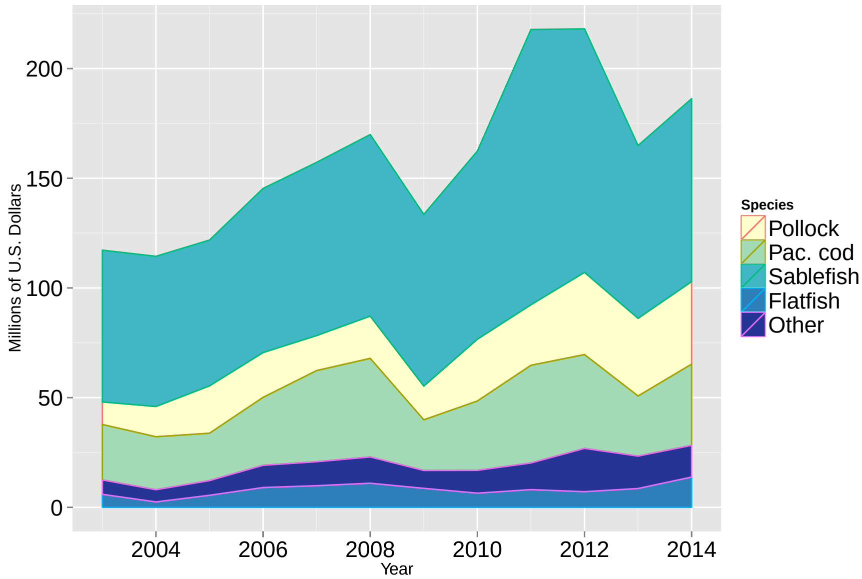


Figure 1.4: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries in the GOA area by species, 2003-2014 (base year = 2014).

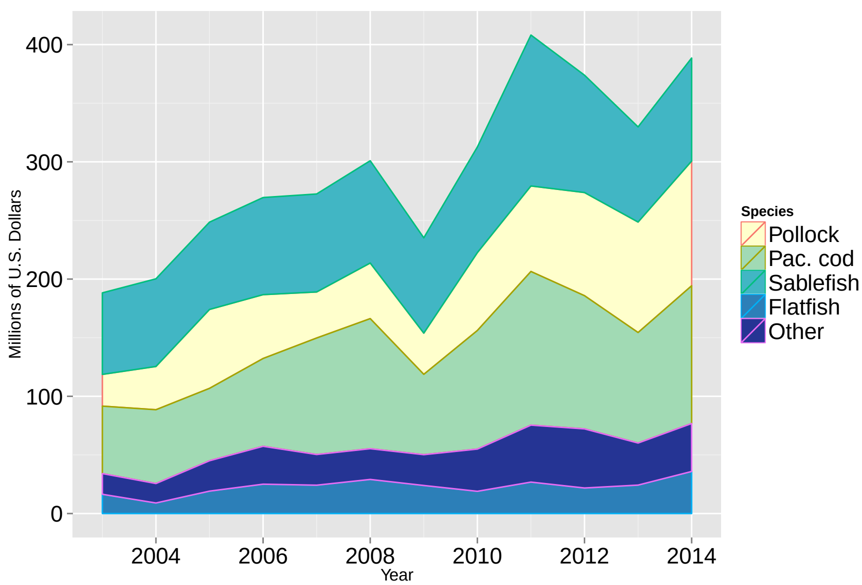


Figure 1.5: Real gross product value of the groundfish catch in the GOA area by species, 2003-2014 (base year = 2014).

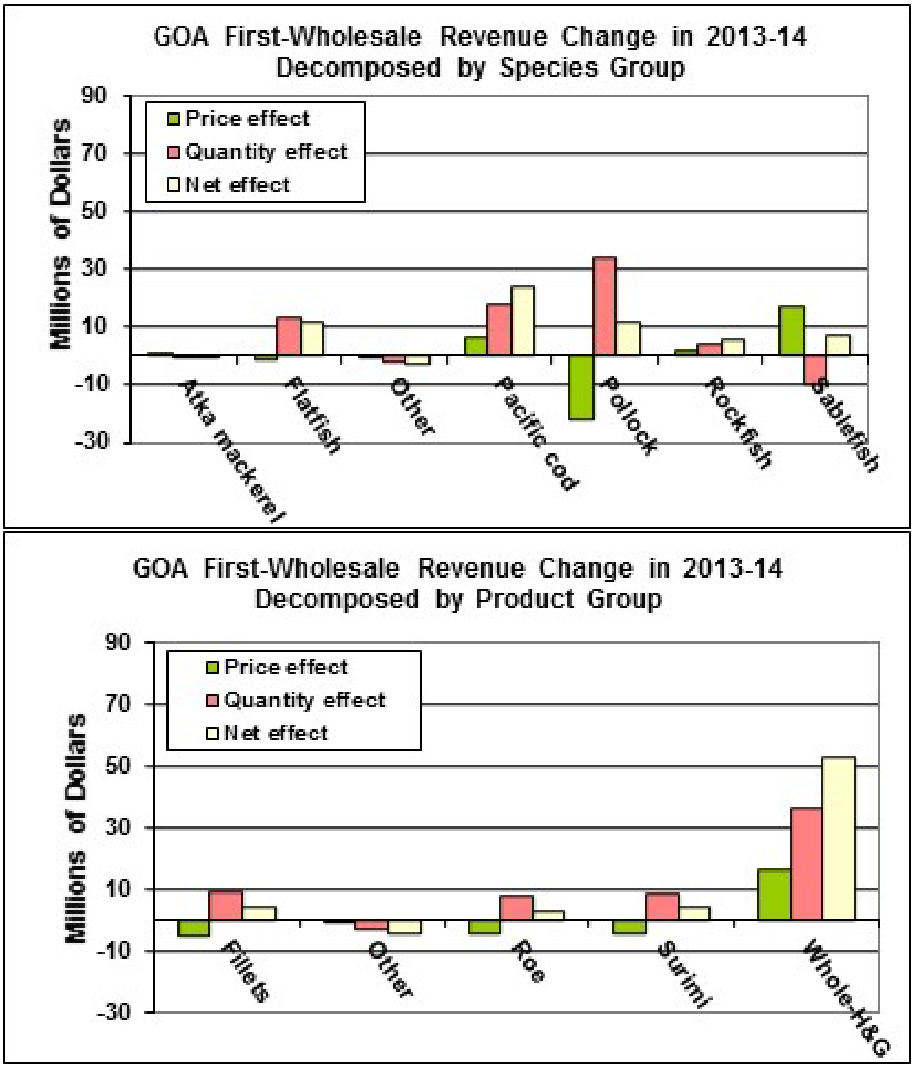


Figure 1.6: Decomposition of the change in first-wholesale revenues from 2013-14 in the GOA area. **Notes:** The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the change in the first-wholesale price index (current dollars per metric ton) for each group. The quantity effect refers to the change in revenues due to the change in production (in metric tons) for each group. The net effect is the sum of price and quantity effects. Year to year changes in the total quantity of first-wholesale groundfish products include changes in total catch and the mix of product types (e.g., fillet vs. surimi).

2. OVERVIEW OF ECONOMIC STATUS REPORT, 2014

2.1. Introduction

This report presents the economic status of groundfish fisheries off Alaska in terms of economic activity and outputs using estimates of catch, prohibited-species catch (PSC), ex-vessel prices and value (i.e., revenue), effort (as measured by the size and level of activity of the groundfish fleet), and the first wholesale production volume and gross value of (i.e., F.O.B. Alaska revenue from) processed products.[1] The catch, ex-vessel value, and fleet size and activity data reported here reflect the fishing industry activities that are that are accounted for in the groundfish landings and production reports, North Pacific groundfish and halibut observer data, and the State of Alaska Commercial Operator's Annual Reports. Catch data in this report are sourced from the NMFS Alaska Regional Office (AKRO) catch-accounting system (CAS), which is used for in-season monitoring groundfish and prohibited species catch (PSC) quotas. The data descriptions, qualifications, and limitations noted in this overview of the fisheries and the footnotes to the tables are critical to understanding the information in this report. This report updates last year's report (Fissel *et al.* 2014) and is intended to serve as a reference document for those involved in making decisions with respect to conservation, management, and use of Gulf of Alaska (GOA) and Bering Sea and Aleutian Islands (BSAI) groundfish fishery resources.

In addition to catch that is counted against a federal Total Allowable Catch (TAC) quota (i.e., managed under a federal Fisheries Management Plan (FMP)), estimates provided in some of the following tables may include catch from other Alaska groundfish fisheries (as indicated by the footnotes). The distinction between catch managed under a federal FMP and catch managed by the State of Alaska is not merely a geographical distinction between catch occurring in the U.S. Exclusive Economic Zone, or EEZ and catch occurring Alaska state waters (3-mile limit). The State of Alaska maintains authority over some rockfish fisheries in the EEZ of the GOA, for example, and parallel fisheries occurring within state waters are managed under federal FMPs. It is not always possible, depending on the data source(s) from which a particular estimate is derived, to definitively identify a unit of catch, or associated units of measure, such as revenue or price, as being part of a federal FMP or otherwise. Users are encouraged to consult table footnotes for clarification on coverage in individual tables with respect to federally-managed and state-managed catch. Additionally, unless explicitly indicated, phrases such as "groundfish fisheries off Alaska" or "Alaska groundfish", as used in this report, should not be construed to precisely include or exclude any category of state or federally managed fishery or to refer to any specific geographic area. These and similar phrases may describe groundfish from both Alaska state waters and the federal EEZ off Alaska, or groundfish managed only under federal FMPs or managed by both NMFS and the state of Alaska.

The BSAI and GOA groundfish fisheries are widely considered to be among the best managed fisheries in the world. These fisheries produce high levels of catch, ex-vessel revenue, processed product revenue, exports, employment, and other measures of economic activity while maintaining ecological sustainability of the fish stocks. However, the data required to estimate the success

[1] F.O.B. refers to the value (or price) excluding transportation costs. The acronym, F.O.B. stands for "Free On Board".

of these policies with respect to net benefits to either the participants in these fisheries or the Nation, such as cost or quota value (where applicable) data, are not available for nearly all the fisheries. Fishery economists began discussing the potential for rent dissipation in fisheries managed with open-access catch policies long ago (Scott 1954, Gordon 1955). The North Pacific region has gradually moved away from such management, as discussed by Holland (2000), and instituted catch share programs in many of its fisheries. Six of the 15 catch-share programs currently in operation throughout the U.S. operate in the North Pacific, accounting for approximately 75% groundfish landings. By allocating the catch to individuals, cooperatives, communities, or other entities catch share programs are intended to promote sustainability and increase economic benefits. Research on North Pacific fisheries has examined some of these issues after program implementation, (e.g., Homans and Wilen 2005, Feltlhoven 2002, Wilen and Richardson 2008, Abbott et al. 2010, Fell and Haynie 2011, Torres and Felthoven 2014, Abbott et al. 2015). Section 8 provides an overview of the North Pacific groundfish catch share programs and provides a consistent set of metrics to evaluate these programs along various dimensions.

There is considerable uncertainty concerning the future conditions of stocks, the resulting quotas, and potential changes to the fishery management regimes for the BSAI and GOA groundfish fisheries. The management tools used to allocate the catch between various user groups can significantly affect the economic health of either the domestic fishery as a whole or segments of the fishery. Changes in fishery management measures are expected as the result of continued concerns with: 1) the catch of prohibited species; 2) the discard and utilization of groundfish catch; 3) the effects of the groundfish fisheries on marine mammals and sea birds; 4) other effects of the groundfish fisheries on the ecosystem and habitat; and 5) the allocations of groundfish quotas among user groups.

The remainder of this report is structured as follows: Section 2.2 gives a verbal description and important information for understanding the economic data tables in Section 4. Section 5 examines the economic performance of the North Pacific groundfish fisheries through market indices. Section 6 gives nowcasts and price projections of first wholesale prices. Section 8 reviews North Pacific groundfish catch share programs. Section 10 characterizes Alaskan community participating in groundfish fisheries. Section 9 provides data collected under Economic Data Report (EDR) program for the Amendment 80 fleet. Section 7 profiles wholesale markets for Alaskan fisheries products. Section A contains additional economic data tables. Sections C and C list projects and publication on North Pacific groundfish fisheries carried out by the Economic and Social Sciences Research Program at the Alaska Fisheries Science Center.

2.2. Description of the Economic Data Tables

2.2.1 Groundfish and Prohibited Species Catch Data Description

Data Sources

Total catch estimates in the groundfish fisheries off Alaska are generated by NMFS from data collected through an extensive fishery observer program and from information provided through required industry reports of harvest and at-sea discard. The North Pacific Groundfish Observer Program (Observer Program), based at the NMFS Alaska Fisheries Science Center (AFSC), has had a vital role in the management of North Pacific groundfish fisheries since the program started over 20 years ago. Observer data are collected by NMFS-certified observers and provide scientific information for managing the groundfish fisheries and minimizing bycatch. Industry-reported data consists of catch and processed product amounts that are electronically recorded and submitted to NMFS through the Interagency Electronic Reporting System, known as eLandings. Observer information and industry reports are integrated into a NMFS application called the Alaska Catch Accounting System (CAS).

The harvest of groundfish in Federal waters are governed under fishery management plans (FMPs) that are specific to the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) regions. The groundfish TACs are established and monitored in terms of total catch, which is both retained catch and discarded catch. In addition, the FMPs describe policy for setting bycatch limits for some species, such as halibut and salmon, whose retention is prohibited in the groundfish fisheries; bycatch of these species is referred to as Prohibited Species Catch (PSC). The primary purpose of the CAS is to provide estimates of total catch for FMP species (including prohibited species) in the groundfish and halibut fisheries and allow the in-season monitoring of catch against the TACs and PSC limits.

In the CAS, at-sea sample data collected by observers are used to create discard and PSC rates (a ratio of the estimated discarded catch to the estimated total catch in sampled hauls). For trips that are unobserved, the discard and PSC rates are applied to industry supplied landings of retained catch. Expanding on the observer data that are available, the extrapolation from observed vessels to unobserved vessels is based on varying levels of aggregated data (post-stratification). Data are matched based on processing sector (e.g. catcher/processor or catcher vessel), week, target fishery, gear, and Federal reporting area. Further detail on the estimation procedure, including levels of post-stratification, is available in Cahalan et al. (2014). With the exception of Pacific halibut PSC, all estimated at-sea discard is assumed to have 100% mortality. Halibut mortality rates are generated every three years based on the estimated condition of halibut sampled by observers (Williams 2010). These rates are applied to the total estimated halibut discard (for a gear type, FMP area (GOA or BSAI), fishery, and year).

Groundfish Catch Tables

The catch presented throughout these tables is total catch which includes retained and discarded catch. Catch data are sourced from the NMFS Alaska Region Office Catch Accounting System (CAS). Catch for all Alaska including state and federal catches is displayed in Table 1 and catch for just FMP-managed groundfish are provided in Tables 2 through 5. Table 2 presents catch data by area (BSAI and GOA), gear (trawl, hook and line–used in this report to include longlines and jigs–and pot gear), vessel type (catcher vessels and catcher/processor vessels), and species. Tables 3 and 4 provide estimates of total catch by species, area, gear, and target species for the GOA and BSAI. In general, the species or species group accounting for the largest proportion of retained catch on the trip or haul is considered the target species, with two exceptions. A target of pelagic pollock is assigned only if 95% or more of the total catch is pollock. In the BSAI, if flatfish species (flathead, rock, and yellowfin sole, and other flatfish) represent the largest amount of retained catch, then a target of yellowfin sole is assigned if this species represents at least 70% of the combined flatfish retained catch; otherwise, the flatfish species accounting for the greatest amount of retained flatfish catch is assigned as the target. Beginning in 2011, Kamchatka flounder was broken out from other flatfish target species categories in the BSAI. As such, the “other flatfish”, and/or arrowtooth flounder target categories may not be directly comparable between 2011 and prior years in Tables 4, 8, 10, 13, and 15; and the other flatfish species category is not comparable in Tables 4, 8, and 26.

Catch data by the residency of primary vessel owners are summarized in Table 5. These data are sourced from the CAS combined with State of Alaska groundfish fish ticket data and vessel registration data, the latter of which includes the stated residency of the primary vessel owner. Residents of Alaska and of other states, particularly Washington and Oregon, are active participants in the BSAI and GOA groundfish fisheries. For the domestic groundfish fishery as a whole, 83% of the 2014 catch volume was made by vessels with primary owners that were not Alaska residents, although catch in the GOA was more equally distributed between Alaska resident and non-resident vessel owners.

Groundfish Discards and Discard Rates

Discarded catch is the unretained catch of species that a vessel is legally able to target and retain. Discards are included in a vessel's total catch. Discards can occur for various reasons and in a variety of ways such as discarding on non-targets species, fish falling off of processing conveyor belts, dumping of large portions of nets before bringing them on-board the vessel, dumping fish from the decks, size sorting by crewmen, and quality-control. In each target fishery the discard rates can be high for non-target species. For the most common species (e.g. pollock and cod) retention requirements can mitigate the amount of discards for these species. The discard rate is the percent of total catch of a species that is discarded. Details on discard estimation can be found in Cahalan *et al.* (2014). The discards of groundfish in the groundfish and halibut fisheries have received significant management attention by NMFS, the Council, Congress, and the public at large. Table 6 presents CAS estimates of discarded groundfish catch and discard rates (calculated as the percent of total catch that is discarded) by gear, area, and species for years 2010-2014. Tables 7-10 provide estimates of discarded catch and discard rates by species, area, gear, and target fishery.

Prohibited-Species Catch

Prohibited-species catch (PSC) is the catch of species that a vessel is prohibited from to targeting and retaining due to their economic value outside the FMP groundfish fisheries. These species include Pacific halibut, king and tanner crab (*Chionoecetes*, *Lithodes* and *Paralithodes spp.*), Pacific salmon (*Oncorhynchus spp.*), and Pacific herring (*Clupea pallasi*). Monitoring and minimizing the amount PSC in the Alaska groundfish fisheries has historically been an issue that has received significant management attention. The retention of these species was prohibited first in the foreign groundfish fisheries to ensure that groundfish fishermen had no incentive to target these species. Estimates of PSC the catch of these "prohibited species" for 2010-2014 are summarized by area and gear in Table 11. More detailed estimates of PSC and of PSC rates for 2013 and 2014 are in Tables 12-15. Details on PSC estimation can be found in Cahalan *et al.* (2014).

The at-sea observer program was developed for the foreign fleets and then extended to the domestic fishery. The observer program, managed by the Fisheries Monitoring and Analysis Division (FMA) of the Alaska Fisheries Science Center, resulted in fundamental changes in the nature of the PSC problem. First, by providing good estimates of total groundfish catch and non-groundfish PSC by species, it eliminated much of the concern that total fishing mortality was being vastly underestimated due to fish that were discarded at sea. Second, it made it possible to establish, monitor, and enforce the groundfish quotas in terms of total catch as opposed to only retained catch. Third, it made it possible to implement and enforce PSC quotas for the non-groundfish species that by regulation had to be discarded at sea. Finally, it provided extensive information that managers and the industry could use to assess methods to reduce PSC and PSC mortality. In summary, the observer program provided fishery managers with the information and tools necessary to prevent PSC from adversely affecting the stocks of the PSC species. An example of how this program is being used is the Bering Sea pollock fishery, became completely observed in 2011. As a result, salmon PSC estimates in the Bering Sea are a census rather than a sample and since 2011, there has been a fixed “hard cap” in the fishery. The information from the observer program helps identify the types of information and management measures that are required to reduce PSC to the extent practicable, as is required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

2.2.2 Ex-Vessel Prices and Value

The ex-vessel market is the transaction of catch delivered by vessels to processors. Tables 16 through 24 summarize data on ex-vessel prices and value of Alaska groundfish fisheries, with Tables 19 through 22 including only groundfish catch counted against federal TACs. Tables 16, 17 23, and 24 additionally including groundfish catch and/or pricing data from state-managed fisheries. In general, ex-vessel prices are derived from Commercial Operator Annual Report buying reports. Some catcher-vessels minimally processes (e.g., head-and-gut) the catch prior to delivery to the processor. The value of this on-board processing is discounted from the ex-vessel price so that it represents the round-weight (unprocessed) prices of the retained catch. Ex-vessel value is calculated by multiplying ex-vessel prices by retained catch. For the at-sea sector much of catch is both caught and processed for first-wholesale distribution by a single entity and as such a true “ex-vessel” market does not exist. For national accounting purposes the “ex-vessel” value of the at-sea sector are calculated by applying COAR buying prices for the corresponding species (group), region, and gear-type of the retained catch. For a subset of fisheries that are prosecuted primarily by the at-sea catcher processor fleet, and for which COAR buying data are sparse, we impute prices as a percentage (40%) of the estimated wholesale value per round weight. This percentage reflects the long-term average of the ratio ex-vessel prices to head-and-gut (H&G) processed-product prices for species (primarily Pacific cod) that are well represented in COAR buying and production reports. Ex-vessel prices and value include post-season adjustments. Additional details on pricing methodology are available in metadata for these tables accessible at `http://www.afsc.noaa.gov/REFM/Socioeconomics/SAFE/CSV_groundfish/metadata/groundfish_exvessel_value_metadata.pdf`.

Table 18 contains estimated ex-vessel prices that are used with estimates of retained catch to calculate ex-vessel values (gross revenues). Prices in this table may include data from both federally-managed and state-managed fisheries. Estimates of ex-vessel value by area, gear, type of vessel, and species are presented in Table 19.

Tables 20 and 21 summarize the ex-vessel value of catch delivered to shoreside processors by vessel-size class, gear, and area. Table 20 gives the total ex-vessel value in each category and Table 21 gives the ex-vessel value per vessel. Table 22 provides estimates of ex-vessel value by residency of primary vessel owners, area, and species. For the BSAI and GOA combined, 76.49% of the 2014 ex-vessel value was accounted for by vessels with primary owners who indicated that they were not residents of Alaska.

Table 23 presents estimates of ex-vessel value of catch delivered to shoreside processors, and Table 24 gives the ex-vessel value of groundfish as a percentage of the ex-vessel value of all species delivered to shoreside processors.[2] Data in both tables are summarized by processor groupings determined

[2] This including catch in non-Federal fisheries. See table notes for details.

primarily by their geographical locations. Refer to the table footnotes for additional details on processor groupings.

An additional set of tables in the appendix, Tables 16.B-24.B, present ex-vessel prices and value utilizing prices derived from ADF&G fish tickets priced by the Alaska Commercial Fisheries Entry Commission (CFEC). This provides an alternative source of ex-vessel prices to the COAR purchasing data that has historically been used to assemble Tables 16-24. CFEC fish ticket prices reflect individual transactions reported on shoreside and mothership landing reports, adjusted by analysts with consideration to COAR buying data, and therefore may be subject to additional scrutiny. Work is ongoing to analyze and characterize differences between the two pricing methods, and we are working with industry to get their perspective on which source may best reflect the pricing conditions faced by their companies. Until we have finalized this analysis we will retain the COAR pricing in the main body of the status report (Section 4: Tables 16-24) and include the CFEC pricing in the appendix. Note that Tables 16.B-24.B are valid only for the years after 2003.

2.2.3 First Wholesale Production, Prices and Value

The first wholesale market is the first sale onto the wholesale market of fisheries products after initial processing by a commercial processor with a Federal Processor Permit (FPP).[3] Groundfish first wholesale production data summarized in Tables 25 through 35 are sourced from at-sea and shoreside groundfish production reports. Product pricing and value reflect COAR product report price data appended to these production data per the AKFIN product pricing index. While groundfish production reports are a federal reporting requirement, there is typically no distinction made in this reporting between product derived from federally-managed catch and product derived from state-managed catch. Likewise, while COAR production reports include the area of processing, these data are insufficient for identifying the fishery inputs for units of finished production. As such, these tables reflect production volume and pricing from federal and some state-managed fisheries. Wholesale value and prices in Tables 25-35 are given as F.O.B. (Free On Board) Alaska, indicating that transportation costs are not included in values and prices.

Estimates of first wholesale weight and value (gross revenue) of the processed products sourced from catch of BSAI and GOA groundfish are presented by species, product form, area, and type of processor in Tables 25, 28 and 29. Product price-per-pound estimates are presented in Table 26, and estimates of total first wholesale product value per round metric ton of retained catch are reported in Table 27. For Table 27, we source the round weight of retained catch from CAS data rather than using product recovery rates to derive round weights from production data.

Table 30 reports estimates of the weight and first wholesale value of processed products from catch in the non-groundfish commercial fisheries of Alaska. As with the ex-vessel value estimates reported in Table 16, Tables 30 and 25 used together provide a means of comparing the value of groundfish and non-groundfish fisheries in Alaska.

Gross product value of Alaska groundfish is summarized by processing sector and area in Table 31. Table 32 and Table 33, respectively, summarize first wholesale value and value per vessel for the catcher/processor sector, stratified by vessel category, length, and area. Vessel categories are assigned by vessel rather than by trip; categorization methods are described in

[3]An FPP is required for all processors receiving and/or processing groundfish harvested in Federal waters.

metadata for these tables available at http://www.afsc.noaa.gov/REFM/Socioeconomics/SAFE/CSV_groundfish/metadata/groundfish_first_wholesale_value_metadata.pdf.

Tables 34 and 35 present the gross product value of groundfish processed by shoreside processors and the groundfish gross product value as a percentage of all-species gross product value, with both tables reported by the same processor groupings used in Tables 23 and 24. Data in these tables are summarized from COAR product reporting, and no distinction is made between state-managed and federally-managed groundfish sources of production.

2.2.4 Counts and Average Revenue of Vessels That Meet a Revenue Threshold

For the purposes of Regulatory Flexibility Act analyses, a business involved in fish harvesting is defined by the Small Business Administration (SBA) as a small business if it is independently owned and operated and is not dominant in its field of operation (including its affiliated operations worldwide). As of September 2015, the SBA defines small entity size standards separately for the finfish fishing (NAICS code 114111) and shellfish fishing (NAICS code 114112) industries. Small entities in the finfish fishing and shellfish fishing industries are defined as those that have combined annual receipts across all revenue sources no greater than $20.5 and $5.5 million, respectively.

Tables 36 - 39b present estimated counts and average revenues of entities with catch in federally-managed Alaska groundfish fisheries in 2014, reported by SBA entity size. A "preponderance of gross receipts" rule determines whether an entity is subject to the finfish or shellfish standard, whereby the standard applied corresponds to the fishing activity from which the entity derived the greater amount of revenue in the given year. Entities are classified as large or small for a given year using their average annual gross revenues over the three most recent three years, inclusive. Beginning with the reporting of 2013 data, which draws on more complete accounting of groundfish bycatch in directed halibut fisheries, we include vessels catching groundfish while targeting halibut among the entities reported in these tables. present counts and

Estimates of gross revenue include revenue streams from ex-vessel landings (for catcher vessels) and first wholesale production (for catcher processors) of groundfish and other species. Available sources of data on Alaska fisheries revenue include the CFEC gross earnings file, COAR product reports, and federal groundfish production data priced via AKFIN's product price index. Data on ex-vessel revenue from federal West Coast fisheries, including the imputed ex-vessel value of the at-sea whiting fishery, have also been incorporated into revenue estimates for the relevant entities. It should be noted that current methods for calculating gross revenue are likely to overestimate the number of small entities and underestimate the number of large entities, as vessels may have additional revenue streams (e.g., tendering activity) not represented in these data sets. We also lack information necessary to determine if a vessel is independently owned and operated, although we attempt in some tables to report counts and average revenues accounting for known affiliations among vessels, as described further below.

Estimates of fishing vessels that are clearly large entities and those that are potentially small entities are presented in Tables 36 and 37a, respectively. Estimates of the average, three-year averaged annual revenue per vessel (i.e., revenue averaged over the three most recent years by vessel, then averaged over all vessels by year) are presented in Table 38 for large entity vessels and in Table 39a for the small entity vessels. These tables treat vessels as proxies for entities, in that revenue and entity size are determined for each vessel individually without regard to affiliated vessels.

An alternative set of tables, Tables 37b and 39b, show small entity counts and average, three-year-averaged annual revenues per entity taking into account known affiliations among vessels. These tables utilize information on cooperative affiliations in the AFA pollock, Amendment 80 non-pollock trawl, Central Gulf of Alaska rockfish, Bering Sea & Aleutians Islands crab, and freezer longliner BSAI Pacific cod fisheries, in addition to known corporate affiliations among vessels. Group revenue for these affiliations is calculated as the total revenue across all member vessels; group revenue averaged over the most recent three-year period is used to determine small or large entity status for affiliations. Entity size for all affiliations is determined with respect to the finfish small entity standard, with the exception of crab cooperatives, which are subject to the shellfish standard.

2.2.5 Effort (Fleet Size, Weeks of Fishing, Crew Weeks)

Tables 40 through 50 present data on selected measures of fishing capacity and effort in federally-managed Alaska groundfish fisheries, including fleet size, duration of fishing, and levels of harvesting and processing employment. Data for these tables are sourced from catch accounting data, ADF&G groundfish fish tickets, North Pacific groundfish observer data, and at-sea groundfish production reports. Note that these tables are not directly useable or comparable with Tables 36-39b in that they do not count vessels and fishing activity for trips where halibut is identified as the target species.

Estimates of the numbers and registered net tonnage of vessels in the groundfish fisheries are presented by area and gear in Table 40, and estimates of the numbers of vessels that landed groundfish are depicted in Fig. 6 by gear type. More detailed counts of vessel participation stratified by target, vessel type, length class, catch volume, residency of vessel owners, and month are shown in Tables 41-47, with Tables 42 and 44 additionally reporting mean length and net tonnage for vessels in these strata. In particular, Table 43 gives estimates of the numbers of smaller (i.e., less than 60 feet in length) hook-and-line catcher vessels.

Tables 48 and 49 provides estimates of vessel weeks for catcher vessels and catcher processors, respectively, stratified by length class, area, gear, and target fishery. Vessel weeks are apportioned by catch volume in cases where a vessel is identified with activity in multiple gears, areas, and/or targets in a given week.

At-sea groundfish production reports, which include data on the number of licensed crew working aboard motherships and catcher/processors, provide the source for reporting of “crew weeks” by month and area in Table 50. A single crew week represents one crew member aboard one vessel for a week. Crew weeks are apportioned by catch volume in cases where a vessel is identified with activity in multiple areas in a given week. These data do not include employment levels in the shoreside and inshore processing sectors. Future versions of this report may include reporting of harvest crew employment in the catcher vessel sector, data for which are now collected in groundfish landing reports.

2.2.6 Economic Data Tables for the Commercial Pacific Halibut Fishery

Pacific halibut catch in the Alaska is managed jointly by NMFS, the state of Alaska and the International Pacific Halibut Commission (IPHC). The IPHC was established through a Convention between the United States and Canada to research the biology of Pacific halibut and conduct stock assessments which are used to establish catch levels in each country.[4] NMFS and the state of Alaska allocate harvest regulations for the commercial and recreational fisheries and set bycatch limits for fisheries with incidental halibut catch. Since 1995 the commercial halibut fisheries off Alaska have been managed as a catch share fishery through the Individual Fisheries Quota (IFQ) program and the Community Development Quota (CDQ) program.

Prior to 2014 this report included only limited data on halibut because it is not an FMP managed species and the Alaska Fisheries Science Center does not conduct the Pacific halibut stock assessment. Beginning in 2014, economic data tables for pacific halibut are included in this report to provide management and the public a consolidated source for economic information of fisheries activity for species harvested in the federal waters off Alaska. Economic data tables in Section 4.1 for Pacific halibut are provided separate from the FMP managed groundfish because of its unique management status. Moreover, halibut management units (e.g., areas) do not match the definitions used for FMP Groundfish making it infeasible to append halibut data directly to the economic data tables for the FMP groundfish.

The economic data in Tables H1A-H13 are only for the commercial fishing sector. Tables H1A-H2 display Pacific halibut commercial landings (net weight retained catch). Table H3 displays prohibited species catch (of non-halibut species) on commercial trips where was the halibut target species. Ex-vessel value and price are displayed by various management areas, vessel length and ports in Tables H4A-H6. First-wholesale production, value and prices by product type is displayed in Table H7 and value by region in Table H8. Fishing effort as measured by: vessel counts are displayed in Tables H9-H11; days fishing are displayed in Table H12; crew weeks are displayed in Table H13.

2.2.7 Description of the Category "Other" in Data Tables

- TABLE 1A: "Other shellfish" comprises shellfish other than crab, including abalone, mussel, clam, oyster, scallop, sea cucumber, sea urchin, shrimp, and snails. Note that octopus and squid are reported as groundfish as they are managed under the BSAI and GOA groundfish FMPs.
- TABLE 4, 8: "Other flatfish" in the BSAI include Alaska Plaice and species within the BSAI other flatfish management complex, including starry flounder and dover, rex, butter, English, petrale, and sand sole.
- TABLE 11, 12: "Other salmon" are non-Chinook salmon species (sockeye, coho, pink, chum). "Other King crab" are blue, golden (brown), and scarlet king crab species. "Other Tanner crab" are snow, grooved, and triangle Tanner crab species.
- TABLE 12, 14: "Other groundfish" are octopus, sculpin, shark, skates, and squid.
- TABLE 13, 15: "Other flatfish" in the BSAI include Alaska Plaice and species within the BSAI other flatfish management complex (starry flounder and dover, rex, butter, english, petrale, and sand sole)
- TABLE 25, 26, 28, 29: "Other fillets" for pollock include fillets with skin and ribs; fillets with skin, no ribs; fillets with ribs, no skin; and skinless/boneless fillets

[4] www.iphc.int/home.html

- TABLE 26: "Flat Other" includes BSAI Alaska Plaice and species within the BSAI other flatfish management complex (starry flounder and dover, rex, butter, english, petrale, and sand sole)
- TABLE 27: "Other" species are primarily skate, squid, octopus, shark, and sculpin.
- TABLE 30: "Other" includes lingcod, non-crab shellfish (mussel, clam, scallop, shrimp), and various freshwater and anadromous finfish species other than federally managed groundfish, salmon, halibut, and herring (e.g., whitefish, trout, Arctic char).

2.2.8 Additional Notes

- Confidential values are excluded from the computation of aggregates (e.g. sums and averages) within a table. This is particularly important to remember for highly stratified tables, such as Tables 19, 20, 25 and 26. Care should be taken when comparing totals from tables containing values suppressed for confidentiality. In general, preference should be given to aggregate numbers from less stratified tables.
- Within the data tables, numbers that are smaller than the level of precision used within the table are printed as '0'. For example, if a table uses the one decimal place level of precision, then an actual value of '0.01' is presented in the table as '0'.
- The Personal Consumption Expenditures: chain-type price index `https://research.stlouisfed.org/fred2/series/PCEPI` was used to deflate the ex-vessel and first wholesale value estimates reported in Tables 16. The PCE is used to adjust to fishermen's ex-vessel revenues to account for the change in general US consumption expenditures. The GDP: chain-type price index `https://research.stlouisfed.org/fred2/series/GDPCTPI` was used to deflate the ex-vessel and first wholesale value estimates reported in Tables 30. The GDP price index is used to adjust to fishermen's wholesale production revenues to account for the change in general US production prices. This is a change from the 2013 version of this document which used the Producer Price Index (PPI) for unprocessed and packaged fish was used for real adjustments (`http://data.bls.gov/cgi-bin/srgate`, using the series ID 'WPU0223').
- Estimates of U.S. imports and per-capita consumption of various fisheries products, previously published in Table 54-56 of this report, are available in Fisheries of the United States (FUS), published annually by the NMFS Office of Science & Technology. The 2014 FUS is available at: `http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus12/index.html`.
- Annual and monthly U.S. economic indicators (producer and consumer price indices), published in past years in Tables 57 and 58 are available from the U.S. Department of Labor Statistics at: `http://www.bls.gov/data/sa.htm`.
- Foreign exchange rates, which we've previously published in Tables 59 and 60, are available from the U.S. Federal Reserve Board (for all currencies except the Icelandic kronur) at: `www.federalreserve.gov`. Exchange rates for Iceland's kronur are available at: `www.oanda.com`.
- The information provided by the FMA division of the AFSC has had a key role in the monitoring of total allowable catches (TACs), catch of prohibited species. In recent years, observer data for individual vessel accounting has been important in the management of the CDQ program, AFA pollock, BSAI crab, Amendment 80 fisheries, as well as others. In

addition, much of the information that is used to assess the status of groundfish stocks, to monitor the interactions between the groundfish fishery and marine mammals and sea birds, and to analyze fishery management actions is provided by the FMA.

- Observes coverage costs: In previous years, Table 51 provided estimates of the numbers of vessels and plants with observers, the numbers of observer-deployment days, and observer costs by year and type of operation. In 2013, the restructured observer program was implemented and more detailed treatment of observer cost estimates can be found in the analysis of the restructuring at: http://alaskafisheries.noaa.gov/analyses/observer/amd86_amd76_earirirfa0311.pdf.

2.3. Request for Feedback

The data and estimates in this report are intended both to provide information that can be used to describe the Alaska groundfish fisheries and to provide the industry and others an opportunity to comment on the validity of these estimates. We hope that the industry and others will identify any data or estimates in this report that can be improved and provide the information and methods necessary to improve them for both past and future years. There are two reasons why it is important that such improvements be made. First, with better estimates, the report will be more successful in monitoring the economic performance of the fisheries and in identifying changes in economic performance that may be attributable to regulatory actions. Second, the estimates in this report often will be used as the basis for estimating the effects of proposed fishery management actions. Therefore, improved estimates in this report will allow more informed decisions by those involved in managing and conducting the Alaska groundfish fisheries. The industry and other stakeholders in these fisheries can further improve the usefulness of this report by suggesting other measures of economic performance that should be included in the report, or other ways of summarizing the data that are the basis for this report, and participating in voluntary survey efforts NMFS may undertake in the future to improve existing data shortages. An online survey to facilitate user feedback is available at: http://www.afsc.noaa.gov/REFM/Socioeconomics/Contact/SAFE_survey.php.

2.4. Citations

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2.5. Acknowledgements

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3. FIGURES REPORTING ECONOMIC DATA OF THE GROUNDFISH FISHERIES OFF ALASKA

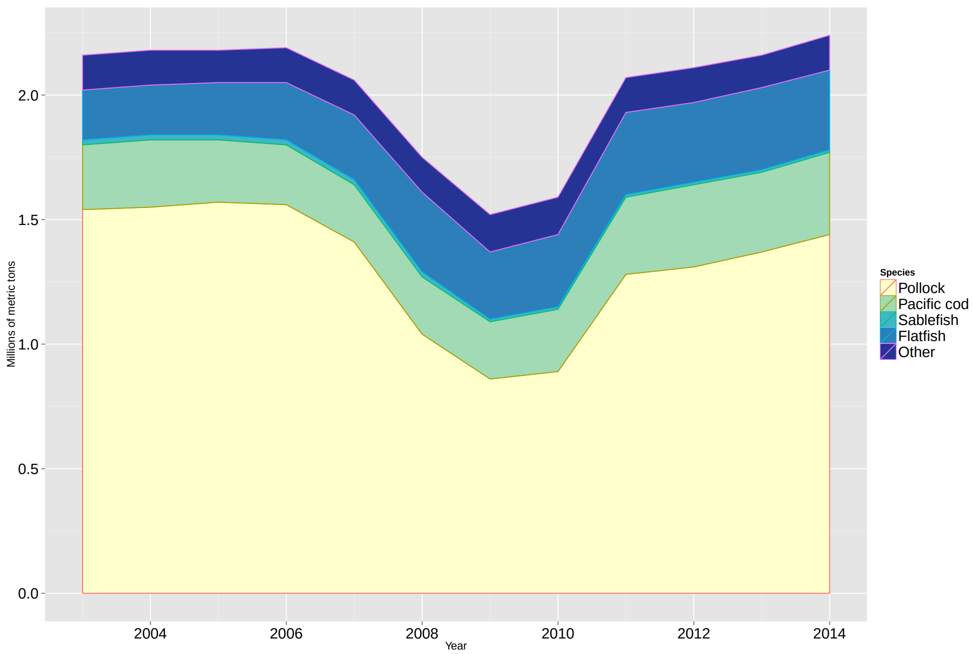

Figure 1: Groundfish catch in the commercial fisheries off Alaska by species, 2003-2014

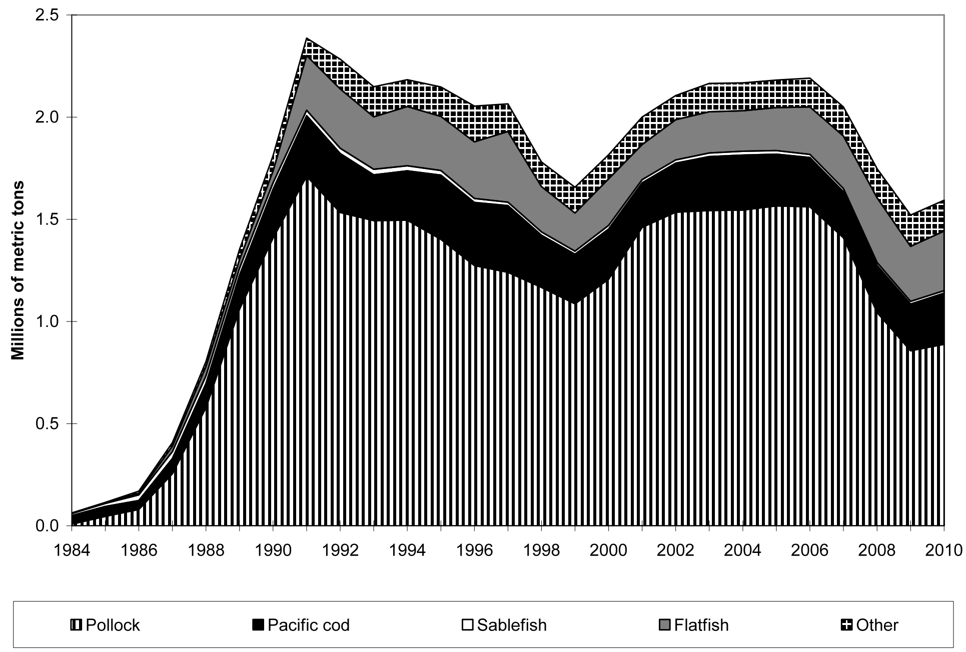

Figure 2: Groundfish catch in the domestic commercial fisheries off Alaska by species, (1984-2010)
Notes: Catch for 2011 and onward are displayed in Figure 1.

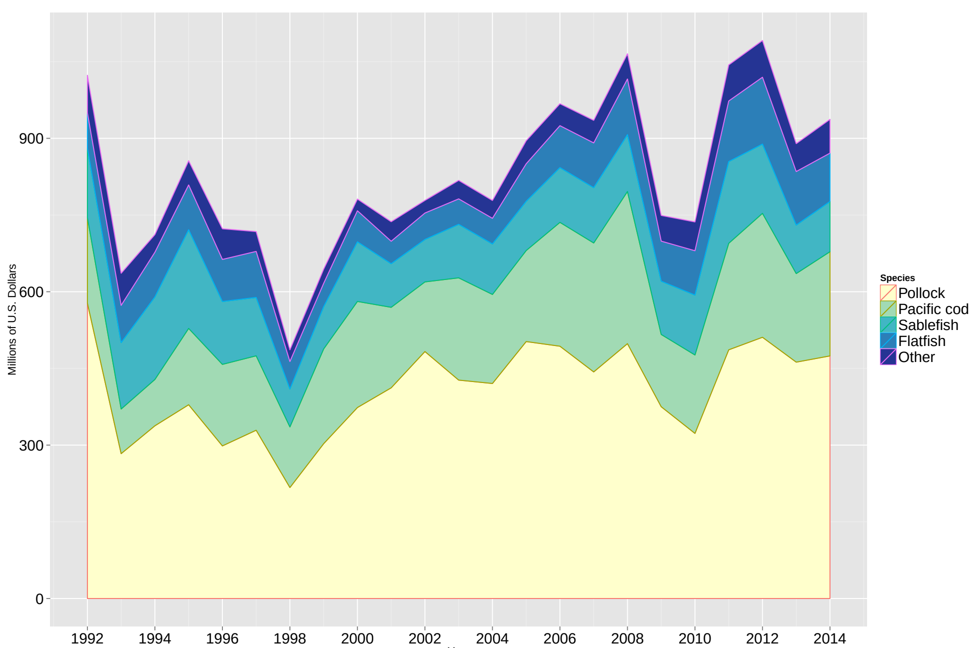

Figure 3: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries off Alaska by species, 1992-2014 (base year = 2014)

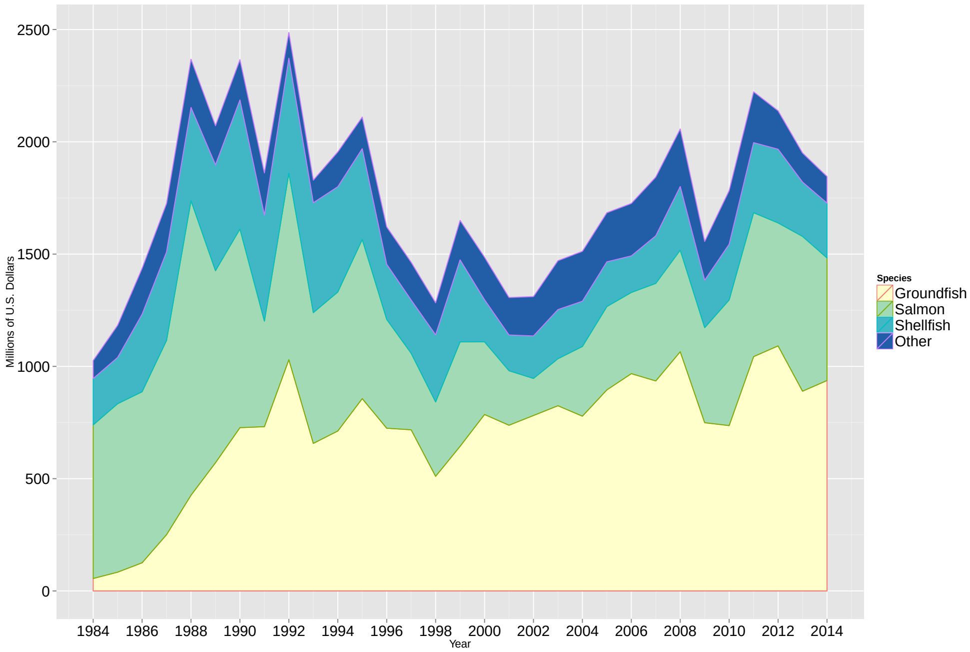

Figure 4: Real ex-vessel value of the domestic fish and shellfish catch off Alaska by species group, 1984-2014 (base year = 2014)

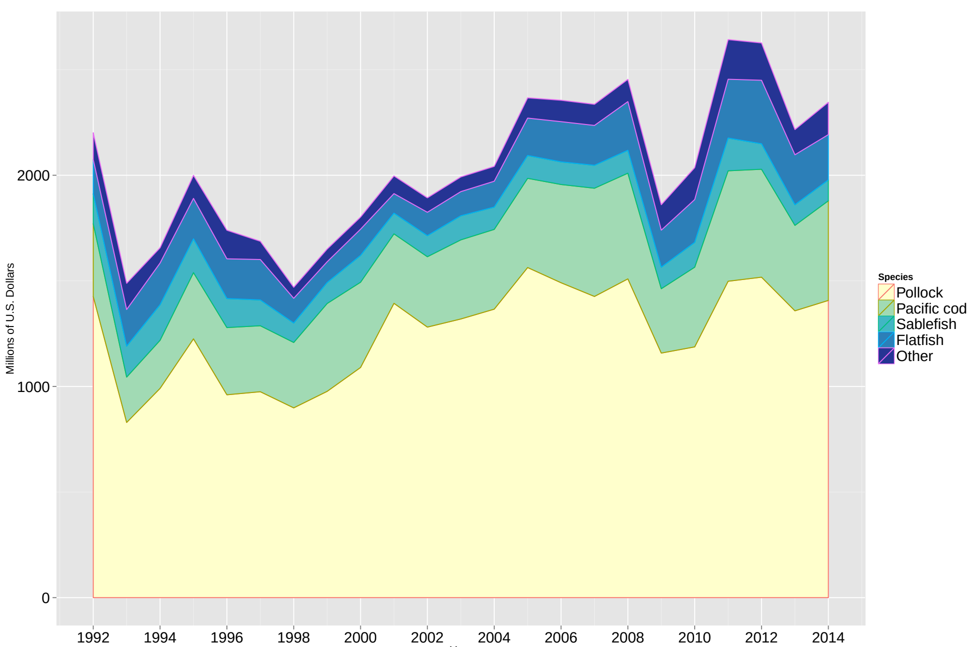

Figure 5: Real gross product value of the groundfish catch off Alaska by species, 1992-2014 (base year = 2014)

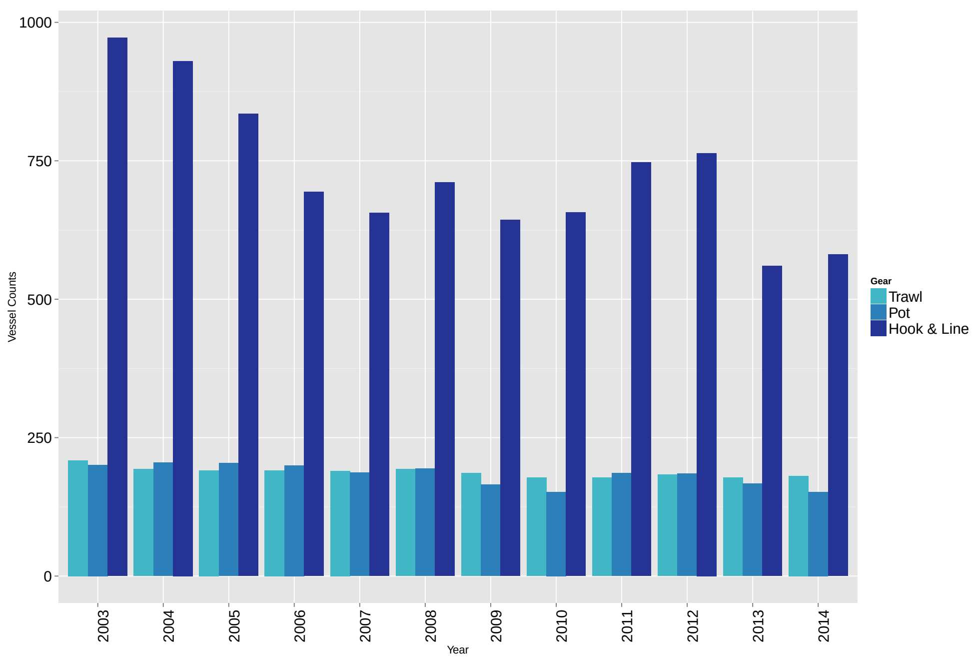

Figure 6: Number of vessels in the domestic fishery off Alaska by gear type, 2003-2014

4. TABLES REPORTING ECONOMIC DATA OF THE GROUNDFISH FISHERIES OFF ALASKA

Table 1: Groundfish catch in the commercial fisheries of Alaska by area and species, 2005-2014 (1,000 metric tons, round weight).

	Year	Pollock	Sablefish	Pacific Cod	Flatfish	Rockfish	Atka Mackerel	Total
Gulf of Alaska	2005	81.0	15.0	47.6	30.0	20.6	0.8	200.3
	2006	72.0	14.6	47.9	42.3	24.5	0.9	210.3
	2007	52.7	14.7	52.3	40.5	23.6	1.5	192.4
	2008	52.6	13.6	59.0	45.7	23.1	2.1	202.6
	2009	44.2	12.0	53.2	42.3	22.8	2.2	185.6
	2010	76.7	10.9	78.3	37.7	25.5	2.4	238.7
	2011	81.4	12.0	85.2	41.0	23.1	1.6	251.6
	2012	104.0	12.7	78.0	29.5	27.4	1.2	258.9
	2013	96.4	12.8	68.6	34.0	24.9	1.3	250.2
	2014	142.6	11.1	84.8	47.6	28.8	1.0	326.2
Bering Sea & Aleutian Islands	2005	1,484.6	2.6	205.6	180.5	15.1	62.0	1,981.1
	2006	1,489.8	2.2	193.0	189.5	17.7	61.9	1,982.6
	2007	1,357.0	2.4	174.5	216.2	23.6	58.7	1,860.4
	2008	991.9	2.0	171.0	270.0	21.7	58.1	1,545.7
	2009	812.5	2.0	175.8	226.3	19.5	72.8	1,337.1
	2010	811.7	1.9	171.9	253.4	23.5	68.6	1,354.7
	2011	1,200.4	1.7	220.1	286.0	28.2	51.8	1,817.8
	2012	1,206.3	1.9	250.9	291.4	28.1	47.8	1,858.0
	2013	1,273.8	1.7	250.3	297.2	34.9	23.2	1,914.5
	2014	1,300.2	1.1	249.3	276.1	36.1	30.9	1,928.4
All Alaska	2005	1,565.6	17.6	253.2	210.5	35.7	62.8	2,181.4
	2006	1,561.8	16.9	240.9	231.8	42.2	62.8	2,192.9
	2007	1,409.7	17.0	226.7	256.7	47.2	60.2	2,052.8
	2008	1,044.4	15.7	230.0	315.7	44.8	60.2	1,748.3
	2009	856.8	14.0	229.0	268.6	42.3	75.0	1,522.7
	2010	888.4	12.8	250.2	291.0	49.0	71.1	1,593.4
	2011	1,281.8	13.7	305.3	327.0	51.3	53.4	2,069.4
	2012	1,310.2	14.6	328.9	320.9	55.5	49.0	2,116.8
	2013	1,370.1	14.5	318.9	331.1	59.9	24.5	2,164.7
	2014	1,442.8	12.3	334.2	323.6	64.9	32.0	2,254.6

Notes: These estimates include catch from both federal and state of Alaska fisheries.

Source: NMFS Office of Science and Technology, Fisheries Statistics Division, Fisheries of the United States. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 1A: Catch of species other than groundfish in the domestic commercial fisheries, 2000-2014 (1,000 metric tons).

Year	Crab	Other Shellfish	Salmon	Halibut	Herring	Total
2000	23.8	3.3	275.2	32.5	30.8	365.6
2001	21.4	2.8	311.3	33.7	38.4	407.8
2002	26.3	3.8	237.3	35.4	31.7	334.3
2003	25.8	2.5	286.0	34.8	31.3	380.4
2004	23.9	3.6	316.6	34.7	32.2	410.9
2005	25.9	2.9	395.7	33.5	38.9	496.9
2006	31.4	2.5	287.8	31.4	36.2	389.2
2007	32.1	2.1	390.7	30.5	30.5	485.8
2008	45.1	2.3	290.4	29.3	38.2	405.4
2009	40.6	2.2	304.6	26.2	39.4	413.0
2010	36.1	2.1	343.3	24.9	49.2	455.6
2011	36.5	1.7	334.8	18.7	44.7	436.5
2012	50.8	1.9	277.6	14.7	34.0	379.0
2013	39.5	1.8	459.3	13.0	38.6	552.3
2014	38.6	1.8	309.9	9.8	43.9	404.1

Notes: These estimates include catch from both federal and state of Alaska fisheries

Source: NMFS Office of Science and Technology, Fisheries Statistics Division, Fisheries of the United States. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 2: Groundfish catch off Alaska by area, vessel type, gear and species, 2010-2014 (1,000 metric tons, round weight).

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total
Hook & Line	Sablefish	2010	9	1	9	1	1	1	9	1	10
		2011	9	1	10	1	0	1	10	1	11
		2012	10	1	11	1	0	1	11	1	12
		2013	10	1	11	1	0	1	11	1	12
		2014	9	1	9	1	0	1	9	1	10
	Pacific Cod	2010	9	8	17	1	89	90	9	97	107
		2011	9	8	17	1	117	119	10	126	136
		2012	11	5	15	1	131	132	11	136	147
		2013	10	3	13	2	125	127	12	128	140
		2014	10	6	16	2	125	128	12	131	143
	Flatfish	2010	0	0	0	0	4	5	0	5	5
		2011	0	0	0	0	4	4	0	4	5
		2012	0	0	0	0	5	5	0	5	5
		2013	0	0	1	0	3	3	1	3	4
		2014	0	0	0	0	4	4	0	4	4
	Rockfish	2010	1	0	1	0	1	1	1	1	2
		2011	1	0	1	0	0	0	1	0	1
		2012	1	0	1	0	0	0	1	0	2
		2013	2	0	2	0	0	0	2	0	3
		2014	1	0	2	0	0	0	2	0	2
	All Groundfish	2010	20	11	31	2	112	113	22	122	144
		2011	22	10	32	2	146	148	24	156	180
		2012	24	6	31	2	162	164	26	168	194
		2013	30	5	34	3	156	158	32	160	193
		2014	25	8	33	4	159	163	29	166	196

Continued on next page.

Table 2: Continued

		Year	Gulf of Alaska: Catcher Vessels	Gulf of Alaska: Catcher Processors	Gulf of Alaska: Total	Bering Sea & Aleutian Islands: Catcher Vessels	Bering Sea & Aleutian Islands: Catcher Processors	Bering Sea & Aleutian Islands: Total	All Alaska: Catcher Vessels	All Alaska: Catcher Processors	All Alaska: Total
Pot	Pacific Cod	2010	20	-	20	17	3	20	37	3	40
		2011	29	*	29	25	3	28	54	3	57
		2012	21	*	21	23	5	29	45	5	50
		2013	17	-	17	23	7	30	40	7	47
		2014	20	-	20	24	8	31	44	8	51
Trawl	Pollock	2010	73	1	75	424	383	807	498	384	882
		2011	78	2	80	632	562	1,195	710	564	1,274
		2012	99	1	101	634	567	1,201	733	568	1,302
		2013	91	2	93	662	605	1,267	753	607	1,360
		2014	138	2	140	670	623	1,293	808	624	1,433
	Sablefish	2010	0	0	1	0	0	0	0	0	1
		2011	1	1	1	0	0	0	1	1	1
		2012	0	0	1	*	0	0	0	1	1
		2013	0	0	1	0	0	0	0	1	1
		2014	0	0	1	*	0	0	0	0	1
	Pacific Cod	2010	20	1	22	28	30	58	49	31	79
		2011	15	1	16	39	33	72	54	34	89
		2012	19	1	20	46	37	83	65	39	103
		2013	20	1	21	42	45	87	62	46	108
		2014	24	2	26	41	36	77	65	38	103
	Flatfish	2010	22	11	33	4	244	249	27	255	282
		2011	23	17	39	7	272	278	29	288	318
		2012	16	11	27	6	272	278	22	282	305
		2013	20	12	31	4	275	279	24	287	311
		2014	20	24	44	4	260	264	25	284	309

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Table 2: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total
Trawl	Rockfish	2010	9	14	24	0	21	22	10	36	45
		2011	9	13	22	1	26	27	10	39	49
		2012	11	15	26	0	25	26	12	40	52
		2013	10	13	23	0	32	32	10	45	55
		2014	12	15	27	0	33	33	12	48	60
	Atka Mackerel	2010	0	2	2	0	65	65	0	67	67
		2011	0	1	1	5	46	52	5	48	53
		2012	0	1	1	1	43	44	1	44	45
		2013	0	1	1	0	21	21	0	23	23
		2014	0	1	1	0	28	28	0	29	29
	All Groundfish	2010	129	30	159	458	753	1,211	587	783	1,370
		2011	127	35	162	686	949	1,635	813	984	1,797
		2012	148	30	179	689	954	1,642	837	984	1,821
		2013	144	30	173	710	989	1,698	854	1,018	1,872
		2014	196	44	241	718	987	1,706	915	1,032	1,946
All Gear	All Groundfish	2010	170	41	211	477	868	1,345	647	908	1,556
		2011	180	45	224	714	1,098	1,812	893	1,143	2,036
		2012	195	36	231	714	1,121	1,835	909	1,157	2,066
		2013	191	34	225	736	1,151	1,888	927	1,186	2,113
		2014	243	52	295	747	1,154	1,901	990	1,206	2,196

Notes: The estimates are of total catch (i.e., retained and discarded catch). All groundfish include additional species categories. These estimates include only catch counted against federal TACs. Includes FMP groundfish catch on halibut targets. Beginning in 2013, CAS includes estimates of groundfish discards in halibut fishery "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 3: Gulf of Alaska groundfish catch by species, gear, and target fishery, 2013-2014 (1,000 metric tons, round weight).

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2013	Hook & Line	Pollock, Bottom	*	-	*	-	-	-	-	-	-	-	*
		Sablefish	0	10.2	0.1	0.3	0	0	0	0	1.5	-	13.8
		Pacific Cod	0.1	0	11.3	0.1	0	-	0	0	0	*	13.4
		Rockfish	-	*	0	-	-	-	-	-	0.2	-	0.2
		All Targets	0.1	11.1	13.3	0.5	0	0	0	0	2.1	0	34.2
	Pot	Pacific Cod	0	0	17.0	0	0	*	0	0	0	0	17.5
		All Targets	0	0	17.0	0	0	*	0	0	0	0	17.5
	Trawl	Pollock, Bottom	13.1	0	0.8	1.5	0.3	0.1	0	0.2	0.3	*	16.8
		Pollock, Pelagic	75.7	0	0.2	0.3	0.1	0	*	0	0.1	-	76.7
		Sablefish	0	0.2	0	0.1	0	0	0	0	0.1	0	0.5
		Pacific Cod	0.7	0	16.1	1.3	0.4	0.1	0	1.0	0.2	0	20.2
		Arrowtooth	1.3	0.1	1.0	14.2	0.9	1.3	0	0.3	0.9	0	21.5
		Flathead Sole	0.1	0	0.1	1.0	0.5	0.1	*	0	0.1	*	1.9
		Rex Sole	0.1	0	0.2	1.0	0.2	1.8	0	0	0.8	*	4.4
		Flatfish, Shallow	0.9	0	2.1	0.4	0.2	0	0	2.8	0	*	7.1
		Rockfish	0.8	0.5	0.6	0.8	0	0.1	0	0	20.1	1.2	24.3
		All Targets	92.9	0.8	21.1	20.6	2.6	3.7	0.1	4.4	22.5	1.2	173.4

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Table 3: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2014	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	-	-	*	-	*
		Sablefish	0	8.8	0.1	0.2	0	-	0	0	1.1	-	10.7
		Pacific Cod	0.2	0	14.6	0	0	-	0	0	0.1	0	17.6
		Rockfish	0	*	0	-	-	-	-	-	0.1	-	0.1
		All Targets	0.2	9.5	15.8	0.3	0	-	0	0	1.5	0	32.7
	Pot	Sablefish	-	-	*	-	-	-	-	-	-	-	*
		Pacific Cod	0	0	20.0	0	0	*	-	0	0	0	21.4
		All Targets	0	0	20.0	0	0	*	-	0	0	0	21.4
	Trawl	Pollock, Bottom	18.7	0	2.8	2.2	0.3	0.3	0	0.2	0.2	*	25.4
		Pollock, Pelagic	116.5	0	0.5	0.2	0.1	0	0	0	0.4	*	117.8
		Sablefish	0	0.1	0	0	0	0	0	0	0	-	0.2
		Pacific Cod	1.3	0	17.2	1.3	0.3	0.1	0	0.9	0.1	0	21.5
		Arrowtooth	1.5	0.2	3.0	29.4	1.3	1.8	0.1	0.7	2.6	0.5	42.2
		Flathead Sole	*	*	*	*	*	*	*	*	*	-	*
		Rex Sole	0	0	0.1	0.2	0	0.4	0	0	0.1	*	0.8
		Flatfish, Shallow	0.3	0	1.8	0.4	0.2	0	0	1.9	0	*	4.9
		Rockfish	1.3	0.5	0.6	1.4	0	0.1	0.1	0	23.2	0.4	27.9
		All Targets	139.7	0.9	26.1	35.1	2.2	2.7	0.3	3.8	26.7	1.0	240.7
	All Gear	All Targets	139.9	10.4	61.8	35.4	2.2	2.7	0.3	3.8	28.3	1.0	294.8

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. Includes FMP groundfish catch on halibut targets. Beginning in 2013, CAS includes estimates of groundfish discards in halibut fishery "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 4: Bering Sea and Aleutian Islands groundfish catch by species, gear, and target fishery, 2013-2014, (1,000 metric tons, round weight).

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2013	Hook & Line	Pollock, Bottom	*	-	*	*	-	*	-	*	-	-	-	*
		Sablefish	*	0.9	0	0	0	*	-	-	0	0.2	*	1.3
		Pacific Cod	5.1	0	126.1	0.6	0	0.4	0	1.4	0	0.1	0	155.3
		Turbot	*	0	*	0	0.1	0	*	*	*	0	-	0.7
		Rockfish	*	0	*	*	*	*	-	-	*	0	-	0
		All Targets	5.1	1.1	126.6	0.6	0.2	0.4	0	1.4	0	0.4	0	158.5
	Pot	Sablefish	*	*	*	*	*	-	-	-	*	*	-	*
		Pacific Cod	0	0	30.3	0	0	0	0	0.3	0	0	0	31.0
		All Targets	0	0	30.3	0	0	0	0	0.3	0	0	0	31.0
	Trawl	Pollock, Bottom	74.9	*	3.0	0.7	0.1	1.6	4.4	1.5	0.2	0.2	0.1	87.6
		Pollock, Pelagic	1,155.2	*	5.9	0.4	0	1.6	2.0	0.5	0.1	0.5	0	1,167.3
		Sablefish	*	*	-	*	*	*	-	-	*	*	-	*
		Pacific Cod	4.0	0	43.1	0.3	0	0.2	1.0	2.7	0.6	0.1	0	52.6
		Arrowtooth	2.3	0.1	0.5	12.2	2.6	0.6	0	0	0.5	0.8	0.2	20.9
		Kamchatka Flounder	0.5	0	0	1.2	2.8	*	*	*	0	0.2	0.1	5.1
		Flathead Sole	2.0	*	1.1	0.6	0.1	6.6	2.1	1.3	0.4	0.3	0	14.8
		Rock Sole	7.3	-	8.6	0.7	0.1	2.0	42.3	8.5	4.6	0	*	76.0
		Turbot	*	*	*	*	*	*	-	-	*	*	-	*
		Yellowfin	18.9	-	22.8	1.9	0.1	3.9	7.4	135.6	15.0	0	0	210.1
		Other Flatfish	0.4	*	0.5	0.1	0	0	0.1	1.3	2.2	*	-	4.7
		Rockfish	1.3	0	0.5	1.0	1.1	0	0	0	0.1	25.2	2.7	32.5
		Atka Mackerel	0.5	0	0.8	0.6	0.6	0	0	*	0	5.1	18.4	26.6
		All Targets	1,267.3	0.2	87.0	19.7	7.6	16.7	59.3	151.4	23.7	32.4	21.5	1,698.2

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Table 4: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2014	Hook & Line	Sablefish	*	0.7	*	0	0	*	-	-	0	0.2	0	1.1
		Pacific Cod	6.0	0	127.5	0.5	0	0.6	0.1	1.9	0	0.1	0	159.8
		Turbot	0	0	*	0	0	0	-	-	*	0	-	0.8
		Rockfish	-	*	*	*	*	-	-	-	-	*	-	*
		All Targets	6.0	0.7	127.7	0.6	0.1	0.6	0.1	1.9	0.1	0.4	0	163.0
	Pot	Sablefish	-	*	-	*	*	-	-	-	-	*	-	*
		Pacific Cod	0	-	31.2	0	*	0	0	0.4	0	0	0	32.2
		All Targets	0	*	31.2	0	*	0	0	0.4	0	0	0	32.2
	Trawl	Pollock, Bottom	47.7	0	1.1	0.3	0.1	0.6	1.9	1.2	0.3	0.2	0.1	54.2
		Pollock, Pelagic	1,196.1	*	4.1	0.5	0.1	2.0	2.5	0.8	0.2	1.2	0	1,209.2
		Sablefish	*	*	-	*	-	*	*	-	*	*	-	*
		Pacific Cod	5.5	*	42.6	0.2	0	0.2	1.5	1.5	0.7	0	0	52.8
		Arrowtooth	2.7	0	0.4	10.1	2.1	0.9	0	0	0.6	0.8	0.5	19.0
		Kamchatka Flounder	0.4	0	0	1.0	2.0	*	*	*	0	0.1	0	3.8
		Flathead Sole	4.1	-	2.3	1.7	0.2	6.9	1.7	2.9	1.0	0.1	*	21.3
		Rock Sole	11.2	*	10.9	0.7	0.1	1.3	36.9	8.7	3.6	0	*	74.9
		Turbot	*	*	*	*	*	*	*	*	*	*	-	*
		Yellowfin	23.8	*	14.3	2.1	0.5	3.9	6.8	133.9	16.4	0	*	204.7
		Other Flatfish	0	-	0	0	0	*	*	*	0	0	*	0.1
		Rockfish	0.9	0	0.3	0.7	0.6	0	0	0	0.1	25.3	1.8	30.1
		Atka Mackerel	0.6	0	0.9	1.0	0.6	*	0	-	0	5.7	25.8	35.4
		All Targets	1,293.1	0.1	76.9	18.3	6.3	15.8	51.3	148.9	22.9	33.4	28.2	1,705.6
	All Gear	All Targets	1,299.1	0.8	235.8	19.0	6.4	16.4	51.4	151.1	22.9	33.9	28.2	1,900.9

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5: Groundfish catch off Alaska by area, residency, and species, 2010-2014, (1,000 metric tons, round weight).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2010	36	39	136	676	172	714
	2011	33	47	181	1,019	215	1,066
	2012	41	61	173	1,034	213	1,094
	2013	33	60	189	1,085	222	1,145
	2014	54	86	185	1,115	239	1,201
Sablefish	2010	5	5	1	1	6	6
	2011	6	5	1	1	7	6
	2012	6	6	1	1	7	7
	2013	6	6	1	1	7	7
	2014	6	5	0	1	6	6
Pacific Cod	2010	35	24	43	125	77	149
	2011	41	22	52	167	94	189
	2012	38	18	57	189	95	207
	2013	31	21	58	187	89	209
	2014	39	24	54	183	92	207
Flatfish	2010	13	25	67	187	80	211
	2011	10	31	23	263	33	294
	2012	7	23	5	287	11	309
	2013	8	26	17	280	25	306
	2014	8	40	16	260	24	299
Rockfish	2010	7	18	1	23	8	41
	2011	5	18	1	27	5	46
	2012	6	21	0	28	6	49
	2013	6	19	0	35	6	53
	2014	6	22	0	36	7	58
Atka Mackerel	2010	0	2	0	69	0	71
	2011	0	2	0	52	0	53
	2012	0	1	0	48	0	49
	2013	0	1	0	23	0	24
	2014	0	1	0	31	0	32
All Groundfish	2010	101	116	252	1,099	353	1,215
	2011	98	128	264	1,554	362	1,682
	2012	101	133	241	1,612	342	1,744
	2013	91	138	272	1,638	363	1,776
	2014	119	181	264	1,652	382	1,833

Notes: These estimates include only catch counted against federal TACs. Catch delivered to motherships is classified by the residence of the owner of the mothership. All other catch is classified by the residence of the owner of the fishing vessel. All groundfish include additional species categories. Other includes catch by vessels for which residency information was unavailable. Includes FMP groundfish catch on halibut targets. Beginning in 2013, CAS includes estimates of groundfish discards in halibut fishery

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; and CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 6: Discards and discard rates for groundfish catch off Alaska by area, gear, and species, 2010-2014, (1,000 metric tons, round weight).

			Fixed		Trawl		All Gear	
		Year	Total Discards	Discard Rate	Total Discards	Discard Rate	Total Discards	Discard Rate
Gulf of Alaska	Pollock	2010	0.2	45 %	1.0	1 %	1.1	1 %
		2011	0	20 %	2.0	2 %	2.0	2 %
		2012	0	21 %	1.9	2 %	2.0	2 %
		2013	0.1	32 %	2.4	2 %	2.4	3 %
		2014	0.1	31 %	1.4	1 %	1.5	1 %
	Sablefish	2010	0.4	4 %	0	5 %	0.4	4 %
		2011	0.4	4 %	0.2	16 %	0.6	5 %
		2012	0.3	2 %	0.1	8 %	0.3	3 %
		2013	0.7	6 %	0	6 %	0.8	6 %
		2014	0.5	5 %	0.1	8 %	0.6	5 %
	Pacific Cod	2010	0.5	1 %	2.4	11 %	2.9	3 %
		2011	1.4	1 %	0.7	4 %	2.1	1 %
		2012	0.3	0 %	0.7	3 %	1.0	1 %
		2013	2.3	5 %	2.3	11 %	4.6	7 %
		2014	1.7	3 %	3.5	13 %	5.2	6 %
	Flatfish	2010	0.3	91 %	10.2	27 %	10.5	28 %
		2011	0.3	91 %	7.6	19 %	7.9	19 %
		2012	0.3	90 %	5.7	19 %	5.9	20 %
		2013	0.5	97 %	5.8	17 %	6.3	19 %
		2014	0.3	96 %	3.9	8 %	4.2	9 %
	Rockfish	2010	0.5	34 %	1.3	6 %	1.8	7 %
		2011	0.3	28 %	1.6	7 %	1.9	8 %
		2012	0.5	33 %	1.6	6 %	2.0	8 %
		2013	1.1	48 %	1.8	8 %	2.9	12 %
		2014	0.7	40 %	2.3	8 %	2.9	10 %
	Atka Mackerel	2010	0.1	100 %	1.2	49 %	1.2	51 %
		2011	0	99 %	0.5	35 %	0.5	35 %
		2012	0	86 %	0.5	42 %	0.5	42 %
		2013	0	99 %	0.4	36 %	0.4	36 %
		2014	0	97 %	0.1	7 %	0.1	7 %
	All Groundfish	2010	4.1	5 %	17.6	11 %	21.7	9 %
		2011	5.3	4 %	13.5	8 %	18.8	7 %
		2012	3.2	4 %	11.6	6 %	14.8	6 %
		2013	12.5	14 %	14.3	8 %	26.8	10 %
		2014	9.7	10 %	12.8	5 %	22.5	7 %

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Table 6: Continued

		Year	Fixed Total Discards	Fixed Discard Rate	Trawl Total Discards	Trawl Discard Rate	All Gear Total Discards	All Gear Discard Rate
Bering Sea & Aleutian Islands	Pollock	2010	0.8	20 %	3.1	0 %	3.9	0 %
		2011	0.8	15 %	4.0	0 %	4.9	0 %
		2012	0.5	10 %	5.0	0 %	5.5	0 %
		2013	0.6	12 %	4.9	0 %	5.5	0 %
		2014	0.6	10 %	13.9	1 %	14.5	1 %
	Sablefish	2010	0	3 %	0	3 %	0	3 %
		2011	0	1 %	0	4 %	0	1 %
		2012	0	1 %	0	1 %	0	1 %
		2013	0	2 %	0	1 %	0	2 %
		2014	0	5 %	0	2 %	0	4 %
	Pacific Cod	2010	1.6	1 %	1.4	2 %	2.9	2 %
		2011	1.9	1 %	0.5	1 %	2.5	1 %
		2012	1.9	1 %	0.9	1 %	2.8	1 %
		2013	3.7	2 %	1.5	2 %	5.2	2 %
		2014	3.3	2 %	0.6	1 %	3.9	2 %
	Flatfish	2010	1.9	40 %	22.8	9 %	24.6	10 %
		2011	2.1	47 %	22.3	8 %	24.5	9 %
		2012	2.6	49 %	18.9	7 %	21.5	7 %
		2013	2.9	79 %	22.5	8 %	25.4	9 %
		2014	3.5	81 %	14.7	5 %	18.2	7 %
	Rockfish	2010	0.3	43 %	1.5	7 %	1.8	8 %
		2011	0.1	39 %	1.0	4 %	1.1	4 %
		2012	0.1	27 %	1.4	5 %	1.5	5 %
		2013	0.2	60 %	0.9	3 %	1.1	3 %
		2014	0.3	68 %	1.2	3 %	1.5	4 %
	Atka Mackerel	2010	0.1	52 %	3.9	6 %	4.0	6 %
		2011	0	81 %	1.7	3 %	1.8	3 %
		2012	0	54 %	1.3	3 %	1.3	3 %
		2013	0	92 %	0.7	3 %	0.7	3 %
		2014	0	95 %	0.4	1 %	0.4	1 %
	All Groundfish	2010	14.4	11 %	40.2	3 %	54.6	4 %
		2011	20.5	12 %	37.6	2 %	58.1	3 %
		2012	20.4	10 %	35.8	2 %	56.2	3 %
		2013	24.1	12 %	39.0	2 %	63.2	3 %
		2014	26.0	12 %	37.9	2 %	63.9	3 %

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Table 6: Continued

		Year	Fixed Total Discards	Fixed Discard Rate	Trawl Total Discards	Trawl Discard Rate	All Gear Total Discards	All Gear Discard Rate
All Alaska	Pollock	2010	1.0	22 %	4.0	0 %	5.0	1 %
		2011	0.9	16 %	6.0	0 %	6.8	1 %
		2012	0.5	11 %	6.9	1 %	7.4	1 %
		2013	0.7	13 %	7.3	1 %	7.9	1 %
		2014	0.7	11 %	15.3	1 %	16.0	1 %
	Sablefish	2010	0.4	4 %	0	5 %	0.5	4 %
		2011	0.5	3 %	0.2	15 %	0.6	4 %
		2012	0.3	2 %	0.1	6 %	0.3	3 %
		2013	0.8	6 %	0	5 %	0.8	6 %
		2014	0.5	5 %	0.1	8 %	0.6	5 %
	Pacific Cod	2010	2.0	1 %	3.7	5 %	5.8	2 %
		2011	3.3	1 %	1.2	1 %	4.5	1 %
		2012	2.2	1 %	1.6	1 %	3.7	1 %
		2013	6.0	3 %	3.8	3 %	9.8	3 %
		2014	5.0	2 %	4.2	4 %	9.1	3 %
	Flatfish	2010	2.2	43 %	33.0	12 %	35.2	12 %
		2011	2.4	49 %	29.9	9 %	32.3	10 %
		2012	2.9	51 %	24.5	8 %	27.4	9 %
		2013	3.5	82 %	28.3	9 %	31.8	10 %
		2014	3.9	82 %	18.6	6 %	22.5	7 %
	Rockfish	2010	0.7	37 %	2.8	6 %	3.6	7 %
		2011	0.4	31 %	2.6	5 %	3.1	6 %
		2012	0.5	32 %	3.0	6 %	3.5	6 %
		2013	1.4	50 %	2.6	5 %	4.0	7 %
		2014	1.0	46 %	3.5	6 %	4.4	7 %
	Atka Mackerel	2010	0.1	67 %	5.1	7 %	5.2	7 %
		2011	0	84 %	2.2	4 %	2.3	4 %
		2012	0	63 %	1.8	4 %	1.8	4 %
		2013	0	93 %	1.1	5 %	1.1	5 %
		2014	0	96 %	0.4	1 %	0.5	1 %
	All Groundfish	2010	18.5	9 %	57.8	4 %	76.3	5 %
		2011	25.8	9 %	51.1	3 %	77.0	4 %
		2012	23.6	9 %	47.3	3 %	71.0	3 %
		2013	36.7	13 %	53.3	3 %	90.0	4 %
		2014	35.7	12 %	50.8	3 %	86.5	4 %

Notes: All groundfish and all gear may include additional species or gear types. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on discard estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 7: Gulf of Alaska groundfish discards by species, gear, and target fishery, 2013-2014, (metric tons, round weight).

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Flat Shallow	Atka Mackerel	All Species
2013	Hook & Line	Sablefish	6	431	93	255	4	7	-	3,472
		Pacific Cod	25	74	237	109	15	9	*	1,947
		Rockfish	-	0	0	-	-	-	-	0
		All Targets	42	737	2,202	481	19	24	1	12,137
	Pot	Sablefish	-	0	*	-	-	-	-	0
		Pacific Cod	8	0	117	1	0	2	3	381
		All Targets	8	0	117	1	0	2	3	381
	Trawl	Pollock, Bottom	228	0	1	669	56	6	0	1,202
		Pollock, Pelagic	166	0	0	15	1	0	-	230
		Sablefish	2	0	0	95	0	0	0	170
		Pacific Cod	72	0	41	767	234	162	19	1,611
		Arrowtooth	634	9	261	986	3	5	4	2,530
		Flathead Sole	78	0	23	926	10	1	*	1,062
		Rex Sole	0	1	3	719	6	4	*	1,323
		Flatfish, Shallow	1,085	2	1,876	660	1	28	*	4,307
		Rockfish	126	35	103	251	4	11	403	1,872
		All Targets	2,391	47	2,308	5,088	316	218	427	14,307

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Table 7: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Flat Shallow	Atka Mackerel	All Species
2014	Hook & Line	Sablefish	1	366	69	162	0	1	-	1,709
		Pacific Cod	57	7	335	43	18	18	2	2,945
		Rockfish	0	0	0	-	-	-	-	0
		All Targets	76	509	1,430	262	19	22	3	8,586
	Pot	Sablefish	-	*	*	-	-	-	-	*
		Pacific Cod	8	2	250	1	0	2	5	1,136
		All Targets	8	2	250	1	0	2	5	1,136
	Trawl	Pollock, Bottom	25	0	6	921	4	0	*	1,336
		Pollock, Pelagic	529	0	1	8	2	0	*	857
		Sablefish	1	0	0	31	0	1	-	59
		Pacific Cod	26	3	57	779	101	303	0	1,503
		Arrowtooth	394	44	1,562	840	23	32	7	4,605
		Flathead Sole	0	*	0	24	0	0	-	27
		Rex Sole	1	0	34	275	1	1	*	721
		Flatfish, Shallow	245	10	1,802	165	4	75	14	2,630
		Rockfish	167	19	81	180	4	4	47	1,082
		All Targets	1,386	76	3,544	3,224	139	418	68	12,819
	All Gear	All Targets	1,470	587	5,224	3,487	158	442	76	22,541

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on discard estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 8: Bering Sea and Aleutian Islands groundfish discards by species, gear, and target fishery, 2013-2014, (metric tons, round weight).

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2013	Hook & Line	Sablefish	*	13	5	11	29	0	-	37	-	12	62	*	282
		Pacific Cod	611	2	3,093	471	42	371	33	3	1,422	11	106	23	21,847
		Turbot	*	1	*	6	51	5	*	13	*	*	4	-	132
		Rockfish	*	0	*	*	*	*	-	4	-	*	1	-	5
		All Targets	611	26	3,560	511	141	377	34	83	1,422	31	240	23	23,307
	Pot	Sablefish	*	*	*	*	*	-	-	*	-	*	*	-	*
		Pacific Cod	6	0	102	2	0	0	1	-	298	2	6	3	843
		All Targets	6	0	102	2	0	0	1	*	298	2	6	3	843
	Trawl	Pollock, Bottom	89	0	12	249	16	83	230	1	250	81	52	9	1,489
		Pollock, Pelagic	265	*	4	102	11	605	1,080	5	484	19	103	0	3,414
		Sablefish	*	*	-	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	1,177	0	306	264	14	121	306	2	351	506	16	2	3,689
		Arrowtooth	399	1	3	390	232	21	1	175	0	7	127	2	1,736
		Kamchatka Flounder	3	0	0	5	15	*	*	33	*	1	1	0	172
		Flathead Sole	243	*	27	122	24	107	39	15	66	195	9	0	1,104
		Rock Sole	484	-	270	496	84	92	1,192	2	216	1,220	2	*	5,768
		Turbot	*	*	*	*	*	*	-	*	-	*	*	-	*
		Yellowfin	2,088	-	868	1,123	77	139	282	25	3,041	7,692	5	0	18,918
		Other Flatfish	2	*	2	11	1	6	2	0	32	105	*	-	242
		Rockfish	59	0	32	247	104	15	11	6	1	11	267	213	1,266
		Atka Mackerel	54	0	4	30	42	0	7	2	*	0	289	448	1,219
		All Targets	4,862	3	1,529	3,038	619	1,188	3,149	267	4,441	9,838	871	675	39,019

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Table 8: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2014	Hook & Line	Sablefish	*	13	0	28	24	*	-	43	-	9	115	0	322
		Pacific Cod	616	1	2,898	469	40	544	52	5	1,812	36	84	4	23,147
		Turbot	1	0	*	17	38	7	-	16	-	*	2	-	126
		Rockfish	-	*	*	*	*	-	-	*	-	-	1	-	1
		All Targets	617	33	3,116	529	114	552	53	67	1,813	53	280	4	24,846
	Pot	Sablefish	-	*	-	*	*	-	-	*	-	-	*	-	*
		Pacific Cod	11	-	156	1	*	0	2	*	351	0	4	7	1,122
		All Targets	11	*	156	1	*	0	2	*	351	0	4	7	1,122
	Trawl	Pollock, Bottom	252	0	2	26	6	5	9	4	31	56	90	1	677
		Pollock, Pelagic	456	*	4	116	19	469	804	3	302	24	639	5	4,102
		Sablefish	*	*	-	*	-	*	*	-	-	*	*	-	*
		Pacific Cod	2,527	*	214	189	18	111	465	2	81	144	19	2	4,268
		Arrowtooth	455	0	1	153	47	15	2	127	0	13	75	0	1,187
		Kamchatka Flounder	54	0	0	3	6	*	*	2	*	1	0	0	167
		Flathead Sole	910	-	18	219	41	79	19	13	78	109	0	*	1,866
		Rock Sole	2,523	*	196	316	50	14	379	3	123	1,391	1	*	6,279
		Turbot	*	*	*	*	*	*	*	*	*	*	*	-	*
		Yellowfin	6,553	*	157	639	153	133	183	35	1,834	5,353	1	*	17,472
		Other Flatfish	0	-	0	0	0	*	*	*	*	0	2	*	4
		Rockfish	93	1	28	116	59	7	7	1	0	10	237	254	1,055
		Atka Mackerel	95	0	9	29	23	*	11	0	-	1	143	113	869
		All Targets	13,919	1	629	1,806	423	834	1,879	190	2,449	7,101	1,208	376	37,946
	All Gear	All Targets	14,547	35	3,900	2,336	537	1,386	1,933	257	4,614	7,154	1,492	386	63,914

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on discard estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 9: Gulf of Alaska groundfish discard rates by species, gear, and target fishery, 2013-2014 (percent).

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2013	Hook & Line	Sablefish	100	4	69	94	100	100	96	99	55	-	21
		Pacific Cod	21	97	2	100	100	-	100	98	29	*	12
		Rockfish	-	0	0	-	-	-	-	-	0	-	0
		All Targets	30	6	14	97	100	100	96	99	48	100	20
	Pot	Sablefish	-	0	*	-	-	-	-	-	*	-	0
		Pacific Cod	41	100	0	100	29	*	100	99	99	99	1
		All Targets	41	1	0	100	29	*	100	99	99	99	1
	Trawl	Pollock, Bottom	2	1	0	46	18	4	1	4	22	12	7
		Pollock, Pelagic	0	0	0	5	1	1	*	1	2	-	0
		Sablefish	88	0	1	95	47	71	46	3	49	100	37
		Pacific Cod	10	0	0	57	57	16	77	17	51	100	8
		Arrowtooth	49	12	25	7	0	0	36	2	40	23	12
		Flathead Sole	72	2	23	91	2	1	*	2	18	*	55
		Rex Sole	0	10	1	74	3	0	87	28	65	*	30
		Flatfish, Shallow	67	20	71	70	0	1	60	1	27	*	41
		Rockfish	15	7	18	33	17	24	58	42	3	35	8
		All Targets	2	6	11	24	11	2	51	4	8	36	8

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Table 9: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2014	Hook & Line	Sablefish	99	4	60	98	100	-	100	100	39	-	13
		Pacific Cod	27	25	2	84	100	-	96	100	55	100	14
		Rockfish	0	0	0	-	-	-	-	-	0	-	0
		All Targets	33	5	7	96	100	-	100	100	40	100	16
	Pot	Sablefish	-	*	*	-	-	-	-	-	-	-	*
		Pacific Cod	19	100	1	51	24	*	-	100	100	95	3
		All Targets	19	100	1	51	24	*	-	100	100	95	3
	Trawl	Pollock, Bottom	0	0	0	41	1	0	0	0	63	*	5
		Pollock, Pelagic	0	0	0	4	3	5	0	0	76	*	1
		Sablefish	100	0	21	100	99	97	81	75	19	-	26
		Pacific Cod	2	13	0	61	36	14	6	34	0	93	7
		Arrowtooth	26	22	52	3	2	1	29	4	39	1	11
		Flathead Sole	0	*	0	30	0	0	6	0	0	-	5
		Rex Sole	1	0	12	40	1	0	31	4	76	*	25
		Flatfish, Shallow	48	41	79	25	1	1	6	3	4	27	38
		Rockfish	12	4	13	13	13	5	76	14	2	11	4
		All Targets	1	8	13	9	5	1	38	9	8	7	5
	All Gear	All Targets	1	5	6	10	6	1	41	9	10	7	7

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on discard estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 10: Bering Sea and Aleutian Islands groundfish discard rates by species, gear, and target fishery, 2013-2014 (percent).

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2013	Hook & Line	Sablefish	*	1	97	80	86	100	-	59	-	100	41	*	21
		Pacific Cod	12	49	2	81	84	100	100	21	100	100	80	91	14
		Turbot	*	12	*	85	85	100	*	2	*	*	19	-	18
		Rockfish	*	0	*	*	*	*	-	88	-	*	11	-	28
		All Targets	12	2	3	82	87	100	100	12	100	90	60	91	14
	Pot	Sablefish	*	*	*	*	*	-	-	*	-	*	*	-	*
		Pacific Cod	77	100	0	99	100	64	97	-	100	100	99	98	2
		All Targets	77	100	0	99	100	64	97	*	100	100	99	98	2
	Trawl	Pollock, Bottom	0	0	0	37	22	5	5	18	16	46	24	13	2
		Pollock, Pelagic	0	*	0	27	50	38	55	30	89	22	22	15	0
		Sablefish	*	*	-	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	29	36	1	90	74	49	32	93	13	83	31	19	7
		Arrowtooth	18	2	1	3	9	3	4	24	31	2	16	1	8
		Kamchatka Flounder	1	0	1	0	1	*	*	31	*	15	0	0	3
		Flathead Sole	12	*	2	20	21	2	2	39	5	49	3	100	7
		Rock Sole	7	-	3	72	77	5	3	90	3	27	4	*	8
		Turbot	*	*	*	*	*	*	-	*	-	*	*	-	*
		Yellowfin	10	-	4	56	52	3	4	71	2	47	29	100	8
		Other Flatfish	0	*	0	14	8	16	3	1	3	5	*	-	5
		Rockfish	4	1	5	22	9	37	38	11	20	21	1	7	4
		Atka Mackerel	11	2	0	5	7	5	18	5	*	4	6	2	4
		All Targets	0	1	2	15	8	7	5	26	3	39	3	3	2

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Table 10: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2014	Hook & Line	Sablefish	*	2	1	96	85	*	-	80	-	100	61	100	28
		Pacific Cod	10	20	2	86	84	97	100	31	97	99	79	99	14
		Turbot	74	2	*	38	100	100	-	3	-	*	7	-	16
		Rockfish	-	*	*	*	*	-	-	*	-	-	19	-	19
		All Targets	10	5	2	83	91	97	100	10	97	99	67	99	15
	Pot	Sablefish	-	*	-	*	*	-	-	*	-	-	*	-	*
		Pacific Cod	70	-	0	100	*	67	100	*	100	100	99	94	3
		All Targets	70	*	0	100	*	67	100	*	100	100	99	94	3
	Trawl	Pollock, Bottom	1	0	0	9	5	1	0	14	3	16	37	1	1
		Pollock, Pelagic	0	*	0	24	36	24	32	19	40	13	54	27	0
		Sablefish	*	*	-	*	-	*	*	-	-	*	*	-	*
		Pacific Cod	46	*	0	84	60	50	32	68	5	21	94	99	8
		Arrowtooth	17	2	0	2	2	2	9	20	26	2	9	0	6
		Kamchatka Flounder	13	0	1	0	0	*	*	2	*	16	0	0	4
		Flathead Sole	22	-	1	13	25	1	1	72	3	11	0	*	9
		Rock Sole	22	*	2	46	53	1	1	63	1	38	100	*	8
		Turbot	*	*	*	*	*	*	*	*	*	*	*	-	*
		Yellowfin	27	*	1	29	31	3	3	61	1	31	82	*	8
		Other Flatfish	0	-	0	0	0	*	*	*	*	2	41	*	5
		Rockfish	8	3	8	17	9	18	31	2	11	14	1	12	3
		Atka Mackerel	15	5	1	3	4	*	33	1	-	42	2	0	2
		All Targets	1	2	1	10	7	5	4	20	2	30	3	1	2
	All Gear	All Targets	1	4	2	12	8	8	4	16	3	30	4	1	3

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on discard estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 11: Prohibited species catch by species, area and gear, 2010-2014, (metric tons (t) or number in 1,000s).

		Year	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
Gulf of Alaska	Hook & Line	2010	-	-	-	0	-	-	2	0
		2011	-	-	-	0	-	0	6	-
		2012	-	-	-	0	-	0	3	0
		2013	-	-	0	1	0	0	1	-
		2014	-	-	0	0	-	0	0	0
	Pot	2010	29	-	-	-	-	-	169	-
		2011	45	-	-	-	-	-	21	-
		2012	42	-	-	-	-	-	167	-
		2013	15	-	-	-	-	-	569	-
		2014	11	-	-	-	-	-	133	-
	Trawl	2010	1,634	2	55	2	-	3	91	*
		2011	1,871	11	21	3	-	0	103	-
		2012	1,706	1	21	1	-	0	83	-
		2013	1,228	11	23	5	-	0	243	-
		2014	1,392	6	16	2	-	*	64	-
	All Gear	2010	1,663	2	55	2	-	3	261	0
		2011	1,915	11	21	3	-	0	130	-
		2012	1,748	1	21	1	-	0	254	0
		2013	1,243	11	23	6	0	0	813	-
		2014	1,403	6	16	3	-	0	198	0
Bering Sea & Aleutian Islands	Hook & Line	2010	574	-	0	0	1	2	10	30
		2011	552	0	0	0	3	2	13	35
		2012	613	0	0	0	3	2	14	28
		2013	521	0	*	0	6	1	16	17
		2014	442	-	0	0	7	1	19	18
	Pot	2010	5	-	-	-	2	136	358	770
		2011	7	-	-	-	19	200	298	145
		2012	6	-	-	-	8	*	102	16
		2013	4	-	-	-	101	0	227	14
		2014	4	-	-	-	135	*	519	82
	Trawl	2010	2,818	356	12	14	58	13	478	1,706
		2011	2,609	396	28	201	41	52	877	731
		2012	3,118	2,376	13	25	31	25	397	597
		2013	3,078	988	15	131	29	31	677	669
		2014	3,029	186	19	228	30	23	578	448
	All Gear	2010	3,397	356	12	14	61	150	846	2,506
		2011	3,168	396	28	201	63	254	1,188	911
		2012	3,736	2,376	13	25	42	27	513	640
		2013	3,603	988	15	131	135	32	919	700
		2014	3,474	186	19	228	172	24	1,117	549

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Table 11: Continued

		Year	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
All Alaska	All Gear	2010	5,060	358	67	16	61	153	1,108	2,506
		2011	5,083	407	49	205	63	254	1,318	911
		2012	5,485	2,377	34	26	42	27	767	640
		2013	4,846	999	38	137	135	32	1,732	700
		2014	4,877	192	35	231	172	24	1,315	549

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The estimates of halibut bycatch mortality are based on the IPHC discard mortality rates that were used for in-season management. The halibut IFQ program allows retention of halibut in the hook-and-line groundfish fisheries, making true halibut bycatch numbers unavailable. This is particularly a problem in the GOA for all hook-and-line fisheries and in the BSAI for the sablefish hook-and-line fishery. Therefore, estimates of halibut bycatch mortality are not included in this table for those fisheries. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. Excludes PSC on halibut targets. Excludes PSC in state fisheries (sablefish and P. cod targets in state waters) For details on prohibited species catch estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 12: Prohibited species catch in the Gulf of Alaska by species, gear, and groundfish target fishery, 2013-2014, (Metric tons (t) or number in 1,000s).

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2013	Hook & Line	Sablefish	-	-	0	0.5	0	0.1	0.1	-
		Pacific Cod	-	-	-	-	0	0	1.0	-
		All Targets	-	-	0	0.5	0	0.1	1.1	-
	Pot	Pacific Cod	15.0	-	-	-	-	-	569.0	-
	Trawl	Pollock, Bottom	136.6	-	3.4	0.1	-	-	8.0	-
		Pollock, Pelagic	20.5	10.5	9.6	0.7	-	-	-	-
		Sablefish	8.4	-	-	*	-	-	-	-
		Pacific Cod	294.6	-	0.4	-	-	-	16.4	-
		Arrowtooth	349.8	-	4.0	1.0	-	-	99.2	-
		Flathead Sole	28.2	-	*	*	-	-	*	-
		Rex Sole	152.7	-	2.6	0.3	-	-	0.8	-
		Flatfish, Shallow	162.7	0.1	0.5	1.4	-	-	118.6	-
		Rockfish	74.6	-	2.3	2.0	-	0.1	0.1	-
		Atka Mackerel	*	-	*	-	-	-	-	-
		All Targets	1,228.2	10.6	22.8	5.4	-	0.1	243.0	-

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Table 12: Continued

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2014	Hook & Line	Sablefish	-	-	0	0.3	-	0	0	-
		Pacific Cod	-	-	-	-	-	-	0.2	0
		All Targets	-	-	0	0.3	-	0	0.2	0
	Pot	Pacific Cod	10.6	-	-	-	-	-	133.2	-
	Trawl	Pollock, Bottom	82.5	-	3.8	0.1	-	-	2.1	-
		Pollock, Pelagic	-	4.6	7.1	1.3	-	-	-	-
		Sablefish	1.1	-	-	-	-	*	-	-
		Pacific Cod	215.5	-	0.3	-	-	-	12.1	-
		Arrowtooth	790.0	0.1	1.0	0.2	-	-	39.2	-
		Flathead Sole	2.3	-	1.2	-	-	-	-	-
		Rex Sole	55.3	-	0.4	0.1	-	-	0.2	-
		Flatfish, Deep	-	-	-	-	-	*	-	-
		Flatfish, Shallow	164.1	0.8	0.7	*	-	-	10.5	-
		Rockfish	81.6	*	1.2	0.6	-	*	0.2	-
		All Targets	1,392.5	5.5	15.7	2.3	-	*	64.3	-
	All Gear	All Targets	1,403.1	5.5	15.7	2.6	-	0	197.8	0

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area and gear. The estimates of halibut PSC mortality are based on the International Pacific Halibut Commission discard mortality rates that were used for in-season management. The halibut IFQ program allows retention of halibut in the hook-and-line groundfish fisheries, making true halibut PSC numbers unavailable. Therefore, estimates of halibut PSC mortality are not included in this table for those fisheries. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on prohibited species catch estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 13: Prohibited species catch in the Bering Sea and Aleutian Islands by species, gear, and groundfish target fishery, 2013-2014, (Metric tons (t) or number in 1,000s)..

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2013	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	*	-
		Sablefish	-	-	*	0	-	0.5	-	-
		Pacific Cod	519.7	0.1	-	0.2	5.6	0.6	16.0	17.4
		Turbot	1.3	-	-	*	-	-	-	*
		Rockfish	*	-	-	-	-	*	-	-
		All Targets	521.0	0.1	*	0.2	5.6	1.1	16.0	17.4
	Pot	Sablefish	*	-	-	-	-	*	*	*
		Pacific Cod	2.2	-	-	-	101.0	0	226.7	13.7
		All Targets	3.7	-	-	-	101.0	0	226.7	13.7
	Trawl	Pollock, Bottom	160.0	0	1.9	1.8	0.3	*	10.6	4.8
		Pollock, Pelagic	111.5	958.9	12.3	127.8	-	0	1.5	3.4
		Sablefish	*	-	-	-	-	-	-	-
		Pacific Cod	364.8	0.2	0.9	0.3	0.4	0	12.3	12.0
		Arrowtooth	247.6	0.2	-	-	-	9.7	4.0	9.0
		Kamchatka Flounder	39.4	-	-	-	*	2.9	-	-
		Flathead Sole	130.8	1.7	-	-	0.9	*	71.0	76.3
		Rock Sole	611.8	0.3	-	*	16.9	*	43.1	12.9
		Turbot	*	-	-	-	-	-	-	-
		Yellowfin	1,197.4	26.8	0.4	0.2	10.1	0.4	528.0	543.8
		Other Flatfish	26.3	-	-	-	-	*	5.5	7.3
		Rockfish	110.6	-	*	-	*	14.7	0.6	*
		Atka Mackerel	77.6	*	-	0.5	*	3.3	-	*
		All Targets	3,077.9	988.0	15.4	130.6	28.6	31.0	676.5	669.4

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Table 13: Continued

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2014	Hook & Line	Sablefish	-	-	-	-	0	0.5	-	-
		Pacific Cod	440.3	-	0	0.2	7.3	0.7	18.9	18.4
		Turbot	1.3	-	-	0.1	-	*	*	*
		Rockfish	*	-	-	-	-	-	-	-
		Other Ground-fish	*	-	-	-	-	-	-	-
		All Targets	441.6	-	0	0.3	7.3	1.2	18.9	18.4
	Pot	Sablefish	*	-	-	-	-	*	-	*
		Pacific Cod	3.1	-	-	-	134.6	-	519.4	82.4
		All Targets	3.6	-	-	-	134.6	*	519.4	82.4
	Trawl	Pollock, Bottom	80.6	8.2	0.8	1.8	0.3	*	11.0	16.0
		Pollock, Pelagic	119.1	151.3	15.7	223.0	-	-	0.7	2.9
		Sablefish	*	-	-	-	-	-	-	-
		Pacific Cod	331.5	1.1	1.3	*	0.6	*	20.5	12.1
		Arrowtooth	191.0	0.3	-	*	-	5.0	5.4	6.1
		Kamchatka Flounder	14.4	*	-	-	-	8.3	-	*
		Flathead Sole	119.6	*	-	0.7	*	-	84.0	98.9
		Rock Sole	677.2	0.7	0.9	0.5	23.1	0.2	105.0	11.4
		Turbot	-	-	-	-	-	*	-	-
		Yellowfin	1,342.0	24.7	*	1.3	5.7	0.3	351.8	300.8
		Other Flatfish	*	*	-	-	-	-	-	-
		Rockfish	69.5	-	0.3	0.3	*	7.2	*	-
		Atka Mackerel	83.7	-	0.3	0.4	*	2.3	-	-
		All Targets	3,028.5	186.2	19.2	228.0	29.7	23.2	578.5	448.1
	All Gear	All Targets	3,473.7	186.2	19.2	228.3	171.7	24.4	1,116.8	548.9

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area and gear. The estimates of halibut PSC mortality are based on the International Pacific Halibut Commission discard mortality rates that were used for in-season management. The halibut IFQ program allows retention of halibut in the hook-and-line groundfish fisheries, making true halibut PSC numbers unavailable. This is particularly a problem in the Bering Sea and Aleutian Islands sablefish hook-and-line fishery. Therefore, estimates of halibut PSC mortality are not included in this table for that fishery. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on prohibited species catch estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 14: Prohibited species catch rates in the Gulf of Alaska by species, gear, and groundfish target fishery, 2013-2014, (Metric tons per metric ton or numbers per metric ton).

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2013	Hook & Line	Sablefish	-	-	0	0.038	0.002	0.007	0.006	-
		Pacific Cod	-	-	-	-	0.001	0.001	0.075	-
		All Targets	-	-	0	0.019	0.002	0.004	0.040	-
	Pot	Pacific Cod	0.001	-	-	-	-	-	32.530	-
	Trawl	Pollock, Bottom	0.008	-	0.201	0.003	-	-	0.477	-
		Pollock, Pelagic	0	0	0.125	0.009	-	-	-	-
		Sablefish	0.018	-	-	*	-	-	-	-
		Pacific Cod	0.015	-	0.019	-	-	-	0.812	-
		Arrowtooth	0.016	-	0.188	0.047	-	-	4.608	-
		Flathead Sole	0.015	-	*	*	-	-	*	-
		Rex Sole	0.035	-	0.594	0.057	-	-	0.172	-
		Flatfish, Shallow	0.016	0	0.046	0.135	-	-	11.397	-
		Rockfish	0.003	-	0.095	0.083	-	0.004	0.003	-
		Atka Mackerel	*	-	*	-	-	-	-	-
		All Targets	0.007	0	0.129	0.031	-	0.001	1.373	-

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Table 14: Continued

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2014	Hook & Line	Sablefish	-	-	0.004	0.027	-	0.004	0.001	-
		Pacific Cod	-	-	-	-	-	-	0.014	0
		All Targets	-	-	0.001	0.010	-	0.001	0.009	0
	Pot	Pacific Cod	0	-	-	-	-	-	6.231	-
	Trawl	Pollock, Bottom	0.003	-	0.149	0.005	-	-	0.081	-
		Pollock, Pelagic	-	0	0.060	0.011	-	-	-	-
		Sablefish	0.005	-	-	-	-	*	-	-
		Pacific Cod	0.010	-	0.013	-	-	-	0.565	-
		Arrowtooth	0.019	0	0.025	0.005	-	-	0.929	-
		Flathead Sole	0.004	-	1.946	-	-	-	-	-
		Rex Sole	0.019	-	0.131	0.040	-	-	0.079	-
		Flatfish, Deep	-	-	-	-	-	*	-	-
		Flatfish, Shallow	0.024	0	0.102	*	-	-	1.518	-
		Rockfish	0.003	*	0.045	0.020	-	*	0.006	-
		All Targets	0.006	0	0.064	0.009	-	*	0.262	-
	All Gear	All Targets	0.005	0	0.053	0.009	-	0	0.670	0

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area and gear. The estimates of halibut PSC mortality are based on the International Pacific Halibut Commission discard mortality rates that were used for in-season management. The halibut IFQ program allows retention of halibut in the hook-and-line groundfish fisheries, making true halibut PSC numbers unavailable. Therefore, estimates of halibut PSC mortality are not included in this table for those fisheries. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on prohibited species catch estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. “*” indicates a confidential value; “-” indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 15: Prohibited species catch rates in the Bering Sea and Aleutian Islands by species, gear, and groundfish target fishery, 2013-2014, (Metric tons per metric ton or numbers per metric ton).

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2013	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	*	-
		Sablefish	-	-	*	0.006	-	0.359	-	-
		Pacific Cod	0.003	0	-	0.001	0.036	0.004	0.103	0.112
		Turbot	0.002	-	-	*	-	-	-	*
		Rockfish	*	-	-	-	-	*	-	-
		All Targets	0.003	0	*	0.001	0.035	0.007	0.101	0.110
	Pot	Sablefish	*	-	-	-	-	*	*	*
		Pacific Cod	0	-	-	-	3.254	0.001	7.301	0.441
		All Targets	0	-	-	-	3.204	0.001	7.188	0.434
	Trawl	Pollock, Bottom	0.002	0	0.021	0.020	0.004	*	0.121	0.055
		Pollock, Pelagic	0	0.001	0.011	0.109	-	0	0.001	0.003
		Sablefish	*	-	-	-	-	-	-	-
		Pacific Cod	0.007	0	0.016	0.006	0.008	0.001	0.233	0.228
		Arrowtooth	0.012	0	-	-	-	0.467	0.190	0.429
		Kamchatka Flounder	0.008	-	-	-	*	0.560	-	-
		Flathead Sole	0.009	0	-	-	0.059	*	4.779	5.137
		Rock Sole	0.008	0	-	*	0.222	*	0.566	0.169
		Turbot	*	-	-	-	-	-	-	-
		Yellowfin	0.005	0	0.002	0.001	0.044	0.002	2.326	2.395
		Other Flatfish	0.006	-	-	-	-	*	1.160	1.531
		Rockfish	0.003	-	*	-	*	0.420	0.017	*
		Atka Mackerel	0.003	*	-	0.018	*	0.116	-	*
		All Targets	0.002	0.001	0.009	0.076	0.017	0.018	0.393	0.389

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Table 15: Continued

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other Salmon (1,000s)	Red King Crab (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other Tanner (1,000s)
2014	Hook & Line	Sablefish	-	-	-	-	0.038	0.444	-	-
		Pacific Cod	0.003	-	0	0.001	0.046	0.004	0.118	0.115
		Turbot	0.002	-	-	0.062	-	*	*	*
		Rockfish	*	-	-	-	-	-	-	-
		Other Groundfish	*	-	-	-	-	-	-	-
		All Targets	0.003	-	0	0.002	0.045	0.007	0.117	0.114
	Pot	Sablefish	*	-	-	-	-	*	-	*
		Pacific Cod	0	-	-	-	4.177	-	16.115	2.556
		All Targets	0	-	-	-	4.134	*	15.950	2.530
	Trawl	Pollock, Bottom	0.001	0	0.014	0.033	0.006	*	0.204	0.294
		Pollock, Pelagic	0	0	0.013	0.184	-	-	0.001	0.002
		Sablefish	*	-	-	-	-	-	-	-
		Pacific Cod	0.006	0	0.025	*	0.011	*	0.389	0.229
		Arrowtooth	0.010	0	-	*	-	0.261	0.282	0.323
		Kamchatka Flounder	0.004	*	-	-	-	2.168	-	*
		Flathead Sole	0.006	*	-	0.031	*	-	3.933	4.630
		Rock Sole	0.009	0	0.012	0.006	0.307	0.002	1.396	0.152
		Turbot	-	-	-	-	-	*	-	-
		Yellowfin	0.006	0	*	0.006	0.027	0.002	1.646	1.407
		Other Flatfish	*	*	-	-	-	-	-	-
		Rockfish	0.002	-	0.008	0.010	*	0.218	*	-
		Atka Mackerel	0.002	-	0.007	0.012	*	0.060	-	-
		All Targets	0.002	0	0.011	0.133	0.017	0.014	0.336	0.261
	All Gear	All Targets	0.002	0	0.010	0.119	0.090	0.013	0.583	0.287

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area and gear. The estimates of halibut PSC mortality are based on the International Pacific Halibut Commission discard mortality rates that were used for in-season management. The halibut IFQ program allows retention of halibut in the hook-and-line groundfish fisheries, making true halibut PSC numbers unavailable. This is particularly a problem in the Bering Sea and Aleutian Islands sablefish hook-and-line fishery. Therefore, estimates of halibut PSC mortality are not included in this table for that fishery. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 and later years, to previous years. For details on prohibited species catch estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 16: Real ex-vessel value of the catch in the domestic commercial fisheries off Alaska by species group, 1984-2014; calculations based on COAR ($ millions, base year = 2014).

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
1984	206.2	683.9	40.7	39.1	55.6	1,025.4
1985	205.8	750.2	71.1	72.2	83.6	1,182.9
1986	344.9	761.6	72.4	132.1	125.5	1,436.6
1987	393.6	865.2	76.3	139.6	250.8	1,725.4
1988	414.8	1,311.4	98.6	116.4	426.4	2,367.5
1989	471.3	855.2	31.6	142.5	571.0	2,071.5
1990	574.5	884.5	38.8	140.6	727.2	2,365.6
1991	471.7	470.1	44.8	143.5	731.5	1,861.5
1992	511.4	830.9	41.2	73.3	1,029.9	2,486.7
1993	489.1	582.3	21.0	79.8	657.1	1,829.3
1994	468.5	619.0	31.5	123.5	712.2	1,954.8
1995	404.2	708.6	55.9	85.0	856.5	2,110.2
1996	245.1	484.8	62.7	103.8	724.7	1,621.2
1997	236.7	340.8	21.9	146.5	717.7	1,463.5
1998	298.5	331.3	14.7	128.4	510.5	1,283.4
1999	364.8	465.0	19.1	157.2	644.2	1,650.4
2000	187.2	323.6	12.6	176.9	785.8	1,486.1
2001	159.0	242.7	13.4	153.6	738.0	1,306.8
2002	189.1	165.0	11.6	163.8	781.3	1,310.7
2003	218.5	209.4	11.1	206.7	824.8	1,470.5
2004	201.5	310.2	17.0	205.2	778.8	1,512.7
2005	199.1	371.1	17.4	201.2	895.7	1,684.5
2006	162.6	361.5	11.4	222.2	968.2	1,725.9
2007	211.8	434.4	17.3	244.3	935.6	1,843.4
2008	283.1	452.3	28.0	228.4	1,066.0	2,057.8
2009	210.9	423.4	26.1	146.9	749.7	1,556.9
2010	247.8	559.6	23.7	215.2	736.9	1,783.3
2011	311.9	640.9	11.3	215.0	1,044.2	2,223.3
2012	327.9	547.7	22.3	148.9	1,092.1	2,138.8
2013	241.8	689.2	16.5	113.1	890.0	1,950.6
2014	244.1	546.0	11.5	106.7	937.5	1,845.8

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2014 dollars by applying the Personal Consumption Expenditure Index at (https://research.stlouisfed.org/fred2/series/PCEPI)

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; ADF&G Commercial Operators Annual Reports (COAR); and NMFS Office of Science and Technology, Fisheries Statistics Division, Fisheries of the United States. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 17: Percentage distribution of ex-vessel value of the catch in the domestic commercial fisheries off Alaska by species group, 1984-2014; calculations based on COAR.

Year	Shellfish	Salmon	Herring	Halibut	Groundfish
1984	20.1 %	66.7 %	4.0 %	3.8 %	5.4 %
1985	17.4 %	63.4 %	6.0 %	6.1 %	7.1 %
1986	24.0 %	53.0 %	5.0 %	9.2 %	8.7 %
1987	22.8 %	50.1 %	4.4 %	8.1 %	14.5 %
1988	17.5 %	55.4 %	4.2 %	4.9 %	18.0 %
1989	22.7 %	41.3 %	1.5 %	6.9 %	27.6 %
1990	24.3 %	37.4 %	1.6 %	5.9 %	30.7 %
1991	25.3 %	25.3 %	2.4 %	7.7 %	39.3 %
1992	20.6 %	33.4 %	1.7 %	2.9 %	41.4 %
1993	26.7 %	31.8 %	1.1 %	4.4 %	35.9 %
1994	24.0 %	31.7 %	1.6 %	6.3 %	36.4 %
1995	19.2 %	33.6 %	2.6 %	4.0 %	40.6 %
1996	15.1 %	29.9 %	3.9 %	6.4 %	44.7 %
1997	16.2 %	23.3 %	1.5 %	10.0 %	49.0 %
1998	23.3 %	25.8 %	1.1 %	10.0 %	39.8 %
1999	22.1 %	28.2 %	1.2 %	9.5 %	39.0 %
2000	12.6 %	21.8 %	0.8 %	11.9 %	52.9 %
2001	12.2 %	18.6 %	1.0 %	11.8 %	56.5 %
2002	14.4 %	12.6 %	0.9 %	12.5 %	59.6 %
2003	14.9 %	14.2 %	0.8 %	14.1 %	56.1 %
2004	13.3 %	20.5 %	1.1 %	13.6 %	51.5 %
2005	11.8 %	22.0 %	1.0 %	11.9 %	53.2 %
2006	9.4 %	20.9 %	0.7 %	12.9 %	56.1 %
2007	11.5 %	23.6 %	0.9 %	13.3 %	50.8 %
2008	13.8 %	22.0 %	1.4 %	11.1 %	51.8 %
2009	13.5 %	27.2 %	1.7 %	9.4 %	48.1 %
2010	13.9 %	31.4 %	1.3 %	12.1 %	41.3 %
2011	14.0 %	28.8 %	0.5 %	9.7 %	47.0 %
2012	15.3 %	25.6 %	1.0 %	7.0 %	51.1 %
2013	12.4 %	35.3 %	0.8 %	5.8 %	45.6 %
2014	13.2 %	29.6 %	0.6 %	5.8 %	50.8 %

Notes: These estimates report the distribution of the value of catch from both federal and state of Alaska fisheries.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; ADF&G Commercial Operators Annual Reports (COAR); and NMFS Office of Science and Technology, Fisheries Statistics Division, Fisheries of the United States. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 18: Ex-vessel prices in the groundfish fisheries off Alaska by area, gear, and species, 2010-2014; calculations based on COAR ($/lb, round weight).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska
	Year	Fixed	Trawl	Fixed	Trawl	All Gear
Pollock	2010	0.133	0.173	0.145	0.153	0.154
	2011	0.128	0.161	0.178	0.165	0.165
	2012	0.144	0.171	0.108	0.173	0.173
	2013	0.156	0.176	0.092	0.150	0.152
	2014	0.114	0.123	0.111	0.154	0.151
Sablefish	2010	4.077	3.267	4.257	1.604	4.025
	2011	5.463	3.986	5.105	1.790	5.290
	2012	4.421	3.231	3.522	1.014	4.192
	2013	3.215	2.434	2.838	1.173	3.100
	2014	3.900	2.972	3.995	1.317	3.825
Pacific Cod	2010	0.269	0.231	0.299	0.209	0.265
	2011	0.339	0.309	0.306	0.249	0.300
	2012	0.361	0.326	0.327	0.313	0.329
	2013	0.273	0.244	0.252	0.240	0.251
	2014	0.307	0.271	0.289	0.262	0.284
Flatfish	2010	0.793	0.107	0.015	0.149	0.143
	2011	0.512	0.110	0.174	0.182	0.174
	2012	0.223	0.137	0.017	0.204	0.197
	2013	0.019	0.141	0.052	0.158	0.156
	2014	0.241	0.145	0.131	0.142	0.142
Rockfish	2010	0.670	0.124	0.903	0.228	0.192
	2011	0.668	0.157	0.742	0.348	0.276
	2012	0.848	0.266	0.687	0.289	0.292
	2013	0.826	0.207	0.975	0.211	0.225
	2014	0.770	0.185	0.623	0.238	0.226
Atka Mackerel	2010	*	0.277	0.015	0.207	0.208
	2011	0.016	0.365	0.124	0.268	0.270
	2012	0.131	0.388	0.180	0.293	0.294
	2013	*	0.367	0.024	0.327	0.328
	2014	*	0.377	0.341	0.353	0.353

Notes: 1) Prices are for catch from both federal and state of Alaska fisheries.
2) The unfrozen landings price is calculated as landed value divided by estimated or actual round weight.
3) Prices for catch processed by an at-sea processor without a COAR buying record (e.g., from catcher processors) are set using the prices for the matching species (group), region and gear-types for which buying records exist.
4) Trawl-caught sablefish, rockfish and flatfish in the BSAI and trawl-caught Atka mackerel in both the BSAI and the GOA are not well represented in the COAR buying records. A price was calculated for these categories from product-report prices; the price in this case is the value of the first wholsale products divided by the calculated round weight and multiplied by a constant 0.4 to correct for value added by processing.
5) The "All Alaska/All gear" column is the average weighted by retianed catch.
"*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; andADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 19: Ex-vessel value of the groundfish catch off Alaska by area ,vessel category, gear, and species,2010-2014; calculations based on COAR ($ millions).

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
Hook & Line	Sablefish	2010	80.6	5.9	86.4	6.0	5.3	11.3	86.5	11.2	97.7
		2011	116.4	9.0	125.4	7.4	4.7	12.1	123.8	13.7	137.5
		2012	105.2	6.8	112.0	5.5	3.7	9.2	110.7	10.5	121.2
		2013	74.6	4.7	79.3	3.6	2.9	6.5	78.1	7.6	85.8
		2014	78.0	4.8	82.8	4.5	1.7	6.3	82.6	6.5	89.1
	Pacific Cod	2010	7.8	4.9	12.7	0.5	57.7	58.2	8.3	62.6	70.9
		2011	10.1	6.1	16.2	0.7	78.0	78.7	10.8	84.1	94.9
		2012	12.6	3.7	16.3	0.6	93.1	93.7	13.2	96.8	110.0
		2013	6.3	1.9	8.1	0.6	67.7	68.2	6.8	69.5	76.4
		2014	8.3	4.0	12.3	1.4	78.0	79.4	9.7	82.0	91.7
	Flatfish	2010	0	0	0	*	0.1	0.1	0	0.1	0.1
		2011	0	0	0	*	0.9	0.9	0	0.9	0.9
		2012	0	0	0	*	0.1	0.1	0	0.1	0.1
		2013	0	*	0	*	0.1	0.1	0	0.1	0.1
		2014	0	*	0	*	0.2	0.2	0	0.2	0.2
	Rockfish	2010	1.4	0.1	1.6	0.1	0.6	0.7	1.5	0.8	2.3
		2011	1.2	0.1	1.4	0.1	0.2	0.3	1.3	0.4	1.7
		2012	1.9	0.2	2.1	0.1	0.3	0.4	2.0	0.5	2.5
		2013	2.0	0.1	2.2	0.1	0.3	0.3	2.1	0.4	2.5
		2014	1.6	0.1	1.7	0.1	0.1	0.2	1.7	0.3	1.9
	All Species	2010	90.3	11.2	101.5	6.5	65.5	72.0	96.9	76.6	173.5
		2011	128.4	15.6	144.0	8.2	89.7	98.0	136.6	105.4	242.0
		2012	120.6	10.9	131.4	6.2	100.4	106.7	126.8	111.3	238.1
		2013	83.5	6.8	90.3	4.2	78.2	82.4	87.7	85.0	172.7
		2014	88.6	9.0	97.6	6.0	89.6	95.6	94.6	98.6	193.2

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Table 19: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
		2010	20.6	-	20.6	11.2	3.4	14.6	31.8	3.4	35.1
		2011	34.1	*	34.1	16.8	2.2	19.0	50.8	2.2	53.1
Pot	Pacific Cod	2012	29.5	*	29.5	18.7	3.9	22.6	48.2	3.9	52.0
		2013	18.7	-	18.7	15.0	*	15.0	33.7	*	33.7
		2014	25.8	-	25.8	22.2	4.9	27.0	48.0	4.9	52.9
		2010	28.4	0.4	28.8	142.4	128.6	271.0	170.8	129.0	299.7
		2011	27.7	0.4	28.1	229.7	204.6	434.3	257.5	205.0	462.4
	Pollock	2012	38.0	0.4	38.4	241.3	216.1	457.4	279.3	216.5	495.9
		2013	35.9	0.4	36.4	218.6	199.8	418.5	254.6	200.3	454.8
		2014	37.8	0.5	38.2	226.9	208.0	434.9	264.6	208.5	473.1
		2010	3.3	2.9	6.2	0	0.4	0.4	3.3	3.2	6.5
		2011	4.6	3.5	8.1	0	0.3	0.3	4.6	3.8	8.4
	Sablefish	2012	2.9	2.7	5.7	*	0.5	0.5	2.9	3.3	6.2
		2013	2.2	2.1	4.3	*	0.5	0.5	2.2	2.6	4.8
Trawl		2014	3.0	2.8	5.8	*	0.2	0.2	3.0	3.0	6.0
		2010	9.3	0.6	9.9	11.1	15.9	27.0	20.4	16.5	36.9
		2011	9.9	0.8	10.7	16.9	23.0	40.0	26.8	23.9	50.7
	Pacific Cod	2012	13.1	0.9	14.0	28.9	30.8	59.7	42.0	31.7	73.7
		2013	9.8	0.6	10.4	21.5	25.1	46.6	31.3	25.7	57.0
		2014	13.2	0.7	13.9	21.4	24.0	45.4	34.5	24.7	59.2
		2010	4.7	1.7	6.4	1.0	73.1	74.1	5.8	74.7	80.5
		2011	5.0	3.1	8.1	1.6	102.5	104.1	6.6	105.6	112.1
	Flatfish	2012	4.2	2.9	7.1	1.7	118.3	119.9	5.9	121.2	127.1
		2013	5.5	3.1	8.6	0.6	93.8	94.5	6.1	97.0	103.1
		2014	5.8	8.0	13.8	0.7	79.8	80.5	6.5	87.8	94.3

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Table 19: Continued

		Year	Gulf of Alaska Catcher Vessel	Gulf of Alaska Catcher Processor	Gulf of Alaska All Sectors	Bering Sea & Aleutian Islands Catcher Vessel	Bering Sea & Aleutian Islands Catcher Processor	Bering Sea & Aleutian Islands All Sectors	All Alaska Catcher Vessel	All Alaska Catcher Processor	All Alaska All Sectors
Trawl	Rockfish	2010	2.5	3.6	6.2	0.1	10.6	10.7	2.6	14.3	16.9
		2011	3.0	4.0	7.0	0.1	20.5	20.6	3.1	24.5	27.6
		2012	6.3	7.9	14.2	0.2	16.6	16.8	6.5	24.6	31.0
		2013	4.4	5.2	9.5	0.1	15.5	15.6	4.5	20.7	25.2
		2014	4.4	5.7	10.2	0.2	17.9	18.1	4.7	23.6	28.2
	Atka Mackerel	2010	0	0.7	0.7	0	29.4	29.5	0	30.2	30.2
		2011	0	0.8	0.8	0.6	29.0	29.5	0.6	29.8	30.4
		2012	0	0.6	0.6	0.1	29.8	30.0	0.2	30.4	30.6
		2013	0	0.7	0.7	0	16.1	16.2	0	16.8	16.9
		2014	0	0.8	0.8	0.1	23.7	23.7	0.1	24.5	24.6
	All Species	2010	49.3	10.1	59.4	154.7	258.2	412.9	204.1	268.2	472.3
		2011	51.8	12.9	64.7	249.0	380.2	629.2	300.8	393.1	694.0
		2012	66.0	15.8	81.8	272.4	412.5	684.9	338.4	428.3	766.7
		2013	59.5	12.1	71.6	240.9	351.1	592.0	300.4	363.2	663.6
		2014	65.0	18.7	83.7	249.5	354.1	603.6	314.5	372.8	687.3
All Gear	Pollock	2010	28.4	0.4	28.8	142.4	129.7	272.1	170.8	130.1	300.9
		2011	27.8	0.4	28.1	229.7	206.4	436.1	257.5	206.8	464.3
		2012	38.0	0.4	38.5	241.3	217.2	458.5	279.4	217.6	497.0
		2013	36.0	0.4	36.4	218.6	200.7	419.4	254.6	201.2	455.8
		2014	37.8	0.5	38.3	226.9	209.4	436.2	264.7	209.8	474.5
	Sablefish	2010	83.9	8.7	92.6	6.0	5.7	11.6	89.8	14.4	104.2
		2011	121.5	12.5	134.0	13.3	5.0	18.3	134.9	17.5	152.4
		2012	108.1	9.5	117.7	5.5	4.2	9.7	113.7	13.7	127.4
		2013	77.0	6.8	83.8	3.6	3.4	7.0	80.6	10.2	90.8
		2014	81.0	7.6	88.7	4.5	1.9	6.4	85.6	9.5	95.1

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Table 19: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
All Gear	Pacific Cod	2010	37.6	5.5	43.1	22.8	76.9	99.8	60.5	82.4	142.9
		2011	54.1	7.0	61.0	34.4	103.3	137.7	88.5	110.2	198.7
		2012	55.2	4.6	59.7	48.2	127.8	176.0	103.4	132.3	235.7
		2013	34.8	2.5	37.2	37.0	92.8	129.8	71.8	95.2	167.0
		2014	47.3	4.7	52.0	45.0	106.8	151.8	92.3	111.5	203.8
	Flatfish	2010	4.7	1.7	6.5	1.0	73.2	74.2	5.8	74.9	80.7
		2011	5.0	3.1	8.1	1.6	103.4	105.0	6.6	106.5	113.1
		2012	4.2	2.9	7.1	1.7	118.4	120.0	5.9	121.3	127.2
		2013	5.5	3.1	8.6	0.6	93.9	94.6	6.1	97.1	103.1
		2014	5.8	8.0	13.8	0.7	80.0	80.7	6.5	88.0	94.5
	Rockfish	2010	4.0	3.8	7.7	0.2	11.3	11.4	4.1	15.1	19.2
		2011	4.2	4.2	8.4	0.2	20.7	20.9	4.4	24.8	29.3
		2012	8.1	8.2	16.3	0.3	16.9	17.2	8.4	25.0	33.5
		2013	6.4	5.3	11.7	0.2	15.8	16.0	6.6	21.1	27.7
		2014	6.0	5.9	11.9	0.3	18.0	18.3	6.3	23.8	30.2
	Atka Mackerel	2010	0	0.7	0.7	0	29.4	29.5	0	30.2	30.2
		2011	0	0.8	0.8	0.6	29.0	29.5	0.6	29.8	30.4
		2012	0	0.6	0.6	0.1	29.8	30.0	0.2	30.4	30.6
		2013	0	0.7	0.7	0	16.1	16.2	0	16.8	16.9
		2014	0	0.8	0.8	0.1	23.7	23.7	0.1	24.5	24.6
	All Species	2010	160.4	21.2	181.7	172.5	327.0	499.5	332.9	348.2	681.2
		2011	215.1	28.6	243.7	280.0	472.1	752.1	495.1	500.7	995.8
		2012	216.3	26.7	243.0	297.3	516.8	814.1	513.7	543.5	1,057.1
		2013	162.2	18.9	181.0	260.2	429.2	689.4	422.3	448.1	870.4
		2014	179.9	27.7	207.6	277.8	448.6	726.3	457.7	476.3	934.0

Notes: Ex-vessel value is calculated by multiplying ex-vessel prices by the retained round weight catch. Refer to Table 18 for a description of the price derivation. The value added by at-sea processing is not included in these estimates of ex-vessel value. All groundfish includes additional species categories. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; andADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 20: Ex-vessel value of Alaska groundfish delivered to shoreside processors by area, gear and catcher-vessel length, 2005-2014; calculations based on COAR ($ millions).

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	2005	55.3	25.3	0.3	3.9	11.5	1.9	59.2	36.8	2.2
	2006	65.6	32.8	0.2	6.4	14.2	3.8	72.0	47.0	4.1
	2007	75.0	33.5	0	5.5	16.0	2.5	80.5	49.4	2.5
	2008	86.0	35.4	0.3	9.1	16.7	3.6	95.1	52.1	3.9
	2009	68.5	26.8	*	5.1	7.3	1.6	73.6	34.1	1.6
	2010	80.1	31.2	*	7.7	11.6	3.2	87.8	42.8	3.2
	2011	117.5	45.8	*	11.9	15.2	3.9	129.4	60.9	3.9
	2012	108.9	41.8	*	14.4	10.8	3.6	123.4	52.6	3.6
	2013	75.8	26.8	*	11.0	7.8	3.2	86.9	34.6	3.2
	2014	85.4	29.8	-	19.4	8.9	2.8	104.9	38.7	2.8
Trawl	2005	8.1	28.9	-	*	89.6	106.8	8.1	118.4	106.8
	2006	7.7	33.4	-	*	94.0	112.1	7.7	127.4	112.1
	2007	8.7	34.2	-	*	92.7	100.1	8.7	126.9	100.1
	2008	10.8	38.2	*	*	106.9	119.2	10.8	145.1	119.2
	2009	6.5	27.1	-	*	72.4	84.2	6.5	99.5	84.2
	2010	10.3	39.0	-	*	60.8	69.3	10.3	99.8	69.3
	2011	8.2	43.6	-	*	100.5	107.8	8.2	144.1	107.8
	2012	15.4	50.6	-	*	111.2	119.7	15.4	161.8	119.7
	2013	8.9	50.6	-	*	95.2	108.4	8.9	145.9	108.4
	2014	12.8	52.2	-	*	98.9	112.1	12.8	151.1	112.1
All Gear	2005	63.4	54.2	0.3	3.9	101.1	108.7	67.3	155.2	109.0
	2006	73.2	66.2	0.2	6.4	108.3	116.0	79.6	174.5	116.2
	2007	83.7	67.7	0	5.5	108.7	102.6	89.2	176.3	102.6
	2008	96.8	73.6	0.3	9.1	123.7	122.8	105.9	197.3	123.1
	2009	75.0	53.9	*	5.1	79.7	85.8	80.1	133.6	85.8
	2010	90.4	70.2	*	7.7	72.4	72.6	98.1	142.6	72.6
	2011	125.7	89.4	*	11.9	115.6	111.7	137.6	205.0	111.7
	2012	124.3	92.4	*	14.4	121.9	123.4	138.8	214.4	123.4
	2013	84.7	77.5	*	11.0	103.0	111.6	95.7	180.5	111.6
	2014	98.3	81.9	-	19.4	107.8	115.0	117.7	189.8	115.0

Notes: These estimates include only catch counted against federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; andADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 21: Ex-vessel value per catcher vessel for Alaska groundfish delivered to shoreside processors by area, gear and catcher-vessel length, 2005-2014; calculations based on COAR ($ thousands).

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	2005	61	213	60	60	180	128	64	244	148
	2006	65	263	57	98	226	321	70	316	340
	2007	72	301	9	76	275	209	76	351	211
	2008	79	337	74	117	275	359	86	395	353
	2009	67	276	*	74	155	200	71	286	178
	2010	77	328	*	113	242	358	83	372	323
	2011	106	498	*	165	271	490	116	521	436
	2012	98	510	*	225	234	404	110	496	363
	2013	82	362	*	140	165	354	91	353	354
	2014	91	425	-	380	212	312	110	416	312
Trawl	2005	299	566	-	*	1,262	4,106	299	1,287	4,106
	2006	295	682	-	*	1,306	4,313	295	1,341	4,313
	2007	324	744	-	*	1,288	3,848	324	1,426	3,848
	2008	384	867	*	*	1,528	4,256	384	1,630	4,256
	2009	231	616	-	*	1,081	3,119	231	1,171	3,119
	2010	412	908	-	*	980	2,568	396	1,248	2,568
	2011	340	969	-	*	1,456	3,993	340	1,757	3,993
	2012	642	1,077	-	*	1,710	4,276	642	1,973	4,276
	2013	341	1,151	-	*	1,465	4,016	341	1,779	4,016
	2014	474	1,213	-	*	1,622	4,154	474	1,865	4,154
All Gear	2005	70	336	60	56	754	2,651	73	666	2,658
	2006	72	406	57	94	808	3,053	77	752	3,059
	2007	80	445	9	70	842	2,699	83	787	2,700
	2008	88	511	59	110	951	3,231	95	917	3,155
	2009	73	396	*	67	705	2,452	77	675	2,384
	2010	87	528	*	107	658	2,016	92	750	1,961
	2011	113	672	*	162	925	3,192	122	1,051	3,104
	2012	112	734	*	209	1,098	3,334	123	1,159	3,246
	2013	91	674	*	136	920	3,101	99	1,020	3,101
	2014	104	745	-	366	1,047	3,193	122	1,110	3,193

Notes: These estimates include only catch counted against federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; andADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 22: Ex-vessel value of the groundfish catch off Alaska by area, residency, and species, 2010-2014; calculations based on COAR ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2010	13.9	14.9	45.5	226.6	59.4	241.5
	2011	12.0	16.2	66.0	370.1	78.0	386.3
	2012	15.8	22.6	65.4	393.1	81.2	415.7
	2013	13.4	23.0	62.3	357.1	75.7	380.1
	2014	14.9	23.3	62.3	373.9	77.2	397.3
Sablefish	2010	51.0	41.8	2.7	8.9	53.7	50.8
	2011	74.1	59.9	7.8	10.6	81.8	70.5
	2012	64.9	53.2	2.7	7.0	67.7	60.2
	2013	46.7	37.1	4.4	5.3	51.1	42.4
	2014	50.5	38.5	2.2	4.2	52.6	42.7
Pacific Cod	2010	29.1	14.0	26.7	73.1	55.8	87.1
	2011	43.9	17.1	34.7	102.9	78.7	120.0
	2012	44.5	15.2	42.2	133.8	86.8	149.0
	2013	25.4	11.8	31.2	98.6	56.6	110.4
	2014	37.6	14.4	38.7	113.1	76.3	127.5
Flatfish	2010	2.6	3.9	20.4	53.8	23.0	57.7
	2011	2.0	6.0	8.0	97.0	10.1	103.0
	2012	1.6	5.5	1.4	118.6	3.0	124.2
	2013	2.0	6.6	4.9	89.7	6.9	96.2
	2014	2.1	11.7	4.4	76.3	6.5	88.0
Rockfish	2010	2.7	5.0	0.3	11.1	3.0	16.2
	2011	2.1	6.2	0.5	20.4	2.7	26.6
	2012	4.1	12.2	0.1	17.1	4.2	29.2
	2013	3.5	8.2	0.2	15.8	3.7	24.0
	2014	3.2	8.7	0.1	18.1	3.4	26.8
Atka Mackerel	2010	0.1	0.6	0	29.5	0.1	30.1
	2011	0	0.8	0	29.5	0	30.4
	2012	0	0.6	0	30.0	0	30.6
	2013	0	0.7	0	16.2	0	16.9
	2014	0	0.8	0	23.7	0	24.5
All Groundfish	2010	100.7	81.2	95.8	403.7	196.5	484.9
	2011	135.9	107.8	118.3	633.9	254.2	741.6
	2012	132.7	110.7	112.7	701.4	245.5	812.1
	2013	92.3	88.9	104.8	587.3	197.2	676.2
	2014	109.7	98.2	109.9	616.4	219.6	714.6

Notes: These estimates include only catches counted against federal TACs. Ex-vessel value is calculated using prices on Table 18a. Please refer to Table 18a for a description of the price derivation. Catch delivered to motherships is classified by the residence of the owner of the mothership. All other catch is classified by the residence of the owner of the fishing vessel. All groundfish include additional species categories. For catch for which the residence is unknown, there are either no data or the data have been suppressed to preserve confidentiality.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region At-sea Production Reports; ADF&G Commercial Operators Annual Reports (COAR); and CFEC gross earnings (fish tickets) file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 23: Ex-vessel value of groundfish delivered to shoreside processors by processor group, 2009-2014; calculations based on COAR ($ millions).

Region	2009	2010	2011	2012	2013	2014
Bering Sea Pollock	172.5	168.1	254.4	270.3	231.3	257.0
AK Peninsula/Aleutians	11.3	5.5	12.0	19.6	14.9	13.9
Kodiak	41.7	59.9	77.4	87.7	68.3	76.4
South Central	25.5	27.0	44.8	37.0	26.4	29.4
Southeastern	30.8	33.6	44.8	43.3	28.4	31.3
All Regions	281.8	294.2	433.5	457.8	369.2	408.0

Notes: Refer to the notes for Table 24.

Source: ADF&G Commercial Operators Annual Reports (COAR); and ADF&G Intent to Operate (ITO) file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 24: Ex-vessel value of groundfish as a percentage of the ex-vessel value of all species delivered to shoreside processors by processor group, 2009-2014; calculations based on COAR (percent).

Region	2009	2010	2011	2012	2013	2014
Bering Sea Pollock	58.9	57.5	58.7	64.4	62.9	67.4
AK Peninsula/Aleutians	6.1	2.4	4.6	7.0	5.4	4.5
Kodiak	35.1	42.9	41.9	47.9	40.4	50.6
South Central	15.8	9.3	17.7	15.6	9.7	14.1
Southeastern	15.9	13.4	13.9	15.7	8.8	12.2
All Regions	29.5	24.5	29.8	32.8	26.3	31.2

Notes: These tables include the value of groundfish purchases reported by processing plants, as well as by other entities, such as markets and restaurants, that normally would not report sales of groundfish products. Keep this in mind when comparing ex-vessel values in this table to gross processed-product values in Table 34. The data are for catch from both federal and state of Alaska fisheries. The processor groups are defined as follows: "Bering Sea Pollock" are the AFA inshore pollock processors including the two AFA floating processors. "AK Peninsula/Aleutian" are other processors on the Alaska Peninsula or in the Aleutian Islands. "Kodiak" are processors on Kodiak Island. "South Central" are processors west of Yakutat and on the Kenai Peninsula. "Southeastern" are processors located from Yakutat south.

Source: ADF&G Commercial Operators Annual Reports (COAR); and ADF&G Intent to Operate (ITO) file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 25: Production and gross value of groundfish products in the fisheries off Alaska by species, 2010-2014, (1,000 metric tons product weight and million dollars).

		2010		2011		2012		2013		2014	
	Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pollock	Whole Fish	1.24	$ 1.6	2.01	$ 3.2	2.19	$ 2.2	2.48	$ 2.8	1.67	$ 1.5
	Head And Gut	60.81	$ 97.0	59.60	$ 109.1	48.15	$ 71.2	62.26	$ 100.0	67.17	$ 93.9
	Roe	16.45	$ 98.0	19.29	$ 152.9	18.16	$ 169.2	16.12	$ 115.6	24.12	$ 148.2
	Deep-Skin Fillets	40.28	$ 158.5	46.19	$ 171.0	55.49	$ 206.5	51.59	$ 184.5	43.69	$ 153.6
	Other Fillets	71.17	$ 263.8	120.72	$ 399.1	96.96	$ 314.0	125.07	$ 379.5	140.27	$ 403.2
	Surimi	103.59	$ 357.2	148.07	$ 418.0	167.04	$ 523.6	170.26	$ 377.5	183.64	$ 441.3
	Minced Fish	21.59	$ 41.6	30.99	$ 50.8	31.59	$ 54.3	30.94	$ 46.0	26.25	$ 34.4
	Fishmeal	38.32	$ 60.3	52.92	$ 82.5	52.52	$ 78.8	53.87	$ 92.9	56.85	$ 96.1
	Other Products	26.25	$ 26.3	33.97	$ 37.3	38.79	$ 48.6	33.81	$ 36.2	36.46	$ 34.7
	All Products	379.72	$ 1,104.3	513.75	$ 1,424.0	510.89	$ 1,468.4	546.41	$ 1,335.1	580.12	$ 1,406.9
Sablefish	Head And Gut	6.70	$ 104.3	6.86	$ 138.3	7.52	$ 113.4	7.35	$ 93.6	6.29	$ 96.1
	Other Products	0.49	$ 5.2	0.81	$ 9.1	0.63	$ 3.4	0.49	$ 2.6	0.41	$ 2.9
	All Products	7.18	$ 109.5	7.67	$ 147.4	8.16	$ 116.8	7.84	$ 96.2	6.70	$ 99.0

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Table 25: Continued

		2010		2011		2012		2013		2014	
	Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pacific Cod	Whole Fish	3.01	$ 2.9	2.47	$ 3.7	3.27	$ 4.8	3.64	$ 3.9	1.43	$ 2.5
	Head And Gut	80.32	$ 232.4	106.07	$ 348.6	119.61	$ 354.1	104.39	$ 240.9	114.51	$ 317.3
	Salted/Split	*	$ *	*	$ *	*	$ *	*	$ *	-	$ -
	Roe	5.05	$ 6.6	3.17	$ 4.9	3.86	$ 7.1	4.38	$ 9.1	5.25	$ 11.7
	Fillets	14.80	$ 86.8	15.79	$ 106.2	15.84	$ 103.1	18.50	$ 122.2	18.27	$ 117.2
	Other Products	12.29	$ 22.6	15.06	$ 33.3	14.17	$ 25.3	14.59	$ 21.9	15.13	$ 23.3
	All Products	115.47	$ 351.3	142.56	$ 496.7	156.75	$ 494.4	145.50	$ 397.9	154.58	$ 471.9
Flatfish	Whole Fish	18.51	$ 20.6	20.47	$ 28.8	25.07	$ 37.7	14.33	$ 38.1	25.57	$ 31.1
	Head And Gut	119.38	$ 152.3	141.36	$ 221.5	141.56	$ 240.5	149.85	$ 180.8	145.17	$ 173.9
	Kirimi	*	$ *	*	$ *	*	$ *	*	$ *	0.13	$ 0.4
	Fillets	0.02	$ 0.1	0.03	$ 0.1	0.02	$ 0.1	0.05	$ 0.2	0.04	$ 0.2
	Fishmeal	-	$ -	0	$ 0	0	$ 0	0.01	$ 0.0	0.01	$ 0.0
	Other Products	4.28	$ 9.2	3.46	$ 8.1	3.12	$ 6.4	2.02	$ 5.9	1.59	$ 3.7
	All Products	142.19	$ 182.2	165.32	$ 258.5	169.77	$ 284.8	166.26	$ 225.0	172.51	$ 209.3
Rockfish	Whole Fish	3.44	$ 6.8	3.61	$ 8.5	3.24	$ 7.0	3.79	$ 7.5	4.28	$ 7.9
	Head And Gut	20.15	$ 50.4	22.32	$ 84.0	22.66	$ 72.6	24.98	$ 58.0	27.57	$ 71.5
	Other Products	0.54	$ 2.2	0.43	$ 2.4	0.69	$ 5.2	0.40	$ 2.4	0.44	$ 1.8
	All Products	24.14	$ 59.3	26.35	$ 94.9	26.59	$ 84.7	29.17	$ 67.8	32.28	$ 81.2
Atka Mackerel	Whole Fish	2.15	$ 1.7	5.33	$ 5.3	5.63	$ 7.9	2.91	$ 5.3	3.25	$ 4.7
	Head And Gut	37.84	$ 72.7	27.41	$ 69.6	24.51	$ 67.0	11.67	$ 34.1	17.63	$ 58.6
	Other Products	0	$ 0	0	$ 0	0.03	$ 0.0	0	$ 0	0	$ 0
	All Products	39.99	$ 74.4	32.74	$ 74.9	30.17	$ 74.8	14.57	$ 39.4	20.88	$ 63.3
All Species	Total	713.69	$ 1,890.4	893.19	$ 2,507.6	907.81	$ 2,538.7	916.02	$ 2,177.2	973.55	$ 2,343.5

Notes: Total includes additional species not listed in the production details as well as confidential data from Tables 28 and 29. These estimates are for catch from both federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region At-sea and Shoreside Production Reports; and ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 26: Price per pound of groundfish products in the fisheries off Alaska by species and processing mode, 2010-2014, (dollars).

		2010		2011		2012		2013		2014	
	Product	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Pollock	Whole Fish	$ 0.44	$ 0.58	$ 0.66	$ 0.73	$ 0.53	$ 0.45	$ 0.40	$ 0.52	$ 0.47	$ 0.39
	Head And Gut	$ 0.74	$ 0.72	$ 0.92	$ 0.65	$ 0.73	$ 0.60	$ 0.71	$ 0.76	$ 0.64	$ 0.62
	Roe	$ 3.51	$ 2.00	$ 3.94	$ 3.07	$ 5.03	$ 3.38	$ 3.73	$ 2.74	$ 3.31	$ 2.29
	Deep-Skin Fillets	$ 1.89	$ 1.57	$ 1.75	$ 1.52	$ 1.70	$ 1.67	$ 1.71	$ 1.41	$ 1.63	$ 1.50
	Other Fillets	$ 1.64	$ 1.72	$ 1.46	$ 1.53	$ 1.42	$ 1.52	$ 1.29	$ 1.46	$ 1.31	$ 1.30
	Surimi	$ 1.75	$ 1.37	$ 1.41	$ 1.16	$ 1.61	$ 1.26	$ 1.08	$ 0.94	$ 1.19	$ 1.00
	Minced Fish	$ 0.87	$ 0.89	$ 0.76	$ 0.70	$ 0.79	$ 0.74	$ 0.68	$ 0.65	$ 0.60	$ 0.59
	Fishmeal	$ 0.86	$ 0.63	$ 0.79	$ 0.65	$ 0.86	$ 0.56	$ 0.88	$ 0.72	$ 0.96	$ 0.63
	Other Products	$ 0.58	$ 0.37	$ 0.60	$ 0.44	$ 0.67	$ 0.53	$ 0.59	$ 0.43	$ 0.46	$ 0.41
	All Products	$ 1.49	$ 1.16	$ 1.36	$ 1.15	$ 1.44	$ 1.17	$ 1.17	$ 1.05	$ 1.19	$ 1.01
Pacific Cod	Whole Fish	$ 0.41	$ 0.45	$ 0.49	$ 0.73	$ 0.57	$ 0.73	$ 0.50	$ 0.46	$ 0.36	$ 0.86
	Head And Gut	$ 1.40	$ 1.01	$ 1.56	$ 1.31	$ 1.41	$ 1.18	$ 1.10	$ 0.82	$ 1.32	$ 1.07
	Salted/Split	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ -
	Roe	$ 0.58	$ 0.60	$ 0.76	$ 0.70	$ 0.81	$ 0.84	$ 0.77	$ 0.95	$ 0.89	$ 1.03
	Fillets	$ 2.41	$ 2.67	$ 2.43	$ 3.08	$ 1.51	$ 2.98	$ 1.07	$ 3.03	$ 0.94	$ 2.93
	Other Products	$ 1.03	$ 0.77	$ 1.26	$ 0.89	$ 0.91	$ 0.78	$ 0.53	$ 0.75	$ 0.74	$ 0.69
	All Products	$ 1.38	$ 1.38	$ 1.53	$ 1.65	$ 1.37	$ 1.51	$ 1.06	$ 1.55	$ 1.30	$ 1.50
Sablefish	Head And Gut	$ 6.40	$ 7.19	$ 7.83	$ 9.38	$ 5.31	$ 7.09	$ 5.19	$ 5.87	$ 6.19	$ 7.04
	Other Products	$ 1.94	$ 5.51	$ 1.20	$ 6.06	$ 1.29	$ 2.58	$ 0.82	$ 3.22	$ 0.83	$ 3.87
	All Products	$ 6.04	$ 7.08	$ 6.94	$ 9.04	$ 5.03	$ 6.74	$ 4.62	$ 5.74	$ 5.63	$ 6.86

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Table 26: Continued

	Product	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside	2013 At-sea	2013 Shoreside	2014 At-sea	2014 Shoreside
Deep-Water Flatfish (GOA)	Whole Fish	$ -	$ 0.40	$ -	$ 0.42	$ *	$ *	$ -	$ 0.45	$ -	$ 0.36
	Head And Gut	$ -	$ 0.53	$ -	$ 0.62	$ 0.90	$ 0.64	$ 0.52	$ 0.78	$ 0.72	$ 0.63
	Kirimi	$ -	$ -	$ -	$ *	$ -	$ -	$ -	$ -	$ -	$ -
	Fillets	$ -	$ 1.51	$ -	$ 2.01	$ -	$ *	$ -	$ 1.76	$ -	$ 2.04
	Other Products	$ -	$ -	$ *	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	All Products	$ -	$ 0.63	$ *	$ 0.58	$ 0.90	$ 0.64	$ 0.52	$ 0.61	$ 0.72	$ 0.73
Shallow-Water Flatfish (GOA)	Whole Fish	$ *	$ 0.51	$ *	$ 0.63	$ *	$ 0.63	$ -	$ 1.08	$ *	$ 0.58
	Head And Gut	$ 0.63	$ 0.56	$ 0.64	$ 0.68	$ 0.77	$ 0.70	$ 0.46	$ 0.72	$ 0.41	$ 0.69
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ 1.58	$ -	$ 2.06	$ -	$ 2.15	$ -	$ 1.62	$ -	$ 1.39
	Other Products	$ -	$ 0.81	$ -	$ 0.14	$ -	$ *	$ -	$ *	$ -	$ *
	All Products	$ 0.63	$ 0.66	$ 0.64	$ 0.78	$ 0.77	$ 0.82	$ 0.46	$ 0.98	$ 0.41	$ 0.65
Arrowtooth	Whole Fish	$ *	$ 0.41	$ -	$ 0.65	$ *	$ 0.47	$ *	$ 0.64	$ 0.54	$ 0.67
	Head And Gut	$ 0.47	$ 0.37	$ 0.69	$ 0.54	$ 0.81	$ 0.57	$ 0.54	$ 0.45	$ 0.75	$ 0.45
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ *	$ *	$ *	$ -	$ *	$ -	$ 1.74	$ -	$ *
	Other Products	$ 0.82	$ 0.71	$ 0.77	$ 0.85	$ 0.75	$ 0.46	$ 1.27	$ 1.39	$ 0.93	$ 0.92
	All Products	$ 0.47	$ 0.48	$ 0.70	$ 0.57	$ 0.81	$ 0.56	$ 0.55	$ 0.51	$ 0.75	$ 0.46
Kamchatka Flounder (BSAI)	Whole Fish	$ -	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -
	Head And Gut	$ -	$ -	$ 0.70	$ -	$ 1.00	$ -	$ 0.55	$ -	$ 0.74	$ -
	Fishmeal	$ -	$ -	$ 0.75	$ -	$ 0.66	$ *	$ 1.29	$ -	$ 0.93	$ -
	All Products	$ -	$ -	$ 0.70	$ -	$ 1.00	$ *	$ 0.55	$ -	$ 0.74	$ -

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Table 26: Continued

	Product	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside	2013 At-sea	2013 Shoreside	2014 At-sea	2014 Shoreside
Flathead Sole	Whole Fish	$ 0.46	$ 0.49	$ 0.59	$ 0.53	$ 0.76	$ 0.62	$ 1.38	$ 1.06	$ 0.62	$ 0.51
	Head And Gut	$ 0.70	$ 0.55	$ 0.89	$ 0.53	$ 0.93	$ 0.61	$ 0.85	$ 0.68	$ 0.70	$ 0.70
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ 1.23
	Fillets	$ -	$ 1.90	$ *	$ 2.15	$ *	$ 2.00	$ -	$ 1.56	$ *	$ 1.36
	Other Products	$ 0.88	$ 0.56	$ 0.82	$ 0.73	$ 0.75	$ 0.37	$ 1.35	$ 1.30	$ 0.93	$ 0.92
	All Products	$ 0.69	$ 0.56	$ 0.89	$ 0.60	$ 0.91	$ 0.59	$ 0.90	$ 0.98	$ 0.70	$ 0.66
Rex Sole (GOA)	Whole Fish	$ 0.91	$ 0.91	$ 1.12	$ 1.02	$ 1.12	$ 1.12	$ 1.21	$ 0.94	$ 1.11	$ 0.86
	Head And Gut	$ *	$ *	$ *	$ *	$ *	$ *	$ 1.76	$ *	$ 0.62	$ *
	Kirimi	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ *	$ -	$ -
	Fillets	$ -	$ *	$ -	$ 1.83	$ -	$ *	$ -	$ 1.31	$ -	$ *
	Other Products	$ -	$ *	$ -	$ 0.74	$ -	$ *	$ -	$ *	$ -	$ *
	All Products	$ 0.91	$ 0.91	$ 1.12	$ 1.03	$ 1.12	$ 1.12	$ 1.21	$ 0.94	$ 1.11	$ 0.86
Rock Sole (BSAI)	Whole Fish	$ 0.35	$ 0.43	$ 0.53	$ *	$ 0.66	$ *	$ 0.50	$ *	$ 0.53	$ *
	Head And Gut	$ 0.56	$ -	$ 0.69	$ -	$ 0.80	$ -	$ 0.54	$ -	$ 0.45	$ -
	Head And Gut With Roe	$ 0.84	$ -	$ 1.05	$ -	$ 1.28	$ -	$ 0.85	$ -	$ 0.85	$ -
	Fillets	$ -	$ -	$ *	$ -	$ -	$ -	$ *	$ -	$ 5.70	$ -
	Other Products	$ 0.87	$ 0.56	$ 0.84	$ 0.74	$ 0.71	$ 0.37	$ 1.26	$ 1.30	$ 0.92	$ 0.92
	All Products	$ 0.61	$ 0.55	$ 0.77	$ 0.74	$ 0.91	$ 0.37	$ 0.58	$ 1.30	$ 0.55	$ 0.92
Turbot (BSAI)	Whole Fish	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ *
	Head And Gut	$ 1.80	$ -	$ 2.65	$ *	$ 2.09	$ -	$ 1.95	$ -	$ 2.18	$ *
	Other Products	$ 1.60	$ 0.56	$ 1.90	$ 0.70	$ 1.59	$ 0.37	$ 1.56	$ 1.33	$ 1.89	$ 0.93
	All Products	$ 1.74	$ 0.56	$ 2.45	$ 0.68	$ 1.96	$ 0.37	$ 1.86	$ 1.33	$ 2.11	$ 0.93

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Table 26: Continued

	Product	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside	2013 At-sea	2013 Shoreside	2014 At-sea	2014 Shoreside
Yellowfin (BSAI)	Whole Fish	$ 0.41	$ -	$ 0.55	$ -	$ 0.63	$ *	$ 1.34	$ *	$ 0.46	$ *
	Head And Gut	$ 0.54	$ -	$ 0.65	$ -	$ 0.63	$ -	$ 0.51	$ -	$ 0.45	$ -
	Kirimi	$ *	$ -	$ *	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Fillets	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -	$ -	$ -
	Other Products	$ 0.96	$ 0.96	$ 0.85	$ 0.85	$ 0.87	$ 0.88	$ 1.30	$ 1.30	$ 0.90	$ 0.92
	All Products	$ 0.52	$ 0.96	$ 0.63	$ 0.85	$ 0.63	$ 0.88	$ 0.58	$ 1.30	$ 0.46	$ 0.92
Flat Other (BSAI)	Whole Fish	$ 0.86	$ *	$ 1.05	$ 1.40	$ 0.81	$ *	$ 0.90	$ *	$ 0.67	$ *
	Head And Gut	$ 0.46	$ *	$ 0.51	$ *	$ 0.58	$ -	$ 0.49	$ -	$ 0.49	$ -
	Fillets	$ -	$ -	$ *	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Other Products	$ 0.97	$ 0.56	$ 0.84	$ 0.74	$ 0.87	$ 0.37	$ 1.26	$ 1.30	$ 0.91	$ 0.92
	All Products	$ 0.52	$ 0.56	$ 0.56	$ 1.34	$ 0.64	$ 0.37	$ 0.57	$ 1.30	$ 0.53	$ 0.92
Rockfish	Whole Fish	$ 1.26	$ 0.74	$ 1.49	$ 0.94	$ 0.96	$ 0.98	$ 1.19	$ 0.84	$ 1.68	$ 0.69
	Head And Gut	$ 1.11	$ 1.32	$ 1.70	$ 1.74	$ 1.40	$ 1.75	$ 1.02	$ 1.32	$ 1.16	$ 1.33
	Other Products	$ 1.09	$ 1.83	$ 1.24	$ 2.76	$ 1.17	$ 3.48	$ 1.10	$ 2.85	$ 0.81	$ 2.01
	All Products	$ 1.11	$ 1.11	$ 1.69	$ 1.42	$ 1.38	$ 1.67	$ 1.03	$ 1.16	$ 1.17	$ 1.03
Atka Mackerel	Whole Fish	$ 0.37	$ *	$ 0.45	$ 0.54	$ 0.63	$ 0.70	$ 0.83	$ *	$ 0.66	$ 0.60
	Head And Gut	$ 0.87	$ -	$ 1.15	$ *	$ 1.24	$ -	$ 1.33	$ -	$ 1.51	$ -
	Other Products	$ 0.56	$ 0.56	$ 0.64	$ 0.47	$ 0.71	$ 0.36	$ 1.03	$ 1.09	$ 1.21	$ 0.51
	All Products	$ 0.84	$ 0.56	$ 1.04	$ 0.54	$ 1.13	$ 0.66	$ 1.23	$ 1.09	$ 1.38	$ 0.60

Notes: These estimates are based on data from both federal and state of Alaska fisheries. Prices based on confidential data have been excluded. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region At-sea and Shoreside Production Reports; and ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 27: Total product value per round metric ton of retained catch in the groundfish fisheries off Alaska by processor type, species, area and year, 2010-2014, (dollars).

		Bering Sea & Aleutian Islands					Gulf of Alaska				
	Species	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Motherships	Pollock	-	1,219	1,153	808	1,033	-	-	-	-	-
	Pacific Cod	-	404	965	553	388	-	-	-	-	-
Catcher processors	Pollock	1,321	1,190	1,206	1,037	1,037	661	883	659	682	497
	Sablefish	8,629	10,172	7,853	7,795	9,728	8,727	11,279	6,770	6,832	8,391
	Pacific Cod	1,494	1,687	1,501	1,181	1,423	1,425	1,622	1,479	1,064	1,300
	Flatfish	746	913	1,003	768	694	1,100	1,018	1,105	909	915
	Rockfish	1,307	1,967	1,572	1,172	1,369	1,300	2,059	1,568	1,103	1,329
	Atka Mackerel	1,131	1,484	1,584	1,681	2,019	1,135	1,694	1,856	2,076	1,828
	Other	460	483	624	482	460	689	1,098	1,245	1,921	1,148
Shoreside processors	Pollock	1,256	1,047	1,089	950	980	882	920	865	1,007	757
	Sablefish	11,955	11,264	9,152	9,920	9,571	8,566	11,319	8,246	6,744	8,380
	Pacific Cod	1,457	1,682	1,632	1,398	1,489	1,328	1,570	1,463	1,502	1,502
	Flatfish	541	815	741	1,102	553	557	678	799	831	700
	Rockfish	1,633	1,729	1,661	1,425	936	1,317	1,865	1,830	1,469	1,299
	Other	708	424	888	707	1,511	1,198	1,609	2,166	2,035	1,589

Notes: These estimates include the product value of catch from both federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region At-sea and Shoreside Production Reports; ADF&G Commercial Operators Annual Reports (COAR); and NMFS Alaska Region Blend and Catch-accounting System estimates. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 28: Production of groundfish products in the fisheries off Alaska by species, product and area, 2010-2014, (1,000 metric tons product weight).

		Bering Sea & Aleutian Islands					Gulf of Alaska				
	Product	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Pollock	Whole Fish	0.7	1.5	1.7	1.8	1.4	0.5	0.5	0.5	0.7	0.3
	Head And Gut	49.2	44.8	29.1	41.0	37.5	11.6	14.8	19.0	21.3	29.7
	Roe	15.3	18.0	16.5	13.9	20.6	1.1	1.3	1.7	2.2	3.5
	Deep-Skin Fillets	40.3	46.2	55.5	51.6	43.7	*	*	*	*	*
	Other Fillets	66.5	115.0	91.1	119.3	132.1	4.7	5.7	5.9	5.8	8.2
	Surimi	97.1	141.0	157.1	161.7	171.3	6.5	7.1	9.9	8.6	12.3
	Minced Fish	21.6	30.4	31.0	30.7	26.1	*	0.5	0.6	0.2	0.2
	Fishmeal	38.3	52.8	52.5	53.9	56.8	*	0.1	*	*	*
	Other Products	25.4	33.3	38.2	33.0	36.0	0.8	0.6	0.6	0.8	0.5
Sablefish	Head And Gut	1.2	1.0	1.2	1.1	0.7	5.5	5.9	6.3	6.2	5.6
	Other Products	0	0	0.1	0	0	0.4	0.8	0.6	0.5	0.4
Pacific Cod	Whole Fish	0.9	1.2	1.5	2.4	1.0	2.1	1.3	1.8	1.2	0.5
	Head And Gut	66.4	88.8	104.2	97.8	100.6	13.9	17.3	15.4	6.6	13.9
	Salted/Split	*	*	*	-	-	*	*	-	*	-
	Roe	3.9	1.8	2.4	2.8	3.5	1.2	1.3	1.5	1.6	1.8
	Fillets	5.6	6.6	6.8	8.8	8.4	9.2	9.2	9.1	9.7	9.9
	Other Products	7.0	9.0	7.9	10.0	10.1	5.2	6.0	6.3	4.6	5.0
Flatfish	Whole Fish	14.9	17.4	22.5	10.5	21.6	4.7	4.1	3.5	5.2	5.5
	Head And Gut	114.2	130.1	133.8	142.6	129.2	5.9	12.0	8.4	8.6	16.9
	Kirimi	*	*	-	-	-	*	*	*	*	0.1
	Fillets	-	*	*	*	0	0.2	0.2	0.2	0.2	0.2
	Fishmeal	-	0	0	0	0	-	-	-	-	-
	Other Products	3.4	3.1	3.1	2.0	1.6	0.9	0.3	0.1	0	*
Rockfish	Whole Fish	0.2	0.7	1.3	0.5	0.5	3.2	3.0	1.9	3.3	3.8
	Head And Gut	10.9	13.4	12.3	16.3	17.5	9.3	8.9	10.4	8.6	10.1
	Other Products	0	0	0.1	0	0.1	0.5	0.4	0.6	0.4	0.4
Atka Mackerel	Whole Fish	2.2	5.3	5.6	2.9	3.3	-	-	*	-	*
	Head And Gut	37.3	26.9	24.2	11.1	17.1	0.5	0.5	0.4	0.5	0.5
	Other Products	0	0	0	0	0	*	-	*	*	-

Notes: These estimates include production resulting from catch from federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value. Confidential data withheld from this table are included in the grand totals in Table 25.

Source: NMFS Alaska Region At-sea and Shoreside Production Reports. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 29: Production of groundfish products in the fisheries off Alaska by species, product and processing mode, 2010-2014, (1,000 metric tons product weight).

		At-sea					Shoreside				
	Product	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Pollock	Whole Fish	0.04	0.11	0.24	0.16	0.31	1.20	1.90	1.95	2.32	1.36
	Head And Gut	19.80	38.83	26.05	37.86	35.40	41.01	20.77	22.10	24.40	31.76
	Roe	7.64	11.66	9.30	8.37	11.71	8.81	7.63	8.86	7.75	12.41
	Deep-Skin Fillets	27.51	32.25	36.84	36.83	32.68	12.78	13.94	18.65	14.76	11.01
	Other Fillets	31.29	58.32	47.55	59.63	63.68	39.88	62.40	49.41	65.44	76.60
	Surimi	52.78	70.80	77.93	80.85	87.80	50.81	77.27	89.11	89.41	95.84
	Minced Fish	17.75	23.49	25.06	23.47	19.98	3.83	7.50	6.53	7.47	6.28
	Fishmeal	14.64	22.58	21.08	20.98	23.25	23.67	30.34	31.44	32.89	33.60
	Other Products	10.63	12.26	10.57	12.21	13.56	15.62	21.71	28.22	21.60	22.90
Sablefish	Head And Gut	1.03	1.03	1.08	1.05	0.78	5.67	5.83	6.44	6.30	5.51
	Other Products	0.09	0.16	0.08	0.16	0.09	0.40	0.65	0.55	0.33	0.32
Pacific Cod	Whole Fish	0.84	0.63	1.28	1.99	0.19	2.17	1.84	1.99	1.65	1.24
	Head And Gut	61.53	78.50	86.92	84.36	84.46	18.79	27.57	32.69	20.03	30.05
	Salted/Split	-	-	-	-	-	*	*	*	*	-
	Roe	0.57	0.46	0.62	0.38	0.75	4.48	2.71	3.24	3.99	4.50
	Fillets	0.85	0.71	0.32	0.28	0.15	13.95	15.08	15.52	18.21	18.12
	Other Products	3.02	4.62	3.11	4.32	3.10	9.26	10.44	11.06	10.27	12.03
Flatfish	Whole Fish	17.32	18.86	23.86	12.37	22.89	2.21	2.68	2.16	3.34	4.18
	Head And Gut	116.68	136.38	138.44	146.87	141.80	3.47	5.69	3.78	4.33	4.30
	Kirimi	*	*	-	-	-	*	*	*	*	0.13
	Fillets	-	*	*	*	0	0.25	0.19	0.19	0.22	0.16
	Fishmeal	-	0	0	0.01	0.01	-	-	*	-	-
	Other Products	2.45	2.46	2.23	1.61	1.30	1.86	1.01	0.89	0.41	0.28
Rockfish	Whole Fish	1.01	0.82	1.17	0.52	0.63	2.43	2.78	2.07	3.27	3.64
	Head And Gut	17.52	19.73	19.42	22.35	24.66	2.63	2.59	3.23	2.63	2.91
	Other Products	0.02	0.06	0.03	0.03	0.05	0.52	0.37	0.66	0.36	0.39
Atka Mackerel	Whole Fish	2.15	5.07	5.43	2.91	3.17	*	0.25	0.20	*	0.08
	Head And Gut	37.84	27.41	24.51	11.67	17.63	-	*	-	-	-
	Other Products	0	0	0	0	0	0	0	0.03	0	0

Notes: These estimates include production resulting from catch from federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value. Confidential data withheld from this table are included in the grand totals in Table 25.

Source: NMFS Alaska Region At-sea and Shoreside Production Reports. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 30: Production and real gross value of non-groundfish products in the commercial fisheries of Alaska by species group and area of processing, 2010-2014, (1,000 metric tons product weight and $ millions.

		Bering Sea & Aleutian Islands		Gulf of Alaska		All Alaska	
	Species	Quantity	Value	Quantity	Value	Quantity	Value
2010	Salmon	63.3	$ 482.9	187.1	$ 972.5	250.4	$ 1,455.5
	Halibut	2.5	$ 46.5	13.5	$ 204.9	16.0	$ 251.4
	Herring	24.9	$ 28.6	22.2	$ 35.3	47.2	$ 63.9
	Crab	18.6	$ 253.8	4.2	$ 60.1	22.8	$ 314.0
	Other	0.2	$ 1.2	1.5	$ 27.3	1.8	$ 28.5
	All Species	109.5	$ 813.1	228.5	$ 1,300.2	338.0	$ 2,113.3
2011	Salmon	48.6	$ 421.9	198.7	$ 1,092.8	247.3	$ 1,514.7
	Halibut	2.8	$ 56.4	8.2	$ 148.2	11.0	$ 204.6
	Herring	20.4	$ 22.4	21.0	$ 23.2	41.4	$ 45.7
	Crab	19.5	$ 338.4	4.6	$ 78.8	24.1	$ 417.2
	Other	*	$ *	1.3	$ 23.9	1.3	$ 23.9
	All Species	91.3	$ 839.1	233.8	$ 1,366.9	325.1	$ 2,206.0
2012	Salmon	39.8	$ 333.7	168.3	$ 996.8	208.1	$ 1,330.6
	Halibut	2.0	$ 34.7	8.5	$ 133.3	10.5	$ 168.0
	Herring	16.2	$ 20.9	15.4	$ 30.3	31.6	$ 51.1
	Crab	29.0	$ 378.3	4.6	$ 69.7	33.6	$ 447.9
	Other	0	$ 0	1.7	$ 33.8	1.7	$ 34.5
	All Species	87.0	$ 768.3	198.6	$ 1,263.8	285.5	$ 2,032.1
2013	Salmon	34.7	$ 358.6	290.3	$ 1,475.0	325.1	$ 1,833.6
	Halibut	1.4	$ 17.8	7.5	$ 115.7	8.9	$ 133.5
	Herring	25.5	$ 25.4	11.6	$ 22.3	37.1	$ 47.7
	Crab	24.7	$ 331.3	3.0	$ 45.3	27.7	$ 376.7
	Other	0	$ 0	1.3	$ 25.9	1.3	$ 26.8
	All Species	86.4	$ 733.9	313.7	$ 1,684.3	400.1	$ 2,418.3
2014	Salmon	57.3	$ 442.7	176.8	$ 957.2	234.1	$ 1,399.9
	Halibut	0.6	$ 8.1	5.5	$ 101.1	6.2	$ 109.2
	Herring	19.5	$ 16.8	20.4	$ 24.3	39.9	$ 41.1
	Crab	22.6	$ 315.2	3.8	$ 58.2	26.4	$ 373.4
	Other	0	$ 0	1.2	$ 18.0	1.2	$ 18.5
	All Species	100.1	$ 783.3	207.7	$ 1,158.8	307.8	$ 1,942.2

Notes: These estimates include production resulting from catch in both federal and state of Alaska fisheries. The data have been adjusted to 2014 dollars by applying the GDP: chain-type price index https://research.stlouisfed.org/fred2/series/GDPCTPI. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 31: Gross product value of Alaska groundfish by area and processing mode, 1992-2014, ($ millions).

	Bering Sea & Aleutian Islands		Gulf of Alaska		All Alaska
Year	At-sea	Shoreside	At-sea	Shoreside	All Sectors
1992	844.4	329.4	71.1	186.7	1,431.5
1993	585.1	195.5	45.7	170.3	996.6
1994	640.1	267.2	37.1	186.0	1,130.4
1995	784.7	349.3	46.0	212.1	1,392.1
1996	706.0	296.1	48.5	181.1	1,231.7
1997	706.3	293.2	30.2	200.9	1,230.5
1998	599.4	258.3	28.3	184.4	1,070.4
1999	639.0	325.3	43.0	209.5	1,216.7
2000	691.9	416.1	41.5	209.5	1,359.0
2001	877.6	464.5	31.0	167.1	1,540.1
2002	810.3	477.5	36.5	157.6	1,482.0
2003	848.8	534.0	39.8	148.5	1,571.1
2004	955.0	519.0	32.6	167.6	1,674.2
2005	1,128.4	625.9	36.6	211.9	2,002.8
2006	1,174.7	610.2	48.3	221.3	2,054.5
2007	1,204.7	614.8	46.2	226.4	2,092.0
2008	1,298.2	641.0	47.3	253.6	2,240.2
2009	978.2	498.3	41.1	194.1	1,711.7
2010	1,064.8	518.7	50.3	262.4	1,896.2
2011	1,447.4	656.1	69.0	339.2	2,511.7
2012	1,469.3	699.4	51.5	322.4	2,542.7
2013	1,221.6	629.7	36.3	292.9	2,180.5
2014	1,291.8	665.9	62.2	325.7	2,345.6

Notes: These estimates include the product value of catch from both federal and state of Alaska fisheries.

Source: NMFS Alaska Region At-sea and Shoreside Production Reports; and ADF&G Commercial Operators Annual Reports (COAR). Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 32: Gross product value of Alaska groundfish by catcher/processor category, vessel length, and area, 2010-2014, ($ millions).

		Bering Sea & Aleutian Islands			Gulf of Alaska	
	Year	125-165	<125	>165	<125	>=125
Fixed Gear	2010	80.3	44.0	44.9	7.5	11.4
	2011	117.7	58.3	62.2	11.7	11.8
	2012	111.1	64.8	57.2	6.9	6.2
	2013	84.6	42.5	51.4	*	6.3
	2014	100.3	47.2	66.2	3.0	10.2
Fillet Trawl	2010	-	-	*	-	-
	2011	-	-	79.6	-	-
	2014	-	-	*	-	-
Head And Gut Trawl	2010	48.9	33.7	207.9	7.6	23.8
	2011	64.4	47.9	287.9	8.4	37.1
	2012	74.2	48.4	307.1	9.3	28.4
	2013	48.7	33.1	244.1	8.7	18.8
	2014	48.6	26.1	262.1	*	35.8
Surimi Trawl	2010	-	-	479.5	-	-
	2011	-	-	595.0	-	-
	2012	-	-	684.8	-	-
	2013	-	-	627.6	-	-
	2014	-	-	590.3	-	-
All Trawl	2010	48.9	33.7	687.4	7.6	23.8
	2011	64.4	47.9	962.5	8.4	37.1
	2012	74.2	48.4	992.0	9.3	28.4
	2013	48.7	33.1	871.7	8.7	18.8
	2014	48.6	26.1	852.4	*	35.8

Notes: These estimates include the product value of catch from both federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region At-sea Production Reports; ADF&G Commercial Operators Annual Reports (COAR); and NMFS Alaska Region permit data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 33: Gross product value per vessel of Alaska groundfish by catcher/processor category, vessel length, and area 2010-2014, ($ millions).

		Bering Sea & Aleutian Islands			Gulf of Alaska	
	Year	125-165	<125	>165	<125	>=125
Fixed Gear	2010	4.7	2.9	4.5	0.8	1.0
	2011	7.8	4.2	7.8	1.5	1.1
	2012	7.4	5.0	6.4	1.0	0.8
	2013	5.6	3.5	5.7	*	0.9
	2014	6.3	5.2	7.4	0.7	1.1
Fillet Trawl	2010	-	-	*	-	-
	2011	-	-	26.5	-	-
	2014	-	-	*	-	-
Head And Gut Trawl	2010	12.2	6.7	18.9	2.5	1.7
	2011	16.1	9.6	24.0	2.1	2.9
	2012	18.6	9.7	23.6	2.3	2.2
	2013	12.2	11.0	18.8	2.9	1.7
	2014	12.2	8.7	20.2	*	4.0
Surimi Trawl	2010	-	-	36.9	-	-
	2011	-	-	49.6	-	-
	2012	-	-	48.9	-	-
	2013	-	-	44.8	-	-
	2014	-	-	45.4	-	-
All Trawl	2010	12.2	6.7	26.4	2.5	1.7
	2011	16.1	9.6	35.6	2.1	2.9
	2012	18.6	9.7	36.7	2.3	2.2
	2013	12.2	11.0	32.3	2.9	1.7
	2014	12.2	8.7	31.6	*	4.0

Notes: These estimates include the product value of catch from both federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region At-sea Production Reports; ADF&G Commercial Operators Annual Reports (COAR); and NMFS Alaska Region permit data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 34: Gross product value of groundfish processed by shoreside processors by processor group, 2010-2014, ($ millions).

Region	2010	2011	2012	2013	2014
Bering Sea Pollock	510.1	675.8	699.4	636.0	691.1
AK Peninsula/Aleutians	20.5	44.2	61.1	35.9	30.2
Kodiak	128.5	161.7	168.5	157.2	179.3
South Central	36.2	58.3	48.5	34.3	30.0
Southeastern	41.5	51.2	51.0	35.8	39.6
All Regions	736.9	991.1	1,028.6	899.2	970.2

Notes: See Table 35 for notes and source information.

Table 35: Groundfish gross product value as a percentage of all-species gross product value by shoreside processor group, 2010-2014, (percent).

Region	2010	2011	2012	2013	2014
Bering Sea Pollock	72.8	72.8	75.7	74.3	79.1
AK Peninsula/Aleutians	4.5	8.8	11.8	6.9	5.5
Kodiak	42.9	46.4	46.0	41.6	55.2
South Central	7.2	13.8	10.2	5.4	6.6
Southeastern	8.8	8.3	9.8	5.7	7.8
All Regions	30.3	35.2	36.7	29.8	-

Notes: The data are for catch from both federal and state of Alaska fisheries. The processor groups are defined as follows: ”Bering Sea Pollock” are the AFA inshore pollock processors including the two AFA floating processors. ”AK Peninsula/Aleutian” are other processors on the Alaska Peninsula or in the Aleutian Islands. ”Kodiak” are processors on Kodiak Island. ”South Central” are processors west of Yakutat and on the Kenai Peninsula. ”Southeastern” are processors located from Yakutat south.

Source: ADF&G Commercial Operators Annual Reports (COAR); and ADF&G Intent to Operate (ITO) file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 36: Number of groundfish vessels that caught or caught and processed more than $20.5 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2013.

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Gear	Catcher Vessels	Catcher Processors	All Vessels	Catcher Vessels	Catcher Processors	All Vessels	Catcher Vessels	Catcher Processors	All Vessels
2013	Hook & Line	1	-	1	-	1	1	1	1	2
	Pot	-	-	-	1	1	2	1	1	2
	Trawl	-	10	10	1	27	28	1	27	28
	All Gear	1	10	11	2	29	31	3	29	32
2014	Hook & Line	-	-	-	-	1	1	-	1	1
	Pot	-	-	-	-	1	1	-	1	1
	Trawl	-	7	7	1	25	26	1	25	26
	All Gear	-	7	7	1	27	28	1	27	28

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel was below the $20.5 million threshold was based on total revenue from catching or processing all species, not just groundfish. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR); ADF&G Intent to Operate (ITO) file; NMFS Alaska Region At-sea Production Reports; CFEC gross earnings (fish tickets) file; NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region permit data; and AKFIN West Coast whiting revenue data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 37a: Number of groundfish vessels that caught or caught and processed less than $20.5 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2013.

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Gear	Catcher Vessels	Catcher Processors	All Vessels	Catcher Vessels	Catcher Processors	All Vessels	Catcher Vessels	Catcher Processors	All Vessels
2013	Hook & Line	819	10	829	125	32	157	882	34	916
	Pot	128	-	128	58	2	60	163	2	165
	Trawl	70	4	74	101	7	108	142	8	150
	All Gear	939	14	953	271	41	312	1,101	44	1,145
2014	Hook & Line	859	13	872	156	30	186	955	33	988
	Pot	102	-	102	54	3	57	148	3	151
	Trawl	71	4	75	99	9	108	145	10	155
	All Gear	962	17	979	299	41	340	1,167	45	1,212

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel was below the $20.5 million threshold was based on total revenue from catching or processing all species, not just groundfish. “*” indicates a confidential value; “-” indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR); ADF&G Intent to Operate (ITO) file; NMFS Alaska Region At-sea Production Reports; CFEC gross earnings (fish tickets) file; NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region permit data; and AKFIN West Coast whiting revenue data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 37b: Number of groundfish vessels that caught or caught and processed less than $20.5 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2013; entity size based on vessel revenues and affiliated group revenues.

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Gear	Catcher Vessels	Catcher Processors	All Vessels	Catcher Vessels	Catcher Processors	All Vessels	Catcher Vessels	Catcher Processors	All Vessels
2013	Hook & Line	813	2	815	124	3	127	876	5	881
	Pot	124	-	124	32	1	33	135	1	136
	Trawl	33	1	34	18	-	18	42	1	43
	All Gear	894	3	897	162	4	166	970	7	977
2014	Hook & Line	853	3	856	154	1	155	949	4	953
	Pot	97	-	97	26	1	27	115	1	116
	Trawl	34	1	35	16	-	16	44	1	45
	All Gear	915	4	919	187	2	189	1,030	6	1,036

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $20.5 million threshold is based on the vessel's total revenue from catching or processing all species, not just groundfish. Entity size determination is additionally based on total vessel revenues of known affiliated groups (Amendment 80, AFA pollock, Central Gulf of Alaska rockfish, BSAI crab, and freezer longline cooperatives, as well as known corporate affiliations), whereby group revenue totaling over $20.5 million confers large entity status on all member vessels. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR); ADF&G Intent to Operate (ITO) file; NMFS Alaska Region At-sea Production Reports; CFEC gross earnings (fish tickets) file; NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region permit data; and AKFIN West Coast whiting revenue data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 38: Average revenue of groundfish vessels that caught or caught and processed more than $20.5 million ex-vessel value or product value of groundfish and other species, by area, vessel type, and gear, 2013, ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2013	Hook & Line	*	-	-	*	*	*
	Pot	-	-	*	*	*	*
	Trawl	-	23.89	*	40.49	*	40.49
2014	Hook & Line	-	-	-	*	-	*
	Pot	-	-	-	*	-	*
	Trawl	-	27.14	*	44.31	*	44.31

Notes: Includes only vessels that fished part of federal groundfish TACs. Categories with fewer than four vessels are not reported. Averages are obtained by adding the total revenues, across all areas and gear types, of all the vessels in the category, and dividing that sum by the number of vessels in the category. Averages include revenue realized from catching or processing all species, not just groundfish. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR); ADF&G Intent to Operate (ITO) file; NMFS Alaska Region At-sea Production Reports; CFEC gross earnings (fish tickets) file; NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region permit data; and AKFIN West Coast whiting revenue data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 39a: Average revenue of groundfish vessels that caught or caught and processed less than $20.5 million ex-vessel value or product value of groundfish and other species, by area, vessel type and gear, 2013, ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2013	Hook & Line	0.45	7.98	0.70	7.92	0.43	7.59
	Pot	0.87	-	2.12	*	1.22	*
	Trawl	1.67	12.23	2.99	15.81	2.54	14.48
2014	Hook & Line	0.38	7.24	0.46	8.30	0.35	7.77
	Pot	0.74	-	2.08	*	1.20	*
	Trawl	1.64	13.81	2.92	16.96	2.41	15.78

Notes: Includes only vessels that fished part of federal groundfish TACs. Categories with fewer than four vessels are not reported. Averages are obtained by adding the total revenues, across all areas and gear types, of all the vessels in the category, and dividing that sum by the number of vessels in the category. Averages include revenue realized from catching or processing all species, not just groundfish. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR); ADF&G Intent to Operate (ITO) file; NMFS Alaska Region At-sea Production Reports; CFEC gross earnings (fish tickets) file; NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region permit data; and AKFIN West Coast whiting revenue data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 39b: Average revenue of groundfish vessels that caught or caught and processed less than $20.5 million ex-vessel value or product value of groundfish and other species, by area, vessel type and gear, 2013, ($ millions); entity size based on vessel revenues and affiliated group revenues.

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2013	Hook & Line	0.48	*	0.80	*	0.46	*
	Pot	0.99	-	1.28	*	1.01	*
	Trawl	2.79	*	3.64	-	2.67	*
2014	Hook & Line	0.40	*	0.53	*	0.38	*
	Pot	0.74	-	1.63	*	0.85	*
	Trawl	2.51	*	3.30	-	2.42	*

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $20.5 million threshold is based on the vessel's total revenue from catching or processing all species, not just groundfish. Categories with fewer than four vessels are not reported. Averages are obtained by adding the total revenues, across all areas and gear types, of all the vessels in the category, and dividing that sum by the number of vessels in the category. Entity size determination is additionally based on total vessel revenues of known affiliated groups (Amendment 80, AFA pollock, Central Gulf of Alaska rockfish, BSAI crab, and freezer longline cooperatives, as well as known corporate affiliations), whereby group revenue totaling over $20.5 million confers large entity status on all member vessels. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Reports (COAR); ADF&G Intent to Operate (ITO) file; NMFS Alaska Region At-sea Production Reports; CFEC gross earnings (fish tickets) file; NMFS Alaska Region Blend and Catch-accounting System estimates; NMFS Alaska Region permit data; and AKFIN West Coast whiting revenue data. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 40: Number and total registered net tons of vessels that caught groundfish off Alaska by area and gear, 2007-2014.

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Number Of Vessels	Registered Net Tons	Number Of Vessels	Registered Net Tons	Number Of Vessels	Registered Net Tons
Hook & Line	2007	627	24,022	85	14,035	656	30,646
	2008	668	24,199	107	15,103	711	31,585
	2009	609	22,636	77	13,862	643	29,454
	2010	633	22,215	72	12,427	657	28,138
	2011	716	23,380	78	11,088	747	28,645
	2012	726	21,638	68	10,686	764	28,688
	2013	516	17,206	67	11,019	560	24,949
	2014	550	19,188	52	10,450	581	25,214
Pot	2007	138	8,330	73	8,381	187	14,871
	2008	149	8,670	72	8,355	194	14,639
	2009	126	7,098	55	6,426	165	12,200
	2010	115	6,639	54	6,737	152	11,820
	2011	146	7,943	58	7,082	186	13,243
	2012	146	7,812	57	6,874	185	13,162
	2013	128	7,134	62	7,084	167	12,364
	2014	102	5,767	58	7,183	152	12,194
Trawl	2007	88	12,326	152	53,000	190	55,971
	2008	88	13,394	150	53,979	193	57,403
	2009	90	14,102	146	47,911	186	51,237
	2010	85	13,769	138	49,024	178	52,399
	2011	86	13,753	141	49,893	178	52,885
	2012	88	14,002	146	50,661	183	53,771
	2013	84	12,274	136	49,540	178	52,903
	2014	82	10,967	134	49,404	181	53,202
All Gear	2007	809	41,592	304	74,990	985	98,079
	2008	857	43,111	315	76,277	1,037	99,361
	2009	779	41,152	270	67,433	939	89,320
	2010	791	39,969	259	67,467	941	89,083
	2011	885	41,678	272	67,486	1,040	90,551
	2012	904	40,191	264	67,531	1,069	91,727
	2013	689	34,051	260	67,359	861	87,292
	2014	695	33,516	241	66,709	867	87,482

Notes: These estimates include only vessels fishing federal TACs. Registered net tons totals exclude mainly smaller vessels for which data were unavailable. Annually percentage of vessels missing is between 1-2%.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 41: Number of vessels that caught groundfish off Alaska by area, vessel category, gear and target, 2010-2014.

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total
Hook & Line	Sablefish	2010	301	9	310	19	10	29	309	14	323
		2011	299	9	308	24	9	33	313	13	326
		2012	297	7	304	25	5	30	311	10	321
		2013	265	7	272	18	6	24	274	11	285
		2014	263	6	269	13	5	18	269	9	278
	Pacific Cod	2010	233	19	252	16	36	52	239	39	278
		2011	323	15	338	20	31	51	331	35	366
		2012	320	9	329	13	32	45	327	35	362
		2013	181	5	186	19	29	48	197	30	227
		2014	203	10	213	8	29	37	210	31	241
	Flatfish	2010	-	-	-	-	12	12	-	12	12
		2011	-	-	-	-	8	8	-	8	8
		2012	-	-	-	-	7	7	-	7	7
		2013	-	-	-	-	4	4	-	4	4
		2014	-	-	-	-	3	3	-	3	3
	Rockfish	2010	144	-	144	-	3	3	144	3	147
		2011	150	-	150	1	-	1	150	-	150
		2012	174	-	174	-	2	2	174	2	176
		2013	143	-	143	1	3	4	144	3	147
		2014	144	-	144	1	2	3	145	2	147
	All Groundfish	2010	611	22	633	33	39	72	617	40	657
		2011	697	19	716	43	35	78	710	37	747
		2012	711	15	726	34	34	68	726	38	764
		2013	506	10	516	34	33	67	525	35	560
		2014	537	13	550	21	31	52	547	34	581

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Table 41: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total	Catcher Vessels	Catcher Processors	Total
Pot	Pacific Cod	2010	115	-	115	44	6	50	142	6	148
		2011	144	1	145	47	5	52	174	5	179
		2012	144	1	145	49	5	54	176	5	181
		2013	128	-	128	56	3	59	161	3	164
		2014	100	-	100	51	4	55	143	4	147
Trawl	Pollock	2010	63	-	63	90	29	119	134	29	163
		2011	62	3	65	86	31	117	129	31	160
		2012	67	1	68	90	32	122	135	32	167
		2013	64	3	67	88	32	120	133	33	166
		2014	68	2	70	89	34	123	138	34	172
	Sablefish	2010	13	1	14	-	-	-	13	1	14
		2011	14	-	14	-	-	-	14	-	14
		2012	12	-	12	-	-	-	12	-	12
		2013	17	-	17	-	2	2	17	2	19
		2014	12	1	13	-	1	1	12	2	14
	Pacific Cod	2010	52	1	53	48	18	66	90	19	109
		2011	52	1	53	50	16	66	86	16	102
		2012	61	3	64	60	18	78	101	18	119
		2013	54	1	55	54	18	72	95	18	113
		2014	55	-	55	50	14	64	97	14	111
	Flatfish	2010	28	6	34	-	29	29	28	30	58
		2011	31	6	37	3	30	33	33	31	64
		2012	32	5	37	4	30	34	36	31	67
		2013	31	5	36	7	27	34	38	28	66
		2014	27	6	33	4	28	32	31	29	60

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Table 41: Continued

		Year	Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
			Catcher Vessels	Catcher Proces-sors	Total	Catcher Vessels	Catcher Proces-sors	Total	Catcher Vessels	Catcher Proces-sors	Total
Trawl	Rockfish	2010	28	15	43	2	15	17	30	19	49
		2011	26	12	38	2	16	18	28	18	46
		2012	31	16	47	2	17	19	33	20	53
		2013	30	13	43	1	16	17	31	19	50
		2014	29	9	38	3	17	20	32	19	51
	Atka Mackerel	2010	-	1	1	2	7	9	2	8	10
		2011	-	1	1	5	9	14	5	9	14
		2012	-	-	-	3	11	14	3	11	14
		2013	-	2	2	3	10	13	3	11	14
		2014	-	-	-	3	8	11	3	8	11
	All Groundfish	2010	68	17	85	103	35	138	142	36	178
		2011	69	17	86	105	36	141	141	37	178
		2012	71	17	88	110	36	146	146	37	183
		2013	70	14	84	102	34	136	143	35	178
		2014	71	11	82	100	34	134	146	35	181
All Gear	All Groundfish	2010	752	39	791	182	77	259	862	79	941
		2011	848	37	885	199	73	272	964	76	1,040
		2012	871	33	904	191	73	264	991	78	1,069
		2013	665	24	689	190	70	260	788	73	861
		2014	671	24	695	173	68	241	795	72	867

Notes: The target is determined based on vessel, week, catching mode, NMFS area, and gear. These estimates include only vessels that fished part of federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 42: Number of vessels, mean length and mean net tonnage for vessels that caught groundfish off Alaska by area, vessel-length class (feet), and gear, 2009-2013, (excluding catcher-processors).

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Number of vessels	Hook & Line	2009	532	54	-	31	6	-	544	56	-
		2010	556	52	-	28	5	-	561	53	-
		2011	641	52	-	38	5	-	652	54	-
		2012	659	47	-	33	1	-	673	48	-
		2013	467	39	-	31	2	-	484	40	-
	Pot	2009	99	25	-	19	24	8	107	45	8
		2010	90	24	1	14	25	9	95	42	9
		2011	119	26	-	15	31	7	125	49	7
		2012	122	23	-	20	24	8	128	44	8
		2013	106	22	-	25	26	8	113	43	8
	Trawl	2009	28	44	-	7	75	28	28	93	28
		2010	25	43	-	5	70	28	26	88	28
		2011	23	45	-	1	76	28	23	89	28
		2012	23	47	-	6	74	30	24	91	30
		2013	25	44	-	2	71	29	25	88	29
Mean vessel length (feet)	Hook & Line	2009	44	72	-	48	83	-	45	73	-
		2010	44	72	-	47	77	-	45	72	-
		2011	43	74	-	47	78	-	44	74	-
		2012	44	73	-	48	98	-	44	73	-
		2013	45	73	-	44	82	-	45	73	-
	Pot	2009	54	87	-	56	105	134	54	96	134
		2010	54	91	133	56	105	134	55	98	134
		2011	53	92	-	57	108	136	54	101	136
		2012	54	91	-	57	108	135	54	100	135
		2013	54	90	-	56	109	136	54	101	136

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Table 42: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Mean vessel length (feet)	Trawl	2009	58	94	-	58	107	155	58	102	155
		2010	58	93	-	58	106	155	58	101	155
		2011	58	93	-	58	105	155	58	101	155
		2012	58	94	-	56	106	157	57	101	157
		2013	58	94	-	58	107	156	58	102	156
Mean Registered net tons	Hook & Line	2009	26	60	-	36	96	-	26	63	-
		2010	25	62	-	36	87	-	26	64	-
		2011	25	65	-	32	100	-	25	68	-
		2012	24	66	-	36	156	-	25	68	-
		2013	26	60	-	33	102	-	27	62	-
	Pot	2009	46	92	-	61	126	128	48	109	128
		2010	47	96	97	66	115	145	49	106	140
		2011	44	100	-	67	118	149	46	110	149
		2012	45	101	-	68	123	147	48	112	147
		2013	47	97	-	67	119	147	51	109	147
	Trawl	2009	65	103	-	67	115	238	65	111	238
		2010	69	103	-	67	116	238	69	111	238
		2011	69	101	-	75	114	238	69	109	238
		2012	69	102	-	59	114	244	67	110	244
		2013	67	100	-	62	115	241	67	109	241

Notes: If the permit files do not report a length for a vessel, the vessel is counted in the ”less than 60 feet” class. These estimates include only vessels that fished part of federal TACs. “*” indicates a confidential value; “-” indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 43: Number of smaller hook-and-line vessels that caught groundfish off Alaska, by area and vessel-length class (feet), 2010-2014(excluding catcher-processors).

		Year	<26	26-29	30-34	35-39	40-44	45-49	50-54	55-60	>=60
Number of vessels	Gulf of Alaska	2010	18	11	72	73	110	93	59	123	52
		2011	32	17	91	85	124	103	67	126	52
		2012	25	18	91	90	136	107	71	126	47
		2013	14	6	57	50	101	76	60	103	39
		2014	20	8	54	65	102	77	65	107	39
	Bering Sea & Aleutian Islands	2010	1	-	3	4	2	4	4	10	5
		2011	1	-	5	5	3	6	6	12	5
		2012	-	-	3	6	3	5	4	12	1
		2013	2	3	5	3	1	4	3	11	2
		2014	1	-	2	2	1	3	3	6	3
	All Alaska	2010	18	11	72	75	110	94	59	125	53
		2011	33	17	92	88	124	103	68	131	54
		2012	25	18	92	94	137	108	72	132	48
		2013	16	9	59	52	101	77	61	110	40
		2014	21	8	55	65	102	79	66	111	40

Notes: If the permit files do not report a length for a vessel, the vessel is counted in the "<26" class. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 44: Number of vessels, mean length and mean net tonnage for vessels that caught and processed groundfish off Alaska by area, vessel-length class (feet), and gear, 2010-2014.

			Gulf of Alaska					Bering Sea & Aleutian Islands					All Alaska				
		Year	<125	125-165	166-235	236-260	>260	<125	125-165	166-235	236-260	>260	<125	125-165	166-235	236-260	>260
Number of vessels	Hook & Line	2010	11	6	5	-	-	14	16	9	-	-	15	16	9	-	-
		2011	9	5	5	-	-	14	14	7	-	-	16	14	7	-	-
		2012	8	5	2	-	-	12	14	8	-	-	16	14	8	-	-
		2013	2	5	3	-	-	12	13	8	-	-	14	13	8	-	-
		2014	4	5	4	-	-	9	14	8	-	-	12	14	8	-	-
	Pot	2010	-	-	-	-	-	3	2	1	-	-	3	2	1	-	-
		2011	-	1	-	-	-	2	2	1	-	-	2	2	1	-	-
		2012	-	1	-	-	-	2	2	1	-	-	2	2	1	-	-
		2013	-	-	-	-	-	-	2	1	-	-	-	2	1	-	-
		2014	-	-	-	-	-	1	2	1	-	-	1	2	1	-	-
	Trawl	2010	3	3	9	1	1	5	4	9	3	14	6	4	9	3	14
		2011	4	2	9	1	1	5	4	10	3	14	6	4	10	3	14
		2012	4	2	9	1	1	5	4	10	3	14	6	4	10	3	14
		2013	3	2	8	1	-	3	4	10	3	14	4	4	10	3	14
		2014	2	3	5	1	-	3	4	10	3	14	4	4	10	3	14
Mean vessel length (feet)	Hook & Line	2010	100	140	176	-	-	106	144	176	-	-	103	143	176	-	-
		2011	94	136	176	-	-	107	144	175	-	-	102	142	176	-	-
		2012	90	136	177	-	-	108	144	176	-	-	101	142	176	-	-
		2013	68	141	175	-	-	114	142	177	-	-	107	142	177	-	-
		2014	76	139	176	-	-	113	142	177	-	-	101	141	177	-	-
	Pot	2010	-	-	-	-	-	112	165	166	-	-	112	165	166	-	-
		2011	-	165	-	-	-	101	165	166	-	-	101	165	166	-	-
		2012	-	165	-	-	-	114	165	166	-	-	114	165	166	-	-
		2013	-	-	-	-	-	-	165	166	-	-	-	165	166	-	-
		2014	-	-	-	-	-	124	165	166	-	-	124	165	166	-	-

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Table 44: Continued

			Gulf of Alaska					Bering Sea & Aleutian Islands					All Alaska				
		Year	<125	125-165	166-235	236-260	>260	<125	125-165	166-235	236-260	>260	<125	125-165	166-235	236-260	>260
Mean vessel length (feet)	Trawl	2010	112	144	204	238	295	115	148	204	245	306	114	146	204	243	305
		2011	111	146	204	238	295	116	148	204	245	306	114	147	204	243	305
		2012	115	150	204	238	295	116	148	204	245	306	115	148	204	243	305
		2013	117	146	201	238	-	122	148	204	245	306	120	147	202	243	306
		2014	114	144	207	238	-	122	148	204	245	306	119	146	205	243	306
Mean Registered net tons	Hook & Line	2010	121	225	562	-	-	127	312	471	-	-	124	288	504	-	-
		2011	100	242	562	-	-	121	294	513	-	-	113	281	534	-	-
		2012	96	241	652	-	-	117	294	478	-	-	108	280	513	-	-
		2013	114	232	533	-	-	126	307	546	-	-	124	286	543	-	-
		2014	105	232	696	-	-	112	295	546	-	-	110	278	596	-	-
	Pot	2010	-	-	-	-	-	169	461	192	-	-	169	461	192	-	-
		2011	-	128	-	-	-	123	461	192	-	-	123	350	192	-	-
		2012	-	128	-	-	-	123	461	192	-	-	123	350	192	-	-
		2013	-	-	-	-	-	-	461	192	-	-	-	461	192	-	-
		2014	-	-	-	-	-	135	461	192	-	-	135	461	192	-	-
	Trawl	2010	121	214	584	611	693	138	254	584	985	1,713	132	237	584	892	1,645
		2011	125	256	584	611	693	134	254	588	985	1,713	130	254	586	892	1,645
		2012	123	255	584	611	693	134	254	588	985	1,713	129	254	586	892	1,645
		2013	119	256	584	611	-	133	254	588	985	1,713	126	254	586	892	1,713
		2014	113	214	661	611	-	133	254	588	985	1,713	125	237	612	892	1,713

Notes: If the permit files do not report a length for a vessel, the vessel is counted in the "less than 125 feet" class. These estimates include only vessels that fished part of federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 45: Number of vessels that caught groundfish off Alaska by area, tonnage caught, and gear, 2007-2014.

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Year	<2 MT	2-25MT	>25MT	<2 MT	2-25MT	>25MT	<2 MT	2-25MT	>25MT
Hook & Line	2007	211	165	250	20	15	50	229	178	275
	2008	217	209	242	21	26	60	238	232	271
	2009	172	197	240	6	13	58	178	208	270
	2010	179	188	266	3	16	53	182	202	291
	2011	205	233	278	5	22	51	210	249	309
	2012	197	222	307	8	14	46	204	235	339
	2013	133	142	241	11	8	48	144	150	278
	2014	154	139	257	7	6	39	161	145	286
Pot	2007	9	14	115	3	4	66	11	18	166
	2008	8	26	115	4	2	66	12	28	160
	2009	12	23	91	1	5	49	13	28	127
	2010	8	6	101	-	5	49	8	11	133
	2011	35	9	102	1	1	56	36	10	143
	2012	18	20	108	-	-	57	18	20	150
	2013	7	18	103	2	3	57	9	21	140
	2014	5	8	89	-	4	54	5	12	136
Trawl	2007	1	1	86	-	1	151	1	2	189
	2008	1	1	86	-	3	147	1	4	192
	2009	2	2	86	-	1	145	2	3	183
	2010	1	-	84	1	-	137	2	-	176
	2011	1	5	80	-	1	140	1	6	173
	2012	1	1	86	-	5	141	1	6	182
	2013	1	1	82	-	2	134	1	3	176
	2014	2	-	80	-	1	133	2	1	179
All Gear	2007	221	179	424	23	20	265	241	196	600
	2008	226	234	414	24	30	270	250	261	588
	2009	186	218	392	6	19	247	192	235	548
	2010	188	193	423	4	21	235	192	212	570
	2011	239	243	434	6	24	242	245	261	592
	2012	216	238	473	8	19	239	223	256	637
	2013	141	161	397	12	13	237	153	174	561
	2014	161	146	397	7	11	223	168	157	567

Notes: These estimates include only vessels fishing part of federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 46: Number of vessels that caught groundfish off Alaska by area, residency, gear, and target,2010-2014.

			Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
		Year	Alaska	Other	Alaska	Other	Alaska	Other
Hook & Line	Pollock	2010	1	-	-	-	1	-
		2011	5	-	1	-	6	-
		2012	1	-	-	-	1	-
		2013	4	-	-	2	4	2
		2014	2	-	-	-	2	-
	Sablefish	2010	223	87	16	13	229	94
		2011	221	87	19	14	233	93
		2012	219	85	19	11	230	91
		2013	195	77	13	11	201	84
		2014	194	75	10	8	199	79
	Pacific Cod	2010	221	31	22	30	229	49
		2011	299	39	26	25	308	58
		2012	304	25	21	24	316	46
		2013	167	19	25	23	190	37
		2014	194	19	15	22	206	35
	Flatfish	2010	-	-	2	10	2	10
		2011	-	-	2	6	2	6
		2012	-	-	-	7	-	7
		2013	-	-	-	4	-	4
		2014	-	-	-	3	-	3
	Rockfish	2010	126	18	-	3	126	21
		2011	133	17	1	-	133	17
		2012	156	18	-	2	156	20
		2013	130	13	1	3	131	16
		2014	129	15	2	1	131	16
	All Groundfish	2010	509	124	38	34	516	141
		2011	581	135	43	35	592	155
		2012	605	121	37	31	623	141
		2013	415	101	36	31	438	122
		2014	450	100	24	28	464	117
Pot	Pacific Cod	2010	96	19	21	29	105	43
		2011	124	21	19	33	132	47
		2012	124	21	21	33	133	48
		2013	109	19	23	36	117	47
		2014	86	14	24	31	105	42
Trawl	Pollock	2010	30	33	14	105	38	125
		2011	26	39	9	108	30	130
		2012	27	41	8	114	30	137
		2013	26	41	9	111	30	136
		2014	31	39	9	114	35	137

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Table 46: Continued

		Year	Gulf of Alaska: Alaska	Gulf of Alaska: Other	Bering Sea & Aleutian Islands: Alaska	Bering Sea & Aleutian Islands: Other	All Alaska: Alaska	All Alaska: Other
Trawl	Sablefish	2010	5	9	-	-	5	9
		2011	7	7	-	-	7	7
		2012	5	7	-	-	5	7
		2013	6	11	-	2	6	13
		2014	6	7	-	1	6	8
	Pacific Cod	2010	25	28	5	61	28	81
		2011	19	34	8	58	21	81
		2012	26	38	9	69	28	91
		2013	26	29	6	66	27	86
		2014	29	26	3	61	30	81
	Flatfish	2010	16	18	8	21	23	35
		2011	13	24	3	30	16	48
		2012	12	25	2	32	14	53
		2013	13	23	1	33	14	52
		2014	12	21	3	29	15	45
	Rockfish	2010	19	24	3	14	20	29
		2011	13	25	1	17	14	32
		2012	15	32	-	19	15	38
		2013	15	28	1	16	16	34
		2014	14	24	1	19	15	36
	Atka Mackerel	2010	-	1	-	9	-	10
		2011	-	1	-	14	-	14
		2012	-	-	-	14	-	14
		2013	-	2	-	13	-	14
		2014	-	-	-	11	-	11
	All Groundfish	2010	36	49	15	123	40	138
		2011	28	58	11	130	32	146
		2012	29	59	11	135	33	150
		2013	30	54	10	126	34	144
		2014	33	49	9	125	37	144
All Gear	All Groundfish	2010	610	181	75	184	632	309
		2011	683	202	75	197	706	334
		2012	713	191	67	197	743	326
		2013	526	163	70	190	561	300
		2014	541	154	58	183	574	293

Notes: The target is determined based on vessel, week, processing mode, NMFS area, and gear. Vessels are classified by the residency of the owner of the fishing vessel. These estimates include only vessels fishing part of federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 47: Number of vessels that caught groundfish off Alaska by month, area, vessel type, and gear, 2010-2014.

			Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	Catcher Vessels	Hook & Line	2010	87	97	131	224	288	150	142	142	178	87	32	16	611
			2011	90	104	192	334	202	148	137	109	187	149	35	61	697
			2012	89	129	247	335	337	204	134	148	190	137	66	42	711
			2013	61	91	167	247	231	197	109	116	97	117	69	40	506
			2014	58	96	191	233	285	135	102	121	127	96	74	46	537
		Pot	2010	69	93	61	23	2	1	-	-	45	27	2	2	115
			2011	72	110	81	-	1	-	-	1	56	53	4	25	145
			2012	64	91	132	1	1	-	-	-	42	40	27	19	145
			2013	75	73	102	23	-	-	-	-	14	16	13	12	128
			2014	57	40	87	7	2	-	-	3	38	39	22	11	102
		Trawl	2010	52	59	48	38	27	18	15	37	53	50	14	3	68
			2011	39	44	51	33	19	15	9	23	50	54	9	1	69
			2012	33	58	54	36	20	18	13	23	59	57	23	6	71
			2013	39	52	58	19	23	18	9	40	42	48	19	2	70
			2014	41	63	61	51	25	20	12	47	59	52	23	4	71
		All Gear	2010	206	240	231	284	317	169	157	178	269	158	48	21	752
			2011	199	255	308	365	222	163	146	133	291	254	48	87	848
			2012	186	271	413	370	358	222	147	170	291	231	114	67	871
			2013	173	212	317	287	254	215	118	156	153	180	101	54	665
			2014	147	199	326	290	312	155	114	171	218	184	119	61	671
	Catcher Processors	Hook & Line	2010	3	17	5	3	4	3	2	3	11	6	-	-	22
			2011	10	8	1	5	4	2	2	2	6	5	2	3	19
			2012	7	4	4	7	4	3	2	1	2	4	2	1	15
			2013	1	2	3	4	3	6	4	2	1	-	2	1	10
			2014	1	6	8	5	3	2	1	1	3	3	3	1	13
		Pot	2011	1	1	-	-	-	-	-	-	-	-	-	-	1
			2012	1	-	-	-	-	-	-	-	-	-	-	-	1
		Trawl	2010	-	1	4	5	2	-	16	1	1	2	2	2	17
			2011	-	1	3	6	1	4	14	3	2	3	2	-	17
			2012	2	1	-	5	1	1	17	6	1	2	1	1	17
			2013	-	1	3	3	2	4	13	3	1	2	4	2	14
			2014	-	-	1	5	4	3	7	6	3	7	5	1	11
		All Gear	2010	3	18	9	8	6	3	18	4	12	8	2	2	39
			2011	11	10	4	11	5	6	16	5	8	8	4	3	37
			2012	10	5	4	12	5	4	19	7	3	6	3	2	33
			2013	1	3	6	7	5	10	17	5	2	2	6	3	24
			2014	1	6	9	10	7	5	8	7	6	10	8	2	24

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Table 47: Continued

			Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Bering Sea & Aleutian Islands	Catcher Vessels	Hook & Line	2010	2	4	2	2	9	13	15	14	16	6	4	-	33
			2011	5	5	4	5	12	15	22	20	17	10	3	-	43
			2012	3	4	4	3	11	15	18	14	13	7	4	-	34
			2013	5	3	5	5	5	15	12	12	11	5	5	2	34
			2014	5	4	5	6	5	7	10	8	9	7	4	2	21
		Pot	2010	28	9	15	5	5	4	3	2	11	18	12	-	48
			2011	35	12	16	6	9	6	3	4	29	32	3	-	53
			2012	38	18	9	9	5	5	3	1	22	19	5	8	52
			2013	41	23	10	12	3	3	2	2	9	16	9	21	59
			2014	41	21	18	19	14	1	1	1	14	13	11	12	54
		Trawl	2010	47	89	99	65	-	59	67	66	33	16	-	-	103
			2011	53	94	91	81	1	69	72	70	58	52	11	-	105
			2012	66	88	101	56	2	71	74	76	60	29	16	-	110
			2013	78	91	94	61	3	71	74	69	43	16	4	-	102
			2014	42	81	81	65	2	71	72	71	55	4	1	-	100
		All Gear	2010	77	102	116	72	14	76	85	82	60	40	16	-	182
			2011	93	111	111	92	21	90	97	94	104	94	17	-	199
			2012	107	110	114	68	18	91	95	91	95	55	25	8	191
			2013	124	117	109	78	11	89	88	83	63	37	17	23	190
			2014	88	106	104	90	21	79	83	80	78	24	14	14	173
	Catcher Processors	Hook & Line	2010	36	36	13	7	8	9	15	25	27	28	26	20	39
			2011	23	27	29	24	15	15	23	27	30	31	28	24	35
			2012	24	27	29	25	14	22	30	30	31	28	27	29	34
			2013	26	26	25	18	13	13	21	28	27	29	28	26	33
			2014	26	26	28	25	18	20	26	25	25	27	27	24	31
		Pot	2010	2	3	2	3	3	3	-	2	4	3	2	1	6
			2011	5	-	1	2	1	-	-	-	2	3	1	1	5
			2012	5	2	1	1	1	1	1	1	3	3	3	-	5
			2013	3	2	-	-	-	-	-	-	3	3	3	2	3
			2014	4	4	2	1	1	-	-	-	3	3	3	1	4
		Trawl	2010	28	33	32	22	19	24	28	29	25	20	12	2	35
			2011	27	34	33	31	21	32	32	31	33	32	25	6	36
			2012	28	33	33	19	20	33	28	30	33	20	14	4	36
			2013	28	31	32	25	19	33	28	32	31	24	13	6	34
			2014	30	34	34	21	19	31	29	30	28	18	14	4	34
		All Gear	2010	66	71	47	32	30	36	43	56	56	51	40	23	77
			2011	55	61	63	57	37	47	55	58	65	65	54	31	73
			2012	57	62	63	45	35	56	59	61	67	51	44	33	73
			2013	57	59	57	43	32	46	49	60	61	56	44	34	70
			2014	60	64	64	47	38	51	55	55	56	48	44	29	68

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Table 47: Continued

			Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
All Alaska	Catcher Vessels	Hook & Line	2010	89	99	133	225	295	162	152	155	188	91	36	16	617
			2011	93	107	196	339	213	161	155	128	198	157	38	61	710
			2012	91	133	251	338	346	215	150	159	202	144	70	42	726
			2013	66	94	172	252	236	210	118	127	107	122	73	42	525
			2014	63	100	196	239	290	141	110	129	134	103	78	48	547
		Pot	2010	95	99	73	28	7	5	3	2	56	43	14	2	146
			2011	101	118	92	6	10	6	3	5	84	85	7	25	181
			2012	99	105	140	10	6	5	3	1	63	57	31	27	180
			2013	112	89	112	35	3	3	2	2	23	31	22	33	164
			2014	98	61	105	26	16	1	1	4	51	52	33	23	148
		Trawl	2010	99	135	134	97	27	72	79	99	86	64	14	3	142
			2011	92	124	134	110	20	77	79	91	106	105	20	1	141
			2012	99	140	138	88	22	84	86	98	114	85	39	6	146
			2013	117	136	136	77	26	83	81	97	81	61	23	2	143
			2014	83	139	137	108	27	86	81	111	108	56	24	4	146
		All Gear	2010	281	324	331	349	329	239	234	255	323	192	64	21	862
			2011	284	346	406	453	242	244	237	224	386	345	65	87	964
			2012	289	371	509	434	373	304	239	257	379	282	138	75	991
			2013	293	315	410	362	265	296	201	226	210	213	117	77	788
			2014	234	300	425	370	332	228	192	244	287	208	133	75	795
	Catcher Processors	Hook & Line	2010	38	38	17	8	11	10	16	27	32	31	26	20	40
			2011	29	31	29	26	17	17	25	28	34	33	28	25	37
			2012	27	29	31	29	17	24	31	31	33	31	29	30	38
			2013	27	27	27	20	15	19	23	29	28	29	29	27	35
			2014	27	28	29	26	20	22	27	26	27	28	28	25	34
		Pot	2010	2	3	2	3	3	3	-	2	4	3	2	1	6
			2011	5	1	1	2	1	-	-	-	2	3	1	1	5
			2012	5	2	1	1	1	1	1	1	3	3	3	-	5
			2013	3	2	-	-	-	-	-	-	3	3	3	2	3
			2014	4	4	2	1	1	-	-	-	3	3	3	1	4
		Trawl	2010	28	34	33	25	20	24	31	30	26	21	13	4	36
			2011	27	35	34	34	22	33	35	33	34	33	27	6	37
			2012	29	33	33	20	21	34	34	33	33	21	15	5	37
			2013	28	32	33	27	20	34	30	33	32	25	14	7	35
			2014	30	34	35	23	21	32	34	34	30	20	17	5	35
		All Gear	2010	68	74	52	36	34	37	47	59	62	55	41	25	79
			2011	61	66	64	62	40	50	60	61	70	68	56	32	76
			2012	61	64	65	50	39	59	66	65	69	55	47	35	78
			2013	58	61	60	47	35	53	53	62	63	57	46	36	73
			2014	61	66	66	50	42	54	61	60	60	51	48	31	72

Notes: These estimates include only vessels fishing part of federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 48: Catcher vessel (excluding catcher-processors) weeks of fishing groundfish off Alaska by area, vessel-length class (feet), gear, and target, 2010-2014.

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Hook & Line	Sablefish	2010	1,027	270	-	94	26	-	1,120	296	-
		2011	1,041	262	-	101	18	-	1,142	280	-
		2012	1,302	314	-	118	15	-	1,420	329	-
		2013	1,268	339	-	91	14	-	1,358	353	-
		2014	1,160	307	-	78	19	-	1,238	326	-
	Pacific Cod	2010	1,480	42	-	78	0	-	1,558	42	-
		2011	1,719	70	-	130	1	-	1,848	71	-
		2012	2,285	56	-	74	-	-	2,359	56	-
		2013	1,201	18	-	74	-	-	1,275	18	-
		2014	1,520	20	-	102	-	-	1,622	20	-
	Rockfish	2010	453	5	-	-	-	-	453	5	-
		2011	476	1	-	1	-	-	477	1	-
		2012	571	3	-	-	-	-	571	3	-
		2013	508	2	-	0	-	-	508	2	-
		2014	425	4	-	1	-	-	426	4	-
	All Groundfish	2010	2,978	318	-	172	26	-	3,150	344	-
		2011	3,244	333	-	232	19	-	3,476	352	-
		2012	4,162	373	-	192	15	-	4,354	388	-
		2013	2,990	359	-	165	14	-	3,155	373	-
		2014	3,107	331	-	181	19	-	3,288	350	-
Pot	Pacific Cod	2010	738	165	2	108	138	34	846	303	36
		2011	880	200	-	131	175	42	1,011	375	42
		2012	862	280	-	196	110	42	1,058	390	42
		2013	714	201	-	221	124	31	935	325	31
		2014	756	216	-	344	115	29	1,100	331	29

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Table 48: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Trawl	Pollock	2010	203	332	-	1	756	483	204	1,089	483
		2011	175	304	-	-	1,057	655	175	1,361	655
		2012	198	398	-	-	946	642	198	1,344	642
		2013	87	384	-	-	903	608	87	1,286	608
		2014	181	550	-	-	838	553	181	1,389	553
	Sablefish	2010	12	9	-	-	-	-	12	9	-
		2011	4	13	-	-	-	-	4	13	-
		2012	-	10	-	-	-	-	-	10	-
		2013	4	21	-	-	-	-	4	21	-
		2014	2	7	-	-	-	-	2	7	-
	Pacific Cod	2010	39	162	-	18	205	28	57	367	28
		2011	30	123	-	1	264	37	31	387	37
		2012	87	145	-	18	284	49	105	429	49
		2013	116	88	-	8	263	39	124	351	39
		2014	163	73	-	13	247	35	176	320	35
	Flatfish	2010	17	203	-	-	-	-	17	203	-
		2011	2	199	-	-	0	16	2	200	16
		2012	5	141	-	-	1	28	5	142	28
		2013	8	170	-	-	0	47	8	170	47
		2014	9	151	-	-	2	31	9	152	31
	Rockfish	2010	6	102	-	-	-	5	6	102	5
		2011	2	91	-	-	-	6	2	91	6
		2012	12	120	-	-	-	6	12	120	6
		2013	11	99	-	-	-	8	11	99	8
		2014	7	101	-	-	-	11	7	101	11

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Table 48: Continued

		Year	Gulf of Alaska <60	Gulf of Alaska 60-125	Gulf of Alaska >=125	Bering Sea & Aleutian Islands <60	Bering Sea & Aleutian Islands 60-125	Bering Sea & Aleutian Islands >=125	All Alaska <60	All Alaska 60-125	All Alaska >=125
Trawl	Atka Mackerel	2010	-	-	-	-	1	13	-	1	13
		2011	-	-	-	-	3	15	-	3	15
		2012	-	-	-	-	-	22	-	-	22
		2013	-	-	-	-	-	7	-	-	7
		2014	-	-	-	-	-	12	-	-	12
	All Groundfish	2010	278	809	-	19	962	529	297	1,771	529
		2011	213	733	-	1	1,325	728	214	2,058	728
		2012	302	814	-	18	1,231	747	320	2,045	747
		2013	225	762	-	8	1,166	710	233	1,928	710
		2014	362	881	-	13	1,087	642	375	1,968	642
All Gear	All Groundfish	2010	3,998	1,291	2	299	1,192	588	4,297	2,483	590
		2011	4,341	1,266	-	364	1,606	788	4,705	2,872	788
		2012	5,327	1,468	-	406	1,393	800	5,733	2,861	800
		2013	3,929	1,321	-	394	1,340	761	4,323	2,661	761
		2014	4,228	1,431	-	538	1,254	686	4,766	2,685	686

Notes: These estimates include only vessels fishing part of federal TACs. A vessel that fished more than one category in a week is apportioned a partial week based on catch weight. A target is determined based on vessel, week, processing mode, NMFS area, and gear. All groundfish include additional target categories. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 49: Catcher/processor vessel weeks of fishing groundfish off Alaska by area, vessel-length class (feet), gear, and target, 2010-2014.

			Gulf of Alaska				Bering Sea & Aleutian Islands				All Alaska			
		Year	<60	60-124	125-230	>230	<60	60-124	125-230	>230	<60	60-124	125-230	>230
Hook & Line	Sablefish	2010	6	5	27	-	-	37	22	-	6	42	48	-
		2011	6	3	29	-	2	67	9	-	8	70	38	-
		2012	8	-	25	-	-	75	6	-	8	75	31	-
		2013	11	-	27	-	-	84	3	-	11	84	31	-
		2014	7	-	18	-	-	41	2	-	7	41	21	-
	Pacific Cod	2010	15	45	30	-	12	198	526	-	27	243	556	-
		2011	13	63	23	-	-	252	696	-	13	315	719	-
		2012	11	45	9	-	10	319	732	-	21	364	742	-
		2013	-	23	13	-	-	239	718	-	-	262	731	-
		2014	2	22	29	-	7	250	817	-	9	272	846	-
	Flatfish	2010	-	-	-	-	3	4	72	-	3	4	72	-
		2011	-	-	-	-	2	2	47	-	2	2	47	-
		2012	-	-	-	-	-	7	45	-	-	7	45	-
		2013	-	-	-	-	-	1	15	-	-	1	15	-
		2014	-	-	-	-	-	5	12	-	-	5	12	-
	Rockfish	2010	-	-	-	-	-	-	0	-	-	-	0	-
		2012	-	-	-	-	-	1	0	-	-	1	0	-
		2013	-	-	-	-	-	2	0	-	-	2	0	-
		2014	-	-	-	-	-	1	-	-	-	1	-	-
	All Groundfish	2010	21	50	57	-	15	239	620	-	36	289	677	-
		2011	19	66	52	-	4	321	752	-	23	387	804	-
		2012	19	45	34	-	10	402	784	-	29	447	818	-
		2013	11	23	41	-	-	326	736	-	11	349	777	-
		2014	9	22	48	-	7	298	831	-	16	320	879	-

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Table 49: Continued

			Gulf of Alaska				Bering Sea & Aleutian Islands				All Alaska			
		Year	<60	60-124	125-230	>230	<60	60-124	125-230	>230	<60	60-124	125-230	>230
Pot	Pacific Cod	2010	-	-	-	-	-	66	25	-	-	66	25	-
		2011	-	-	3	-	-	15	29	-	-	15	32	-
		2012	-	-	0	-	-	22	38	-	-	22	38	-
		2013	-	-	-	-	-	-	54	-	-	-	54	-
		2014	-	-	-	-	-	19	53	-	-	19	53	-
Trawl	Pollock	2010	-	-	-	-	-	3	9	237	-	3	9	237
		2011	-	0	0	-	-	4	10	414	-	4	10	414
		2012	-	0	-	-	-	2	5	313	-	2	5	313
		2013	-	1	0	-	-	3	14	309	-	4	14	309
		2014	-	0	0	-	-	1	14	305	-	1	14	305
	Sablefish	2010	-	-	0	-	-	-	-	-	-	-	0	-
		2013	-	-	-	-	-	0	0	-	-	0	0	-
		2014	-	0	-	-	-	-	0	-	-	0	0	-
	Pacific Cod	2010	-	0	-	-	-	5	7	8	-	5	7	8
		2011	-	-	1	-	-	4	4	1	-	4	6	1
		2012	-	4	0	-	-	6	3	5	-	10	3	5
		2013	-	-	0	-	-	4	11	5	-	4	11	5
		2014	-	-	-	-	-	0	9	12	-	0	9	12
	Flatfish	2010	-	49	9	-	-	149	356	51	-	199	366	51
		2011	-	50	17	-	-	144	406	52	-	194	423	52
		2012	-	39	10	-	-	125	402	69	-	164	412	69
		2013	-	48	12	-	-	105	401	87	-	153	412	87
		2014	-	62	27	-	-	92	415	81	-	154	442	81

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Table 49: Continued

		Year	Gulf of Alaska <60	Gulf of Alaska 60-124	Gulf of Alaska 125-230	Gulf of Alaska >230	Bering Sea & Aleutian Islands <60	Bering Sea & Aleutian Islands 60-124	Bering Sea & Aleutian Islands 125-230	Bering Sea & Aleutian Islands >230	All Alaska <60	All Alaska 60-124	All Alaska 125-230	All Alaska >230
Trawl	Rockfish	2010	-	3	33	3	-	0	18	7	-	3	51	10
		2011	-	-	29	2	-	5	24	12	-	5	53	14
		2012	-	3	26	1	-	5	25	10	-	8	51	11
		2013	-	3	27	1	-	0	40	16	-	3	66	16
		2014	-	2	29	3	-	3	34	12	-	5	63	15
	Atka Mackerel	2010	-	-	0	-	-	-	77	33	-	-	77	33
		2011	-	-	0	-	-	0	60	25	-	0	60	25
		2012	-	-	-	-	-	1	63	24	-	1	63	24
		2013	-	0	0	-	-	0	33	13	-	0	33	13
		2014	-	-	-	-	-	-	40	19	-	-	40	19
	All Groundfish	2010	-	53	43	3	-	157	467	335	-	210	510	338
		2011	-	50	47	2	-	156	505	504	-	206	552	506
		2012	-	46	36	1	-	140	498	422	-	186	534	423
		2013	-	52	39	1	-	113	498	428	-	165	537	429
		2014	-	65	56	3	-	96	513	428	-	161	569	431
All Gear	All Groundfish	2010	21	103	100	3	15	462	1,112	335	36	565	1,212	338
		2011	19	116	102	2	4	495	1,292	504	23	611	1,394	506
		2012	19	91	71	1	10	576	1,319	422	29	667	1,390	423
		2013	11	75	79	1	-	439	1,289	428	11	514	1,368	429
		2014	9	87	104	3	7	413	1,397	428	16	500	1,501	431

Notes: These estimates include only vessels fishing part of federal TACs. A vessel that fished more than one category in a week is apportioned a partial week based on catch weight. A target is determined based on vessel, week, processing mode, NMFS area, and gear. All groundfish include additional target categories. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Blend and Catch-accounting System estimates; CFEC gross earnings (fish tickets) file; NMFS Alaska Region groundfish observer data; NMFS Alaska Region permit data; CFEC vessel registration file. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 50: Total at-sea processor vessel crew weeks in the groundfish fisheries off Alaska by month and area, 2010-2014.

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	2010	67	630	237	544	265	55	1,629	102	462	446	*	*	4,437
	2011	498	267	112	635	251	196	1,404	323	376	483	167	175	4,887
	2012	370	186	86	471	220	144	1,161	396	128	178	110	*	3,450
	2013	*	98	214	326	204	433	951	341	*	*	283	96	2,946
	2014	*	190	358	638	233	201	834	526	312	427	415	*	4,134
Bering Sea & Aleutian Islands	2010	7,796	12,775	10,917	4,412	3,899	5,442	10,389	9,231	6,891	6,079	3,380	1,326	82,537
	2011	6,311	13,513	13,817	8,407	3,882	7,601	13,600	11,967	12,266	14,208	5,033	2,105	112,710
	2012	6,434	13,755	15,928	4,383	3,621	10,683	11,700	12,300	11,670	5,207	3,661	2,757	102,099
	2013	4,694	13,341	16,032	4,875	3,756	8,744	9,974	13,745	8,716	5,773	4,581	2,506	96,737
	2014	4,472	13,482	16,511	4,776	4,981	8,841	11,722	14,986	8,523	4,935	4,706	2,384	100,319
All Alaska	2010	7,863	13,405	11,154	4,956	4,164	5,497	12,018	9,333	7,353	6,525	3,380	1,326	86,974
	2011	6,809	13,780	13,929	9,042	4,133	7,797	15,004	12,290	12,642	14,691	5,200	2,280	117,597
	2012	6,804	13,941	16,014	4,854	3,841	10,827	12,861	12,696	11,798	5,385	3,771	2,757	105,549
	2013	4,694	13,439	16,246	5,201	3,960	9,177	10,925	14,086	8,716	5,773	4,864	2,602	99,683
	2014	4,472	13,672	16,869	5,414	5,214	9,042	12,556	15,512	8,835	5,362	5,121	2,384	104,453

Notes: Crew weeks are calculated by summing weekly reported crew size over vessels and time period. These estimates include only vessels targeting groundfish counted toward federal TACs. Catcher processors typically account for 90-95% of the total crew weeks in all areas. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region At-sea Production Reports. Data compiled and provided by the Alaska Fisheries Information Network (AKFIN). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

4.1. Economic Data Tables for the Commercial Pacific Halibut Fishery

Table H1A: Catch (net landed weight) in the commercial Pacific halibut off Alaska by FMP area, 2010-2014, (hundreds of metric tons).

Year	Gulf Of Alaska	Bering Sea & Aleutian Islands	All Alaska
2010	167.50	31.03	198.53
2011	116.48	32.52	149.00
2012	93.03	23.69	116.72
2013	86.39	17.52	103.91
2014	64.78	13.40	78.18

Notes: These estimates include catch from both federal and state of Alaska fisheries. Net weight is dressed, head-off, slime and ice deducted.

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive FT.

Table H1B: Catch (net landed weight) in the commercial Pacific halibut off Alaska by IPHC area, 2010-2014, (hundreds of metric tons).

Area	2010	2011	2012	2013	2014
2C	20.85	11.13	12.31	13.78	13.28
3A	96.35	67.95	55.40	51.70	34.10
3B	47.16	34.31	23.31	19.02	8.70
4A	10.33	10.39	7.02	5.47	3.37
4B	8.10	9.18	7.75	5.54	4.93
4CDE	15.75	16.04	10.94	8.39	5.59

Notes: 4CDE refers to Areas 4C, 4D and 4E. These estimates include catch from both federal and state of Alaska fisheries. Net weight is dressed, head-off, slime and ice deducted.

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive FT.

Table H2: Catch (net landed weight) in the commercial Pacific halibut off Alaska by vessel length (feet) and FMP, 2010-2014, (hundreds of metric tons).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Length	Net Tons	Percent	Net Tons	Percent	Net Tons	Percent
2010	<20	0.13	0	0.49	0.02	0.62	0
	20-29	2.76	0.02	2.87	0.09	5.63	0.03
	30-39	20.45	0.12	3.54	0.11	23.99	0.12
	40-49	61.31	0.37	6.09	0.20	67.40	0.34
	50-59	51.74	0.31	9.47	0.31	61.21	0.31
	>=60	30.91	0.18	8.58	0.28	39.48	0.20
2011	<20	0.09	0	0.32	0.01	0.41	0
	20-29	1.91	0.02	2.86	0.09	4.77	0.03
	30-39	15.10	0.13	3.77	0.12	18.86	0.13
	40-49	40.36	0.35	5.91	0.18	46.27	0.31
	50-59	36.67	0.32	10.02	0.31	46.69	0.31
	>=60	22.07	0.19	9.65	0.30	31.72	0.21
2012	<20	0.10	0	0.29	0.01	0.39	0
	20-29	1.61	0.02	2.34	0.10	3.95	0.03
	30-39	12.56	0.14	2.82	0.12	15.38	0.13
	40-49	33.72	0.36	4.78	0.20	38.50	0.33
	50-59	28.45	0.31	7.92	0.33	36.37	0.31
	>=60	16.37	0.18	5.54	0.23	21.91	0.19
2013	<20	0.09	0	0.24	0.01	0.33	0
	20-29	1.79	0.02	2.17	0.12	3.95	0.04
	30-39	12.79	0.15	2.28	0.13	15.06	0.15
	40-49	30.84	0.36	2.79	0.16	33.63	0.32
	50-59	26.14	0.30	5.78	0.33	31.91	0.31
	>=60	14.50	0.17	4.26	0.24	18.76	0.18
2014	<20	0.10	0	0.19	0.01	0.29	0
	20-29	1.92	0.03	1.52	0.11	3.43	0.04
	30-39	10.36	0.16	1.96	0.15	12.31	0.16
	40-49	23.98	0.37	2.16	0.16	26.14	0.33
	50-59	19.32	0.30	4.45	0.33	23.78	0.30
	>=60	9.11	0.14	3.12	0.23	12.23	0.16

Notes: Excludes vessels in the Annette Island commercial Pacific halibut fishery. These estimates include catch from both federal and state of Alaska fisheries. Net weight is dressed, head-off, slime and ice deducted.

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive FT; AKFIN vessel database.

Table H3: Non-halibut prohibited species catch on commercial Pacific halibut target trips off Alaska by PSC species and area, 2013-2014.

	Year	Bairdi Tanner Crab (Count)	Non-Chinook Salmon (Count)	Other King Crab (Count)	Red King Crab (Count)
Gulf of Alaska	2013	-	-	*	-
	2014	21	447	-	379
Bering Sea & Aleutian Islands	2013	-	-	663	-
	2014	-	-	307	-
All Alaska	2013	-	-	663	-
	2014	21	447	307	379

Notes: These estimates include trips from both federal and state of Alaska fisheries. For details on prohibited species catch estimation see Cahalan, J., J. Gasper, and J. Mondragon. 2014. Catch sampling and estimation in the federal groundfish fisheries off Alaska, 2015 edition. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-286, 46 p. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: AKRO PSC.

Table H4A: Ex-vessel value and price in the commercial Pacific halibut off Alaska by FMP area, 2010-2014, ($ millions and $/lb net weight, respectively).

	Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
Year	Value	Price	Value	Price	Value	Price
2010	173.53	4.70	29.33	4.29	202.86	4.63
2011	162.89	6.34	43.60	6.08	206.49	6.29
2012	117.32	5.72	26.80	5.13	144.13	5.60
2013	95.75	5.03	16.66	4.32	112.41	4.91
2014	87.94	6.16	15.73	5.33	103.67	6.01

Notes: See notes on Table H4B.

Source: ADF&G fish tickets / CFEC gross earnings.

Table H4B: Ex-vessel value and price in the commercial Pacific halibut off Alaska by IPHC area, 2010-2014, ($ millions and $/lb net weight, respectively).

		2010	2011	2012	2013	2014
2C	Value	21.68	15.71	16.24	15.67	17.62
	Price	4.72	6.40	5.98	5.16	6.02
3A	Value	100.32	94.80	70.08	58.05	47.05
	Price	4.72	6.33	5.74	5.09	6.26
3B	Value	48.37	47.97	28.62	20.20	11.63
	Price	4.65	6.34	5.57	4.82	6.06
4A	Value	10.38	14.81	8.23	5.32	4.27
	Price	4.56	6.47	5.32	4.41	5.75
4B	Value	7.57	12.23	8.60	5.14	5.88
	Price	4.24	6.04	5.04	4.21	5.41
4CDE	Value	14.54	20.97	12.35	8.02	6.20
	Price	4.19	5.93	5.12	4.34	5.03

Notes: Values and prices are for catch from both federal and state of Alaska fisheries. Price is calculated as landed value divided by net weight. Net weight is dressed, head-off, slime and ice deducted.

Source: ADF&G fish tickets / CFEC gross earnings.

Table H5: Ex-vessel value and average value per vessel in the commercial Pacific halibut off Alaska by FMP area and vessel length (feet), 2010-2014, (millions and thousands $, respectively).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Length	Value	Avg. Value/Vessel	Value	Avg. Value/Vessel	Value	Avg. Value/Vessel
2010	<20	0.14	5.66	0.34	6.50	0.48	6.24
	20-29	2.88	21.30	2.22	16.72	5.10	19.17
	30-39	21.09	64.29	3.08	73.23	24.16	67.68
	40-49	63.38	175.56	5.93	247.18	69.31	188.35
	50-59	53.67	367.64	9.11	364.54	62.79	418.59
	>=60	32.17	536.23	8.64	298.00	40.82	627.94
2011	<20	0.13	6.11	0.29	4.83	0.42	5.16
	20-29	2.68	19.71	3.05	20.34	5.73	20.18
	30-39	20.93	66.86	4.61	104.85	25.54	74.25
	40-49	56.15	160.42	8.30	332.14	64.45	182.06
	50-59	51.64	356.16	13.74	490.67	65.38	432.99
	>=60	30.97	533.94	13.60	485.78	44.57	685.70
2012	<20	0.13	5.31	0.31	6.44	0.44	6.14
	20-29	2.07	17.42	2.27	15.77	4.34	16.58
	30-39	15.78	53.50	3.17	67.39	18.95	57.25
	40-49	42.68	124.07	5.50	229.33	48.18	137.67
	50-59	35.91	249.38	9.05	323.27	44.96	299.75
	>=60	20.46	401.22	6.50	282.65	26.96	464.88
2013	<20	0.10	5.26	0.20	3.84	0.30	4.27
	20-29	2.00	16.98	2.09	13.40	4.09	15.00
	30-39	14.10	53.01	2.10	53.87	16.20	54.74
	40-49	34.06	108.13	2.59	152.44	36.65	114.19
	50-59	29.07	215.32	5.49	196.16	34.56	245.12
	>=60	16.16	336.65	4.18	199.28	20.34	383.85
2014	<20	0.13	5.76	0.18	10.94	0.31	8.09
	20-29	2.60	21.47	1.38	26.99	3.97	23.24
	30-39	13.97	51.73	2.17	65.84	16.14	55.08
	40-49	32.15	106.46	2.57	151.45	34.72	113.85
	50-59	26.41	195.63	5.46	248.22	31.87	229.29
	>=60	12.68	294.99	3.97	233.41	16.65	362.02

Notes: Values are for catch from both federal and state of Alaska fisheries. Excludes vessels in the Annette Island commercial Pacific halibut fishery. Length is measured in feet.

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive FT; AKFIN vessel database.

Table H6: Port rank by ex-vessel value, ex-vessel value, price, percent of statewide value and in the commercial Pacific halibut off Alaska by port, 2010-2014, ($ millions and $/lb net weight).

	Port	2010	2011	2012	2013	2014
Rank	Homer	1	1	2	1	1
	Kodiak	2	2	1	2	2
	Seward	3	3	3	3	3
	Dutch Harbor	4	4	4	5	5
	Sitka	5	7	5	6	6
	Juneau	6	9	8	4	7
	St Paul Island	7	5	7	9	13
	Petersburg	9	10	6	7	4
	Sand Point	8	6	9	14	12
	Yakutat	10	12	10	8	10
Value	Homer	54.78	37.76	26.93	24.24	18.51
	Kodiak	30.63	36.24	27.59	16.60	15.94
	Seward	23.52	23.20	15.77	14.79	11.50
	Dutch Harbor	*	*	10.94	*	*
	Sitka	9.43	8.54	*	6.02	*
	Juneau	8.83	7.16	5.90	6.86	5.61
	St Paul Island	*	*	*	*	*
	Petersburg	7.61	6.19	6.36	5.56	7.62
	Sand Point	*	*	*	*	*
	Yakutat	*	*	*	*	*
Price	Homer	4.65	6.02	5.50	4.95	6.05
	Kodiak	4.84	6.49	5.64	4.88	6.32
	Seward	4.65	6.27	5.83	5.07	6.17
	Dutch Harbor	*	*	5.25	*	*
	Sitka	4.79	6.61	*	5.06	*
	Juneau	4.57	6.06	5.69	5.44	5.93
	St Paul Island	*	*	*	*	*
	Petersburg	4.73	6.46	6.07	5.18	6.24
	Sand Point	*	*	*	*	*
	Yakutat	*	*	*	*	*

Continued on next page.

Table H6: Continued

	Port	2010	2011	2012	2013	2014
Percent	Homer	27 %	18 %	19 %	22 %	18 %
	Kodiak	15 %	18 %	19 %	15 %	15 %
	Seward	12 %	11 %	11 %	13 %	11 %
	Dutch Harbor	*	*	8 %	*	*
	Sitka	5 %	4 %	*	5 %	*
	Juneau	4 %	3 %	4 %	6 %	5 %
	St Paul Island	*	*	*	*	*
	Petersburg	4 %	3 %	4 %	5 %	7 %
	Sand Point	*	*	*	*	*
	Yakutat	*	*	*	*	*

Notes: Displays only the 10 Alaska ports with the highest average ex-vessel value. Values and prices are for catch from both federal and state of Alaska fisheries. Price is calculated as landed value divided by net weight. Net weight is dressed, head-off, slime and ice deducted. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G fish tickets / CFEC gross earnings.

Table H7: First wholesale production volume, value and price in the commercial Pacific halibut off Alaska by product, 2010-2014, (1000s of metric tons, millions $ and $/lb net weight, respectively).

	Year	Quantity	Value	Price
Head and Gut	2010	12.21	158.17	5.88
	2011	7.71	127.39	7.49
	2012	6.70	105.24	7.12
	2013	6.46	92.69	6.51
	2014	4.80	81.92	7.73
Fillet	2010	3.12	74.23	10.81
	2011	2.61	65.33	11.36
	2012	1.94	53.20	12.47
	2013	1.66	35.78	9.80
	2014	0.85	24.85	13.26
Other Products	2010	0.65	1.77	1.24
	2011	0.67	1.76	1.19
	2012	1.85	4.22	1.03
	2013	0.83	2.90	1.58
	2014	0.50	2.47	2.23
All Products	2010	15.97	234.17	6.65
	2011	10.99	194.48	8.03
	2012	10.49	162.65	7.03
	2013	8.94	131.37	6.66
	2014	6.16	109.24	8.05

Notes: Landings, values and prices include both federal and state of Alaska fisheries. Price is calculated as landed value divided by net weight. Net weight is dressed, head-off, slime and ice deducted.

Source: ADF&G Commercial Operators Annual Report, data compiled by AKFIN in Comprehensive ENCOAR PROD.

Table H8: First wholesale value of shoreside processors and percentage share of statewide wholseale value in the commercial Pacific halibut fisheries off Alaska by region, 2010-2014, (millions $).

	Year	Value	Percent
AK Peninsula/Aleutians	2010	55.79	24 %
	2011	60.63	31 %
	2012	41.28	25 %
	2013	19.07	15 %
	2014	8.83	8 %
Kodiak	2010	42.19	18 %
	2011	44.50	23 %
	2012	33.75	21 %
	2013	22.94	17 %
	2014	22.12	20 %
Southcentral	2010	82.80	35 %
	2011	43.38	22 %
	2012	48.82	30 %
	2013	51.27	39 %
	2014	37.15	34 %
Southeast	2010	50.33	22 %
	2011	42.46	22 %
	2012	36.25	22 %
	2013	36.25	28 %
	2014	40.31	37 %
Southwest/ Other AK	2010	2.52	1 %
	2011	1.95	1 %
	2012	2.49	2 %
	2013	1.63	1 %
	2014	0.67	1 %

Notes: Values are for catch from both federal and state of Alaska fisheries. Includes Pacific halibut processed by shoreside processors only.

Source: ADF&G Commercial Operators Annual Report, data compiled by AKFIN in Comprehensive ENCOAR PROD.

Table H9: Number of vessels and median length (feet) for vessels catching Pacific halibut commercially off Alaska by FMP area and vessel length class, 2010-2014.

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Vessels	Median Length	Vessels	Median Length	Vessels	Median Length
<20	2010	24	18	53	18	77	18
	2011	21	18	61	18	82	18
	2012	25	17	48	18	72	18
	2013	19	17	53	18	71	18
	2014	23	18	16	18	38	18
20-29	2010	135	26	133	24	266	24
	2011	136	26	150	24	284	24
	2012	119	25	144	24	262	24
	2013	118	25	156	24	273	24
	2014	121	25	51	26	171	26
30-39	2010	328	34	42	32	357	34
	2011	313	34	44	32	344	34
	2012	295	34	47	32	331	34
	2013	266	34	39	32	296	34
	2014	270	34	33	32	293	34
40-49	2010	361	45	24	48	368	45
	2011	350	45	25	47	354	45
	2012	344	45	24	48	350	45
	2013	315	45	17	48	321	45
	2014	302	45	17	48	305	45
50-59	2010	146	57	25	58	150	57
	2011	145	58	28	58	151	58
	2012	144	58	28	58	150	58
	2013	135	58	28	58	141	58
	2014	135	58	22	58	139	58
≥60	2010	60	72	29	73	65	73
	2011	58	73	28	76	65	76
	2012	51	72	23	78	58	74
	2013	48	71	21	76	53	73
	2014	43	72	17	76	46	72

Notes: Excludes vessels in the Annette Island commercial Pacific halibut fishery. Length is measured in feet.

Source: ADF&G/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive FT; AKFIN vessel database.

Table H10: Number of vessels catching Pacific halibut commercially off Alaska by FMP area and thousands of pounds caught, 2010-2014.

	Landings	2010	2011	2012	2013	2014
Gulf of Alaska	<1	121	158	142	112	129
	1-9	362	411	395	360	370
	10-24	221	175	191	189	203
	25-49	127	113	109	114	115
	50-74	61	51	64	58	55
	75-99	39	41	37	38	22
	100-199	101	73	40	30	-
	>=200	22	1	-	-	-
Bering Sea & Aleutian Islands	<1	106	118	126	141	20
	1-9	100	109	91	91	63
	10-24	28	36	30	27	30
	25-49	27	19	26	28	25
	50-74	19	21	20	20	12
	75-99	5	13	10	3	4
	100-199	17	18	11	4	2
	>=200	4	2	-	-	-
All Alaska	<1	221	274	267	250	147
	1-9	449	496	461	435	413
	10-24	226	191	205	198	211
	25-49	142	116	114	118	111
	50-74	57	50	62	59	64
	75-99	38	37	39	37	38
	100-199	104	107	74	58	8
	>=200	46	9	1	-	-

Notes: Excludes vessels in the Annette Island commercial Pacific halibut fishery. “-” indicates no applicable data or value.

Source: ADF&G fish tickets / CFEC gross earnings.

Table H11: Number of vessel catching Pacific halibut commercially off Alaska and the percentage of yearly catch in area by FMP area and month, 2010-2014.

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Month	Vessels	Percent	Vessels	Percent	Vessels	Percent
2010	Mar-Apr	379	22 %	7	2 %	381	19 %
	May	410	18 %	22	6 %	425	16 %
	Jun	353	14 %	139	17 %	484	14 %
	Jul	283	11 %	213	23 %	487	13 %
	Aug	401	13 %	180	22 %	558	15 %
	Sep	343	11 %	69	18 %	394	12 %
	Oct	247	9 %	36	8 %	275	9 %
	Nov	100	2 %	20	4 %	116	2 %
2011	Mar-Apr	312	20 %	10	2 %	317	16 %
	May	394	19 %	39	14 %	420	18 %
	Jun	321	15 %	209	19 %	524	16 %
	Jul	242	10 %	243	21 %	474	13 %
	Aug	351	15 %	123	19 %	444	16 %
	Sep	314	11 %	73	12 %	366	11 %
	Oct	219	7 %	50	11 %	261	8 %
	Nov	82	2 %	13	2 %	93	2 %
2012	Mar-Apr	276	17 %	3	2 %	279	14 %
	May	332	15 %	22	9 %	348	14 %
	Jun	334	16 %	154	16 %	479	16 %
	Jul	223	10 %	210	24 %	422	13 %
	Aug	361	17 %	106	27 %	444	19 %
	Sep	279	10 %	68	16 %	336	12 %
	Oct	233	13 %	22	6 %	251	11 %
	Nov	68	1 %	7	1 %	75	1 %
2013	Mar-Apr	256	19 %	6	3 %	262	16 %
	May	304	20 %	17	11 %	317	18 %
	Jun	298	16 %	192	16 %	482	16 %
	Jul	197	9 %	226	28 %	413	12 %
	Aug	300	15 %	75	18 %	361	15 %
	Sep	283	12 %	62	13 %	331	12 %
	Oct	219	8 %	25	9 %	236	8 %
	Nov	79	2 %	10	2 %	87	2 %
2014	Mar-Apr	286	26 %	2	2 %	288	22 %
	May	309	20 %	25	15 %	324	19 %
	Jun	233	11 %	46	18 %	269	12 %
	Jul	166	7 %	81	27 %	241	11 %
	Aug	301	16 %	87	21 %	369	17 %
	Sep	256	12 %	43	12 %	286	12 %
	Oct	193	7 %	14	4 %	200	6 %
	Nov	42	1 %	6	1 %	48	1 %

Notes: Includes catch from both federal and state of Alaska fisheries.

Source: ADF&G fish tickets / CFEC gross earnings.

Table H12: Total vessel days fishing Pacific halibut commercially off Alaska by area, 2010-2014.

Area	2010	2011	2012	2013	2014
Gulf of Alaska	19,774	16,159	14,818	14,633	12,820
Bering Sea & Aleutian Islands	5,680	6,397	5,110	4,339	2,880
All Alaska	25,170	22,166	19,747	18,754	15,484

Notes: Excludes vessels in the Annette Island commercial Pacific halibut fishery.

Source: ADF&G fish tickets / CFEC gross earnings.

Table H13: Crew days fishing Pacific halibut commercially off Alaska by month and area, 2010-2014.

	Year	Mar-Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Gulf of Alaska	2010	13,762	12,669	9,429	7,872	9,507	7,964	6,882	1,694
	2011	10,415	12,079	8,254	6,446	8,286	6,937	4,678	1,333
	2012	8,304	9,431	8,200	5,796	8,708	6,495	6,243	814
	2013	8,546	10,247	7,777	4,859	7,350	6,589	5,928	1,300
	2014	9,905	9,414	5,733	3,603	6,297	5,470	4,185	499
Bering Sea & Aleutian Islands	2010	966	1,043	2,845	5,759	4,979	3,034	1,604	1,013
	2011	967	2,271	4,754	6,219	4,457	2,952	2,062	637
	2012	455	1,429	3,391	5,338	4,693	2,758	1,067	212
	2013	563	1,042	3,166	5,244	2,428	2,291	1,266	224
	2014	242	1,472	1,586	3,397	2,403	1,369	653	121
All Alaska	2010	14,667	13,676	12,171	13,565	14,147	10,688	8,330	2,669
	2011	11,221	14,181	12,983	12,454	12,154	9,616	6,621	1,923
	2012	8,759	10,822	11,483	10,938	13,131	9,133	7,271	1,026
	2013	9,109	11,207	10,807	10,011	9,632	8,670	7,029	1,460
	2014	10,147	10,650	7,178	6,905	8,484	6,765	4,760	620

Notes: Excludes vessels in the Annette Island commercial Pacific halibut fishery.

Source: ADF&G fish tickets / CFEC gross earnings.

5. ECONOMIC PERFORMANCE INDICES FOR THE NORTH PACIFIC GROUNDFISH FISHERIES

5.1. Introduction

Fisheries markets are complex. A multitude of factors influence demand, supply, price, catch composition, product types produced and other forms of market activity. Indices are a common method used by agencies to synthesize market information in a digestible format. Indices establish a baseline that helps characterize trends in the market for values, prices and quantities of fisheries goods. Market indices have many uses. From a management perspective indices can both retrospectively characterize changes in the market that may be related to policy decisions, or allow managers to evaluate current market conditions in the context of future policy change. Indices may also be useful to market participants when making business decisions.

This section of the Economic Status of the Groundfish Fisheries off Alaska attempts to distill the numerous factors that affect the North Pacific groundfish markets into a simple set of indices that can be used to track performance. Indices of value, price and quantity are presented for each of the four primary sectors: the Bering Sea and Aleutian Island (BSAI) at-sea, the BSAI shoreside, the Gulf of Alaska (GOA) at-sea, and the GOA shoreside. For the at-sea sectors, index analysis will focus on the wholesale market; for the shoreside sectors, index analysis will consider both the wholesale and ex-vessel markets. To help understand and evaluate the indices, we plot the value share stratified by species and product type for wholesale markets, and by species and gear type for the ex-vessel markets. Value share is the proportion of total value from each of the stratified components, such as the proportion of total value that comes from pollock. Additionally, bar graphs provide detail on the division of production among species, product types and gear types. Specifically, for the wholesale market, these graphs show species by product type and product type by species, and in the ex-vessel market, they show species by gear type and gear type by species.

Aggregate indices, by their very nature, cumulate over the many species, products types, and gear types that apply to a sector. The values, prices, and quantities from individual components of these factors (e.g., individual species) may contribute to the movements of the aggregate indices in very different ways. The myriad of market influences make it difficult to disentangle the relative importance of different species or products when monitoring aggregate performance, a problem that can be approached by using a value-share decomposition to examine the influence of these different components on the aggregate index. Decomposition relates the indices for each of the components of a single factor to the aggregate through its value share.

For example, consider an aggregate price index for a sector. The aggregate price index is a function of all the prices for each of the species sold (e.g., pollock, Pacific cod, sablefish). Here, species type is the factor and the component indices of this factor are the price indices for each of the species (e.g., pollock price index, Pacific cod price index). The importance of each individual species price index is determined by the proportion of total value in the sector for each species. By decomposing the aggregate index in this way, one can see how each of the species price indices influence the movement in the aggregate price index. Similar value-share decompositions are also constructed for product types in the wholesale market, and for gear types in the ex-vessel market.

Section 5.1.1 provides a more in-depth explanation of the indices and how to understand them. Understanding the indices and their construction facilitates accurate interpretation. The indices are presented and discussed in remaining sections 5.2-5.5. The discussion explicitly references the plots in Figures 5.2-5.13. Hereafter, "wholesale value" and "ex-vessel value" refer to the revenue from production at the first wholesale level or from sales of catch on the ex-vessel market, respectively. Walleye pollock will often be referred to simply as "pollock"; similarly, Pacific cod will often be referred to as "cod".

5.1.1 Understanding an Index

Economic indices measure changes in the levels of a set of related economic variables. The set of variables is aggregated to provide a single number that is meant to summarize the cumulative state of the market. This aggregation is done in a way that achieves two objectives: first, is that the more "important" variables should be weighted more heavily in the index; second, is that the index should be comparable over time. Indices and the methods used to construct them to achieve these basic objectives have a deep theoretical foundation in both statistics and economics. An in-depth treatment of these foundations can be found in Coelli (2005), and Diewert (1993). The discussion here is presented with the intent of providing the reader with an intuitive understanding of the index that will help in both general interpretations of the indices and relating the decomposed indices to the aggregate. Details on the precise methods used for constructing indices can be found in NOAA Technical memorandum (Fissel 2014).

The basic intuition behind an economic index is the same for value indices, price indices and quantity indices. For the sake of exposition, we will consider an aggregate price index for the shoreside wholesale market in the GOA but the discussion applies equally well to the quantity and value indices as well as to the other sectors and markets. We will write the two-period price index between 2010 and 2009 as $P_{2009}(2010)$. This price index gives the aggregate price level in 2010 using 2009 as a reference period. If the price index in 2009 was $P_{2008}(2009) = 1$ and the price index in 2010 was $P_{2009}(2010) = 1.1$ then the two-period price index would indicate that when you consider all the prices together for the GOA shoreside wholesale market, there was a 10% increase in prices over the year. There are many species and products that GOA shoreside processors sell onto the first wholesale market, including headed-and-gutted sablefish and Pacific cod fillets, which each have their own price. The index $P_{2009}(2010)$ is formed by taking a weighted sum of the relative prices between 2010 and 2009 over all of these goods: $P_{2009}(2010) = \sum_{i=1}^{N} \frac{p^i(2010)}{p^i(2009)} * \omega^i_{2009}(2010)$. Here, $p^i(2010)$ is the price of good i (e.g., Pacific cod fillets) in 2010 and $\omega^i_{2009}(2010)$ is the weight representing the "importance" of good i between 2009 and 2010 in the GOA shoreside wholesale market. The economic measure that is used to determine this importance is the proportion of total value that good makes up in the market, the value share.

Using the same basic weighting idea we can relate the subindices (e.g., species price indices) to their individual components for either *individual species* or for *aggregations* across species. For example, a Pacific cod index, $P^{cod}_{2009}(2010)$, would be a weighted sum of all the cod-based product prices, whereas the aggregate index, $P_{2009}(2010)$, would be a weighted sum over all the individual species indices. Specifically, $P_{2009}(2010) = \sum_{s=1}^{S} P^S_{2009}(2010) * w^S_{2009}(2010)$, where each $P^S_{2009}(2010)$ is the species index of species "s" for species $s \in \{\text{pollock}, \text{cod}, \text{yellowfin sole}, \ldots\}$ and $w^s_{2009}(2010)$ can be thought of as an "importance" weight determined by the value share for each species s (the proportion of total value for the species). This decomposition of the aggregate index into the species indices is referred to here as the value share decomposition. This decomposition can be done for other cross-sections of the market as well; for example, the aggregate price index can be expressed as a weighted sum of the individual product price indices: $P_{2009}(2010) = \sum_{k=1}^{K} P_{2009}^{k}(2010) * w_{2009}^{k}(2010)$, where k runs over product types, $k \in \{\text{fillet}, \text{head \& gut}, \text{surimi}, \ldots\}$ and $w_{2009}^{k}(2010)$ is the value share of product k. Value and quantity indices, $V_{t-1}^{i}(t)$ and $Q_{t-1}^{i}(t)$, are constructed analogously. These examples show how an aggregate index can be decomposed into its constituent parts. Plotting the factor indices together with the aggregate index provides a perspective on the common movements between associated objects in a market[1].

Indices may be compared across multiple periods by chaining consecutive two-period estimates together to create a chain index. The consumer price index and other such indices often mentioned in the news are chain indices. Chain indices specify a base period in which the index is equal to 100. For the economic indices presented here, we use 2010 as the base year. Taking our GOA shoreside price index as an example, the 2008 chained price index is given by $I_{2006}^{P}(2008) = 100 * P_{2006}(2007) * P_{2007}(2008)$. The 2009 chained price index is obtained by multiplying the 2008 index by the two-period price increment between 2008 and 2009, $I_{2006}^{P}(2009) = 100 * I_{2006}(2008) * P_{2008}(2009)$, thus chaining the index forward. To provide a concrete numerical example, suppose 2006 is our base year in which the index is equal to 100 and assume there was a 50% increase in aggregate prices in 2007, so that $P_{2006}(2007) = 1.5$. The chained price index in 2007 would be $I_{2006}^{P}(2007) = 100 * I_{2006}(2006) * P_{2006}(2007) = 150$. Now suppose there was a 50% decrease in aggregate prices between 2007 and 2008 ($P_{2007}(2008) = 0.5$). The 2008 chained price index would now be $I_{2006}^{P}(2008) = 100 * I_{2006}(2007) * P_{2007}(2008) = 75$. Thus, the value of the index in 2008 makes sense with respect to both 2006 and 2007. That is, 2008 prices are 75% of their 2006 level and half their 2007 level. Notice also that the weights in the chain index $w_{t-1}^{k}(t)$ are adapting to potential shifts in the value share that may be occurring due to swings in output or production. This is an important feature of the index in fisheries where output can change significantly based on changes in the stock and the TAC.[2]

The primary tools we will use to analyze market performance are Figures 5.2-5.13. The index figures in Figures 5.2-5.13 are designed to help the reader visualize changes in the indices and relate the changes to shifts in aggregate value, prices, and quantities. All indices use 2006 as the base year for the index. All calculations and statistics are made using nominal U.S. dollars.[3] Aggregate indices are located in the upper-left panel and the value share decomposition of the aggregate index is below in the lower-left panels of the figures. Changes in the indices have been color coded to indicate the relevance in determining aggregate index movements. Following the notation above,

[1]The formulation presented here is intended to give an intuitive understanding of indices. The Fisher index method was used in the actual creation of the indices. The Fisher index is the geometric mean of Laspeyres' index, which uses weights that favor the reference period, and Paasche's index, which uses weights that favor the current period. The Fisher index provides a more central index measure and enjoys some desirable theoretic properties that lead it to be preferred over other indices. The Fisher index cannot strictly be written as a linear combination of relative price ratios. However, the Fisher index is bounded by two linear objects that in practice don't differ significantly and the linear perspective is correct to a first-order approximation. Hence, there is little loss from using the linear intuition given by the other indices when thinking of the Fisher index. Further details on the Fisher index can be found in the NOAA Technical Memorandum (Fissel 2014) as well as Coelli (2005), Diewert (1993)

[2]The alternative to a chain index is a fixed-base index that references each year to a single base year without considering the changes in the intervening periods. When output/production changes significantly over short periods, (e.g., changing TAC) the fixed base index can be quite sensitive to the base year chosen.

[3]U.S. nominal dollars are used so price indices capture unadjusted changes in prices throughout time, allowing them to be used as deflator indices. For readers comparing these indices to other figures in the SAFE denominated in inflation adjusted terms, this adjustment should be kept in mind.

the relevance of a change in the price index in year t is calculated by $(year - on - year\%change) * (share\ weight) = (P^i_{t-1} - 1) * \tilde{w}^i(t)$ where $\tilde{w}^i(t) = \frac{p^i_t * q^i_t}{\sum_i p^i_t * q^i_t}$ is the year t value share. When the value $(year - on - year\%change) * (share\ weight)$ is roughly zero, indicating little to no change or influence on the aggregate index, it is colored blue. When this value is less than -0.1, the index is colored red to indicate that it has had a significant negative impact on the aggregate index. When this value is greater than 0.1, the index is colored green, indicating a significant positive impact on the aggregate index. Shades in between these colors indicate intermediate impacts. Changes in the value and quantity indices are similarly calculated by replacing $P^i_{t-1}(t)$ with the value index and quantity index increments: $V^i_{t-1}(t)$, and $Q^i_{t-1}(t)$. The indices can take on these "significant colors" if the percentage change is large and/or the value share is large. The value share plot in the upper-right corner of each figure helps to discern the difference. For each sector and market, two decompositions are presented. The wholesale market is decomposed by species and product type, and the ex-vessel market is decomposed by species and gear type. To help relate the different decompositions, bar graphs in the lower-right panel of each figure show the composition of one factor (e.g., product type) for each relevant category of the other factors (e.g., species) as measured by production. Furthermore, the height of the bars shows the annual output in that market. Only the components of a factor with a value share greater than 1% have been plotted, although all prices and quantities were used in the construction of the aggregate index. Ex-vessel indices are constructed using catch that is counted against a federal total allowable catch (TAC).

To properly interpret the indices, the reader must realize that the indices are merely descriptive and characterize the state of the market relative to other periods, and display the co-movement of different species, product types, or gear types both individually and in aggregate. The indices have no inherent causal interpretation. For example, it would be wrong to assert from these indices that a change in surimi prices "caused" a change in pollock price. Nor could we say the converse. We can say that they are connected, as surimi is a significant portion of the value from pollock in some regions, but causality is beyond the scope of indices. Carefully designed regression analysis is better suited for addressing such causality questions.

5.2. Economic Performance of the BSAI At-Sea Sector

BSAI At-Sea Wholesale Market

Highlights in 2014

- Increases in value driven by increases in quantities.
- Production quantities at high levels for most species.
- Mixed price movement across species with decreases in pollock and flatfish and increases in cod and Atka mackerel.

The BSAI at-sea sector is the largest, by measure of wholesale value, of the sectors (Figure 5.1). Wholesale value in the BSAI at-sea region increased 5.8% between 2013 and 2014. While lower than the levels seen in 2011 and 2012, the value index, at 121 in 2014, remains above the levels seen prior to 2008 and well above the average (110) (Figure 5.2). Value in this region is largely concentrated in pollock, which had a value share of 58% in 2014, a slight decrease over last year.

Pollock value share is slightly below its average (61%) over 2004-2014 as other species (in particular flatfish) acquired an increasing share of the value within the region. Cod and flatfish's share of value stood at 19% and 14%, respectively. Atka mackerel's value share rose 3% to 4.8% erasing the drop in 2013. Non-pollock species are primarily processed into the headed-and-gutted (H&G) product type (Figure 5.3). As a result, the share of value from H&G products is the largest in the region at 42% in 2014 and has grown over the last decade as species such as flatfish have become a larger source of value. Pollock is processed into a variety of product forms, the most significant of which are surimi, fillets (including deep-skin fillets) and roe. The share of value from surimi was 18% in 2014. Fillets and deep-skin fillets retained a combined 23% of the region's total value share. Roe, a high priced product that is the focus of the A season catch, accounted for 16% of the value share a decade ago has steadily declined and currently accounts for 6.7% of total value.

Quantity indices track production of wholesale market goods over time. The aggregate quantity index shows that in 2014 total production in this sector increased 4.4% from 2013. The pollock quantity index increased 5.2% in 2014 and the quantity index remains at a level comparable to the highs observed before 2008 (Figure 5.2). Between 2008 and 2010 conservation reductions in the pollock total allowable catch (TAC) account for the lows in the pollock quantity index over these years. The 2014 increase in pollock production was not seen in most of the other species. Cod production remained basically unchanged as indicated by the quantity index, but remains at high levels. Similarly, the flatfish quantity index is remained basically unchanged but at a high level. Production of flatfish has steadily increased over the last 10 years, in part because of increased efficiences following rationalization of the A80 fleet in 2007. The Atka mackerel quantity index increased 48% as production rebounded and the TAC increased after reductions sharp reductions in 2013. The H&G quantity index remained unchanged but at a high level (Figure 5.3). The fillet quantity indices (which is largely comprised of pollock fillets) moved in opposing directions with an 6.6% increase in the standard fillet index and a 11% decrease in the deep-skin fillet index.[4] Combined production of deep-skin and standard fillets remained basically unchanged between 2013 and 2014 and the apparent shift to standard fillets brought production quantities to its highest level over the last decade. Roe (pollock) quantity index increased substantially in 2014 as production returned to the recent high in 2011; over the long-term production remains below pre-2008 levels. Pollock surimi production has been steadily increasing since diving in 2008 and 2009 during the pollock TAC reductions. The surimi quantity index rose 8.6% in 2014 but remains slightly below pre-2008 levels. Production of meal and oil has also been increasing since 2009. Although production of whole fish is relatively small, it increased reversing the decline in 2013, largely because of a increase in flatfish produced as whole fish.

The aggregate price index showed no change in 2014. However, the static aggregate index was the net effect of variation in prices across species The pollock price index fell slightly by 0.22% as a result of slight decreases in the fillet (standard and deep-skin) and roe price indices (Figure 5.2). The roe price index fell 11% (Figure 5.3). Roe prices, like production, are as low as they've been over the last decade. Fillets price indices also fell, primarily for deep-skin fillets which dropped 4.8%, the standard fillet index only fell 1.3%. Fillet prices indices have been slowly declining since 2008 and 2009 when reduced pollock production drove prices up, but remain at or above levels seen prior to 2008. The surimi price index rose slightly in 2014. Surimi prices peaked in 2008 and have been vacillating since and in 2014 the index was approximately at its 10 year average. The more prominent change in 2014 was in the cod price index which increased 20% bringing the index out of the low in 2013. The H&G price index, which is the (the primary product form for BSAI at-sea

[4] The term 'standard' fillets is used to differentiate non-deep-skin fillets from deep-skin fillets.

cod), similarly increased by 7.9%. The H&G price index is an amalgamation of price change from various species, but primarily cod and flatfish. The flatfish price index fell 16% dropping it to its lowest level since 2003. Though it's only a small segment of the market price index the whole fish price index decreased 53% partially in association with the decrease in flatfish prices.

Commensurate with the increasing quantity index, the aggregate value index rose 5.8% in 2014. The value across species was increasing, if only slightly, for all indices except for flatfish. The pollock value index remained basically flat increasing only 5% in 2014 (Figure 5.2). Though not at its peak, the pollock value index remains above its ten year average. Across pollock products, there were significant increases in roe and surimi which rose 25% and 20%, respectively, as a result of increased production quantities (Figure 5.3). The decreasing deep-skin quantity and price indices resulted in a 16% in the value index. For the standard fillet product type the quantity increase from the shift in production and only a marginal change in prices resulted in a 8% increase in the value index. The net effect in combined (deep-skin and standard) was a 4% decrease in fillet value. The rebound in cod prices in 2014 brought the cod value index up 17% from its dip in 2013. While the cod price index remains low relative to historical norms, quantities are high, leaving the value index at 129 slightly above its average level (118). The value index for flatfish fell (14%) for the second consecutive year after trending up fairly consistently between 2003 and 2011. The upward trend in value was primarily the result of increasing production quantities which have leveled off since 2012 and decreasing prices over 2013-2014 have translated into declining value. The value from H&G products rose 6.9% with the prices for this product. The aggregate impact was significant because of H&G's value share in this sector.

Indices indicate that the BSAI at-sea sector was better off in 2014 than in 2013 and while value is not as high as in 2010 and 2011 it remains economically healthy. In contrast to 2013 when price shocks cause dramatic a drop in value, in 2014 production quantity increases were the source value growth. In part, the marked 2013 decrease in the value index was likely a regression from highs seen in 2011 and 2012. Value remains higher than it was prior to 2008. The low levels of value in 2009-2010 were driven by reduced production from conservation reductions in the pollock TAC and depressed cod prices from competition with Atlantic cod. Pollock value is distributed across a diverse set of product forms enabling processors to make marginal changes in production mix based on market prices and demand thereby providing a buffer against adverse shocks in any one product type. This is less true for other species in the BSAI at-sea sector which are concentrated in H&G, such as cod. In general, prices have been the primary driver of value throughout much of the decade (with the exception of 2008-2010). With production quantities since 2011 at, or near, the highest they have been in the last decade, future growth in this sector seems unlikely to come from substantial increases in quantities. While value increases prior to about 2008 were driven mostly by pollock and Pacific cod, other species such as flatfish have begun to play a more significant role in value growth.

5.3. Economic Performance of the BSAI Shoreside Sector

BSAI Shoreside Wholesale Market

Highlights in 2014

- Value at a high level and increased in 2014 with increased value in pollock and cod.

- Increases in pollock and cod leave species quantity indices at high levels.
- Pollock prices are down across most product types (surimi was an exception), and H&G prices were strong (primarily for cod).

Value in the BSAI shoreside wholesale market rose 5.8% in 2014. Groundfish value in this sector is highly concentrated in pollock, which in 2014 comprised 82% of the total value (Figure 5.4). Pollock processing derives value from many different product forms. Fillets are a critical product for this sector with 42% of the value share (standard and deep-skin fillets), as is the production of surimi which accounted for 28% of sector's value (Figure 5.5). As with the at-sea sector, the significance in value share of roe has been steadily decreasing over time, and in 2014 8% of this sector's value came from roe (an increase over 2013). The remainder of value across species is divided between cod at 16% and sablefish which brought in 1.2% of the total value. In contrast to the BSAI at-sea sector, cod value is diversified outside of H&G into fillets and "other" products.[5] Relative to the at-sea sector, the 8% share of value from H&G products is small.

The aggregate quantity index increased 7.6% to 151 in 2014, its highest level since 2003. The quantity index for pollock, the most important species in the region, rose 7.6% (Figure 5.4) and was a primary source of positive production growth in the region. Part of pollock's additional production went into fillets, which (together with growth in cod fillet production) resulted in a 11% increase in the fillet quantity index, though deep-skin fillet production fell 27% (Figure 5.5). Surimi production remained stable increasing a mere 3.4%. Shoreside roe production also increased significantly (54%) to levels not seen since 2007. Similar shifts in the production mix are were also observed in the at-sea sector. The cod quantity index increased by 9.7% to a decadal high. While 2013 cod production shifted out of H&G and into fillets, in 2014 fillet remained flat while H&G production increased. This shift contributed to an 8.5% increase in the H&G quantity index.

Aggregate prices in the shoreside sector fell in 2014 as shown by the 1.7% decrease in the index. The aggregate change is largely be attributed to a 3% drop in the pollock price index (Figure 5.4). The largest factor in the declining pollock price was the 9.3% drop in the fillet price index (Figure 5.5). Declining roe price index (down 9.2%) also contributed, and to a lesser extent the decrease in the price of meal and oil. The pollock price index was not as high in 2014 as it was in 2008-2010 when supply constraints put upward pressure on prices, however they remain higher than they were prior to 2008 as a result of moderately strong fillet and surimi prices that are near the decadal average. The cod price index rose 5.1% in 2014 but remains at a low level. This coincides with the 19% increase in the H&G price index. Though sablefish is not a large share of the shoreside sector, the modest change in the price index comes after a price spike in the years leading up to 2011 and a subsequent reversion in 2012.

The increase in the quantity index resulted in a net 5.8% increase in the aggregate value index leaving the value index at it's second highest level. The aggregate change is a reflection of value increases in both pollock and cod, which were also the result of price changes. The pollock value index rose 4.4% and the cod 15% (Figure 5.4). For both pollock and cod increases in the quantity indices were the primary determinant of value growth. The products that saw the most value growth were roe (9.2%) H&G (19%) and surimi (9.4%) (Figure 5.5). While the decline in deep-skin value was the major detractor falling 6.4%.

[5]The "other" product type typically consists of ancillary products such as heads, stomachs, etc. For cod the "other" product is any product that is not whole fish, headed and gutted, fillet, or salted and split. Fillets are basically either pollock or cod. In contrast, both head-and-gut and whole fish production are balanced across species.

Examining the indices over the past decade, the shoreside wholesale sector is performing at level that is on par with performance prior to 2008. Production, which had fallen in 2008-2010, has rebounded and has continued to increase in recent years. Value changes in 2014 for the BSAI shoreside sector were the result of changes in production quantities. With production quantities near highs for both pollock and cod, increasing prices (in particular pollock prices) will be critical to value growth in the BSAI shoreside sector. Because of the high concentration of the BSAI shoreside sector in pollock, groundfish value in this sector is highly exposed to changes in the TAC or prices of the product forms in which it is concentrated (e.g., fillets and surimi). An example of this is the effect of conservation measures that reduced the pollock and cod TACs in 2008-2010, which was comparatively more disruptive to the groundfish revenues of the shoreside sector than the at-sea sector because of the concentration in pollock. Diversification across product types, as with pollock and cod, will continue to buffer this sector against product-specific shocks in price or demand, but broad scale shocks to a pollock or whitefish will adversely affect groundfish revenues in this sector.

BSAI Shoreside Ex-Vessel Market

Highlights in 2014

- Value at a high range and increased in 2014 with increased value in pollock and cod.
- Ex-vessel prices indices increased across for the three primary species.
- Catch quantities indices stable except for sablefish which is at a low.

The BSAI ex-vessel market consists of catcher vessels that sell their catch to shoreside processors who process the catch into products that are sold on the first-wholesale market. Thus, the distribution of value share across species in the ex-vessel market (Figure 5.6), as expected, is similar to the wholesale distribution (Figure 5.4). Analysis of the ex-vessel market provides additional insight into the gear types (Figure 5.7) used to harvest delivered catch. Difference in quantity indices across species can, in part, be attributed product recovery rates as wholesale production is measured in product weight and ex-vessel production is measured in round weight.[6] Differences between price indices of species relate to the premium on wholesale processing and negotiations between catcher vessels and wholesale processors. Comparing the ex-vessel market to the wholesale market also provides insight into pass-through of value from the wholesale to the ex-vessel market.

As in the wholesale market, value share in the ex-vessel market is focused in a single species, with 81% of the value coming from pollock alone (Figure 5.6) in 2014. the value share from cod and sablefish were 16% and 3.1%, respectively. Though pollock has remained the dominant species, across the last ten years value share has fluctuated somewhat between pollock and cod. Almost all of the catch in the sector and consequent value in this sector comes from trawl gear (90%). Trawl gear is used to harvest pollock and a large portion of the cod harvest (Figures 5.7). Most of the remaining harvest of cod is carried out using pot gear, which accounted for 7.6% of the total value share. Hook-and-line gear, which targets sablefish and cod, accounted for 2.5% of value in 2014. The share of value across gear types has remained essentially constant over the last few years.

The aggregate quantity index, which is an index of catch deliveries to shoreside processors, increased 0.22% to 152 in 2014. Quantity indices show that pollock catcher vessel quantities are below their

[6] Ex-vessel indices are constructed using catch that is counted against a the federal total allowable catch (TAC).

levels prior to 2007 (Figure 5.6). The pollock quantity index remained basically flat increasing a mere 1.2%. After consecutive years of catch growth since 2008, the cod have been stable since 2012 and high relative to historic norms. The sablefish index decreased 17% to its lowest level, though sablefish catch in this sector is comparatively small. The gear-type quantity indices show that hook-and-line quantity index increased 6% as more cod was caught by this gear-type (Figure 5.7). The pot quantity index decreased slightly (4.5%).

The aggregate ex-vessel price index increased 5% to 102 in 2014. The increase was primarily the result of the slight 2.6% rise in the pollock price index because of pollock's large share in the sector (Figure 5.6). A more prominent change occurred in the ex-vessel cod price index wich rose 12% with its corresponding wholesale price. This suggests that change in the ex-vessel price was in part the result of wholesale price changes passing through to the ex-vessel price. Similar price changes occurred across gear-type price indices (Figure 5.7). The price for trawl caught fish increased 3.3% with the pollock price. Pot gear, which is concentrated largely in cod, saw a 19% increase in its price index. Hook-and-line makes up a small share of the sector, but the ex-vessel price index rose 34% with the price of cod and sablefish. In aggregate, the ex-vessel price index level is in the middle of its range over the past decade. It is as low or lower than it has been since 2008 but still higher than it was 2007 and earlier.

The aggregate value index in the BSAI shoreside ex-vessel market for 2014 is up 5.2%, going from 147 to 154. Because pollock is such a large share of the value the increase in aggregate ex-vessel value was in large part a result of the rise in pollock value. The pollock value index increased 3.8% as the price index rose and the quantity index was essentially flat. The aggregate impact of cod and sablefish is more muted due to their smaller shares in the ex-vessel market. In 2014 the 8.9% rise in cod value index gave additional the upward momentum to aggregate value growth. Also like pollock, the rise in cod value was the result of the increasing price index while quantities remained stable. Sablefish also contributed to the growth in value with a 17% rise in the value index coming from prices as quantities declined.

Groundfish revenues in the BSAI shoreside ex-vessel sector is highly concentrated in pollock. Thus, groundfish value is high when the market for pollock is strong and catches are stable. The ex-vessel sector is intrinsically connected to the wholesale market. Variation in pollock prices has driven much of the dynamics in this sector. Particularly in the years prior to 2008 and since 2011 when catch has been relatively stable. In the intervening years 2009-2010 the conservation reductions in the pollock TAC pulled down revenues in this sector. While ex-vessel value index is lower than it was in 2011 and 2012, it remains near the top of its range over the last decade. The current level of pollock (and sablefish) production is below its peak over the last decade thus there seems some, albiet limited, potential for future growth in production when the TAC allows. However, broader market prices and the pass through of value from the wholesale market for pollock will continue to be the largest factor determining the economic health of this sector.

5.4. Economic Performance of the GOA At-Sea Sector

GOA At-Sea Wholesale Market

Highlights in 2014

- Increases in value for all species (complexes) with significant increases in value for the three of the four primary species.
- Increases in quantity indices for most species with a huge increase in the quantity index in the flatfish quantity index.
- Price increases for all primary species.

The GOA at-sea sector is the smallest, by measure of wholesale value, of the sectors (Figure 5.1). In terms of the distribution of value, it is the most diversified with a sizable share of value coming from four different key species or species complexes: flatfish, cod, rockfish and sablefish (Figure 5.8). It is also the only sector that does not rely substantively on pollock. Flatfish and rockfish had the largest share of value at 37% and 30% in 2014, respectively. Flatfish's value share increased 11% in 2013 from the 26% in 2014, which resulted in decreasing value share for sablefish and to a lesser extent for most other species besides cod. Value did grow for these other species, if only marginally, however, they were outpaced by flatfish which resulted in the significant shift in the proportion of value. Sablefish still maintained a sizable 13% value share. Cod's value share remained fairly stable increasing slightly to 15%. While diversified in species, value from the product types in this region is concentrated in head-and-gut products (91%) with the remainder going to mostly to whole fish (8%) (Figure 5.9).

The aggregate quantity index increased 39% to 114 in 2014. The substantial increase production brought the quantity index from it's low level in 2013 to its highest observed. Quantity indices show that production increased for three of the four key species: flatfish, cod and rockfish (Figure 5.8). By far, the species index showing the largest growth was in the flatfish quantity index which rose 93%. Production graphs show that flatfish production more than doubled (Figure 5.8) and catch tables show a large increase in arrowtooth flounder catch (Table 4). Rockfish and cod also showed increasing quantity indices (23%, and 64% respectively). While the sablefish index remained basically unchanged. The increase of 46% in the H&G quantity index came largely from the increase in flatfish production (Figure 5.9). Despite the large growth in production the flatfish whole fish product production dropped resulting in a 1.5% decrease in whole fish quantity index.

The aggregate price index also increased 23% to 109 in 2014. This level is above the average and in the upper part of the distribution of index values since 2003. Price indices increased significantly for three of the four key species in this sector: flatfish, cod and rockfish (Figure 5.8). These three species combined account 82% of the value in this sector. The 22% increase in the rockfish price index and the 30% increase in the flatfish index were particularly influential on the aggregate price change. While the current level of the rockfish price index is within its typical historical range it has show considerable volatility in recent year after a large increase in 2011 and two consecutive years of significant decreases. The 25% increase in the cod price index brought it up from the low in 2013. Relative to the shoreside sector sablefish price index (which rose 22%), the at-sea sablefish price index change was smaller increasing by 20%.

Increasing value in rockfish, flatfish and cod contributed to the 71% rise in the aggregate value index (Figure 5.8). The value index increase in 2014 mostly erased the substantial consecutive decreases in 2012 and 2013 bringing the value index from a low to its second highest level. The magnitude of the increase is the result of coinciding price and quantity index increases in flatfish, rockfish and cod. The 152% increase in the flatfish index was the largest component of change which was, in turn, the primarily the result of the large increasing quantity index. The value index increases in rockfish and cod were also substantial at 50% and 105%, respectively. The change in the rockfish and cod value indices were the result of more balanced increases in both price and quantity.

In general, variation in the price index has been driving much of the change in aggregate value throughout 2003-2014. Aggregate quantities have been comparatively more stable, particularly between 2006-2011. The substantial change in the 2014 quantity index is somewhat of an anomaly in this sense, though not unprecedented. In 2004 decrease similar in magnitude occurred in the quantity index, which also primarily the result of activity in the flatfish fisheries. Contributing to the volatility are the sector's small size and the fact many of the vessel's primary fishing operations occur in the BSAI. Catches for the GOA flatfish species are well under the total allowable catches (TAC) leaving room to expand the fisheries when the opportunity arises (though coincident catches of pollock and cod which are close to their TAC may act as a contraint). Hence, changes in the activity in the sector may, in part, reflect changes in opportunities in the BSAI fisheries for the vessels that operate in both.

5.5. Economic Performance of the GOA Shoreside Sector

GOA Shoreside Wholesale Market

Highlights in 2014

- Increases in production quantities indices of pollock and cod was the primary source of value growth in 2014.
- Prices indices were stagnant or decreasing slightly for all species except for sablefish.
- The price index for H&G was increasing but indices were decreasing for the other key product forms (fillet, roe and surimi).

The GOA shoreside wholesale market is primarily comprised of cod, pollock and sablefish (Figure 5.10). These three species account for roughly equal proportions of total value; in 2014 pollock had a value share of 32%, cod 33%, and sablefish 25%. Composition bar graphs show that cod and pollock output is distributed across multiple product forms. Fillets are an important product type with in this sector a 29% value share (Figure 5.11). This is particularly true for cod where fillets make up a large portion of the production quantities. H&G products had the largest share of total value (49%) which rose 5%, primarily from cod. Sablefish is processed almost exclusively as H&G, and H&G pollock made up a comparatively larger share of production in this sector than in the BSAI. The value share of roe has doubled from 3% in 2009 to 6.1% in 2014, with the most significant increases coming from pollock, though cod roe has also been on the rise. Surimi is also a significant product form for pollock with 7.4% of the total value. The GOA shoreside is the only sector where the "other" product type comprises a significant portion of value with a of value share of 3.1%.[7] The remaining value comes from the whole fish product type which is an important product form for rockfish and flatfish.

[7]The "other" product type typically consists of ancillary products such as heads, stomachs, etc. For cod the "other" product is any product that is not whole fish, headed and gutted, fillet, or salted and split. Fillets are basically either pollock or cod. In contrast, both head-and-gut and whole fish production are balanced across species.

The aggregate quantity index rose 14% in 2014. Overall, the aggregate quantity produced in 2014 is at a high with peak levels in pollock and high levels of cod production. The decomposition of the index across species shows that the 41% and 17% increases in the pollock and cod quantity indices, respectively, was the primary factor in the aggregate increase (Figure 5.10). The sablefish quantity index decreased 11% though the decline had only a mitigating impact on aggregate production. Composition bar graphs show that the majority of the cod production increases in 2014 went into H&G, though notably cod roe production has continued to rise and is at its highest level over the last decade. The pollock production increases in 2014 were distributed across the fillet, H&G, roe and surimi product forms (Figure 5.11). The increased production of these product types is apparent in the product quantity indices. The H&G production increase of 15% was most significant in an aggregate sense and reversed the decline in production seen in the previous year. Key increases in the product quantity indices also came from fillets (12%), surimi (43%) and roe (47%) which are each at the highest levels observed over the last decade. There was a significant idiosyncratic decline in the "Other" product quantity index in spite of the increase in cod production which makes up the dominant share of the "Other" product type.

The aggregate price index fell 2.5% in 2014 for the third year in a row. Since 2011 the aggregate price index has fallen 18%. The 20% decrease in pollock was the primary component in the declining aggregate price index because of the magnitude of the price change, and its importance in the region (32% value share) (Figure 5.10). Pollock's impact on the aggregate price was mitigated by the 20% rise in the sablefish price index which saw it's first increase since 2011. The meteoric rise in sablefish price starting in about 2009 brought prices to an unsustainable high from which it subsequently reverted. The 2014 increase could indicate that the recent price range is more tenable. The idiosyncratic change in the flatfish price index was notable (down 19%), but the aggregate affect on the sector was marginal. Changes in the price indices of the other key species, cod and rockfish, were smaller. The H&G price index increase of 7.3% was most prominent product price change in the sector and it was the only product showing positive price movement (Figure 5.11). This was offset by the across the board decrease in all the other price indices, in particular for fillets, roe and surimi (where corresponding quantity indices increased substantially).

The increase in the quantity index was larger than the decrease in the price index resulting in an aggregate value index increase of 11% in 2014. Value indices grew for the three key species, pollock, cod and sablefish, though the growth in value came in subtly different ways (Figure 5.10). Pollock value index growth (13%) came purely from quantity increases in which more than counteracted the decline in price. Similarly, the increase in the cod value (21%) index also came from increased production quantities, although it coincided with a marginal increase in the cod price index. The increase in the sablefish value index (8.4%) was driven by price while quantities decreased. Commensurate with its significance in the sector, the 23% increase in the H&G value index was the most influential product component of the aggregate value change (Figure 5.11). Fillet, surimi and roe value indices also increased as a result of increased production quantities offset declining prices.

Looking at the GOA shoreside wholesale sector over a longer time horizon, aggregate value is near it's peak. Recently, fillets, surimi and roe have made up a larger share of the portfolio of products brought to market. Diversification across product types and species has likely contributed to the strength of this sector throughout the decade. Though the shoreside market's sources of value are fairly diversified increases in production quantities have been the driver of growth and prices have declined in aggregate since 2011. Increasing the relative share of higher valued product forms down the line could help buoy value in this sector down the line should production decline.

GOA Shoreside Ex-Vessel Market

Highlights in 2014

- Increases in production quantities indices of pollock and cod was the primary source of value growth in 2014.
- Prices indices were stagnant or decreasing slightly for all species except for sablefish.
- The price index for H&G was increasing but indices were decreasing for the other key product forms (fillet, roe and surimi).

Because the delivery of catch feeds production and sales to the wholesale market, trends in the GOA shoreside wholesale sector are largely reflected in the ex-vessel market.[8] Value from deliveries is largely concentrated in three key species: sablefish, cod and pollock (Figures 5.12 and 5.13). Sablefish has a much larger value share in the ex-vessel market, where it accounted for 48% of 2014 value, than in the wholesale market, where it accounted for only 25% of 2014 value. The difference in relative value share between the wholesale and ex-vessel markets comes from differences in the relative prices of the three primary species. The much larger value share for sablefish in the ex-vessel market indicates that the ex-vessel price for sablefish is much closer to the wholesale price than it is for either pollock or cod; this is largely because most sablefish is minimally processed into H&G products while more value is added to the cod and pollock catch by processing it into products like fillets or surimi. Value share shifted towards cod in 2014 bringing its value share to 20%. Hook-and-line gear accounts for the largest fraction of value (51%) largely because it is used in the harvest of sablefish, though the value share from trawl gear is a close second at 40%. Despite the distribution of value across gear types, trawl gear accounted for roughly three-quarters of the total quantity (weight) delivered to processors.

The aggregate quantity index increased 6% and stands at a high level. Catches increased for two of the three key species, pollock and cod, as displayed by the quantity indices (Figure 5.12). The pollock quantity index increase (52%) brings the index to a decadal high. Correspondingly, the trawl quantity index, which is largely made up of pollock catch, increased 33% (Figure 5.13). Cod is caught in substantial quantities by pot gear, and hook-and-line and trawl, however, most of the 16% increase in the cod quantity index came from the pot gear type which rose 19% in 2014. The 13% decrease in the sablefish quantity index contributed to the hook-and-line quantity index falling 13%. The quantity index for the "Other" species group was at low levels with catch at roughly three-quarters the levels seen over the past five years.

The aggregate ex-vessel price index rose 2.7% in 2014 (Figure 5.12). The slight increase in the aggregate price was the net effect of increases in the sablefish and cod price indices and a decrease in the pollock. The 21% increase in sablefish was larger both in magnitude and it's aggregate impact on the sector and mirrors the corresponding change in the wholesale sablefish price index. If the current sablefish wholesale price level is within a more tenable range, then ex-vessel price may also stabilize after the high volatility in recent years. The fall in the ex-vessel pollock price index was substantial (30%) bringing the index to it's lowest level since 2005. The drop in the pollock ex-vessel price index was in agreement with the corresponding change in the wholesale sector, though slightly more acute. Rockfish prices were also down 10% with the corresponding price decline in the wholesale sector.

[8] Ex-vessel indices are constructed using catch that is counted against a the federal total allowable catch (TAC).

The 12% increase in the cod price index was a source of positive price movement. The price indices change across gear types were commensurate with the changes across species (Figure 5.13). The price index for hook-and-line gear 20% rose with the increases in sablefish and cod. The pot gear price index increased 12% with the cod price index. The trawl price index fell 17% with the decline in the pollock price index.

The aggregate value index increased 8.9% in 2014 as aggregate quantity and price both increased. However, increases in the quantity component was the stronger source of change in value. Value indices grew for the three key species, pollock, cod and sablefish though the growth in value came in different ways (Figure 5.12). The largest increase came from the cod value index which increased by 30% where both quantity and price indices increased. Value growth in sablefish and pollock was more muted because of counteracting movements in price and quantity. Growth in the sablefish (5.7%) value index came from a marked increase in the price index. Pollock value index growth (6.4%) came from the large increase in the quantity index which more than counteracted the decline in price. The value change for trawl mirrored the change in pollock which comprises the majority of catch for this gear type. Two species groups showing decreased value indices were rockfish and "other" which declined because of deceases in price and quantity indices respectively. The largest increase in value across gear types came from the pot-gear index which rose 34% with the increase in quantity and price. The value index increase from hook-and-line (4.7%) was more muted as much of the increased cod catch was in pot-gear. However, the price index increases produced a net increase in value despite the decline in the quantity index.

Between 2004 and 2011 the rise in the price index and comparatively lower volatility in the quantity index translated to an upward-trending value index. Between 2005 and 2008 price increases were largely driven by cod and from 2009-2011 by sablefish. Since 2011 prices have dropped considerably, mostly as a result of sablefish. The aggregate quantity index has increased since 2010 and is at the highest level observed, mostly as a result of increased pollock catch. While the diversity across species has helped support the sector when negative shocks occur, with roughly 50% of the sectors value coming from sablefish the performance of this fishery is a critical component of value in the sector. The quantity index of sablefish is at a low and total allowable catch projections through 2016 aren't increasing. A return of sablefish catches could be a source of future value growth in this sector. Additionally, prices in the ex-vessel sector are intrinsically connected to prices in the wholesale sector, and strong prices in the first-wholesale market in the future should translate into strong ex-vessel prices and value.

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5.6. Economic Indices of the Groundfish Fisheries off Alaska

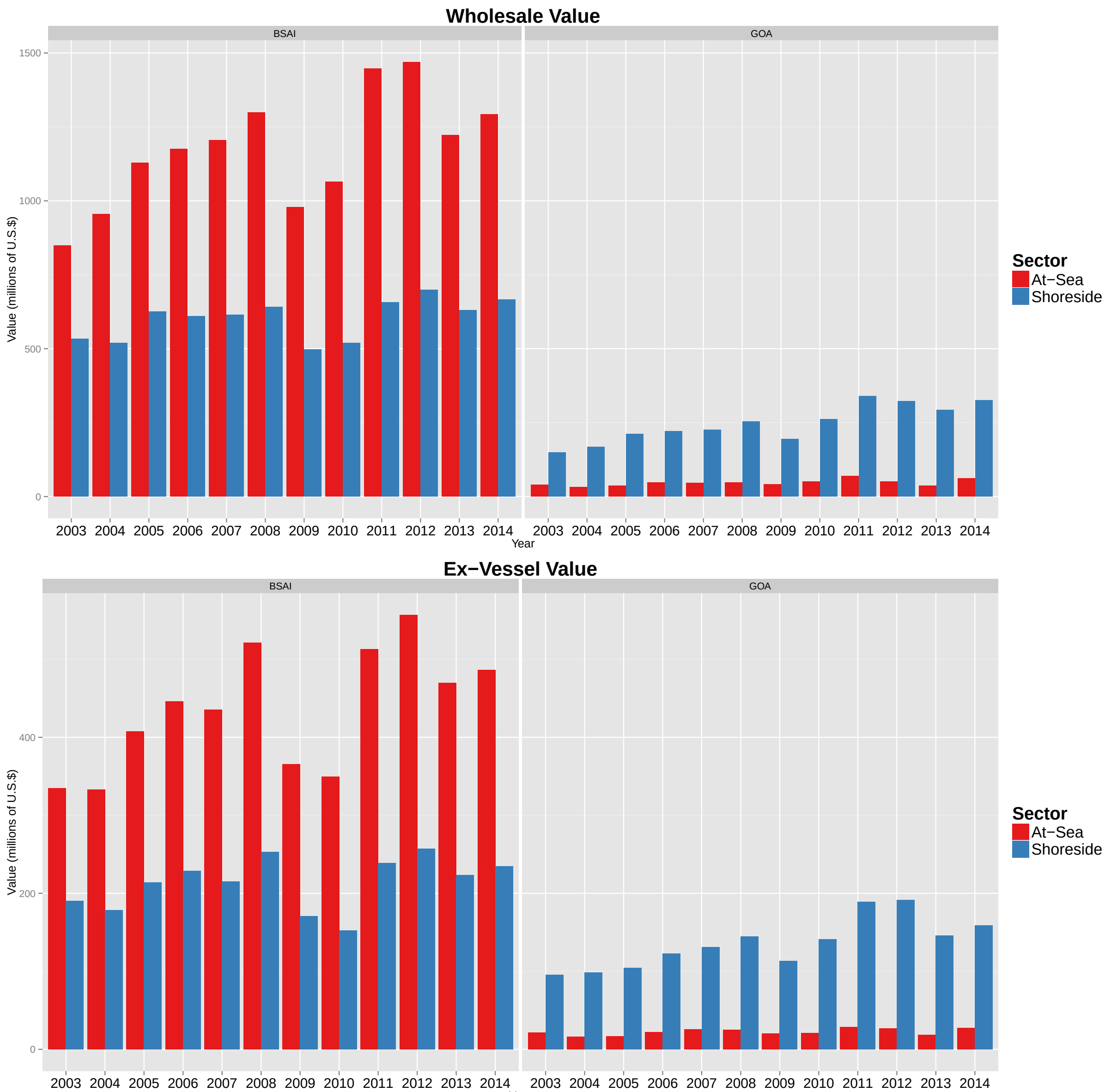

Figure 5.1: Wholesale and ex-vessel value by region and sector 2005-2014.
Source: NMFS Alaska Region's Catch-accounting system (CAS) and Weekly Production Report (WPR) estimates; Alaska Department of Fish and Game (ADF&G) Commercial Operator's Annual Report (COAR), National Marine Fisheries Service. P.O. Box 15700, Seattle, WA 98115-0070.

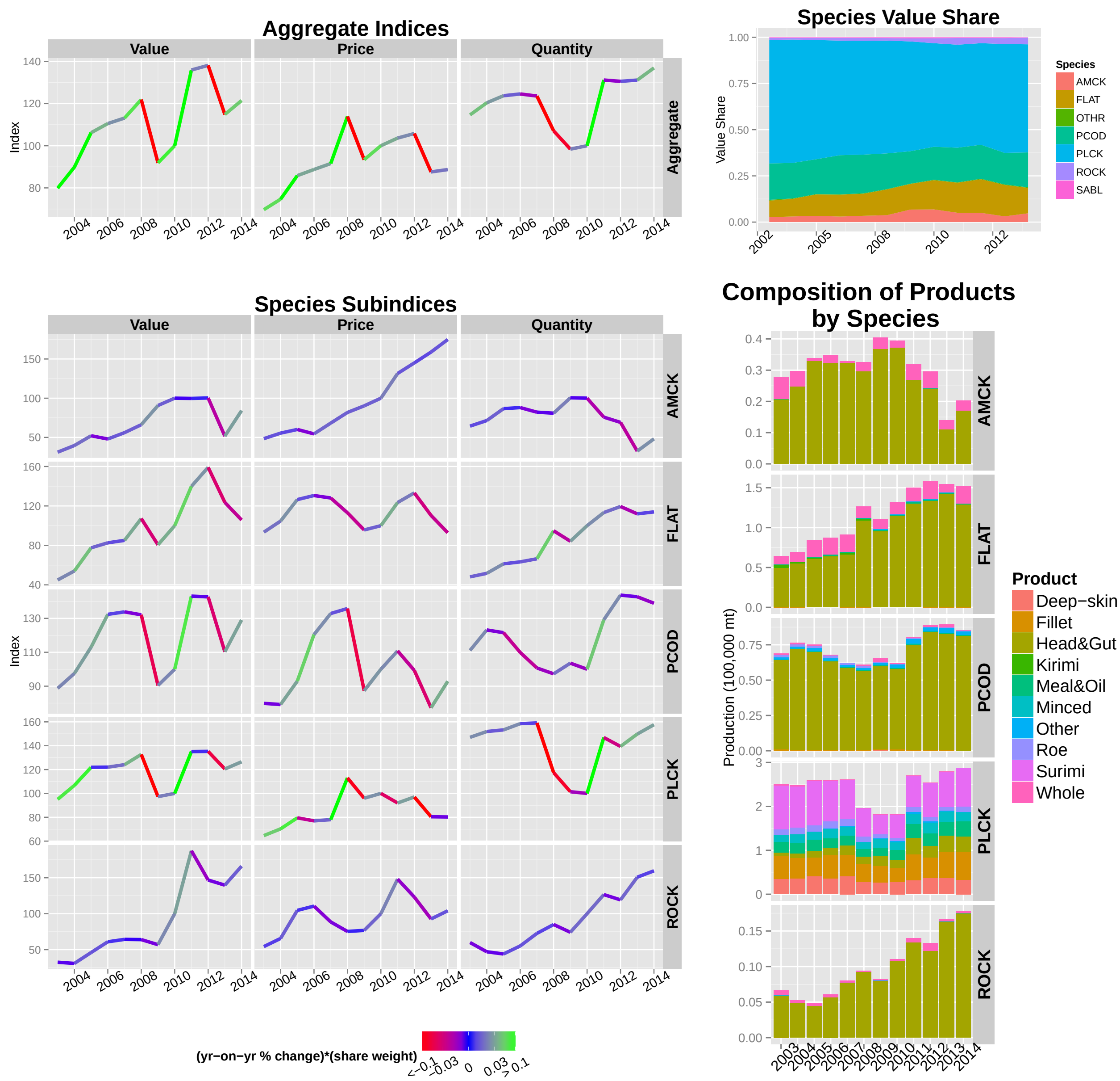

Figure 5.2: BSAI at-sea wholesale market: species decomposition 2005-2014 (Index 2010 = 100). **Notes:** Index values for 2009-2014, notes and source information for the indices are on Table 5.1. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

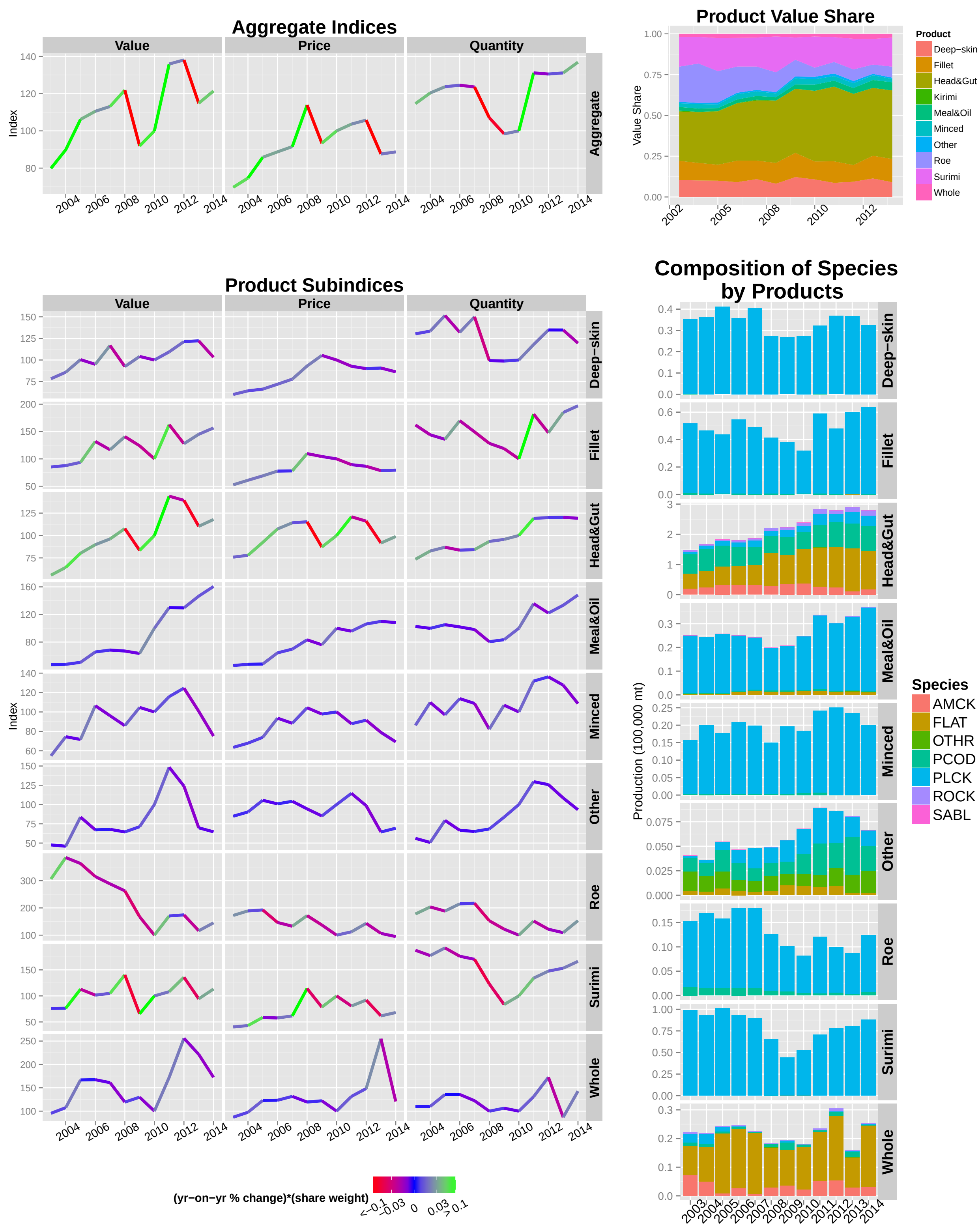

Figure 5.3: BSAI at-sea wholesale market: product decomposition 2005-2014 (Index 2010 = 100). **Notes:** Index values for 2009-2014, notes and source information for the indices are on Table 5.2. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

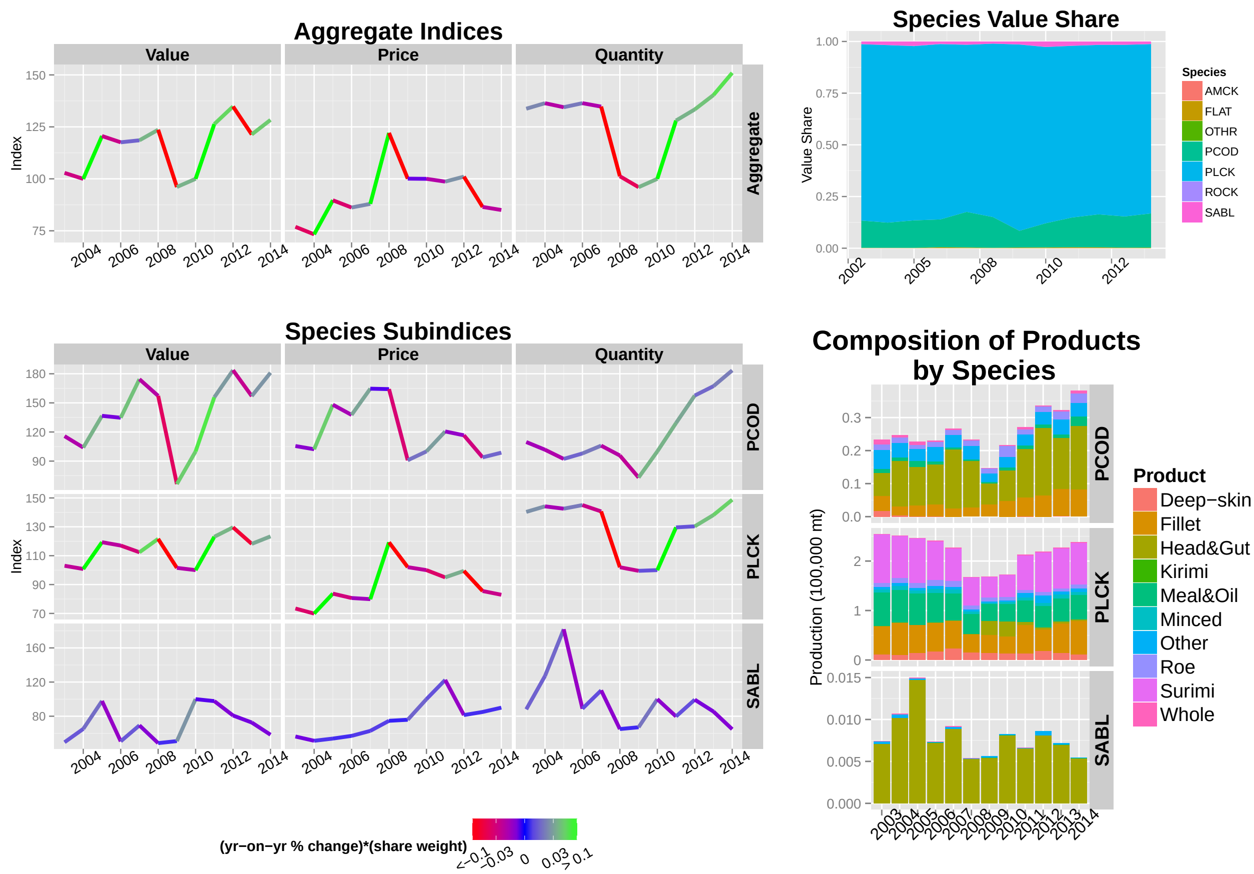

Figure 5.4: BSAI shoreside wholesale market: species decomposition 2005-2014 (Index 2010 = 100). **Notes:** Index values for 2009-2014, notes and source information for the indices are on Table 5.3. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

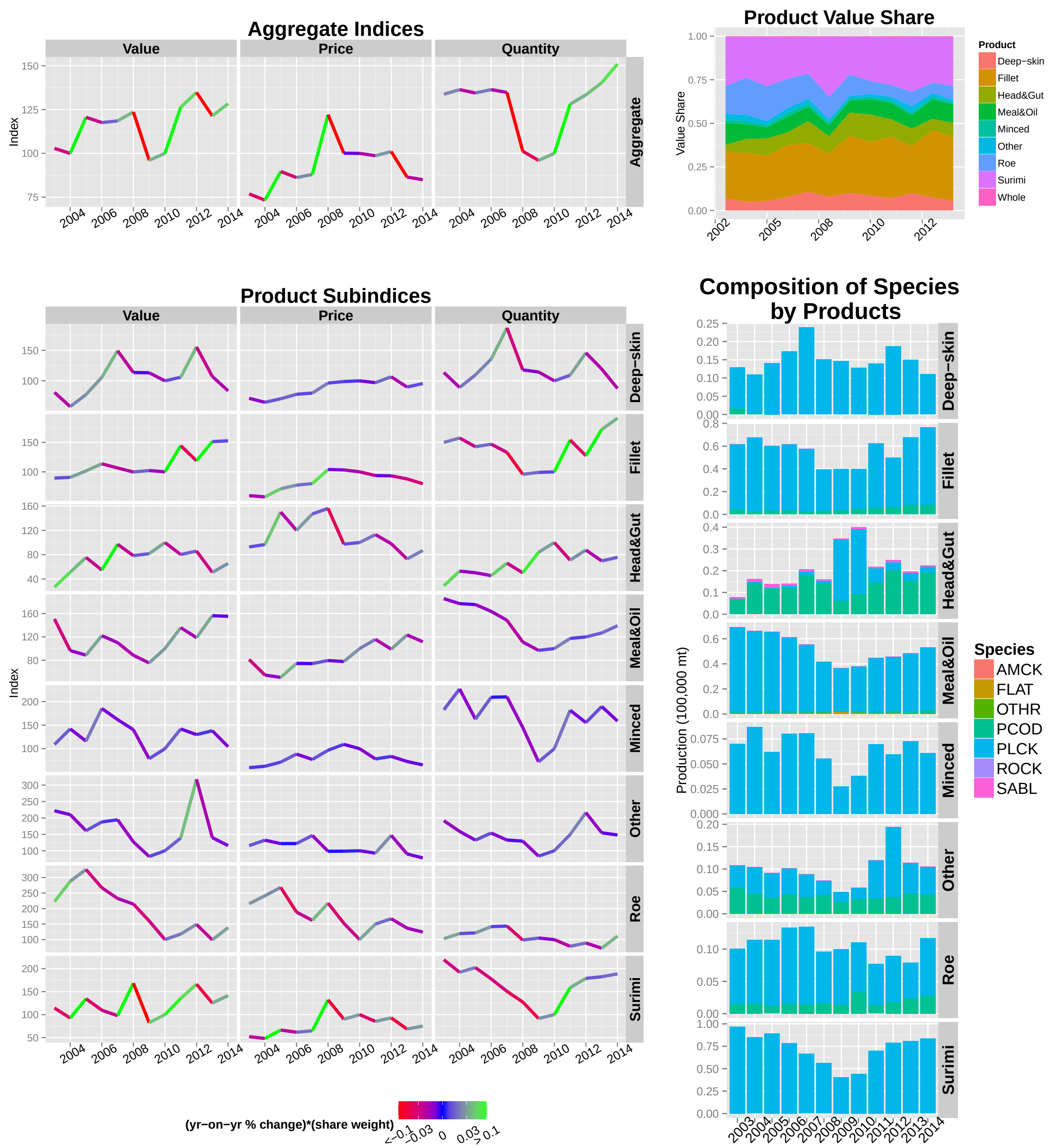

Figure 5.5: BSAI shoreside wholesale market: product decomposition 2005-2014 (Index 2010 = 100). **Notes:** Index values for 2009-2014, notes and source information for the indices are on Table 5.4. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

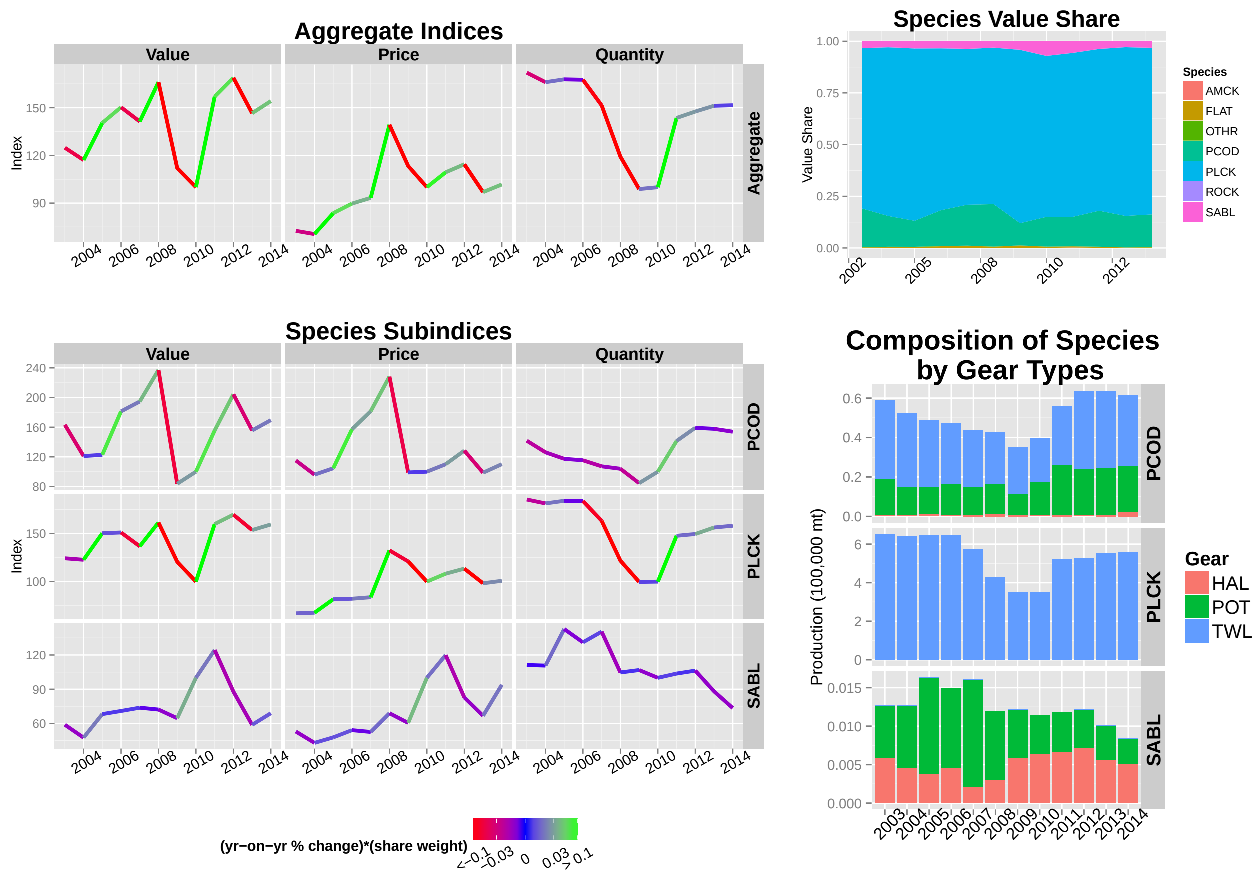

Figure 5.6: BSAI shoreside ex-vessel market: species decomposition 2005-2014 (Index 2010 = 100). **Notes:** Index values for 2009-2014, notes and source information for the indices are on Table 5.5. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

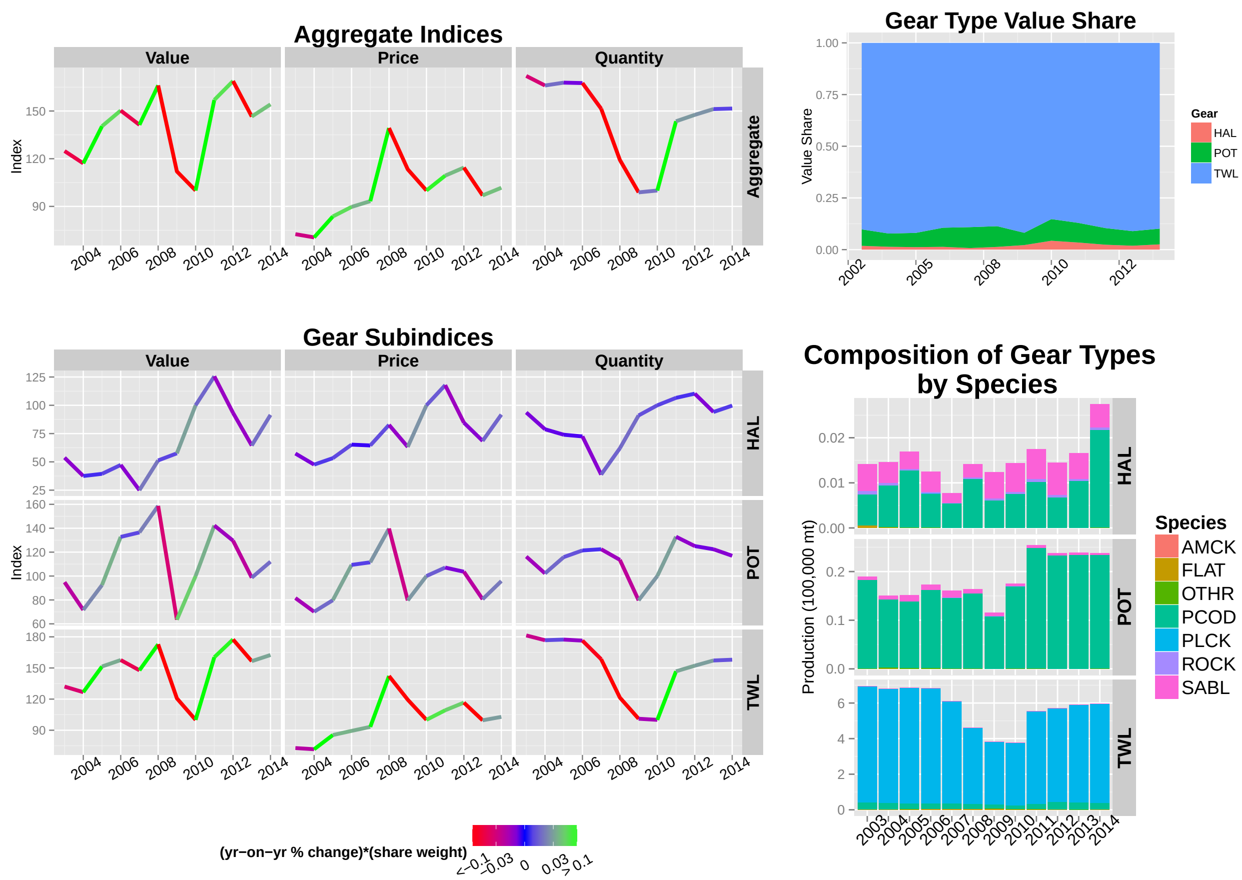

Figure 5.7: BSAI shoreside ex-vessel market: gear decomposition 2005-2014.

Notes: Index values for 2009-2014, notes and source information for the indices are on Table 5.6. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

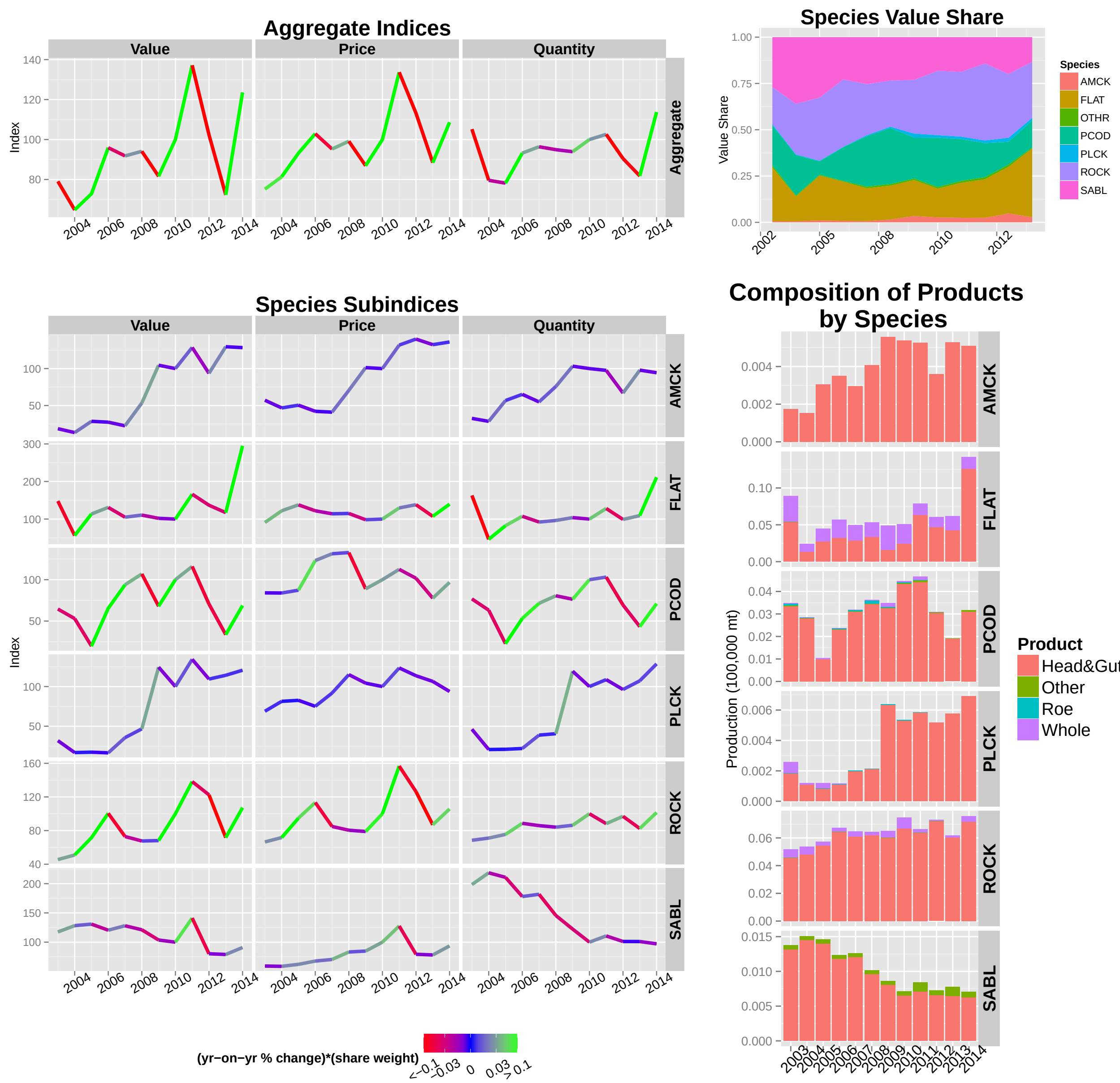

Figure 5.8: GOA at-sea wholesale market: species decomposition 2005-2014.
Notes: Index values for 2009-2014, notes and source information for the indices are on Table 5.7. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

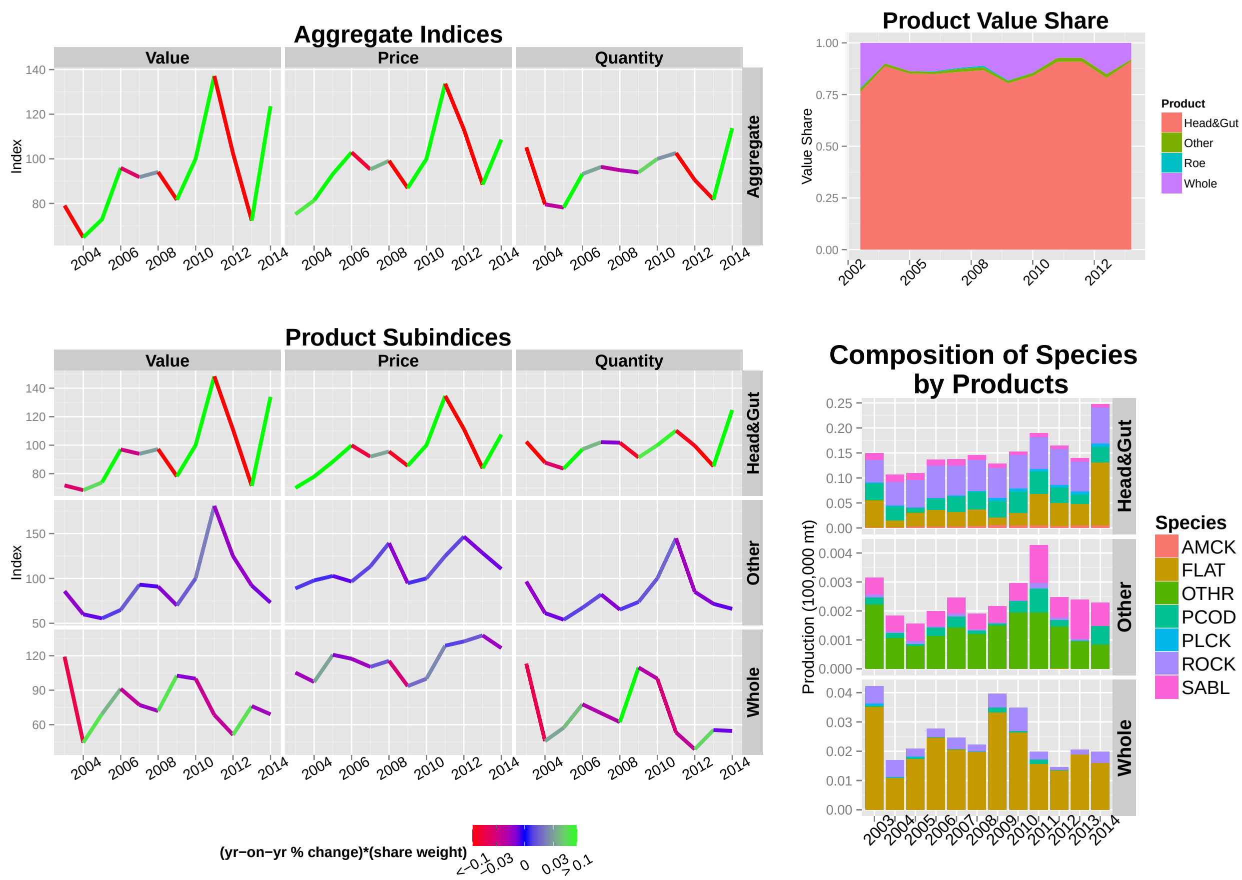

Figure 5.9: GOA at-sea wholesale market: product decomposition 2005-2014.
Notes: Index values for 2009-2014, notes and source information for the indices are on Table 5.8. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

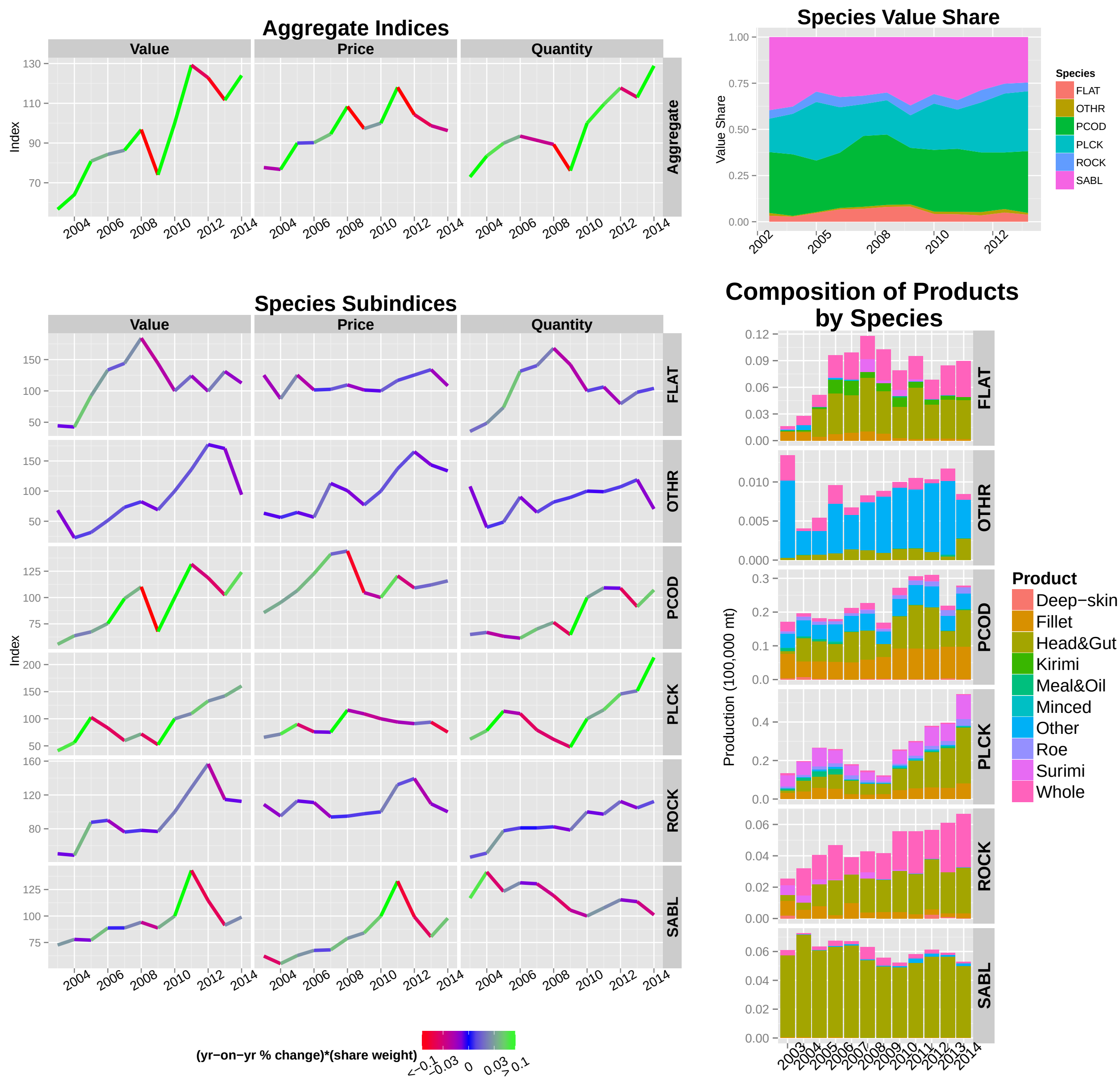

Figure 5.10: GOA shoreside wholesale market: species decomposition 2005-2014.
Notes: Index values for 2009-2014, notes and source information for the indices are on Table 5.9. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

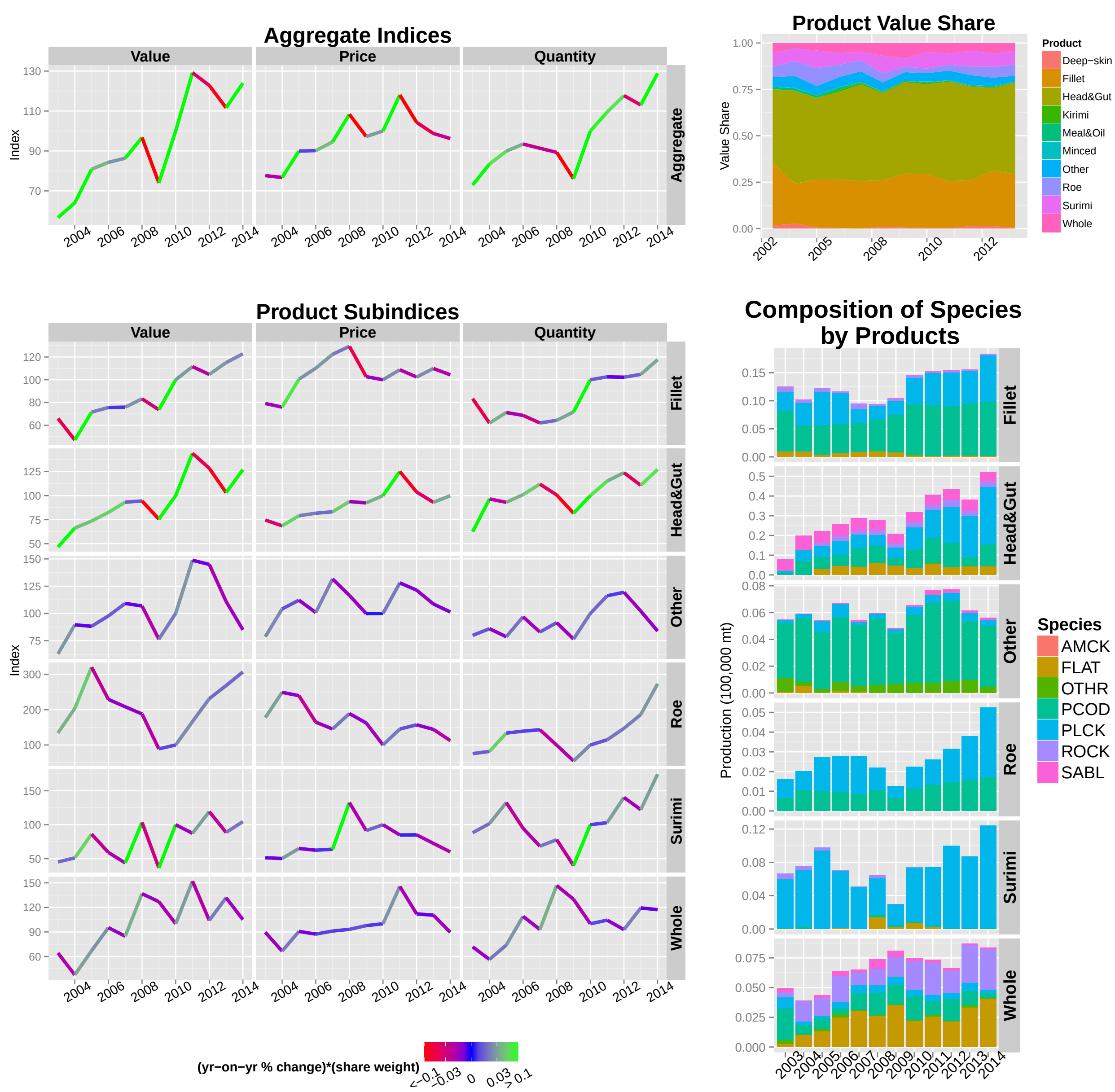

Figure 5.11: GOA shoreside wholesale market: product decomposition 2005-2014.

Notes: Index values for 2009-2014, notes and source information for the indices are on Table 5.10. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

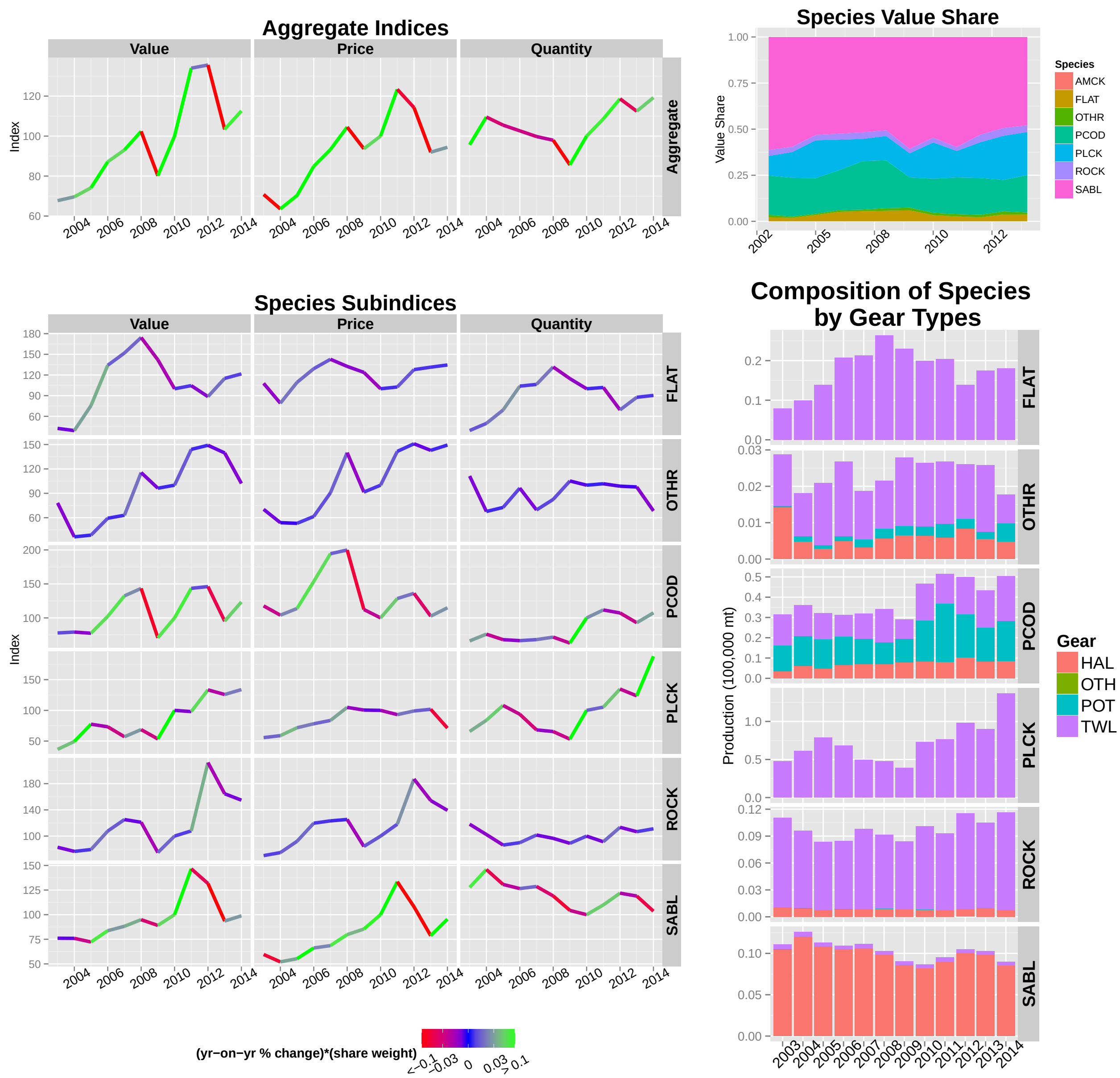

Figure 5.12: GOA shoreside ex-vessel market: species decomposition 2005-2014.
Notes: Index values for 2009-2014, notes and source information for the indices are on Table 5.11. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

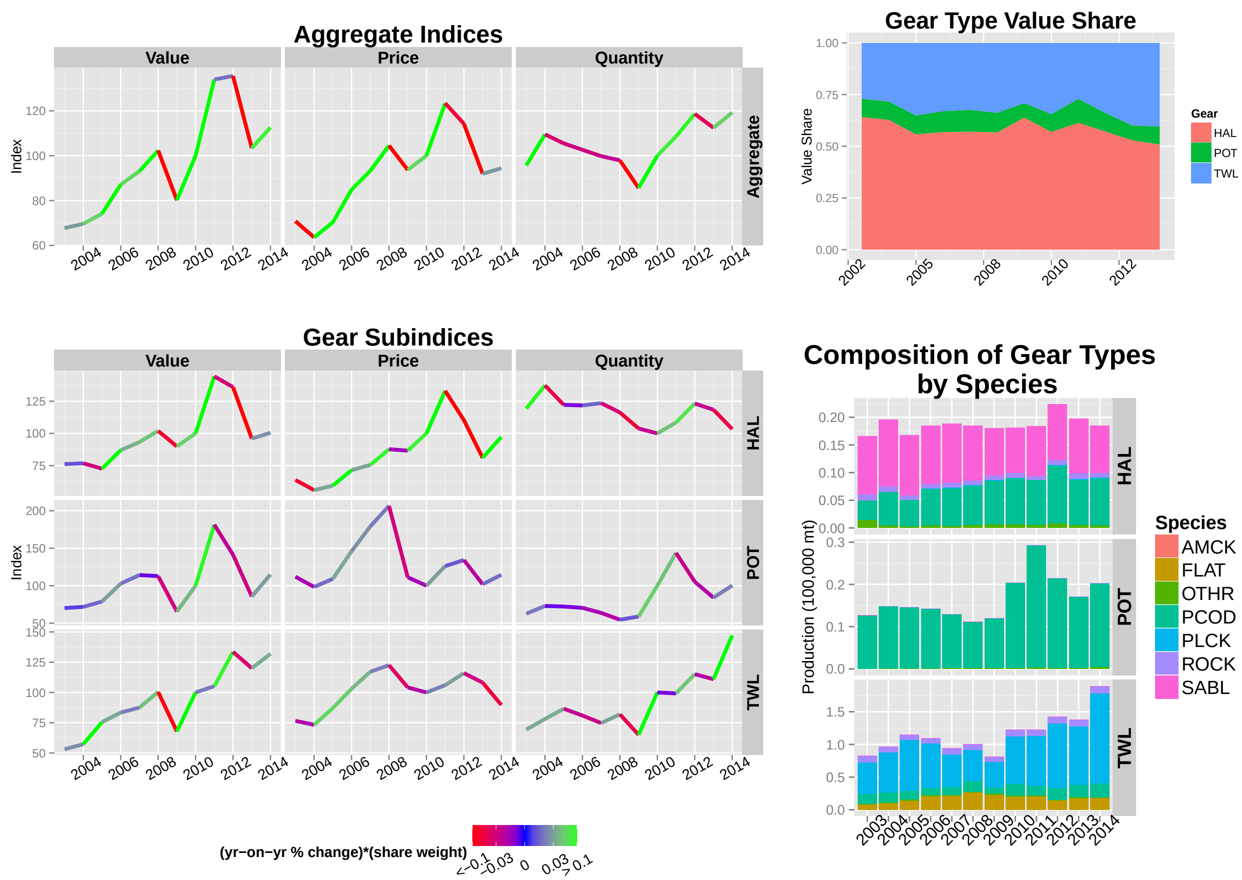

Figure 5.13: GOA shoreside ex-vessel market: gear decomposition 2005-2014 (Index 2010 = 100). **Notes:** Index values for 2009-2014, notes and source information for the indices are on Table 5.12. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

Table 5.1: Species Indicies and Value Share for the BSAI At-Sea First-Wholesale Market 2009 - 2014

Species	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	91.87	100.00	135.93	138.12	114.83	121.44
Aggregate	Price	93.37	100.00	103.63	105.80	87.56	88.70
Aggregate	Quantity	98.39	100.00	131.17	130.55	131.14	136.91
AMCK	Value	90.69	100.00	99.71	100.26	51.57	84.17
AMCK	Price	90.21	100.00	131.53	145.02	158.85	174.86
AMCK	Quantity	100.52	100.00	75.81	69.13	32.47	48.13
AMCK	Value Share	0.07	0.07	0.05	0.05	0.03	0.05
FLAT	Value	80.56	100.00	139.90	159.16	123.63	105.76
FLAT	Price	95.65	100.00	123.48	133.26	110.39	92.81
FLAT	Quantity	84.22	100.00	113.29	119.44	111.99	113.96
FLAT	Value Share	0.14	0.16	0.16	0.18	0.17	0.14
PCOD	Value	90.43	100.00	143.09	142.65	110.27	129.04
PCOD	Price	87.32	100.00	110.82	99.29	77.26	92.90
PCOD	Quantity	103.56	100.00	129.12	143.68	142.72	138.90
PCOD	Value Share	0.18	0.18	0.19	0.18	0.17	0.19
PLCK	Value	97.32	100.00	135.09	135.24	120.47	126.52
PLCK	Price	95.96	100.00	91.97	97.02	80.43	80.26
PLCK	Quantity	101.42	100.00	146.88	139.39	149.77	157.63
PLCK	Value Share	0.59	0.56	0.56	0.55	0.59	0.58
ROCK	Value	56.91	100.00	187.55	146.81	139.70	166.10
ROCK	Price	76.78	100.00	148.16	123.14	92.67	104.05
ROCK	Quantity	74.13	100.00	126.58	119.22	150.76	159.63
ROCK	Value Share	0.02	0.03	0.04	0.03	0.03	0.04

Notes: Species with a value share less than 1% were not included in this table. All groundfish species were used to calculate aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070

Table 5.2: Product Indicies and Value Share for the BSAI At-Sea First-Wholesale Market 2009 - 2014

Product	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	91.87	100.00	135.93	138.12	114.83	121.44
Aggregate	Price	93.37	100.00	103.63	105.80	87.56	88.70
Aggregate	Quantity	98.39	100.00	131.17	130.55	131.14	136.91
Deep-skin	Value	104.12	100.00	109.41	121.30	122.19	103.16
Deep-skin	Price	105.36	100.00	92.77	90.02	90.71	86.31
Deep-skin	Quantity	98.82	100.00	117.94	134.75	134.70	119.52
Deep-skin	Value Share	0.12	0.11	0.09	0.09	0.11	0.09
Fillet	Value	123.94	100.00	162.67	127.75	144.98	156.53
Fillet	Price	104.31	100.00	89.43	86.46	78.43	79.43
Fillet	Quantity	118.81	100.00	181.89	147.75	184.85	197.07
Fillet	Value Share	0.15	0.11	0.13	0.10	0.14	0.14
Head&Gut	Value	83.35	100.00	143.90	139.23	110.26	117.87
Head&Gut	Price	87.14	100.00	120.86	116.02	91.60	98.87
Head&Gut	Quantity	95.65	100.00	119.06	120.01	120.37	119.21
Head&Gut	Value Share	0.39	0.43	0.46	0.44	0.42	0.42
Meal&Oil	Value	63.40	100.00	129.95	129.57	146.56	160.55
Meal&Oil	Price	76.02	100.00	95.77	106.15	109.92	108.30
Meal&Oil	Quantity	83.41	100.00	135.69	122.06	133.34	148.24
Meal&Oil	Value Share	0.03	0.04	0.04	0.04	0.05	0.05
Minced	Value	104.66	100.00	115.79	124.59	100.71	75.13
Minced	Price	97.82	100.00	87.85	91.50	78.92	69.18
Minced	Quantity	107.00	100.00	131.81	136.17	127.60	108.61
Minced	Value Share	0.04	0.03	0.03	0.03	0.03	0.02
Other	Value	71.23	100.00	148.44	123.91	69.81	64.58
Other	Price	85.16	100.00	114.48	98.47	64.36	69.28
Other	Quantity	83.64	100.00	129.67	125.83	108.47	93.22
Other	Value Share	0.01	0.01	0.02	0.01	0.01	0.01
Roe	Value	167.62	100.00	170.51	174.38	116.13	145.25
Roe	Price	137.32	100.00	112.23	143.28	106.42	94.81
Roe	Quantity	122.06	100.00	151.92	121.70	109.13	153.20
Roe	Value Share	0.10	0.06	0.07	0.07	0.06	0.07
Surimi	Value	65.45	100.00	108.08	135.90	94.37	113.21
Surimi	Price	78.45	100.00	80.57	92.04	61.61	68.06
Surimi	Quantity	83.42	100.00	134.14	147.65	153.18	166.34
Surimi	Value Share	0.14	0.19	0.15	0.19	0.16	0.18
Whole	Value	129.87	100.00	172.26	256.01	221.58	172.39
Whole	Price	122.15	100.00	131.46	148.40	255.03	120.70
Whole	Quantity	106.32	100.00	131.04	172.51	86.88	142.83
Whole	Value Share	0.02	0.02	0.02	0.03	0.03	0.02

Notes: Products types 'Minced', 'Other' and those with a value share less than 1% were not included in this table. All product types were used to contruct aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070

Table 5.3: Species Indicies and Value Share for the BSAI Shoreside First-Wholesale Market 2009 - 2014

Species	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	96.08	100.00	126.35	134.80	121.36	128.34
Aggregate	Price	100.10	100.00	98.68	101.06	86.49	85.01
Aggregate	Quantity	95.99	100.00	128.04	133.40	140.32	150.97
PCOD	Value	66.38	100.00	155.79	183.68	156.99	181.06
PCOD	Price	90.88	100.00	120.56	116.58	93.87	98.68
PCOD	Quantity	73.05	100.00	129.22	157.55	167.25	183.48
PCOD	Value Share	0.08	0.12	0.14	0.16	0.15	0.16
PLCK	Value	101.56	100.00	123.11	129.65	118.19	123.36
PLCK	Price	102.06	100.00	94.98	99.46	85.53	82.94
PLCK	Quantity	99.51	100.00	129.61	130.35	138.18	148.75
PLCK	Value Share	0.90	0.85	0.83	0.82	0.83	0.82
SABL	Value	50.85	100.00	97.68	80.84	72.62	58.33
SABL	Price	75.83	100.00	122.49	81.34	84.98	90.01
SABL	Quantity	67.07	100.00	79.75	99.38	85.45	64.81
SABL	Value Share	0.01	0.03	0.02	0.02	0.02	0.01

Notes: Species with a value share less than 1% were not included in this table. All groundfish species were used to calculate aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070

Table 5.4: Product Indicies and Value Share for the BSAI Shoreside First-Wholesale Market 2009 - 2014

Product	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	96.08	100.00	126.35	134.80	121.36	128.34
Aggregate	Price	100.10	100.00	98.68	101.06	86.49	85.01
Aggregate	Quantity	95.99	100.00	128.04	133.40	140.32	150.97
Deep-skin	Value	113.19	100.00	105.90	155.61	107.23	83.61
Deep-skin	Price	98.85	100.00	96.96	106.64	89.83	95.54
Deep-skin	Quantity	114.51	100.00	109.22	145.92	119.38	87.52
Deep-skin	Value Share	0.10	0.09	0.07	0.10	0.08	0.06
Fillet	Value	102.21	100.00	144.25	118.64	151.18	152.50
Fillet	Price	103.23	100.00	93.73	93.29	88.08	79.91
Fillet	Quantity	99.01	100.00	153.90	127.18	171.64	190.83
Fillet	Value Share	0.33	0.31	0.35	0.27	0.38	0.37
Head&Gut	Value	81.71	100.00	80.27	85.95	50.86	65.65
Head&Gut	Price	97.34	100.00	113.05	98.09	72.94	86.82
Head&Gut	Quantity	83.93	100.00	71.00	87.63	69.72	75.61
Head&Gut	Value Share	0.13	0.16	0.10	0.10	0.07	0.08
Meal&Oil	Value	75.33	100.00	135.84	118.63	156.30	155.23
Meal&Oil	Price	77.78	100.00	115.75	98.93	123.37	111.62
Meal&Oil	Quantity	96.85	100.00	117.36	119.92	126.70	139.07
Meal&Oil	Value Share	0.07	0.09	0.09	0.08	0.11	0.11
Minced	Value	78.63	100.00	141.93	129.85	138.13	104.10
Minced	Price	109.17	100.00	78.14	83.56	72.82	65.58
Minced	Quantity	72.03	100.00	181.64	155.39	189.68	158.73
Minced	Value Share	0.01	0.01	0.02	0.01	0.02	0.01
Other	Value	82.49	100.00	138.77	317.96	139.99	115.67
Other	Price	98.65	100.00	92.83	147.08	90.41	78.13
Other	Quantity	83.62	100.00	149.49	216.18	154.84	148.04
Other	Value Share	0.01	0.02	0.02	0.04	0.02	0.01
Roe	Value	160.22	100.00	117.87	149.04	99.00	138.52
Roe	Price	152.51	100.00	150.23	167.25	136.94	124.32
Roe	Quantity	105.06	100.00	78.46	89.11	72.29	111.43
Roe	Value Share	0.12	0.07	0.07	0.08	0.06	0.08
Surimi	Value	82.41	100.00	135.27	166.29	125.08	141.49
Surimi	Price	90.01	100.00	85.32	93.01	68.59	75.07
Surimi	Quantity	91.56	100.00	158.55	178.78	182.37	188.49
Surimi	Value Share	0.22	0.25	0.27	0.31	0.26	0.28

Notes: Products types 'Minced', 'Other' and those with a value share less than 1% were not included in this table. All product types were used to contruct aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: Catch-accounting system estimates, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.5: Species Indicies and Value Share for the BSAI Shoreside Ex-Vessel Market 2006 - 2014

Species	Index Type	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aggregate	Value	150.29	141.31	166.09	112.01	100.00	156.96	168.83	146.53	154.16
Aggregate	Price	89.69	93.31	139.29	113.33	100.00	109.35	114.41	96.90	101.73
Aggregate	Quantity	167.56	151.44	119.25	98.84	100.00	143.54	147.57	151.22	151.54
PCOD	Value	181.33	194.66	237.19	83.69	100.00	155.58	204.44	155.62	169.52
PCOD	Price	157.17	181.57	228.21	99.00	100.00	110.04	128.42	98.60	110.16
PCOD	Quantity	115.37	107.21	103.93	84.54	100.00	141.39	159.20	157.83	153.89
PCOD	Value Share	0.17	0.20	0.20	0.11	0.14	0.14	0.17	0.15	0.16
PLCK	Value	151.11	136.75	161.47	120.61	100.00	159.89	169.66	153.61	159.46
PLCK	Price	82.20	83.77	132.53	121.00	100.00	108.25	113.49	98.28	100.83
PLCK	Quantity	183.83	163.25	121.84	99.68	100.00	147.70	149.50	156.29	158.14
PLCK	Value Share	0.78	0.75	0.76	0.84	0.78	0.79	0.78	0.82	0.81
SABL	Value	70.90	73.77	72.15	64.55	100.00	124.37	87.94	58.75	68.95
SABL	Price	54.07	52.52	68.93	60.45	100.00	119.92	82.74	66.67	93.86
SABL	Quantity	131.12	140.47	104.67	106.79	100.00	103.70	106.29	88.12	73.46
SABL	Value Share	0.03	0.04	0.03	0.04	0.07	0.06	0.04	0.03	0.03

Notes: Species with a value share less than 1% were not included in this table. All groundfish species were used to calculate aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's CAS and WPR estimates; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.6: Gear Indicies and Value Share for the BSAI Shoreside Ex-Vessel Market 2006 - 2014

Gear	Index Type	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aggregate	Value	150.29	141.31	166.09	112.01	100.00	156.96	168.83	146.53	154.16
Aggregate	Price	89.69	93.31	139.29	113.33	100.00	109.35	114.41	96.90	101.73
Aggregate	Quantity	167.56	151.44	119.25	98.84	100.00	143.54	147.57	151.22	151.54
HAL	Value	47.28	24.99	51.28	57.54	100.00	125.58	93.33	64.46	91.48
HAL	Price	65.23	64.50	82.69	63.22	100.00	117.82	84.63	68.52	91.75
HAL	Quantity	72.49	38.75	62.01	91.03	100.00	106.58	110.27	94.07	99.71
HAL	Value Share	0.01	0.01	0.01	0.02	0.04	0.03	0.02	0.02	0.03
POT	Value	132.75	136.49	158.69	63.47	100.00	142.30	129.60	98.65	112.02
POT	Price	109.33	111.49	139.76	79.63	100.00	107.08	103.61	80.58	95.78
POT	Quantity	121.42	122.43	113.54	79.70	100.00	132.89	125.08	122.42	116.96
POT	Value Share	0.09	0.10	0.10	0.06	0.10	0.09	0.08	0.07	0.08
TWL	Value	157.63	147.76	172.79	120.72	100.00	160.34	177.46	156.55	162.49
TWL	Price	89.39	93.25	142.26	119.44	100.00	109.24	116.61	99.58	102.87
TWL	Quantity	176.35	158.45	121.46	101.07	100.00	146.78	152.18	157.21	157.96
TWL	Value Share	0.89	0.89	0.89	0.92	0.85	0.87	0.90	0.91	0.90

Notes: The Fisher index method was used to construct the indices. Further details on index construction and gear decomposition can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's CAS and WPR estimates; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.7: Species Indicies and Value Share for the GOA At-Sea First-Wholesale Market 2009 - 2014

Species	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	81.61	100.00	137.15	102.42	72.31	123.57
Aggregate	Price	86.90	100.00	133.69	113.18	88.44	108.62
Aggregate	Quantity	93.92	100.00	102.59	90.49	81.77	113.76
AMCK	Value	104.58	100.00	128.59	93.58	129.59	128.39
AMCK	Price	101.32	100.00	131.79	139.95	132.36	136.00
AMCK	Quantity	103.22	100.00	97.57	66.87	97.90	94.40
AMCK	Value Share	0.03	0.03	0.03	0.02	0.05	0.03
FLAT	Value	101.94	100.00	166.17	136.88	117.12	294.95
FLAT	Price	98.17	100.00	129.62	138.23	107.22	139.66
FLAT	Quantity	103.84	100.00	128.20	99.02	109.23	211.19
FLAT	Value Share	0.19	0.16	0.19	0.21	0.25	0.37
PCOD	Value	67.92	100.00	116.02	70.59	33.60	68.72
PCOD	Price	88.92	100.00	112.51	101.72	77.63	96.77
PCOD	Quantity	76.38	100.00	103.12	69.40	43.28	71.01
PCOD	Value Share	0.22	0.27	0.23	0.18	0.12	0.15
PLCK	Value	124.47	100.00	134.33	109.44	114.21	120.59
PLCK	Price	104.28	100.00	123.51	113.65	106.48	93.81
PLCK	Quantity	119.36	100.00	108.76	96.29	107.26	128.55
PLCK	Value Share	0.02	0.01	0.01	0.01	0.02	0.01
ROCK	Value	68.11	100.00	138.27	122.51	71.66	107.24
ROCK	Price	78.91	100.00	156.71	126.33	86.89	105.69
ROCK	Quantity	86.31	100.00	88.23	96.97	82.47	101.47
ROCK	Value Share	0.29	0.35	0.35	0.42	0.34	0.30
SABL	Value	103.65	100.00	141.22	80.17	78.96	90.86
SABL	Price	84.74	100.00	127.63	79.27	78.12	93.57
SABL	Quantity	122.31	100.00	110.65	101.13	101.08	97.10
SABL	Value Share	0.23	0.18	0.19	0.14	0.20	0.13

Notes: Species with a value share less than 1% were not included in this table. All groundfish species were used to calculate aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.8: Product Indicies and Value Share for the GOA At-Sea First-Wholesale Market 2009 - 2014

Product	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	81.61	100.00	137.15	102.42	72.31	123.57
Aggregate	Price	86.90	100.00	133.69	113.18	88.44	108.62
Aggregate	Quantity	93.92	100.00	102.59	90.49	81.77	113.76
Head&Gut	Value	78.12	100.00	148.31	110.87	71.41	133.89
Head&Gut	Price	85.49	100.00	134.53	111.33	83.80	107.39
Head&Gut	Quantity	91.38	100.00	110.24	99.59	85.21	124.68
Head&Gut	Value Share	0.80	0.84	0.91	0.91	0.83	0.91
Other	Value	69.86	100.00	180.87	124.76	91.99	73.06
Other	Price	94.68	100.00	124.99	146.64	128.32	110.58
Other	Quantity	73.79	100.00	144.72	85.08	71.69	66.07
Other	Value Share	0.01	0.01	0.02	0.02	0.02	0.01
Whole	Value	102.63	100.00	68.50	51.16	76.18	69.03
Whole	Price	93.52	100.00	128.71	132.40	137.61	126.61
Whole	Quantity	109.75	100.00	53.22	38.64	55.36	54.52
Whole	Value Share	0.18	0.14	0.07	0.07	0.15	0.08

Notes: Products types 'Minced' and those with a value share less than 1% were not included in this table. All product types were used to contruct aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.9: Species Indicies and Value Share for the GOA Shoreside First-Wholesale Market 2009 - 2014

Species	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	74.02	100.00	129.20	122.81	111.60	123.99
Aggregate	Price	97.23	100.00	118.04	104.32	98.74	96.24
Aggregate	Quantity	76.13	100.00	109.46	117.73	113.02	128.83
FLAT	Value	143.90	100.00	124.12	99.47	131.09	112.58
FLAT	Price	101.44	100.00	116.73	125.31	133.93	108.18
FLAT	Quantity	141.85	100.00	106.34	79.38	97.88	104.06
FLAT	Value Share	0.08	0.04	0.04	0.03	0.05	0.04
OTHR	Value	68.90	100.00	135.84	177.16	170.58	94.04
OTHR	Price	76.99	100.00	137.22	165.41	143.45	133.52
OTHR	Quantity	89.49	100.00	98.99	107.11	118.91	70.43
OTHR	Value Share	0.01	0.01	0.01	0.02	0.02	0.01
PCOD	Value	67.76	100.00	131.66	118.70	102.33	124.11
PCOD	Price	104.71	100.00	120.57	109.07	111.99	115.82
PCOD	Quantity	64.71	100.00	109.20	108.83	91.37	107.16
PCOD	Value Share	0.31	0.33	0.34	0.32	0.31	0.33
PLCK	Value	52.17	100.00	109.52	132.70	142.10	160.50
PLCK	Price	109.07	100.00	93.97	91.03	93.75	75.33
PLCK	Quantity	47.83	100.00	116.54	145.78	151.58	213.07
PLCK	Value Share	0.18	0.25	0.21	0.27	0.32	0.32
ROCK	Value	76.82	100.00	128.56	156.66	114.71	112.40
ROCK	Price	97.81	100.00	132.12	139.40	109.56	100.11
ROCK	Quantity	78.55	100.00	97.31	112.38	104.71	112.27
ROCK	Value Share	0.05	0.05	0.05	0.07	0.05	0.05
SABL	Value	88.70	100.00	143.07	114.57	91.32	98.94
SABL	Price	84.04	100.00	132.85	99.33	80.41	97.89
SABL	Quantity	105.55	100.00	107.69	115.34	113.56	101.08
SABL	Value Share	0.37	0.31	0.34	0.29	0.25	0.25

Notes: Species with a value share less than 1% were not included in this table. All groundfish species were used to calculate aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.10: Product Indicies and Value Share for the GOA Shoreside First-Wholesale Market 2009 - 2014

Product	Index Type	2009	2010	2011	2012	2013	2014
Aggregate	Value	74.02	100.00	129.20	122.81	111.60	123.99
Aggregate	Price	97.23	100.00	118.04	104.32	98.74	96.24
Aggregate	Quantity	76.13	100.00	109.46	117.73	113.02	128.83
Fillet	Value	73.64	100.00	111.54	104.68	115.07	122.79
Fillet	Price	102.73	100.00	108.78	102.39	109.89	104.36
Fillet	Quantity	71.69	100.00	102.54	102.24	104.72	117.67
Fillet	Value Share	0.29	0.29	0.25	0.25	0.30	0.29
Head&Gut	Value	75.51	100.00	144.02	128.48	103.10	127.07
Head&Gut	Price	92.45	100.00	125.07	103.73	93.09	99.88
Head&Gut	Quantity	81.67	100.00	115.15	123.87	110.75	127.22
Head&Gut	Value Share	0.49	0.48	0.54	0.50	0.44	0.49
Other	Value	76.40	100.00	148.79	144.96	111.02	84.99
Other	Price	99.82	100.00	128.04	121.36	108.65	101.37
Other	Quantity	76.54	100.00	116.20	119.45	102.18	83.84
Other	Value Share	0.05	0.05	0.05	0.05	0.05	0.03
Roe	Value	88.91	100.00	166.32	231.38	268.46	307.18
Roe	Price	162.42	100.00	145.11	157.19	144.12	112.39
Roe	Quantity	54.74	100.00	114.62	147.19	186.28	273.32
Roe	Value Share	0.03	0.02	0.03	0.05	0.06	0.06
Surimi	Value	36.42	100.00	87.39	119.27	88.58	104.62
Surimi	Price	91.32	100.00	84.84	85.10	72.52	60.00
Surimi	Quantity	39.88	100.00	103.01	140.15	122.15	174.37
Surimi	Value Share	0.04	0.09	0.06	0.09	0.07	0.07
Whole	Value	127.00	100.00	152.05	104.09	131.85	105.05
Whole	Price	97.75	100.00	145.64	112.07	110.48	89.57
Whole	Quantity	129.93	100.00	104.40	92.88	119.34	117.28
Whole	Value Share	0.08	0.05	0.06	0.04	0.06	0.04

Notes: Products types 'Minced' and those with a value share less than 1% were not included in this table. All product types were used to contruct aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.11: Species Indicies and Value Share for the GOA Shoreside Ex-Vessel Market 2006 - 2014

Species	Index Type	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aggregate	Value	87.12	93.08	102.35	80.18	100.00	133.99	135.57	103.38	112.57
Aggregate	Price	84.88	93.27	104.52	93.66	100.00	123.41	114.26	91.94	94.40
Aggregate	Quantity	102.64	99.79	97.93	85.61	100.00	108.58	118.65	112.45	119.25
FLAT	Value	134.12	151.91	174.42	142.04	100.00	104.55	88.59	115.07	121.61
FLAT	Price	129.18	142.82	132.49	123.80	100.00	102.61	127.81	131.35	134.53
FLAT	Quantity	103.83	106.36	131.64	114.74	100.00	101.90	69.31	87.60	90.40
FLAT	Value Share	0.05	0.05	0.06	0.06	0.03	0.03	0.02	0.04	0.04
OTHR	Value	59.32	63.00	115.53	96.25	100.00	144.03	149.08	139.67	102.14
OTHR	Price	61.53	90.64	140.01	91.50	100.00	141.57	150.94	142.83	149.37
OTHR	Quantity	96.41	69.51	82.52	105.19	100.00	101.74	98.77	97.78	68.38
OTHR	Value Share	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01
PCOD	Value	102.26	132.40	143.39	70.79	100.00	143.51	146.07	95.29	123.44
PCOD	Price	153.56	194.44	199.83	112.41	100.00	128.47	136.14	102.58	114.88
PCOD	Quantity	66.59	68.10	71.75	62.97	100.00	111.71	107.29	92.90	107.46
PCOD	Value Share	0.22	0.26	0.26	0.16	0.19	0.20	0.20	0.17	0.20
PLCK	Value	73.26	57.02	68.69	53.43	100.00	97.98	133.39	125.83	133.82
PLCK	Price	78.20	83.59	104.87	100.48	100.00	93.06	99.00	101.78	71.17
PLCK	Quantity	93.68	68.22	65.50	53.18	100.00	105.28	134.74	123.63	188.04
PLCK	Value Share	0.17	0.12	0.13	0.13	0.20	0.14	0.19	0.24	0.23
ROCK	Value	107.67	125.24	121.08	74.89	100.00	107.94	212.27	164.63	154.85
ROCK	Price	119.71	123.25	125.40	84.18	100.00	118.18	187.14	154.26	139.30
ROCK	Quantity	89.94	101.62	96.56	88.96	100.00	91.34	113.43	106.72	111.16
ROCK	Value Share	0.03	0.04	0.03	0.02	0.03	0.02	0.04	0.04	0.04
SABL	Value	83.71	88.21	94.92	89.08	100.00	146.60	131.66	93.52	98.84
SABL	Price	66.17	68.57	79.74	85.39	100.00	133.46	108.03	78.63	95.42
SABL	Quantity	126.51	128.65	119.04	104.33	100.00	109.85	121.87	118.93	103.58
SABL	Value Share	0.52	0.52	0.51	0.61	0.55	0.60	0.53	0.49	0.48

Notes: Species with a value share less than 1% were not included in this table. All groundfish species were used to calculate aggregate indices and value share. The Fisher index method was used to construct the indices. Further details can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's WPR; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.12: Gear Indicies and Value Share for the GOA Shoreside Ex-Vessel Market 2006 - 2014

Gear	Index Type	2006	2007	2008	2009	2010	2011	2012	2013	2014
Aggregate	Value	87.12	93.08	102.35	80.18	100.00	133.99	135.57	103.38	112.57
Aggregate	Price	84.88	93.27	104.52	93.66	100.00	123.41	114.26	91.94	94.40
Aggregate	Quantity	102.64	99.79	97.93	85.61	100.00	108.58	118.65	112.45	119.25
HAL	Value	86.99	93.26	101.96	89.91	100.00	144.28	135.94	95.96	100.51
HAL	Price	71.48	75.53	87.70	86.62	100.00	133.01	110.33	81.06	97.25
HAL	Quantity	121.71	123.48	116.26	103.80	100.00	108.47	123.22	118.38	103.36
HAL	Value Share	0.57	0.57	0.57	0.64	0.57	0.61	0.57	0.53	0.51
POT	Value	102.84	114.23	112.81	65.45	100.00	181.45	141.28	85.63	114.90
POT	Price	145.96	179.21	206.53	111.20	100.00	126.18	134.20	101.93	114.61
POT	Quantity	70.45	63.74	54.62	58.86	100.00	143.80	105.28	84.01	100.25
POT	Value Share	0.10	0.11	0.09	0.07	0.09	0.12	0.09	0.07	0.09
TWL	Value	83.42	87.51	100.41	67.76	100.00	105.21	133.53	120.04	131.91
TWL	Price	103.06	117.12	122.55	104.18	100.00	106.03	115.98	108.18	89.67
TWL	Quantity	80.94	74.72	81.93	65.04	100.00	99.22	115.13	110.96	147.11
TWL	Value Share	0.33	0.32	0.34	0.29	0.34	0.27	0.34	0.40	0.40

Notes: The Fisher index method was used to construct the indices. Further details on index construction and gear decomposition can be found in the text or by contacting Ben.Fissel@NOAA.gov.

Source: NMFS Alaska Region's CAS and WPR estimates; ADF&G COAR, National Marine Fisheries Serivce. P.O. Box 15700, Seattle, WA 98115-0070.

6. ALASKA GROUNDFISH FIRST-WHOLESALE PRICE PROJECTIONS

6.1. Introduction

The most recent year for which first-wholesale prices (Table 26) are available is 2014. This is because these prices are derived from the Commercial Operators Annual Report (COAR). Because of the report's submission deadline, data processing and validation of the data from the report are not completed until July of the following year. Thus, at the time of this report's writing (October), the most recent COAR data available was for the previous year. To provide recent information, current (i.e., 2015) prices are estimated ("nowcast") using 2015 export prices and COAR first-wholesale prices through 2014. Furthermore, first-wholesale prices are projected out over the next 4 years (2016-2019). The projections give a probabilistic characterization of the range of future prices.

The species and products for which price projections are made approximately correspond with the prices in Table 26 in Section 4 of this document. With the notable exception that estimates are made for all Alaska, and no distinction is made between at-sea and shoreside prices. This corresponds with the export data which make no distinction between sectors, only the custom district of origin. Export data were constrained to exports originating from states Washington and Alaska which tended to provide a better estimate of first-wholesale prices.

Table 6.1 summarizes the price projections for the six years spanning 2012-2017. Prices between 2012-2014 are realized (actual) first-wholesale prices. The summary data provided for the years 2015-2017 are the expected price (mean) and 90% confidence bounds. Confidence bounds give the probability that the price will fall within the bound. Thus, for the 5% bound, 5% of the simulated prices were less than the given value. Similarly, for the 95% bound, 95% of the simulated prices were less (and 5% were greater). Hence, the region between the 5% and 95% bounds can be interpreted as the 90% confidence bound. Smaller confidence bounds indicate less uncertainty in the projections. In general, price projections for the current year, 2015, display a modest degree of volatility with most confidence bounds within ±5-10% of the projected price. As prices are projected past the current year the confidence bounds grow reflecting increased uncertainty further out in the future.

Methods are briefly outlined in Section 6.3. Section 6.4 examines the individual product price projections for 2015-2019. For these projections a more detailed characterization of the forecast distribution is given by the mean, median and 40%, 60%, 80%, and 90% confidence bounds. Figures plot the price projection results as well as historical realized prices.

6.2. Tabular Summary of Price Projection Results

Species	Product	stat.	2012	2013	2014	2015	2016	2017
pollock	surimi	mean	1.422	1.006	1.09	1.177	1.106	1.22
pollock	surimi	conf.int.90				[1.16,1.19]	[1.01,1.23]	[1.09,1.37]
pollock	roe	mean	4.226	3.254	2.787	2.505	2.597	2.681
pollock	roe	conf.int.90				[2.47,2.54]	[2.37,2.87]	[2.35,3.09]
pollock	fillet	mean	1.469	1.376	1.304	1.286	1.297	1.32
pollock	fillet	conf.int.90				[1.27,1.31]	[1.21,1.39]	[1.2,1.46]
pollock	deep-skin fillet	mean	1.688	1.622	1.595	1.609	1.639	1.666
pollock	deep-skin fillet	conf.int.90				[1.59,1.63]	[1.56,1.72]	[1.56,1.79]
pollock	other products	mean	0.668	0.687	0.627	0.665	0.77	0.808
pollock	other products	conf.int.90				[0.65,0.68]	[0.72,0.82]	[0.76,0.86]
pacific cod	fillet	mean	2.953	2.997	2.91	2.742	2.894	3.024
pacific cod	fillet	conf.int.90				[2.72,2.76]	[2.73,3.07]	[2.79,3.28]
pacific cod	head and gut	mean	1.343	1.047	1.257	1.267	1.325	1.371
pacific cod	head and gut	conf.int.90				[1.24,1.29]	[1.22,1.44]	[1.23,1.54]
pacific cod	other products	mean	0.792	0.699	0.779	0.839	0.855	0.852
pacific cod	other products	conf.int.90				[0.82,0.86]	[0.79,0.92]	[0.77,0.96]
sablefish	head and gut	mean	6.836	5.774	6.932	7.427	7.626	7.965
sablefish	head and gut	conf.int.90				[7.26,7.59]	[7.17,8.13]	[7.33,8.67]
yellowfin (bsai)	head and gut	mean	0.628	0.506	0.455	0.459	0.467	0.474
yellowfin (bsai)	head and gut	conf.int.90				[0.45,0.47]	[0.44,0.5]	[0.43,0.52]
rock sole (bsai)	head and gut with roe	mean	1.278	0.855	0.854	0.906	0.898	0.869
rock sole (bsai)	head and gut with roe	conf.int.90				[0.87,0.93]	[0.82,0.98]	[0.79,0.96]
rock sole (bsai)	head and gut	mean	0.804	0.541	0.445	0.445	0.459	0.458
rock sole (bsai)	head and gut	conf.int.90				[0.43,0.46]	[0.41,0.51]	[0.4,0.52]
greenland turbot (bsai)	head and gut	mean	2.094	1.951	2.183	2.643	2.389	2.381
greenland turbot (bsai)	head and gut	conf.int.90				[2.5,2.77]	[2.1,2.7]	[2.07,2.73]
arrowtooth	head and gut	mean	0.811	0.545	0.748	0.83	0.853	0.906
arrowtooth	head and gut	conf.int.90				[0.77,0.88]	[0.73,0.99]	[0.77,1.05]
flathead sole	head and gut	mean	0.929	0.848	0.702	0.752	0.796	0.837
flathead sole	head and gut	conf.int.90				[0.72,0.78]	[0.73,0.86]	[0.75,0.93]
rex sole (goa)	whole fish	mean	1.119	1.21	1.108	1.051	1.057	1.063
rex sole (goa)	whole fish	conf.int.90				[1.04,1.06]	[1,1.12]	[0.98,1.16]

shallow-water flatfish (goa)	fillet	mean	2.154	1.618	1.39	1.045	1.054	1.023
shallow-water flatfish (goa)	fillet	conf.int.90				[1.02,1.07]	[0.95,1.17]	[0.89,1.19]
atka mackerel	head and gut	mean	1.239	1.326	1.509	1.632	1.67	1.732
atka mackerel	head and gut	conf.int.90				[1.59,1.67]	[1.48,1.89]	[1.47,2.05]
rockfish	head and gut	mean	1.454	1.054	1.177	1.253	1.26	1.277
rockfish	head and gut	conf.int.90				[1.24,1.27]	[1.15,1.39]	[1.11,1.48]

Table 6.1: Groundfish Product Price Projection Summary

6.3. Summary of Price Projection Methods

The methods for nowcasting the current year's prices are distinctly different than the methods used to estimate future prices. Current year prices were nowcast using export prices which are available with a minimal time lag of up to three months. The relationship between export prices and first-wholesale prices was fairly strong for most products. Therefore, nowcasts were made with fairly high precision, particularly in comparison to the projections of future prices. Only a small component of the future first-wholesale prices (2015-2018) was forecastable, a feature that is common in price forecasts for commodities. Price projections were primarily made using models that estimate long-run returns and deviations from their long-run value. Estimates were made more robust by using a suite of canonical time series models to capture different aspects of the time series signal. The primary suite of models used were within the class of ARMA time series models (Hamilton, 1994). Two exponential smoothing models were also used, however, these tended to contribute little to the price projections (Hyndman & Athanasopoulos, 2013). Changes in price return volatility (a measure of the dispersion of the return distribution) over time were also modeled. Confidence bounds for the estimated models were residual resampling methods. Simulations created a probabilistic distribution of potential returns that are consistent with historical deviations from the models. Price projections from the suite of models were then combined using weights that were determined by model fit. Prices were calculated from returns and statistics such as the mean and percentiles for confidence bounds were calculated from the forecast distribution. A detailed description of the price projection methods will be available in a forthcoming NOAA Technical Memorandum (Fissel 2014).

6.4. First-Wholesale Product Price Projections

6.4.1 Alaska Pollock

In the North Pacific fisheries 60% of the wholesale production and 61% of the wholesale value came from Alaska pollock in 2014 (Table 25). Pollock is caught by catcher processors who process their catch at-sea, and by catcher vessels who deliver their catch to shoreside processors (Table 25). The primary products produced from pollock are surimi, fillets and roe. Fillets have been divided into deep-skin fillets and all other fillets (which are simply labeled fillets). All other products have been aggregated into an 'Other-products' category which includes whole fish, head-and-gut (H&G), minced, meal, and other products.

The pollock surimi price has generally trended down since peaking 2009 when supply was constrained by a temporary decline in the U.S. Alaska pollock quota (Figures 6.1 and 5.3). Subsequent price declines are, in part, attributable to the Alaska pollock catch returning to more normal levels since 2011 (Table 1). Competition from the production of surimi from non-Pollock species, may also account for some of the recent price trends (Seafoodnews, 2012; Undercurrent, 2014a). Consumer demand and exchange rates, primarily in Japan, also influence Alaska pollock surimi prices and contributed to the drop in 2013 prices which had fallen back to 2008 levels (ASMI, 2014; Seafoodnews, 2013). In recent years U.S. surimi exports to South Korea have grown and in 2013 surpassed exports to Japan. However some of the surimi exported to South Korean is ultimately re-exported to Japan (Undercurrent, 2014b) (Table E.2). The media reports that 2014 A season surimi production was strong with prices increases in B season (Undercurrent, 2014c,d).

The production of pollock surimi increased substantially in 2014 and the first-wholesale price increased to \$1.09/lb. Last year, this report estimated the 2014 price would increase from 2013 to \$1.04. The realized 2014 of \$1.09/lb was higher than last year's estimated median price of \$1.04/lb but within the 90% confidence bounds. This year's First-wholesale surimi price projections indicate an increase in 2015 prices to \$1.18 (Figure 6.1; Table 6.2). Confidence bounds (90%) for 2015 place the realized price within \$1.13 and \$1.23. For surimi export prices tend to provide a reasonably good prediction of the state of surimi prices. The lower bound of the 2015 90% confidence is greater than the 2014 price indicating that we can be reasonably certain that 2015 prices will increase. The model projects a subsequent drop in 2016 as prices fluctuate year-over-year around a stable trend as they have historically. Volatility projections suggest that the recent level of volatility will persist in the near-term and are below the historical average.

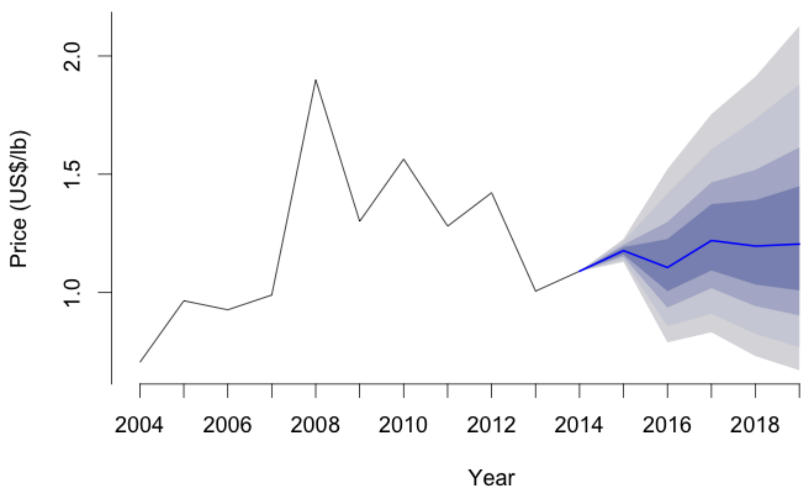

Figure 6.1: Pollock Surimi Price Projections and Confidence Bounds

Table 6.2: Projected Mean, Probability Bounds of First-wholesale Pollock Surimi Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	1.13	1.14	1.15	1.16	1.18	1.18	1.19	1.20	1.22	1.23
2016	0.79	0.86	0.94	1.01	1.11	1.11	1.23	1.30	1.42	1.52
2017	0.83	0.91	1.02	1.09	1.22	1.23	1.37	1.46	1.60	1.75
2018	0.73	0.83	0.94	1.03	1.20	1.20	1.39	1.52	1.73	1.91
2019	0.67	0.77	0.90	1.01	1.20	1.21	1.45	1.61	1.88	2.13

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pollock Surimi Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
21.29	21.18	21.14	21.16	21.17	21.17

The price of pollock fillets steadily increased between 2006 and 2009, corresponding to the reduction in harvest quotas (ASMI, 2014). The price reduction experienced in 2013 may be due to the MSC certification of Russia's Sea of Okhotsk pollock fishery, which accounts for about half of Russia's pollock landings. In September 2012, the Sea of Okhotsk pollock fishery became MSC certified, making Russian Pollock more marketable to European consumers. Prior to 2013, pollock from the

U.S. North Pacific was the only MSC certified pollock to be used by European fish stick buyers who use the MSC label (Fishchoice, 2014a). Certification of the Sea of Okhotsk pollock fishery increased the global supply of MSC-certified pollock, which put additional downward pressure on market prices (Undercurrent, 2013a).

The production of pollock fillets was strong throughout 2014 but the first-wholesale price dropped slightly to \$1.30/lb. The realized 2014 price of \$1.30 was below last year's estimated median price of \$1.35/lb but within the 90% confidence bounds. Price projections estimate the 2015 first-wholesale fillet price will drop slightly from 2014 to \$1.286/lb (Figure 6.2). Small increases or decreases in the price are possible as prices within the range of \$1.23/lb to \$1.35/lb (the 90% confidence bounds) are plausible. Mean estimates of fillet prices for 2016 and beyond indicate that based on previous trends fillet prices may increase slightly but not substantially. Volatility projections indicate that there is no expected change in the future volatility.

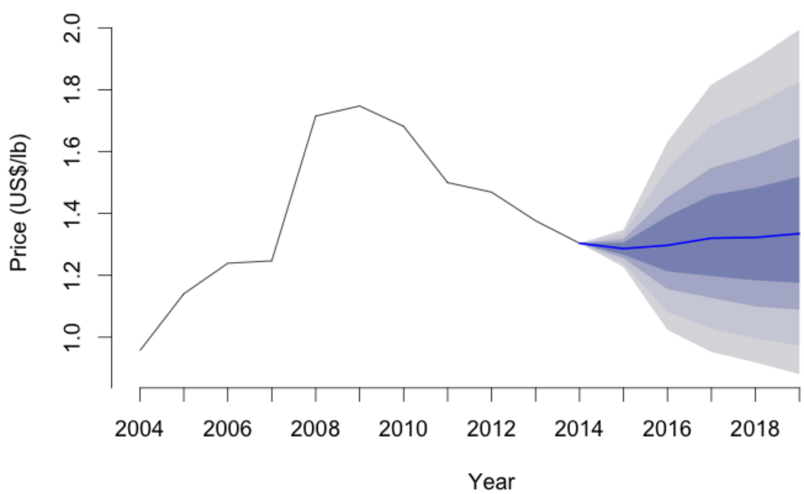

Figure 6.2: Pollock Fillet Price Projections and Confidence Bounds

Table 6.3: Projected Mean, Probability Bounds of First-wholesale Pollock Fillet Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	1.23	1.24	1.26	1.27	1.29	1.29	1.31	1.32	1.33	1.35
2016	1.02	1.08	1.16	1.21	1.30	1.30	1.39	1.45	1.54	1.63
2017	0.95	1.03	1.13	1.20	1.32	1.32	1.46	1.55	1.68	1.82
2018	0.92	1.00	1.10	1.18	1.32	1.33	1.48	1.59	1.75	1.90
2019	0.88	0.97	1.09	1.18	1.33	1.34	1.52	1.64	1.83	1.99

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pollock Fillet Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
14.69	14.69	14.69	14.69	14.69	14.69

Production of deep-skin fillets in 2014 declined, some of the deep-skin fillet production may have shifted to other fillet types which saw an increase. Deep-skin fillet prices showed little change between 2013 and 2014 decreasing only slightly to \$1.60/lb. This was consistent with last year's estimate which projected little change in the deep-skin price. Confidence bounds show that the 2015 deep-skin price is estimated to be within the range of \$1.55/lb to \$1.67/lb with a median estimate of \$1.61/lb (Figure 6.3). This estimate indicates little if any expected change in the 2015 price, but a realized price of ±\$0.06/lb are also possible. Mean estimates of deep-skin fillet prices for 2016 and beyond indicate that based on the historical trend deep-skin fillet prices may increase slightly but not substantially. Volatility estimates indicate that recent return volatility has been low relative to the historical average and could increase in the years to come if it reverts back to its estimated norm.

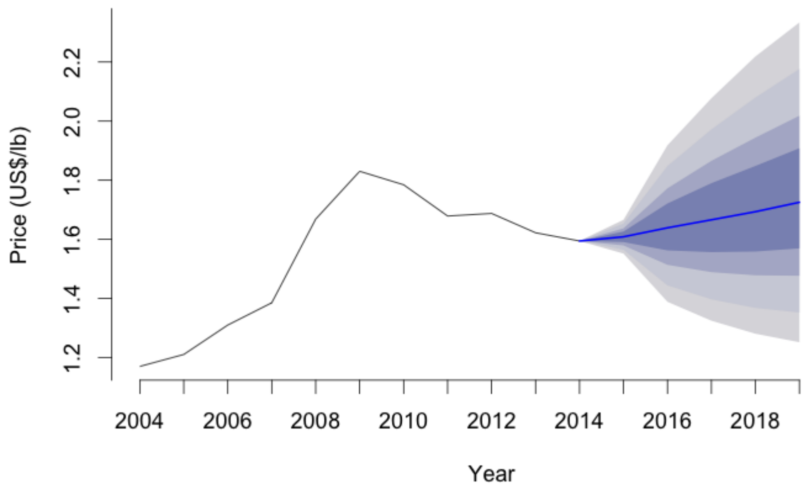

Figure 6.3: Pollock Deep-skin-fillet Price Projections and Confidence Bounds

Table 6.4: Projected Mean, Probability Bounds of First-wholesale Pollock Deep-skin-fillet Prices (US\$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	1.55	1.57	1.58	1.59	1.61	1.61	1.63	1.64	1.65	1.67
2016	1.39	1.44	1.51	1.56	1.64	1.65	1.72	1.77	1.85	1.92
2017	1.32	1.40	1.49	1.56	1.67	1.67	1.79	1.87	1.97	2.08
2018	1.28	1.37	1.48	1.56	1.69	1.70	1.85	1.94	2.08	2.22
2019	1.25	1.35	1.48	1.57	1.73	1.73	1.91	2.02	2.18	2.33

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pollock Deep-skin-fillet Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
10.20	10.18	10.19	10.19	10.20	10.22

Pollock roe prices have shown a downward trend in recent years (Figures 6.4, and 5.3; Table 26). Stagnant demand for the product in Japan and a weak yen are thought to be the significant factors in this trend (ASMI, 2014; Seafoodnews, 2014a). Japan, the largest importer of pollock roe, experienced a significant drop in the value of the yen versus the dollar in 2013 (AK J. Comm., 2013). The value of the yen has continued to weaken relative in 2014. The volume of pollock roe produced by Alaska and Russia combined hit a high in 2014 which has put further downward pressure on pollock roe prices (Seafoodnews, 2014b).

Pollock roe production increased substantially in 2014 for the first time since 2011, despite a decline in the 2014 price to \$2.79/lb. Last year's report projected a drop in prices to \$2.67/lb which was below the realized price, but the realized 2014 price of \$2.79/lb was well within last year's confidence bounds. The first-wholesale pollock roe price is projected to continue its decline dropping from \$2.79/lb in 2014 to \$2.51/lb in 2015 (Figure 6.4). Confidence bounds for 2015 place the roe price are within the range of \$2.40/lb-\$2.62/lb, ± \$0.10/lb-\$0.12/lb of the projected 2015 price. With the upper bound of the 2015 confidence interval below the 2014 price, a drop in roe prices is highly likely. Projections beyond 2015 indicate some potential reversion to slightly higher prices in 2016 and 2017. There is considerable volatility in roe returns which could increase. The asymmetry in the confidence bound indicates a greater potential for larger increases in the future price than large decreases. Confidence bounds show that in spite of the considerable uncertainty in roe prices it is highly unlikely that roe prices will return to levels as high as those observed prior to 2006 over the next four years.

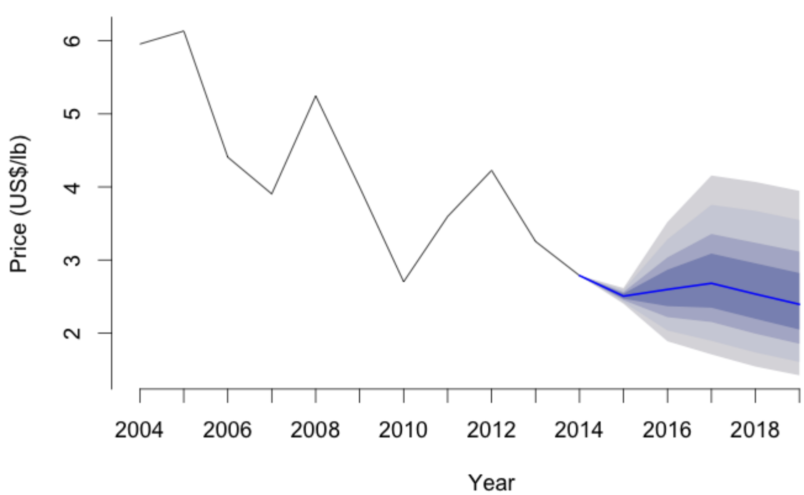

Figure 6.4: Pollock Roe Price Projections and Confidence Bounds

Table 6.5: Projected Mean, Probability Bounds of First-wholesale Pollock Roe Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	2.40	2.42	2.45	2.47	2.51	2.51	2.54	2.56	2.59	2.62
2016	1.89	2.04	2.22	2.37	2.60	2.61	2.87	3.03	3.28	3.52
2017	1.71	1.90	2.15	2.35	2.68	2.70	3.09	3.36	3.75	4.16
2018	1.54	1.74	1.99	2.20	2.53	2.55	2.95	3.24	3.67	4.07
2019	1.42	1.61	1.85	2.05	2.39	2.40	2.82	3.11	3.55	3.95

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pollock Roe Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
19.63	20.30	19.94	20.01	20.09	20.22

6.4.2 Pacific Cod

Since 2009, the world's cod supply has increased 61% (ASMI, 2014). The major cod fisheries include Barents Sea cod fishery, Alaskan cod fishery, and the Baltic cod fishery. The significant decreases in Alaskan and European cod prices since 2011 may be attributable to the large increases in production. In 2012, the Barents Sea cod quota increased 33%, resulting in decreased cod prices for most of 2012 (Undercurrent, 2012). The Barents Sea cod quota peaked in 2013 at roughly 1 million metric tons which was largely maintained through 2014 (Barents Observer, 2014; GLOBEFISH, 2014). Between 2010 and 2012 Alaska Pacific cod wholesale production increased 36% but dropped 7% in 2013 (Table 25). The supply of whitefish cod substitutes can also influence Pacific cod prices. The ability of producers to substitute between groundfish species including cod, haddock, and pollock, potentially link prices across the markets for these species (Undercurrent, 2013b,c, 2014e).

Pacific cod is mainly produced into the H&G product form, though fillets constitute a significant portion of the output, particularly for shoreside processors (Table 25). Pacific cod prices are showed improvement in 2014 as strong demand has put upward pressure on prices according to media reports mid-way through the 2014 (Undercurrent, 2014e). Sales in new markets, such as China, could also help support cod prices as cod inventories are very low, demand is strong and anticipated to grow (Tradex, 2014). European market is also a significant source of demand for cod products (GLOBEFISH, 2014).

Production of Pacific cod H&G increased between 2014 and 2013 as prices rebounded to \$1.26/lb in 2014 after a substantial dip in 2013. Last year's price projection did not capture the 2014 increase in the realized H&G price, largely because there was a large price change in the second half of 2014 and hence was not in the market information available at the time of the price projections. The 2015 price projections indicate that the H&G price will remain essentially unchanged over 2014 with the median price estimate at \$1.27/lb (Figure 6.5). Increases or decreases are possible as the 90% confidence bounds range from \$1.19/lb to \$1.34/lb. H&G price projections for 2016 and beyond show some mean reversion indicating that prices could increase. However, there is considerable uncertainty reflecting the significant historical and projected volatility in the H&G cod price.

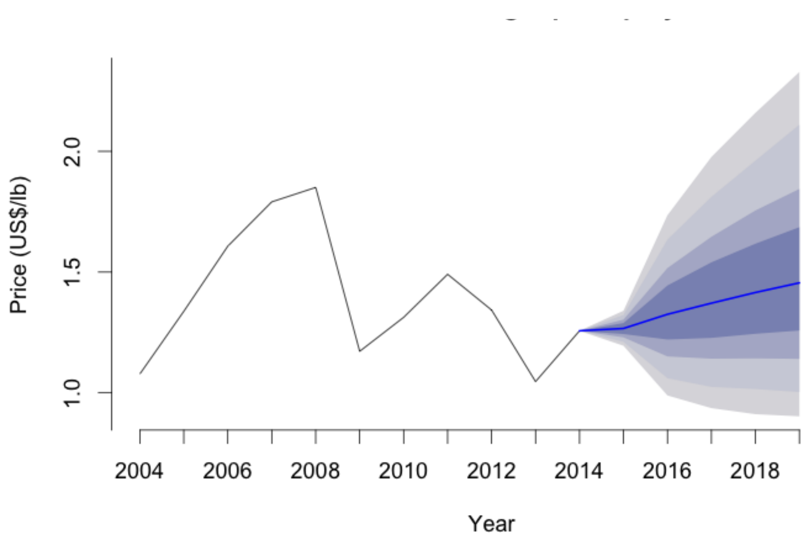

Figure 6.5: Pacific-cod Head-and-gut Price Projections and Confidence Bounds

Table 6.6: Projected Mean, Probability Bounds of First-wholesale Pacific-cod Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	1.19	1.21	1.23	1.24	1.27	1.27	1.29	1.30	1.32	1.34
2016	0.99	1.06	1.15	1.22	1.33	1.34	1.44	1.52	1.63	1.74
2017	0.94	1.02	1.14	1.23	1.37	1.38	1.54	1.65	1.81	1.98
2018	0.91	1.02	1.14	1.24	1.42	1.42	1.62	1.75	1.96	2.16
2019	0.90	1.00	1.14	1.26	1.46	1.46	1.69	1.84	2.11	2.33

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pacific-cod Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
17.64	18.10	18.18	18.23	18.26	18.18

Production of Pacific cod fillets decrease in 2014 as prices dropped slightly to $2.91/lb. The 2014 price change was close with last year's price projection of $2.89/lb which captured the slight dip in prices. First-wholesale fillet prices are projected to decrease from $2.91/lb in 2014 to $2.74/lb in 2014 (Figure 6.6). Confidence bounds place the final 2015 price between $2.68/lb and $2.81/lb with 90% probability so some drop in fillet prices again seems likely. Projections of cod fillet prices in 2015 and beyond could increase if prices revert back to their historical trajectory. Volatility estimates indicated that the recent volatility is inline with the historical average (perhaps slightly above) and is prone to potentially increase in the future.

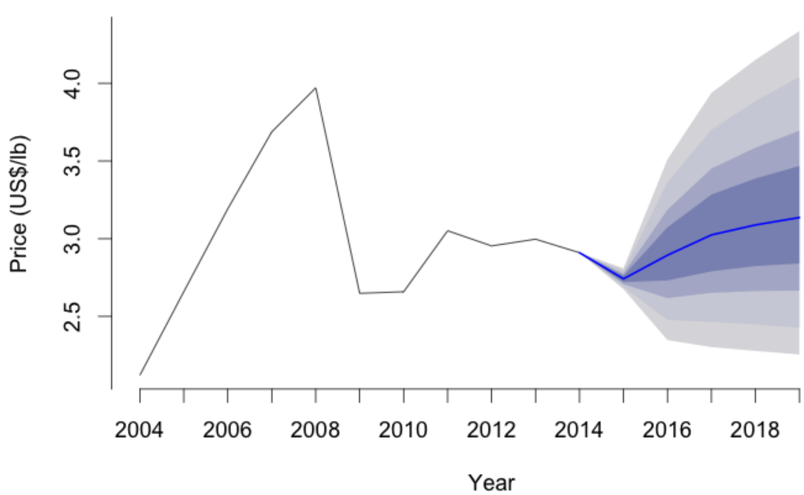

Figure 6.6: Pacific-cod Fillet Price Projections and Confidence Bounds

Pacific cod's 'other products' first-wholesale include whole fish, roe and a variety of miscellaneous product forms that are produced in less substantial quantities. In aggregate, prices for these other product forms has been declining since 2011 and appears to be generally trending down since 2007.

Prices for 'other products' increased to $0.78/lb, largely as a result of a substantial increase in the price of roe and decrease in the production of the comparatively lower valued whole fish products. Last year's price projections failed to capture these changes instead predicting a drop in the 'other

Table 6.7: Projected Mean, Probability Bounds of First-wholesale Pacific-cod Fillet Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	2.68	2.69	2.71	2.72	2.74	2.74	2.76	2.77	2.79	2.81
2016	2.35	2.48	2.62	2.73	2.89	2.91	3.07	3.19	3.36	3.51
2017	2.30	2.46	2.65	2.79	3.02	3.03	3.28	3.45	3.70	3.94
2018	2.28	2.45	2.66	2.82	3.09	3.10	3.39	3.59	3.88	4.15
2019	2.26	2.43	2.67	2.84	3.14	3.15	3.47	3.69	4.04	4.34

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pacific-cod Fillet Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
12.63	12.94	13.17	13.28	13.35	13.44

products' prices. Because the 'other products' category is an amalgamation of diverse product types it can be harder project with the same degree of accuracy as more narrowly defined product types (e.g., fillets, H& G). Future projections may break out roe which has become an important secondary product for cod. Projections for the 'other product' forms indicated that prices are expected it increase in 2015 with 90% confidence bound ranging from \$0.78/lb to \$0.90/lb and median estimate of \$0.84/lb (Figure 6.7). Prices in 2016 and beyond are expected to level off, however, the distribution of potential future prices is wide.

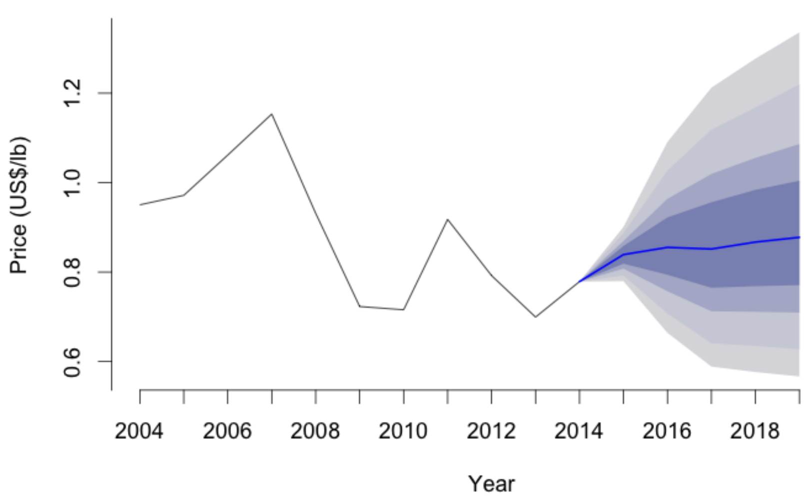

Figure 6.7: Pacific-cod Other-products Price Projections and Confidence Bounds

6.4.3 Sablefish

The H&G product type is only product produced in signifcant quantities at the first-wholesale level comprising approximately 97% of the value from sablefish products. The sablefish first-wholesale price went from \$4.80/lb in 2007, to a record high of \$9.14/lb in 2011 and subsequently dropped to \$5.77/lb in 2013 (Figure 6.8). Lower prices in 2012 were likely the result of inventory that was carried over from 2011, and diminished international demand (Arctic Sounder, 2013; Undercurrent, 2013). The continued decline in prices through 2013 may be attributable to the weakening of the

Table 6.8: Projected Mean, Probability Bounds of First-wholesale Pacific-cod Other-products Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	0.78	0.79	0.81	0.82	0.84	0.84	0.86	0.87	0.89	0.90
2016	0.66	0.71	0.76	0.79	0.86	0.86	0.92	0.96	1.03	1.09
2017	0.59	0.64	0.71	0.77	0.85	0.85	0.96	1.02	1.12	1.21
2018	0.58	0.64	0.71	0.77	0.87	0.87	0.98	1.06	1.17	1.28
2019	0.57	0.63	0.71	0.77	0.88	0.88	1.00	1.09	1.22	1.34

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Pacific-cod Other-products Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
15.06	15.06	15.06	15.06	15.06	15.06

yen and persistent excess inventory as buyers and sellers settle on a lower market clearing price (Fishchoice, 2014b; NFCS, 2014). With excess inventory depleted, prices in 2013 brought down to a level where inventories could move more rapidly. News in 2014 indicated that sablefish prices could increase as supply was constrained by the 10% reduction in the 2014 Alaskan sablefish quota (Fishchoice, 2014b).

Sablefish H&G production in 2014 decreased correspondingly with the sablefish TAC. The realized price of sablefish H&G in 2014 increased to $6.93. Price projections from last year's report estimated prices would increase to $5.98. Thus, projections captured the direction of change but not the magnitude. This year's price projections indicate that the 2015 first-wholesale sablefish H&G price will increase again to $7.42/lb with 90% confidence bounds spaning $6.92/lb to $7.95/lb (Figure 6.8). With the lower bound of the confidence interval roughly at the 2014 price level it's highly likely that the 2015 price will increase. The models project that if prices revert to their historical trend they will continue to increase at a gradual pace through 2019. The recent high volatility in the market is expected to remain high relative to its historical average and increase in the years to come. Thus, the models indicate that there a high degree of uncertainty remains in future sablefish H&G prices.

Table 6.9: Projected Mean, Probability Bounds of First-wholesale Sablefish Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	6.92	7.04	7.17	7.26	7.43	7.42	7.59	7.69	7.84	7.95
2016	6.17	6.49	6.88	7.17	7.63	7.66	8.13	8.44	8.92	9.33
2017	6.06	6.47	6.95	7.33	7.97	7.99	8.67	9.12	9.79	10.41
2018	6.20	6.63	7.19	7.59	8.33	8.33	9.14	9.66	10.45	11.12
2019	6.29	6.79	7.40	7.90	8.69	8.72	9.60	10.18	11.04	11.87

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Sablefish Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
13.46	12.67	13.82	13.94	14.30	12.65

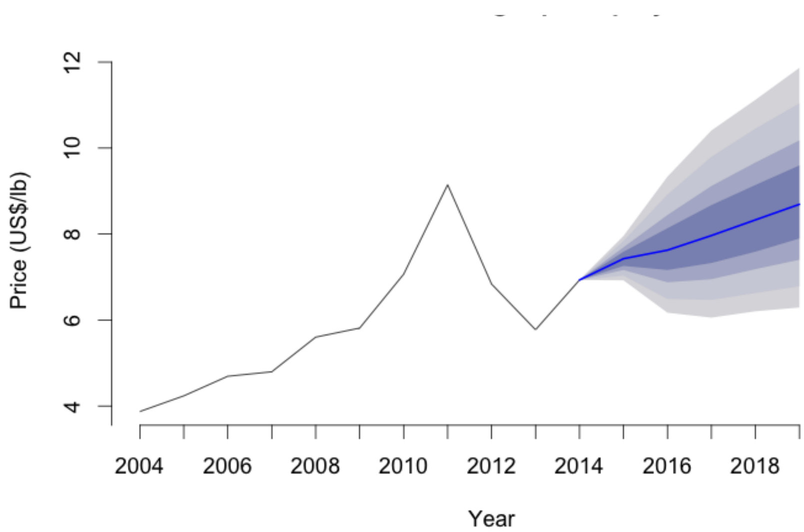

Figure 6.8: Sablefish Head-and-gut Price Projections and Confidence Bounds

6.4.4 Atka Mackerel

Atka mackerel are the target of a directed trawl fishery, which caught 42 thousand metric tons in the Aleutian Islands in 2009. The primary product form is H&G with some whole fish (AKRO, 2001) (Table 25), which are exported to Japan or Korea (NPFMC, 2008). In the United States, the Atka mackerel supply is largely dependent on regulations in place to protect the endangered stellar sea lion. In December of 2010, National Marine Fisheries Service (NMFS) regulations to protect Stellar sea lion significantly reduced fishing opportunities for Atka mackerel in the Aleutian Islands (NPFMC, 2013). After consecutive declines in previous years the 2013 total allowable catch (TAC) was reduced by 50%, and the total production of Alaskan Atka mackerel hit a low (Table 25). Landings of the substitute product, Hakkaido origin Atka mackerel, have also declined steadily since 2008 (Minato-Tsukiji, 2012a). In 2012, the Hakkaido Atka Mackerel quota was set to be cut by 30% over a three-year period to protect declining stocks and restore the population of juvenile fish (Minato-Tsukiji, 2010). Reductions in supply of Mackerel in both Japan and Alaska contributed to the observed price increases between 2008 and 2012. The Alaskan Atka mackerel quota increased roughly 25% to 31,000 metric tons in 2014 (HighBeam, 2014). Japanese landings of Atka mackerel continue to stagnate as the stocks continue to decline and the Japanese price continues to increase (Undercurrent, 2014f).

The Atka mackerel first-wholesale H&G price in 2014 increased to $1.51. Price projections from last year's report accurately estimated an increase the 2014 with the realized price falling well within the 90% confidence interval. This years Atka mackerel H&G price projections indicate that prices will continue to increase in 2015 to $1.63 with 90% confidence bounds ranging from $1.50 to $1.77 (Figure 6.8). Because the lower end of the 2015 interval is near the 2014, prices are highly likely to increase. This projected increase is expected to continue in 2016 and beyond based on the historical trend. However, substantial changes in production through the increased TACs not captured in the models could mitigate or reverse the upward trend in price.

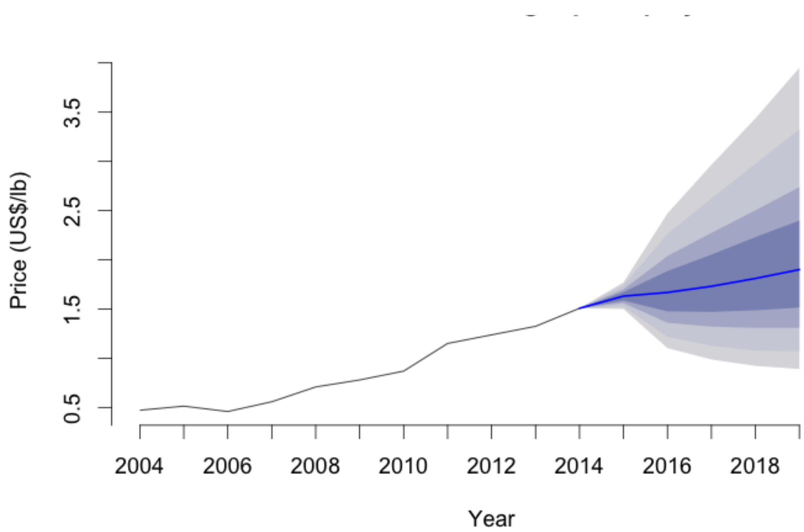

Figure 6.9: Atka-mackerel Head-and-gut Price Projections and Confidence Bounds

Table 6.10: Projected Mean, Probability Bounds of First-wholesale Atka-mackerel Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	1.50	1.53	1.56	1.59	1.63	1.63	1.67	1.70	1.74	1.77
2016	1.10	1.22	1.36	1.48	1.67	1.68	1.89	2.04	2.26	2.47
2017	0.99	1.13	1.32	1.47	1.73	1.74	2.05	2.27	2.62	2.97
2018	0.92	1.08	1.31	1.49	1.81	1.83	2.23	2.50	2.97	3.44
2019	0.89	1.08	1.31	1.52	1.90	1.91	2.40	2.74	3.33	3.95

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Atka-mackerel Head-and-gut Return Volatility Projections					
Hist. Avg.	2016	2017	2018	2019	Long-run
25.46	25.46	25.46	25.46	25.46	25.46

6.4.5 Flatfish

The two most significant flatfish species in terms of market value and volume are yellowfin and rock sole. In 2008, these two species accounted for 75% of total flatfish value and 72% of flatfish volume (ASMI, 2010). The Alaska flatfish fishery became MSC certified in 2010 and received the Responsible Fishery Management (RFM) certification in 2014 (Undercurrent, 2014g). Certification provides access to some markets and may enhance value. The Alaska flatfish undergo relatively low fishing pressure and harvests of the are routinely below their TAC. In 2008, Amendment 80 rationalized the non-pollock groundfish fisheries (which includes the BSAI flatfish fisheries) by instituting a catch-share system that annually allocates a set percentage of the quota to vessels, based on historic catch levels (Tradex, 2007a). Amendment 80 also mandated improved retention and utilization of fishery resources, which lowered discard and bycatch rates (Fishwatch, 2014a,b).

Yellowfin Sole

After 2008, prices for yellowfin sole steadily increased, potentially due to decreases in the availability of possible substitute groundfish species (Tradex, 2007b,c). The supply of first-wholesale yellowfin sole products increased between 2010 and 2013 as production rose 37%. Over this time, yellowfin H&G price increased in 2011 but fell in 2012 and 2013 to $ 0.51 returning to roughly the same level as seen in 2009 and 2010 (Figures 6.10). Some media reports have attributed the price increase in 2011 to the MSC certification the fishery received in 2010 and growth of Asian markets where raw materials demand is expected to increase with growth in the middle class population (AK Seafood Coop., 2012; Newsminer, 2012; Tradex, 2011a). In 2014, the multi-species Alaska flatfish fishery became RFM certified (Undercurrent, 2014h).

The 2014 first-wholesale price for yellowfin sole H&G was $0.45/lb a decrease roughly $0.05/lb from 2013. The projection from last year's report estimated that prices would remain flat but with fairly large confidence bounds. While last year's projection did not indicate a price decrease, the realized price was within the estimated confidence bounds and hence consistent with the projection. This year's projection for yellowfin sole H&G estimate a median price of $0.46/lb in 2015, basically unchanged from 2014 (Figure 6.10). Yellowfin sole is a species that has a distinct export definition and substantial share of production is exported. The 90% confidence bound for prices place prices in the range of $0.43/lb and $0.49/lb. Projections for future prices show continued marginal increases going forward. Return volatility is rather moderate and does not change substantially with the forecast horizon.

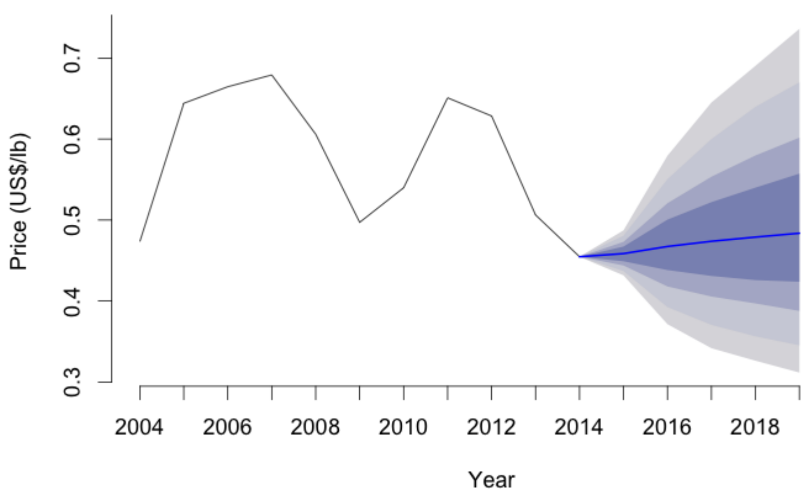

Figure 6.10: Yellowfin-(BSAI) Head-and-gut Price Projections and Confidence Bounds

Rock Sole

The majority of rock sole is processed into two product forms; H&G with roe is a higher priced product with slightly different price dynamics than the other product form H&G (without roe) (Figures 6.11 and 6.12). H&G rock sole with roe is primarily sold to Japan and H&G without roe is primarily exported to China for secondary processing (Iquique, 2014). Some of the rock sole exported to China is filleted and re-exported to the U.S. (Pac. Seafoods, 2014). Upward trending prices in 2011 may, in part, be attributed to growing demand in China (Tradex, 2011b). In 2012, the

Table 6.11: Projected Mean, Probability Bounds of First-wholesale Yellowfin-(BSAI) Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	0.43	0.44	0.44	0.45	0.46	0.46	0.47	0.47	0.48	0.49
2016	0.37	0.39	0.42	0.44	0.47	0.47	0.50	0.52	0.55	0.58
2017	0.34	0.37	0.41	0.43	0.47	0.48	0.52	0.55	0.60	0.65
2018	0.33	0.36	0.40	0.43	0.48	0.48	0.54	0.58	0.64	0.69
2019	0.31	0.35	0.39	0.42	0.48	0.49	0.56	0.60	0.67	0.74

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Yellowfin-(BSAI) Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
13.57	13.82	13.99	13.85	13.98	13.93

price for rock sole (H&G without roe) increased from the previous year because of strong demand in European markets and a supply shortage (Minato-Tsukiji, 2012b). Prices dropped in 2013 reverting back to roughly 2010 levels for both H&G with roe and H&G (without roe)products. The rock sole export definition does not distinguish between H&G with roe and H&G (without roe) which may reduce the accuracy of the product specific projections somewhat.

The rock sole H&G with roe in 2014 was $0.85/lb. This was close to last year's projected rock sole H&G with roe price of $0.83/lb and was well within the confidence bounds. This year's rock sole H&G with roe price is projected to increase slightly from $0.90/lb in 2015 with 90% confidence bounds at $0.81/lb and $1.00 (Figure 6.11). The price projection for 2016 and beyond does not exhibit a significant trend, reverting back to the 2014 price range, though confidence bounds are quite large.

The rock sole H&G (without roe) price in 2014 decreased to $0.45/lb. This change was not captured in last year's projections which showed a slight increase and was outside the estimated confidence bounds. This year's projections estimate the 2015 rock sole H&G (without roe) median price at $0.44/lb with confidence bounds ranging from $0.40/lb to $0.49/lb (Figure 6.12), suggesting that increases or decreases are possible. The price projection for 2016 and beyond does not exhibit a significant trend and remains basically flat, though confidence are quite large.

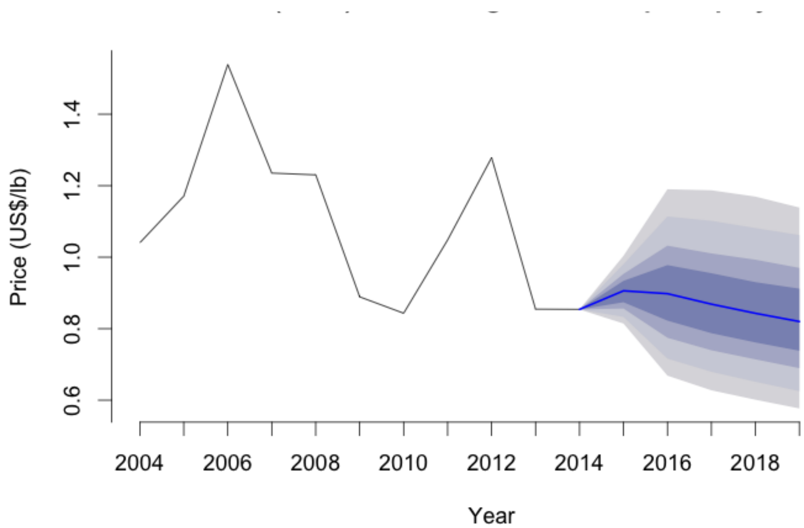

Figure 6.11: Rock-sole-(BSAI) Head-and-gut-with-roe Price Projections and Confidence Bounds

Table 6.12: Projected Mean, Probability Bounds of First-wholesale Rock-sole-(BSAI) Head-and-gut-with-roe Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	0.81	0.83	0.86	0.87	0.91	0.90	0.93	0.95	0.98	1.00
2016	0.67	0.72	0.77	0.82	0.90	0.90	0.98	1.03	1.11	1.19
2017	0.63	0.68	0.74	0.79	0.87	0.87	0.96	1.01	1.10	1.19
2018	0.60	0.65	0.71	0.76	0.84	0.84	0.93	0.99	1.08	1.17
2019	0.58	0.63	0.69	0.74	0.82	0.82	0.91	0.97	1.06	1.14

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Rock-sole-(BSAI) Head-and-gut-with-roe Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
16.82	17.03	16.89	16.90	16.90	16.85

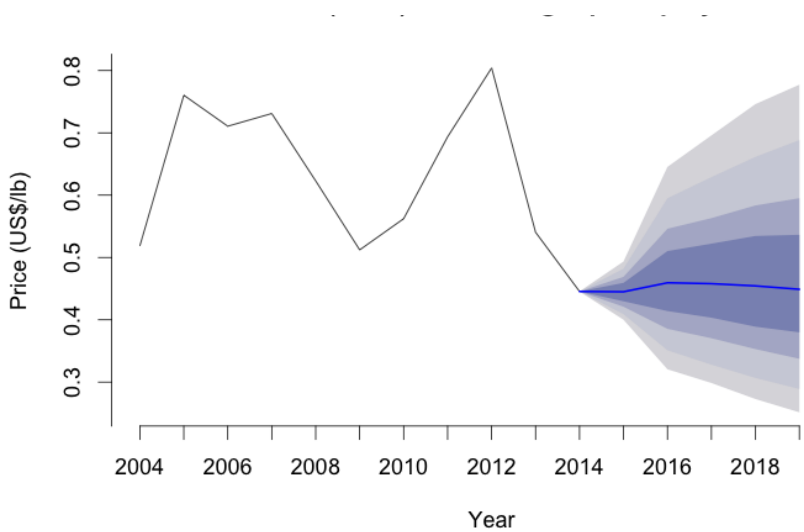

Figure 6.12: Rock-sole-(BSAI) Head-and-gut Price Projections and Confidence Bounds

Table 6.13: Projected Mean, Probability Bounds of First-wholesale Rock-sole-(BSAI) Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	0.40	0.41	0.42	0.43	0.44	0.44	0.46	0.47	0.48	0.49
2016	0.32	0.35	0.39	0.41	0.46	0.46	0.51	0.55	0.59	0.65
2017	0.30	0.33	0.37	0.40	0.46	0.46	0.52	0.56	0.63	0.70
2018	0.27	0.31	0.35	0.39	0.45	0.46	0.53	0.58	0.66	0.75
2019	0.25	0.29	0.34	0.38	0.45	0.45	0.54	0.60	0.69	0.78

At the ‘Lower’ and ‘Upper’ bounds x% of the simulated prices were less. The confidence bounds are the regions between the ‘Upper’ and ‘Lower’ bounds.

Rock-sole-(BSAI) Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
23.90	21.56	22.79	23.53	24.20	22.16

Other Flatfish

The market shares for other flatfish fisheries are comparatively smaller. These include arrowtooth flounder, flathead sole, and greenland turbot. Export definitions are not specific to these species (with the exception of greenland turbot) hence nowcasts are primarily made using a non-specific aggregate flatfish export price. Among the various flatfish species, year-over-year prices move in different directions complicating the use of a coarse of non-specific flatfish export price for estimating first-wholesale prices as consistently and robustly as projections for species where there is a large active market (like yellowfin sole or rock sole). Finally, current media reports on the activity in these fisheries are scarce or non-existant, making it difficult to evaluate the price projections. Price projections are included here to provide the best available estimates of prices given the information available.

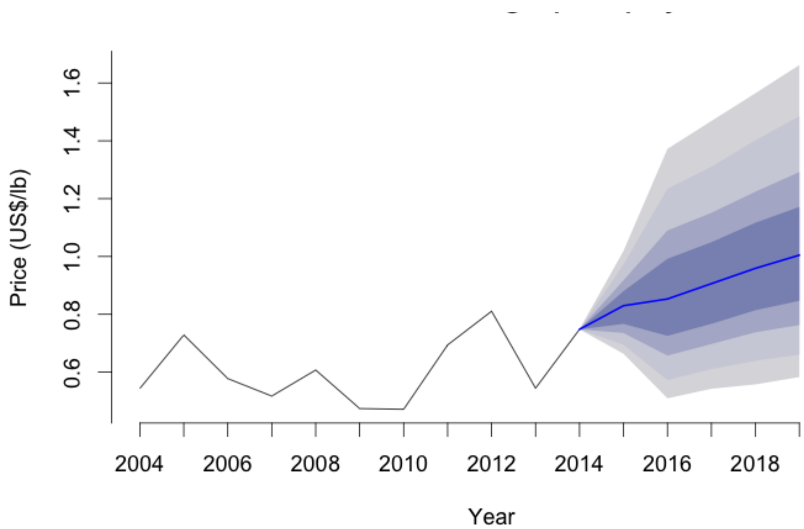

Figure 6.13: Arrowtooth Head-and-gut Price Projections and Confidence Bounds

Table 6.14: Projected Mean, Probability Bounds of First-wholesale Arrowtooth Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	0.66	0.70	0.74	0.77	0.83	0.82	0.88	0.92	0.97	1.02
2016	0.51	0.57	0.66	0.73	0.85	0.85	0.99	1.09	1.23	1.37
2017	0.54	0.61	0.70	0.77	0.91	0.90	1.05	1.15	1.31	1.47
2018	0.56	0.64	0.74	0.81	0.96	0.96	1.12	1.22	1.40	1.56
2019	0.58	0.66	0.76	0.85	1.00	1.00	1.17	1.29	1.48	1.66

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Arrowtooth Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
28.68	28.68	28.68	28.68	28.68	28.68

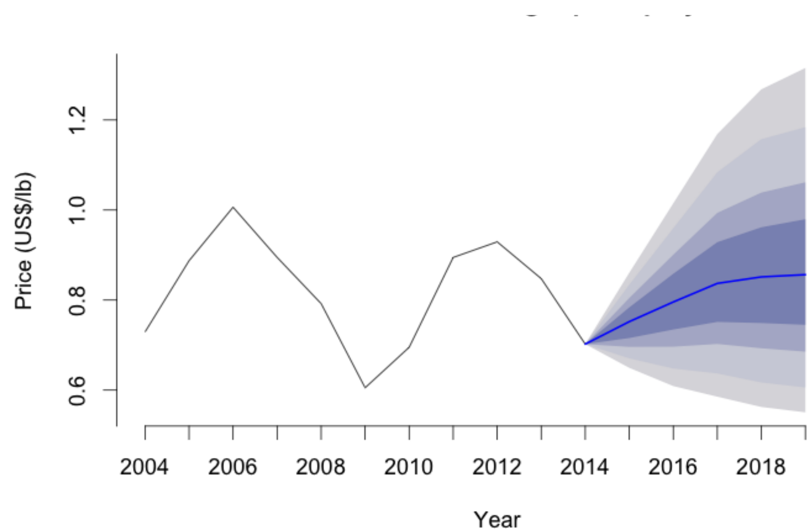

Figure 6.14: Flathead-sole Head-and-gut Price Projections and Confidence Bounds

Table 6.15: Projected Mean, Probability Bounds of First-wholesale Flathead-sole Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	0.65	0.67	0.70	0.72	0.75	0.75	0.78	0.80	0.83	0.86
2016	0.61	0.65	0.70	0.73	0.80	0.80	0.86	0.90	0.96	1.01
2017	0.59	0.64	0.70	0.75	0.84	0.84	0.93	0.99	1.08	1.17
2018	0.56	0.62	0.69	0.75	0.85	0.85	0.96	1.04	1.16	1.27
2019	0.55	0.61	0.69	0.75	0.86	0.85	0.98	1.06	1.18	1.32

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Flathead-sole Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
13.49	13.49	13.49	13.49	13.49	13.49

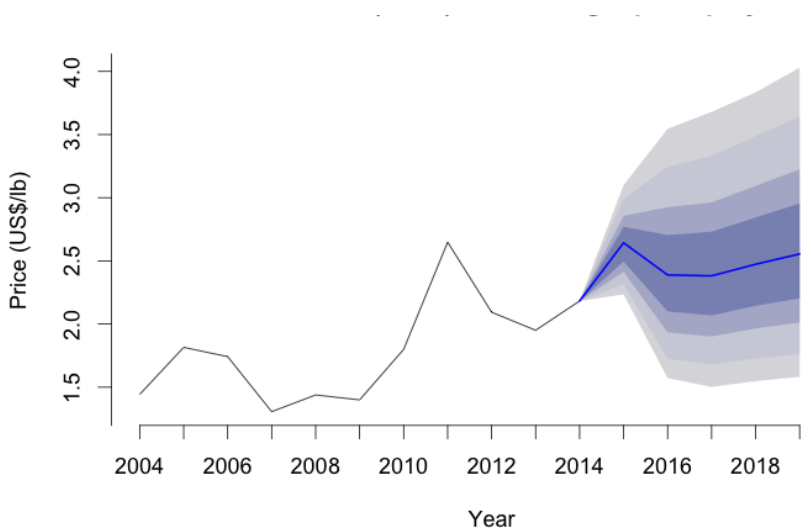

Figure 6.15: Greenland-turbot-(BSAI) Head-and-gut Price Projections and Confidence Bounds

Table 6.16: Projected Mean, Probability Bounds of First-wholesale Greenland-turbot-(BSAI) Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	2.24	2.32	2.42	2.50	2.64	2.63	2.77	2.86	2.99	3.10
2016	1.57	1.73	1.93	2.10	2.39	2.39	2.70	2.92	3.24	3.55
2017	1.50	1.68	1.90	2.07	2.38	2.38	2.73	2.96	3.33	3.68
2018	1.55	1.73	1.97	2.15	2.47	2.47	2.84	3.09	3.49	3.83
2019	1.58	1.76	2.01	2.20	2.55	2.55	2.95	3.22	3.64	4.03

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Greenland-turbot-(BSAI) Head-and-gut Return Volatility Projections					
Hist. Avg.	2016	2017	2018	2019	Long-run
24.06	24.06	24.06	24.06	24.06	24.06

6.4.6 Rockfish

Rockfish fisheries have historically been aggregated into a species complex in this report (e.g. Table 25). Consistent with the current presentation of economics data in this report, price projections are made for aggregate first-wholesale prices of the aggregate rockfish complex. Species within the complex include northern rockfish, Pacific Ocean perch, rougheye rockfish, shortraker rockfish, dusky rockfish and thornyhead rockfish. Like the other flatfish (Section 6.4.5), the mismatch between the first-wholesale product definition and the export definition potentially complicates the estimation of first-wholesale prices for these species as consistently and robustly as projections for species where there is a large active market (like pollock or cod). The only rockfish species defined in the export data is Pacific Ocean perch (POP) which is used to project current first-wholesale prices for the aggregate rockfish complex. While the POP export price is a significant predictor, because of the definition mismatch, there is a greater likelihood that movement in the POP export price differs from the movement in prices for the aggregate rockfish complex. However, estimated confidence bounds for 2014 are modest ranging from ±5% of the projected first-wholesale rockfish price. Current media reports on the activity in these fisheries is scarce making it difficult to evaluate the price projections. Price projections are included here to provide the best available estimates of prices given the information available to be used.

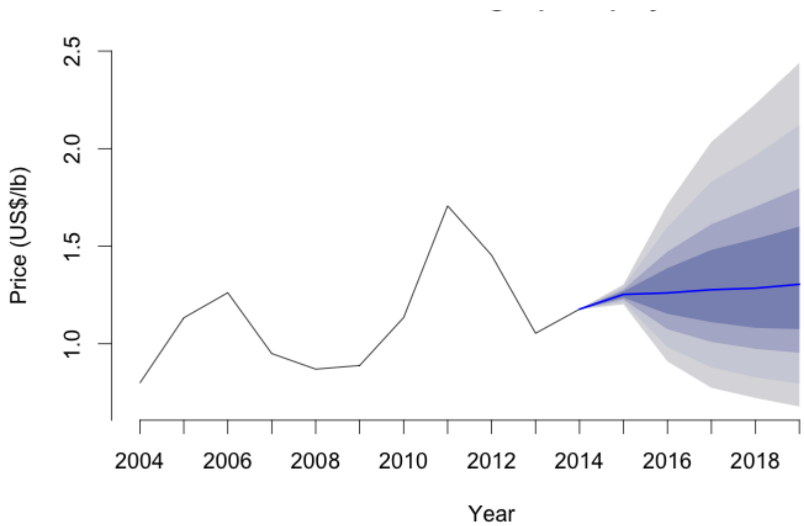

Figure 6.16: Rockfish Head-and-gut Price Projections and Confidence Bounds

Table 6.17: Projected Mean, Probability Bounds of First-wholesale Rockfish Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	Mean	Median	70%	80%	90%	95%
2015	1.20	1.21	1.23	1.24	1.25	1.25	1.27	1.28	1.29	1.30
2016	0.91	0.98	1.08	1.15	1.26	1.27	1.39	1.47	1.60	1.71
2017	0.77	0.88	1.01	1.11	1.28	1.29	1.48	1.61	1.83	2.03
2018	0.72	0.83	0.97	1.08	1.28	1.29	1.54	1.70	1.96	2.23
2019	0.68	0.80	0.95	1.08	1.30	1.31	1.60	1.80	2.12	2.44

At the 'Lower' and 'Upper' bounds x% of the simulated prices were less. The confidence bounds are the regions between the 'Upper' and 'Lower' bounds.

Rockfish Head-and-gut Return Volatility Projections

Hist. Avg.	2016	2017	2018	2019	Long-run
20.11	20.44	20.54	20.66	20.78	19.35

6.5. Acknowledgments

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7. WHOLESALE MARKET PROFILES FOR ALASKA GROUNDFISH

The Alaska Groundfish Wholesale Market Profiles (forthcoming) was prepared for Alaska Fisheries Science Center (AFSC) by McDowell Group in collaboration with AFSC and Pacific States Marine Fisheries Commission. This section is an extract from the full Profiles report.

Note: AKFIN and COAR data used in the Profiles report may not match other figures in the Economic SAFE exactly because different versions of the data sets were used independently in the analysis.

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7.1. Executive Summary

This section of the *Economic Status Report of the Groundfish Fisheries off Alaska, 2014* is extracted from the content in the larger and more comprehensive Alaska Groundfish Wholesale Market Profiles (forthcoming). The following section of the report covers the primary wholesale products for Alaska pollock, Pacific cod, sablefish, yellowfin sole, and rock sole. The full Profiles report contains more extensive analysis and covers additional species and products not contained here, including Pacific halibut, Atka mackerel Pacific Ocean perch, king crab and snow crab.

The profiles provide an overview of the wholesale markets related to primary Alaska groundfish species and/or products. Most of the wholesale data and analysis outside of this section pertains to first wholesale markets. This section and the Market Profiles report provide a broader analysis on wholesale markets from production to consumers. Each profile in this series contains detailed information about key markets and competing supply for individual species or products, while this chapter contextualizes Alaska groundfish production and versus the rest of the world. Each profile characterizes wholesale production volume and value, product mix, supply chain, competing supply, and key markets.

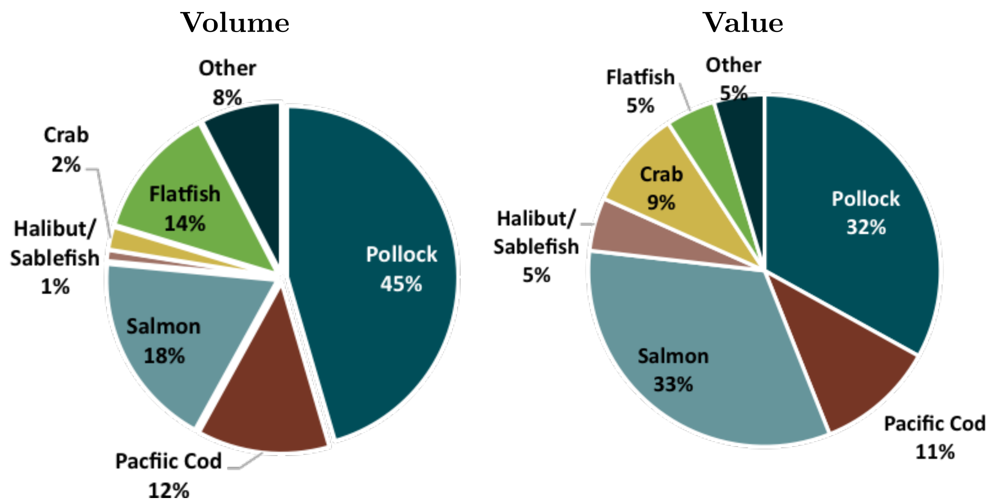

Figure 7.1: Composition of Total First Wholesale Volume and Value for Alaska Seafood, by Species, 2014.
Source: AKFIN.

The fisheries off the coast of Alaska are by far the most productive in the nation, accounting for 60 percent of total U.S. commercial fishery harvest volume. In 2014, total first wholesale production of 1.28 million metric tons of all Alaska species combined was valued at $4.27 billion.[1] The majority of Alaska seafood is exported, with overall exports estimated at 1.12 million metric tons valued at $3.28 billion. Alaska groundfish and crab species accounted for 78 percent of Alaska's total wholesale production volume in 2014, and 66 percent of the wholesale value.

In 2014, the BSAI region produced 86 percent of statewide total wholesale groundfish production volume and 83 percent of the value. The GOA region (including Southeast Alaska) produced 13 percent of total wholesale groundfish production volume and 16 percent of the value.

[1]See glossary defining first wholesale volume and value and other terms commonly used in this report.

Seafood processors use Alaska groundfish and crab species to produce a mix of product types. The majority of these products are considered intermediate products, which undergo secondary processing outside Alaska to create finished products for retail and food service buyers around the world. Figure 2 summarizes first wholesale production volume and value of key groundfish and crab products by general product.

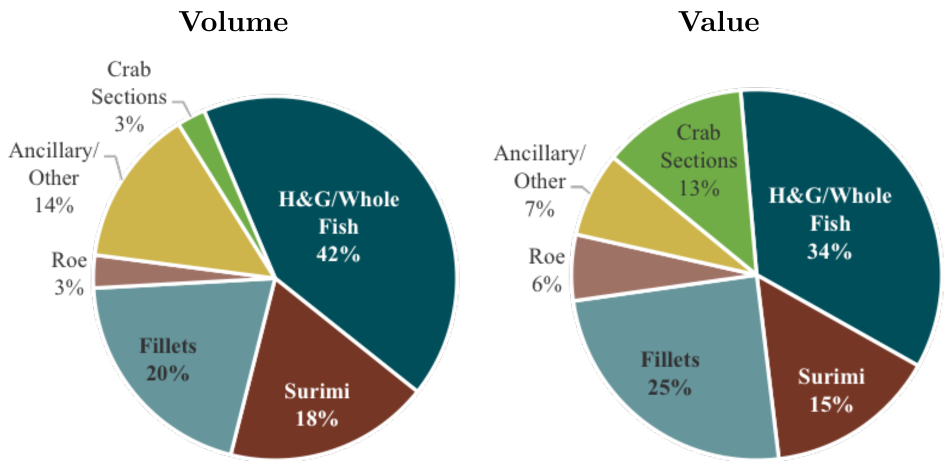

Figure 7.2: Composition of Total First Wholesale Volume and Value of Alaska Groundfish and Crab, by Product Type, 2014.
Source: AKFIN.

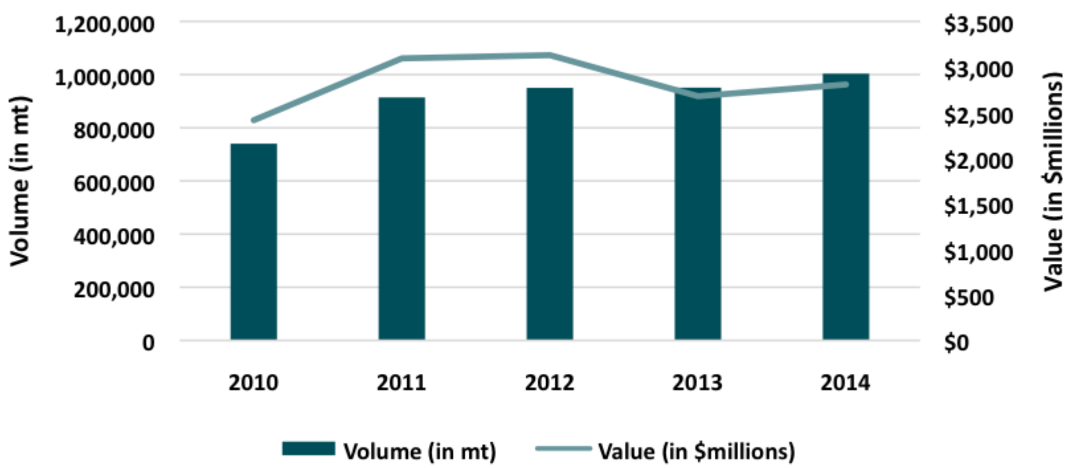

Figure 7.3: First Wholesale Volume and Value of Alaska Groundfish and Crab Species, 2010-2014.
Source: AKFIN.

The total value of Alaska groundfish and crab has remained steady over the last five years based on available data (2010-2014, see Figure 2). Unit values for each species category are shown in Table 7.1. Changes in value per metric ton are the result of numerous factors, summarized below and examined in greater detail in the rest of this section.

Table 7.1: Average First Wholesale Value per Metric Ton, 2010-2014.

	2010	2011	2012	2013	2014	2014 Pct. Change from Average
Alaska Pollock	$2,906	$2,772	$2,874	$2,443	$2,384	-13%
Pacific Cod	$3,042	$3,484	$3,154	$2,735	$3,033	-2%
Yellowfin Sole	$1,154	$1,400	$1,387	$1,287	$1,043	-20%
Rock Sole	$1,368	$1,705	$1,990	$1,333	$1,290	-19%
Pacific Halibut	$14,659	$17,693	$15,508	$14,419	$17,194	10%
Sablefish	$15,247	$19,220	$14,316	$12,250	$14,577	-4%
Pacific Ocean Perch	$2,459	$3,560	$3,137	$2,259	$2,578	-10%
Atka Mackerel	$1,861	$2,292	$2,480	$2,705	$3,561	53%
Snow Crab	$7,277	$12,054	$10,559	$11,052	$11,650	14%
King Crab	$25,273	$32,573	$27,144	$24,370	$23,968	-12%

Source: AKFIN.

Key Markets for Alaska Groundfish and Crab

The U.S., Europe, and Japan are the largest markets for finished products derived from Alaska groundfish and crab, typically accounting for more than 80 percent of first wholesale value. Approximately one-third of the production volume is reprocessed in China and re-exported to markets in Europe, the U.S., and Japan. A significant percentage of product exported to South Korea is held in cold storage facilities or secondarily processed and re-exported to Japan and Europe (Table 7.2).

Table 7.2: Primary Sales of First Wholesale Alaska Groundfish and Crab Products by Market, Estimated Annual Average Volume and Value, 2010-2014.

Market	First Wholesale Value ($Millions)	Pct. of Market Share (Value)	Sales Volume (mt)	Pct. of Market Share (Volume)
China*	$615	22%	281,533	33%
Japan	$454	16%	144,936	17%
Europe	$495	17%	168,026	19%
South Korea*	$313	11%	108,432	13%
Other Countries	$220	8%	60,030	7%
Export Markets Total	**$2,097**	**74%**	**762,957**	**88%**
Est. Domestic Market	**$736**	**26%**	**99,779**	**12%**

Notes: *Primarily re-export markets.

Source: AKFIN, ADF&G (COAR), ASMI Alaska Seafood Export Database, and McDowell Group estimates.

The Alaska species profiled in this report represent a significant percentage of the global seafood trade between developed nations; however, most species face market competition from fisheries in other countries. Table 7.3 summarizes first wholesale production volume and value of Alaska groundfish and crab products, the percent of global production volume, and key initial markets for each species.

Table 7.3: Alaska Groundfish and Crab Production and Market Summary, 2014.

Species/Product	First Wholesale Value ($Millions)	Alaska Production Volume (mt)	Pct. of Global Harvest (2013)	Key Markets
Alaska Pollock	$1,384	580,449	43%	Japan
Pacific Cod	$469	154,584	18%	China*
Flatfish	$216	175,919	32%	China*
Pacific Halibut	$109	6,159	57%	U.S.
Sablefish	$98	6,696	78%	Japan
Atka Mackerel	$74	20,892	19%	Japan
Rockfish	$85	32,383	28%	China*
King Crab	$117	4,870	15%	U.S.
Snow Crab	$233	20,023	15%	U.S.

Notes: *Denotes re-export market.

Source: AKFIN, ADF&G (COAR), and McDowell Group estimates.

Current Market Issues

The value of Alaska groundfish and crab is affected by a range of market forces. The market profiles contain more detailed analysis about how these forces impact the value of Alaska production; noteworthy market factors are summarized by species below.

Alaska Pollock

- MSC certification of Russia's largest pollock fishery has depressed prices for pollock fillets in Europe, where certification is required by many large retailers.
- Increasing production volume and changing consumer preferences in Japan have negatively affected prices for pollock roe - an important high margin product for Alaska pollock producers.
- Prices for Alaska pollock surimi blocks are trending up, due to lower production of competing products.

Pacific Cod

- Traditionally, markets in Europe substituted Pacific cod for declining Atlantic cod stocks. In recent years, Atlantic cod production has rebounded. Larger supplies of competing product and protective tariffs in the EU have made it more difficult for Pacific cod to compete.

Halibut and Sablefish

- Halibut and sablefish processors have noted that moving inventory is not a problem due to high demand. Prices have reflected lower TACs for both species.
- Prices for halibut and sablefish peaked in 2011, but remain high. Sablefish, traditionally sold almost exclusively to Japanese buyers, has seen increased demand from other markets.

Flatfish

- Wholesale prices for primary Alaska products have been negatively affected by a weaker euro and rising secondary processing costs in China.
- Alaska flatfish compete with many different whitefish species. Globally, flatfish and other competing whitefish production is up in recent years, putting downward pressure on prices for Alaska sole.

Pacific Ocean Perch and Atka Mackerel

- Declining harvests of Atka mackerel in Japan have pushed up prices for product coming out of Alaska.
- Pacific Ocean Perch and other rockfish species are commonly reprocessed in China and exchange rates have decreased demand for the raw material from Alaska.

Crab

- The largest impact on market demand for crab from Alaska has been linked to changes in IUU fishing from Russia, which has historically produced a large volume of illegal crab. King crab prices are most responsive to total Russian production volume, but snow crab prices are also affected.

Implication of Currency Exchange Rates

In addition to the market issues described above, prices for Alaska products have been negatively impacted by a stronger U.S. dollar in recent years. A stronger dollar, relative to the currencies of key export markets and competing suppliers, generally makes Alaska seafood more expensive and competing product less expensive from foreign consumers' point of view. Over the past five years, 88 percent (by value) of the state's groundfish and crab production was sold to export markets - primarily in Europe and Japan.

Table 7.4 summarizes changes in foreign currency rates for key buyers and major competitors, versus the U.S. dollar, between 2013 and 2015. Exchange rates vary from year to year, but movements of this magnitude are unusual. Unfortunately, the situation has swiftly altered the bargaining position of Alaska producers.

7.2. Global Groundfish Production & Key Markets

Alaska Groundfish Production and Market Summary

Table 7.5 summarizes production volume, value, key markets, and the percentage of global production for Alaska groundfish species and products. Overall, the largest markets for Alaska groundfish are Europe, Japan, and the United States. Although Alaska accounts for a significant share of production for many groundfish species, the state produced only 2.9 percent of global whitefish and other marine fish harvests in 2013.

Table 7.4: Changes in Relevant Currency Exchange Rates, October 2013 vs. October 2015.

Country/Market	Currency	Primary Role	Pct. Change vs. U.S. Dollar
European Union	Euro	Buyer	-17.6%
Japan	Yen	Buyer	-18.6%
Canada	Canadian Dollar	Buyer	-20.8%
Russia	Ruble	Competitor	-49.2%
Norway	Kroner	Competitor	-28.1%
U.S. Dollar Index (value relative to a basket of foreign currencies)			**+20.9%**

Source: OANDA Average Foreign Exchange Rates and Investing.com DXY historical data.

Table 7.5: Alaska Groundfish Production and Market Summary, 2014.

Species-Product	First Whole-sale Value ($Mill.)	Alaska Production (mt)	Pct. of 2013 Global Production	Key Markets		
Pollock-Fillets	$551	183,970	30%	Europe	U.S.	Brazil
Pollock-Surimi	$421	183,641	23%	Japan	Europe	Korea
Pollock-Roe	$151	24,117	*N/A*	Japan	Korea	–
Pacific Cod	$469	154,584	18%	China*	Europe	U.S.
Flatfish	$216	175,919	32%	China*	U.S.	Europe
Pacific Halibut	$109	6,159	57%	U.S.	Canada	–
Sablefish	$98	6,696	78%	Japan	China	U.S.
Atka Mackerel	$74	20,892	19%	Japan	China*	Korea
Rockfish	$85	32,383	28%	China*	Japan	U.S.

Notes: *Denotes re-export market. Alaska harvest/production volume from 2013 was compared to 2013 global harvest/production estimates. Global harvest/production data for 2014 is not yet available.

Source: AKFIN, ADF&G (COAR), and McDowell Group estimates.

Global Whitefish and Other Marine Fish Production

Whitefish generally refers to cod, pollock, haddock, hake, whiting, and benthic flatfish species, such as sole, plaice, flounder, and halibut. These species -primarily caught in wild fisheries- also compete in global seafood markets with notable aquaculture species such as tilapia and pangasius. Depending on the market, the scope of these whitefish species may be narrowed or supplemented with other local varieties. Although global fisheries produce significant volumes of whitefish, there are many other marine species with significant harvest volumes (referred to here as "other marine fish species.") .

Capture fisheries and aquaculture production yielded 74 million metric tons of whitefish and other marine fish species in 2013 (round weight terms) (Table 7.6). The majority of production is used for meat, but fish meal, fish oil, and surimi production also utilize significant volumes of wild marine fish species. Fish meal and fish oil production required 16.3 million metric tons of wild capture fish species in 2012; however, about 35 percent of fish meal production was created using fish residues (ancillary products and waste rather than whole fish).[2]

[2] (Green, 2014)

Table 7.6: Global Whitefish and Other Marine Fish Species Production, in Metric Tons, 2013.

Species	Harvest Volume (mt)	Primary Uses
Alaska Pollock	3,239,719	Meat, Surimi, Meal/Oil
Hakes, Hoki, and Whiting	2,209,131	Meat, Surimi, Meal/Oil
Cod and Haddock	2,169,226	Meat
Other Flatfish (Sole/Flounder/etc.)	882,063	Meat
Saithe	318,371	Meat
Other Whitefish	221,986	-
Halibuts and Turbots	157,824	Meat
Total Wild Whitefish (Capture Fisheries)	**9,198,320**	**-**
Anchovies, Shads, and Menhaden	9,411,729	Meal/Oil
Herring and Sardines	8,056,155	Meal/Oil, Meat, Roe, and Bait
Mackerel and Saury	5,716,215	Meat and Meal/Oil
Jacks, Scads, and Carangids	2,582,584	Meat and Meal/Oil
Other Coastal Species	2,556,069	-
Eels, Congers, and Hairtails	2,439,811	Meat and Surimi
Croakers and Drums	1,761,530	Meat and Bait
Breams, Lizardfish, and Pomfrets	1,539,437	Surimi and Meat
Mullets and Goatfish	778,322	Meat
Capelin	758,735	Roe and Meal/Oil
Other Demersal Species	590,858	-
Other Pelagic Species	529,231	-
Groupers and Seabass	317,542	Meat
Snappers	264,286	Meat
Rockfish	213,337	Meat
Atka Mackerels	130,448	Meat
Mahi-mahi (Dolphin)	102,986	Meat
Monkfish	92,768	Meat
Sablefish and Patagonia Toothfish	46,508	Meat
Other Misc. Species - Capture Fisheries	20,422,968	-
Total Other Marine Species	**58,311,519**	**-**
Tilapias (Farmed)	4,823,312	Meat
Pangasius (Farmed)	1,671,825	Meat
Total - Tilapias and Pangasius	**6,495,137**	**-**
Total Whitefish and Other Marine Species	**74,004,976**	**-**
Total Alaska Groundfish Harvest (2013)*	**2,169,200**	**Pct of Total: 2.9%**

Notes: *Includes herring harvests, to make the figure more comparable to the broader range of groundfish included in the table.
Red-fleshed fish species (e.g. tuna) and diadromous fish (e.g. salmon) are not included in these figures.

Source: FAO, compiled by McDowell Group.

The vast majority of fish shown in Table 7.6 produce white fillets, and could represent a substitute for key Alaska species on a general level. However, culinary traditions and local tastes tend to limit the number of species palatable to individual markets. For example, cod is a staple fish in Europe but virtually non-existent in Southeast Asia, where it would be more common to find carp or milkfish filling the whitefish role. Cost is always a primary concern as well. Consumers generally will not substitute imported whitefish species for less expensive and traditionally palatable domestic species. There are also significant differences in the way different cultures prepare whitefish. Countries in emerging markets are generally more likely to cook fish whole while developed countries tend to use fillets or steaks. Differences in availability, price, taste, and fish size limit actual consumer substitution, despite the fact that most species listed in Table 7.6 could generally be categorized as white-fleshed fish.

Alaska's Position in the Global Whitefish Market

Alaska accounted for 2.9 percent of global whitefish and other marine fish production volume in 2013. However, wild whitefish species, representing the majority of Alaska's groundfish harvest, only accounted for 12.4 percent of total production in 2013. Alaska plays a bigger role in global production if the whitefish scope is narrowed to wild and farmed whitefish species (i.e. tilapias and pangasius). In 2013, Alaska production accounted for 13.5 percent of global wild and farmed whitefish production, a substantial figure in a global context.[3] This is a notable comparison because wild whitefish species, such as cod, pollock, and sole, as well as farmed tilapias and pangasius, are more likely to be exported than other wild fish species, which are mainly sold into domestic markets or transformed into fish meal, fish oil, or surimi.

Alaska's commercial fisheries produce larger harvests than every other U.S. state combined and 80 percent of Alaska's harvest volume came from high-volume whitefish fisheries (pollock, cod, and flatfish) in 2013. Despite the impressive scale of its high-volume whitefish fisheries, Alaska is only a fractional part of global whitefish production. As a result, Alaska's groundfish industry is a usually a price taker, where the value of its cod, pollock, and flatfish are impacted by competing suppliers and competing whitefish species. Russia (cod/pollock/flatfish), China (tilapia), Norway (cod), Japan (pollock/cod), New Zealand (hoki), and Vietnam (pangasius) are the biggest competitors for Alaska's groundfish industry, in terms of high-volume whitefish species.

Low volume Alaska whitefish species like halibut, sablefish, rockfish, and Atka mackerel have much more defined markets where Alaska is the primary export supplier and generally account for a larger percent of global supply in these niche markets. As a result, species substitution is less common in markets for these species and price is mostly a function of Alaska or local harvest volume.

Tradition, taste preferences, and familiarity are hurdles in developing new markets for Alaska groundfish species. However, culinary influences are blending and crossing borders faster than perhaps any other time in human history. Modern urban centers, from Singapore, Sao Paulo, San Francisco, Sydney, to Seoul, provide a growing supply of unique seafood options. Expanding culinary options presents new marketing opportunities for Alaska's seafood industry, particularly since Alaska has a reputation for quality and a strong distribution network, having been in the business of exporting fish for decades. However, it may also present challenges in existing markets in years to come as consumers gain more exposure to seafood from other cultures.

[3]Whitefish in this comparison includes tilapia, pangasius, cod, haddock, pollock, hakes, hoki, whiting, flatfish, and other wild cod-like groundfish species.

Summary of Key Alaska Groundfish Markets

Export markets buy about 90 percent of Alaska groundfish meat products, and an even larger percentage of surimi, roe, and ancillary groundfish products are exported. China is the largest wholesale market for meat products, accounting for 44 percent of estimated sales volume in 2014 (see Table 7.7). However, with the exception of sablefish, the vast majority of Alaska groundfish exported to China is re-exported to Europe, the U.S., and Japan. Europe is the largest overall market for Alaska groundfish, due to the high volume of pollock and cod which eventually enters European markets. Japan is likely the second largest market followed by the United States, in terms of final sales volume.

Table 7.7: Wholesale Sales of Alaska Groundfish Meat Products, in Metric Tons, 2014.

Species	Wholesale Production	U.S. (Est.)	Europe	China	Japan	Other	Total Exports
Alaska Pollock	252,809	39,961	137,209	53,390	4,512	17,737	212,848
Pacific Cod	134,206	30,394	20,975	57,195	16,571	9,071	103,812
Flatfish	167,185	40,045	717	107,486	5,356	13,581	127,140
Rockfish	32,192	8,390	58	15,566	6,861	1,317	23,802
Atka Mackerel	20,888	1,361	15	3,741	12,627	3,144	19,527
Sablefish	6,696	593	173	559	4,648	723	6,103
Pacific Halibut	6,159	4,093	0	16	0	2,050	2,066
Unknown Species	-	-58,740*	310	36,950	7,401	14,079	58,740
Total	**620,134**	**66,096**	**159,457**	**274,903**	**57,976**	**61,702**	**554,038**
Pct. of Total	**-**	**11%**	**26%**	**44%**	**9%**	**10%**	**89%**

Notes: Wholesale production of high-volume whitefish species only includes whole fish, H&G, and fillet production. Virtually all halibut and sablefish consists of edible products.

*Unknown species likely represent exports of Alaska flatfish and other high-volume whitefish species, this non-specific volume is debited from estimates of U.S. sales.

Source: AKFIN, ADF&G (COAR), and ASMI Alaska Seafood Export Database.

7.3. Alaska Pollock Product Market Profiles

Alaska pollock or walleye pollock[4] (gadus chalcogrammus) is currently the largest single species fishery in the world, with stocks concentrated in the North Pacific Ocean. Pollock are commercially harvested by several countries, but Alaska and Russia are the largest producers by a wide margin. Alaskan pollock harvests are large on a national scale, accounting for 33 percent of total U.S. commercial fishery landings and 14 percent of wholesale production value in 2014.

Pollock is the single most valuable and plentiful species in Alaska's seafood industry, accounting for 45 percent of production volume and 32 percent of first wholesale value in 2014. Alaskan pollock is processed into fillets, surimi, roe, head/gut (H&G), fish meal, fish oil, and other products. Europe, Japan, and U.S. are the primary markets. Table 7.8 summarizes some of the key statistics in the Alaskan pollock fishery from 2014.

Table 7.8: Summary Profile of Alaskan Pollock Wholesale Production and Markets, 2014.

Value and Volume		Key Products	Fillets	Surimi	Roe	H&G	Other
First Wholesale Production (mt)	580,400	% of Value	40%	30%	11%	7%	12%
Pct. of Global Pollock Harvest (2013)	43%	Key Markets	Japan	Europe	US	Korea	Other
First Wholesale Value ($millions)	$1,384	% of Final Sales	36%	40%	11%	6%	6%
Pct. Change from Prior 4-yr Avg.	3.7%	YoY Change	24%	11%	*N/A*	12%	*N/A*
Pct. of Alaska Groundfish/Crab Value	49%	Competing Species: Russian Pollock, hake, hoki, tropical surimi, & cod.					

Alaskan Pollock Wholesale Production and Value

Pollock is one of the most valuable fisheries in Alaska, due to its tremendous volume, production versatility, and white, mild-flavored flesh. In total, Alaskan pollock accounted for 58 percent of Alaska's groundfish/crab production volume and 49 percent of first wholesale value in 2014. Virtually all edible pollock products are frozen before being sold into wholesale markets. Alaska pollock harvests yielded 580,400 mt of processed product in 2014, with a first wholesale value of $1.38 billion.

Alaskan pollock yield five primary product types: surimi, fillets, head/gut, roe, and fish meal/oil. In 2014, of the 580,400 mt of pollock products produced, 184,000 mt were used in fillets, 183,600 mt in surimi, 67,200 mt in H&G, 24,100 mt in roe, and other products (including fish meal, minced meat, and fish oil) adding up to 121,600 mt (Table 7.9). Fish meal, oil, and other ancillary are discussed in greater detail in the forthcoming Alaska Groundfish Wholesale Market Profiles report. Fillets are usually the most valuable product, with surimi a close second. Together fillets and surimi accounted for 70 percent of Alaskan pollock's first wholesale value in 2014. Although roe is only 4 percent of the production volume, it accounts for 11 percent of the fish's value and used to be a more valuable piece of the pie. Fish meal/oil, minced meat, and other ancillary products account for 12 percent of the value, while head/gut production is 7 percent.

[4] Differentiating pollock by its place of origin, primarily Russia or Alaska, can be confusing due to the official species name (Alaska pollock). To avoid confusion, we typically use the term "pollock" to refer to Alaska pollock from any country/place. References to pollock from a specific place are called out by name (e.g. "Alaskan pollock" or "Russian pollock").

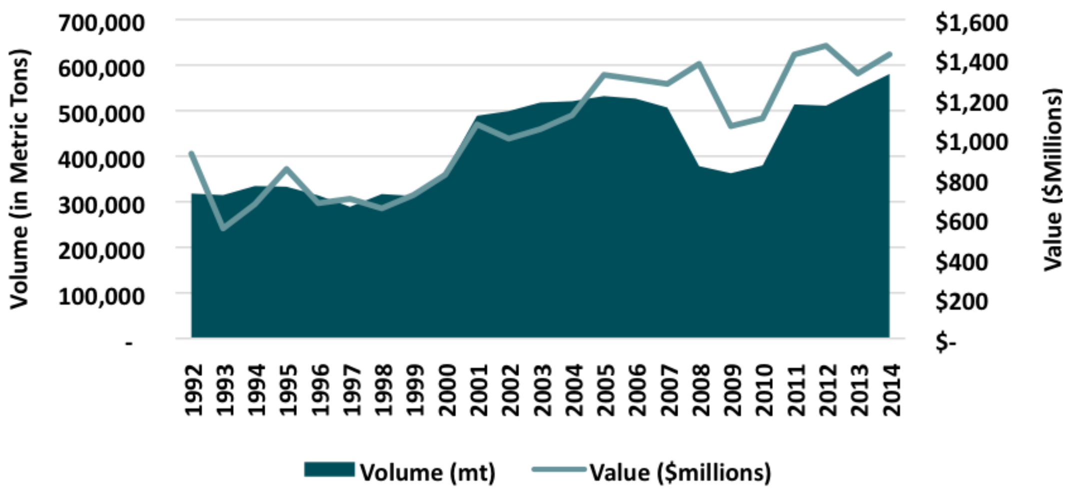

Figure 7.4: First Wholesale Volume and Value for Alaskan Pollock, 1992-2014.
Source: AKFIN.

Table 7.9: Production Volumes and Recovery Rates for Common Alaskan Pollock Products, 2014.

	2014 Production Volume (in mt)	2014 Production Value (in $000s)	Recovery Rate Range Pct. from Round Weight	Average Price per Kilo
Fillets	184,000	$551,100	20-35%	$3.31
Surimi	183,600	$419,200	20-30%	$2.28
Head and Gut	67,200	$84,100	52-72%	$1.25
Roe	24,100	$148,700	*1.2-1.9%	$6.17
Other Products	121,600	$165,300	-	$1.36
Total Production	**580,400**	**$1,383,700**	**41%**	**-**
Total Retained Harvest	**1,426,800**	**-**	**-**	**-**

Notes: Production volume is shown in product-weight terms.
*Actual range of roe recovery rate from 2010 to 2014 compared to total harvest volume; however, recovery rates can vary significantly depending on when fish are harvested - from virtually zero percent to eight percent.
Source: AKFIN, industry interviews, and Crapo, 2013.

Roe typically has the highest profit margin per unit of production. Its current price levels are at historic lows at $6.24 per kilo. In comparison, fillets and surimi have first wholesale prices of $3.00 and $2.29 per kilo, respectively.

Supply Chain

When pollock is landed in Alaska, it enters one of the most complex supply chains of any groundfish species. Landed fish are first headed and gutted. Heads and other offal is turned into fish meal/oil or retained for other niche markets. Pollock meat is generally used to make either surimi or fillets. The fillet supply chain is summarized in Figure 7.5.

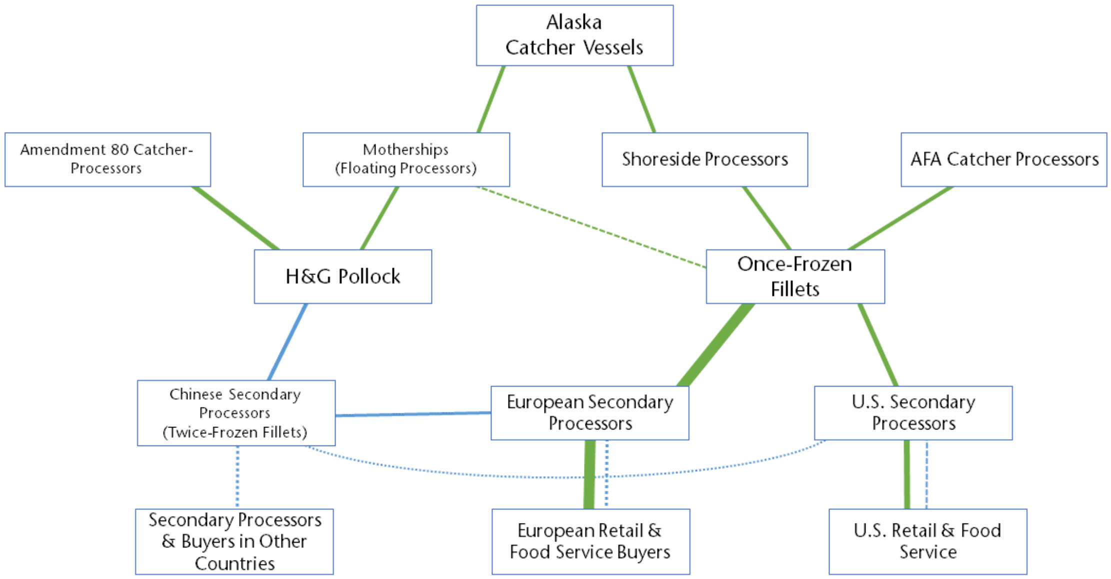

Figure 7.5: Alaskan Pollock Fillet Supply Chain.
Notes: The diagram above depicts the movement of major product volumes, and does not reflect supply channels for smaller volumes of product.

7.3.1 Alaskan Pollock Fillets Wholesale Market Profile

Fillets accounted for 40 percent of the total Alaskan pollock production value in 2014. Pollock fillets function as a whitefish commodity for fish sticks/fingers, patties, and other value-added frozen whitefish fillet products. The two primary markets for fillets are Europe and the U.S. Prices have trended downward in recent years due to increased supply and a stronger U.S. dollar.

Alaska Pollock Fillet Product Description

Alaskan pollock fillets are produced primarily by catcher-processors and shoreside production facilities. These Alaska producers manufacture once-frozen products. Pollock fillets are also produced at secondary processing facilities in China and Europe using imported H&G product. However, the fish must be thawed and often re-frozen after processed, creating what is known as twice-frozen fillets. Once-frozen and twice-frozen Alaska pollock fillets compete in most of the same markets, but once-frozen product sells at a premium due to its higher quality. Whether the fish is processed in Alaska or abroad, the primary processing forms are skinless fillets and deep-skinned fillets. Deep-skinned fillets are skinless/boneless fillets with a deeper cut below the skin to remove the fat line resulting in a whiter fillet.

The average commercially harvested Alaskan pollock weighs two pounds and yields fillets ranging from two to four ounces. The majority of Alaskan pollock fillets are processed into frozen blocks of skinless or deep-skinned fillets, due to the long slender fillet shape of pollock. Fillets are also packaged as individually quick frozen (IQF) portions or shatterpacks (blocks of frozen fillets with each fillet separated by plastic).

Pollock fillets are primarily used in frozen, generic whitefish products, such as fish sticks/fingers, breaded fish fillets/patties, and other value-added frozen products. They are popular in quick service restaurants such as McDonald's and Long John Silver's. Frozen products made from pollock fillets are widely available in most European and North American grocery stores.

Alaska Pollock Fillet Production Analysis

Fillets accounted for 32 percent of all Alaskan pollock production volume in 2014. Skinless/boneless fillets account for the majority of production. Deep-skinned fillets are the next most common product. In 2014, 74 percent of pollock fillets produced in Alaska were skinless fillets without ribs, while deep-skinned fillets accounted for 24 percent of production volume. Fillet production has grown in recent years, generally tracking increases in harvest volume.

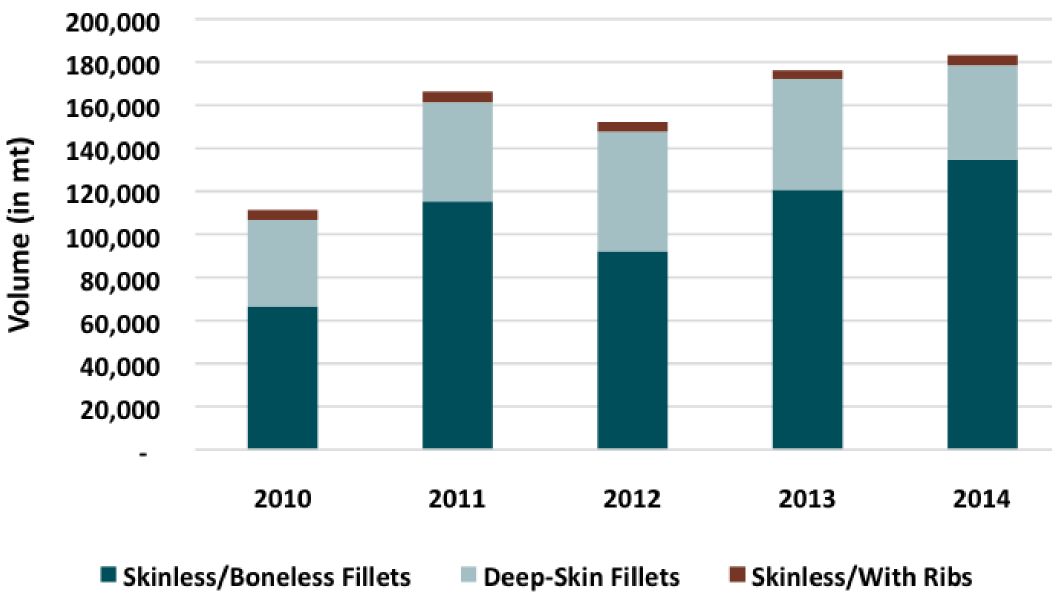

Figure 7.6: Alaskan Pollock Fillet Production Volume, in Metric Tons, 2010-2014. **Source:** AKFIN.

Alaska Pollock Fillet Key Market Analysis

Export markets are critically important to Alaska's pollock industry. It is estimated that export markets buy approximately two-thirds of all Alaskan pollock fillet production. More than half of all Alaskan pollock fillets go directly to European markets (Table 7.10). In addition, the majority of Alaskan pollock fillets exported to China are eventually re-exported to Europe. Germany is the largest single market for Alaskan pollock fillets while the U.S. is the second-largest market.

The percentage of Alaskan pollock fillet production exported directly to Europe increased to 65 percent in 2014, from 58 percent in the previous year. Due to a lack of data, sales to the domestic market must be estimated by subtracting production from exports. These estimates suggest domestic

Table 7.10: Sales of Alaskan Pollock Fillets to Key Markets, in Metric Tons, 2010-2014.

Market	2010	2011	2012	2013	2014	Pct. of Total (5yr. Avg.)
Europe[1]	59,576	96,133	85,114	102,330	119,809	59%
China*	12,479	11,238	8,802	4,632	4,526	5%
South Korea*	6,907	3,374	1,602	848	839	2%
Other Countries	2,644	3,226	4,404	7,078	7,078	3%
Total Exports	**81,605**	**113,971**	**99,921**	**114,888**	**132,252**	**69%**
U.S. (Estimated)[2]	29,886	52,956	52,629	61,829	51,718	31%
Total Production	**111,491**	**166,927**	**152,550**	**176,717**	**183,970**	**-**
Est. Production to Export Markets	**73%**	**68%**	**66%**	**65%**	**72%**	**-**

Notes: *Denotes countries which primarily re-process and/or re-export product to other markets.
[1] Does not include Russia, Ukraine, or some minor European markets.
[2] Estimated based on annual production less calendar year exports.
Data pertains to primary exports only, does not portray product which may be re-exported to other markets.
Source: NMFS Trade Data, ASMI Alaska Seafood Export Database, and McDowell Group estimates.

market purchases increased significantly in 2011; however, given the sharp increase in production it is likely that some of that year's volume went into inventory and was sold the following year.

Europe

Europe is the world's largest market for pollock fillets and is also the largest market for any Alaska groundfish or crab product, in terms of first wholesale value. European countries account for 80 to 90 percent of all U.S. pollock fillet export value. European markets imported 119,809 mt of Alaskan pollock fillets in 2014, worth $348 million. Pollock fillets are generally exported to Europe as frozen fillet blocks and are utilized as a whitefish commodity, primarily functioning as raw material for secondary processors. Although it is not possible to quantify precisely, industry interviews suggest pollock fillets are more often sold to European consumers via retailers, with less production entering the foodservice sector. Europe has a long history of whitefish consumption, so the presence of pollock as an affordable substitute to cod is common in most countries.

Alaskan pollock fillets are primarily exported to Europe via Germany and the Netherlands. Germany's Hamburg and the Netherlands' Rotterdam are major ports. Overall, these two countries accounted for nearly 90 percent of total Alaskan pollock fillet exports to European markets in 2014. The total volume and value of Alaskan pollock fillets exported to Europe has increased substantially in recent years; however, the export value/mt was down 16 percent in 2014 compared to 2010.

Alaskan single-frozen pollock fillets accounted for about a third of all pollock fillets imported into Europe, over the past five years (2010-2014, See Table 7.10). However, Alaska's market share increased to 39 percent in 2014. The balance comes from China - mostly re-processed, twice-frozen fillet block made from Russian pollock - or directly from Russia as a single-frozen fillet blocks.

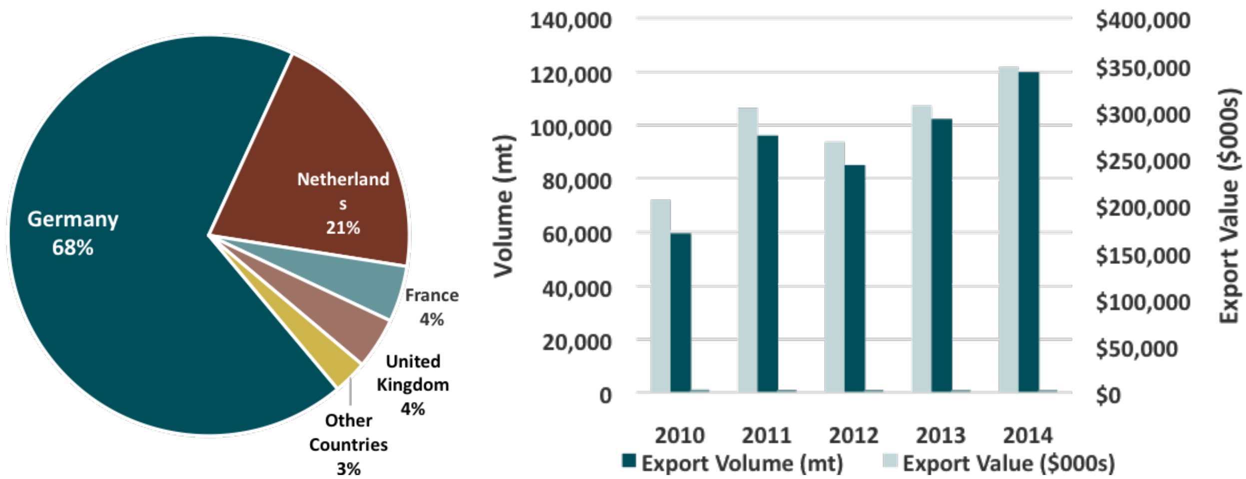

Figure 7.7: Exports of Alaskan Pollock Fillets to European Markets, 2010-2014.

	2010	2011	2012	2013	2014
Export Volume (mt)	59,576	96,133	85,115	102,330	119,809
Export Value ($000s)	$205,860	$304,019	$267,796	$306,382	$347,635
Average Export Value per Metric Ton	$3,455	$3,162	$3,146	$2,994	$2,902

Source: ASMI Alaska Seafood Export database, compiled by McDowell Group.

Market Impact of Third-Party Certification

Several major European retailers have committed to only selling certain seafood products from sustainable fisheries, certified by the Marine Stewardship Council (MSC). Until Russia's Sea of Okhotsk pollock fishery was certified in September 2013, Alaska's pollock fisheries were the only source for certified pollock fillets. This effectively gave Alaska producers sole access to a sizeable, premium market. Once-frozen Alaskan pollock fillets used to sell at a significant premium to twice-frozen Russian pollock, typically on the order of $300 to $400 per ton due to Alaska's certification status but also based on the intrinsic difference in quality. Russian certification, along with larger harvests in both countries, has roughly doubled the supply of pollock fillets available to "MSC-only" buyers in Europe. The result has been a steady decline in wholesale prices for both Alaskan and Russian pollock fillets, as well as a declining premium for once-frozen Alaskan product.

United States

The domestic market is the second-largest consumer of Alaska pollock fillets in the world. In contrast to Europe, Americans consume more pollock through foodservice channels than retail outlets. Pollock is the primary whitefish species used in most generic fried fish sandwiches whole fillets or fillet portions, and frozen fish sticks. It is becoming more common to see the species name identified in product messaging.

It is possible to estimate the U.S. supply of pollock fillets by subtracting Alaskan pollock fillet exports from domestic production, and adding this figure to imports of pollock fillets. Although the process provides some visibility about the nature and size of the U.S. market, it cannot account for the impact of Alaskan pollock fillet inventories, which are added or subtracted to the U.S. supply estimate. Large supply estimates in 2011 and 2012 are outliers and likely the result of increasing inventory due to growing Alaskan fillet production. However, when averaged over several years, it is a reasonable method for estimating market share and supply, given the lack of data.

The U.S. market consumes approximately 110,000 mt of pollock fillets per year (Table 7.11). Although the species name implies the product comes from Alaska, a large percentage of pollock fillets consumed by Americans actually come from Russian fisheries. Import volume and total supply estimates declined sharply from 2010 to 2014, suggesting a weakening market for fillet products.

Table 7.11: Estimated U.S. Pollock Fillet Market Supply, in Metric Tons, 2010-2014.

Year	Alaska Pollock Fillet Production	Imports	Exports	U.S. Supply (Est.)	Once-Frozen Product from Alaska (Est.)	Pct. from Alaska
2010	111,491	70,278	81,605	100,164	29,886	30%
2011	166,927	72,938	113,971	125,894	52,956	42%
2012	152,550	51,845	99,921	104,474	52,629	50%
2013	176,717	55,104	114,888	116,933	61,829	53%
2014	183,970	49,817	132,252	101,535	51,718	51%
Average	**158,331**	**59,996**	**108,527**	**109,800**	**49,804**	**45%**

Source: NMFS Foreign Trade Data, AKFIN, ASMI Alaska Seafood Export Database, and McDowell Group estimates.

Pollock fillets are usually put through a secondary manufacturing process before reaching American consumers. Most fillets are bought by companies unaffiliated with harvesting companies in Alaska or Russia. However, there is some integration in the U.S. market. Alaska's largest pollock producer, Trident Seafoods, sells finished product to retailers (in addition to wholesale customers). Unisea, Alaska's third-largest pollock producer, is owned by NISSUI and supplies raw material to Gorton's - a popular brand for frozen whitefish products. Foodservice operators utilizing Alaska pollock typically own or contract with processing facilities.

7.3.2 Alaska Pollock Surimi Wholesale Market Profile

Surimi accounted for 30 percent of Alaskan pollock's first wholesale value and 32 percent of production volume in 2014. Nearly 184,000 mt of pollock surimi was processed in Alaska, with a first wholesale value of $421 million in 2014. Japan, Europe, South Korea, and the U.S. are key surimi markets.

Alaska Pollock Surimi Product Description

Surimi is an odorless, protein-rich, white paste that is an intermediate product used in a variety of surimi seafood products (such as imitation crab sticks). Pollock are first filleted and then minced. Blood and other odorous substances are removed through rinsing with water. Surimi blocks are produced when pulverized minced meat is mixed with additives such as salt, starch, egg white, and sugar, and then frozen and packaged. The commercial grade of surimi depends on the length of the process and the purity of the product. Surimi technology has improved over the years, with the yield increasing from 12 percent to over 30 percent.[5]

[5] (Park, 2014)

Surimi can be made from a variety of fish, but Alaska pollock surimi is sought after for its white color, binding ability, and meat quality. There are hundreds of surimi seafood product varieties. The broad categories include: kamakobo (steamed), chikuma (broiled), satsuma-age (fried), and seafood analogs (e.g. imitation crab sticks). The quality of surimi is determined by a few main characteristics including its gel-forming properties, color (the whiter, the better), and purity.

Alaska Pollock Surimi Production Analysis

Production volume has been relatively consistent outside of 2008 to 2010, typically ranging from 150,000 to 200,000 mt. First wholesale value is more variable, as the price of Alaskan pollock surimi can vary widely from year to year depending on global surimi market conditions. Average surimi material prices were $2.28 per kilo in 2014, up 3.0 percent from 2013.

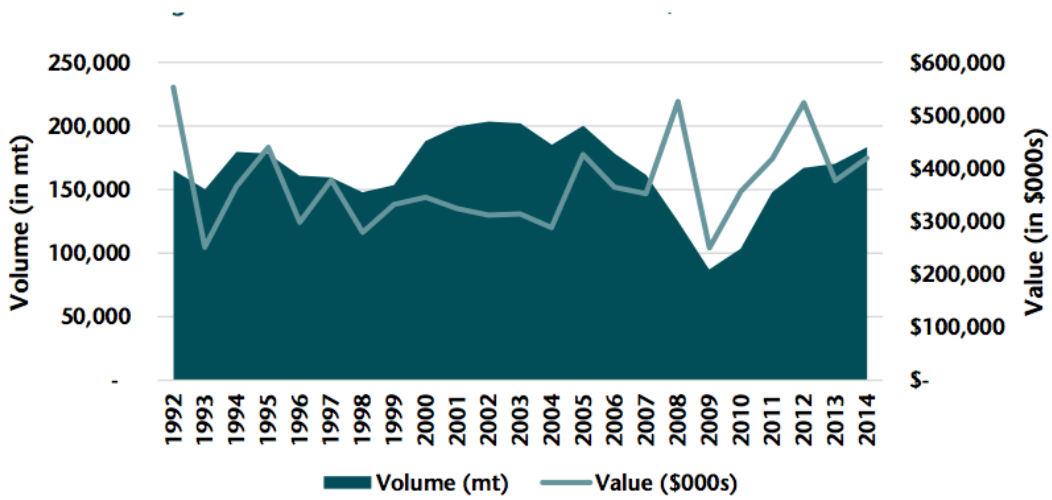

Figure 7.8: Pollock Surimi Production in Alaska, 1992-2014.

Source: AKFIN.

Alaska Pollock Surimi Key Market Analysis

Approximately 90 percent of Alaskan pollock surimi is sold to export markets (Table 7.12). In 2014, Japan and South Korea imported 70 percent of all Alaskan pollock surimi production. The remaining markets included Europe, U.S., China, Russia, and former Soviet-bloc countries. Europe is a larger market than the export data below suggests, importing significant volumes of surimi from South Korea (containing Alaskan pollock as well as surimi made from other species). U.S. surimi exports in 2014 were 20 percent above the previous four year average.

The global market for surimi is approximately 820,000 metric tons, which is converted into approximately 3 million metric tons of surimi seafood products. Alaska's pollock fishery accounts for between 20 and 25 percent of global surimi production. Japan is the largest market; however, other Asian countries such as China and Korea are also important surimi consumers.

Japan

Japan is the world's largest end market for surimi seafood products, consuming 40 percent of global surimi production. Large companies and artisanal shops in Japan process over 1,000 different surimi

Table 7.12: U.S. Exports of Alaskan Pollock Surimi by Country, in Metric Tons, 2010-2014.

Country	2010	2011	2012	2013	2014	Pct. Change from 2010-2013 Avg.	Pct. of Total (5yr. Avg.)
Japan	45,377	53,810	67,609	56,292	71,870	29%	38%
South Korea	33,671	41,332	44,788	61,516	56,804	25%	31%
Europe	10,992	28,391	32,568	35,359	25,920	-3%	17%
Russia	1,689	3,851	3,457	3,592	2,235	-29%	2%
China	515	1,144	370	1,466	1,281	47%	1%
Other Countries	1,629	4,978	2,407	4,127	4,534	38%	2%
Total Surimi Exports	**93,358**	**132,363**	**150,829**	**160,886**	**161,363**	**20%**	**-**
U.S. (Estimated)	10,237	15,709	16,214	9,373	22,278	73%	10%
Total Production	**103,595**	**148,072**	**167,043**	**170,259**	**183,641**	**25%**	**-**
Pct. Exported	**90%**	**89%**	**90%**	**94%**	**88%**	**-**	**-**

Notes: Reflects direct exports only. Does not reflect final market destination.

Source: ASMI Alaska Seafood Export database and AKFIN.

products. Surimi, known as neri in Japan, is a popular, convenient protein that is consumed in numerous ways, including fried, boiled, steamed, baked, and broiled. Consumption has declined since the mid-1970s, but has stabilized since 2010 at roughly 570,000 mt of surimi seafood products per year.[6]

Japan directly imported 38 percent of Alaskan pollock surimi produced from 2010 to 2014, averaging 59,000 mt of direct imports worth $132.1 million per year. Including product routed through Korea and other countries, 55 to 60 percent of Alaska's total pollock surimi production goes to the Japanese market.

Alaska accounted for 36 percent of Japan's imported surimi volume between 2010 and 2014, and including domestic surimi production Alaskan product comprises 25 to 30 percent of the total market share in Japan (Table 7.13). Competing suppliers include Thailand, India, China, and Vietnam. Thailand's tropical surimi production has declined in recent years and India has increased market share as a lower cost producer.

Imported surimi prices have trended up in recent years, partly due to lower supply and a weaker Japanese yen (Table 7.14). Alaskan pollock surimi prices were lower than tropical surimi, on average, in recent years. This is due primarily to changes in supply patterns rather than the intrinsic quality of the product. Alaskan pollock surimi production has increased significantly since 2010 while tropical surimi production declined in 2013 after years of steady growth. In addition, prices for common types of fish used in tropical surimi have increased.

Other Key Markets

Europe and former Soviet states are the second largest market for Alaskan pollock surimi. Alaska producers exported 28,200 mt of surimi worth $61.2 million to Europe and Russia in 2014. Alaskan

[6] (Park, 2014)

Table 7.13: Japan Surimi Imports from Major Producers, in Metric Tons, 2010-2014.

Exporter	2010	2011	2012	2013	2014	Pct. of Total (5yr. Avg.)
U.S. (Alaska)	62,194	79,817	93,990	94,070	109,957	36%
Thailand	55,055	57,723	50,782	36,661	34,159	19%
India	25,334	28,895	29,174	28,083	33,969	12%
China	29,163	26,817	14,535	13,459	19,078	8%
Vietnam	23,691	18,756	18,576	12,122	16,753	7%
All Others	38,233	35,870	37,771	34,875	37,599	15%
Total	**240,171**	**252,093**	**249,403**	**224,725**	**259,386**	**-**
Pct. from Alaska	**26%**	**32%**	**38%**	**42%**	**42%**	**-**

Source: Japan Trade Statistics (Ministry of Finance), compiled by McDowell Group.

Table 7.14: Total and Unit Value of Japan Surimi Imports, 2010-2014 Europe and Russia.

	2010	2011	2012	2013	2014	Pct. Change from 2010-2013 Avg.
Total Import Value						
Millions yen	¥72,321	¥69,913	¥77,436	¥71,924	¥88,979	22%
Yen/kg	¥301	¥277	¥310	¥320	¥343	14%
Alaska Surimi Import Value						
Millions yen	¥20,723	¥19,580	¥26,441	¥23,452	¥30,693	36%
Millions US dollar	$236	$246	$331	$240	$290	10%
Yen/kg	¥333	¥245	¥281	¥249	¥279	1%
US dollar/kg	$3.80	$3.08	$3.53	$2.55	$2.64	-19%
Exchange Rate (yen/USD)	¥87.8	¥79.7	¥79.8	¥97.6	¥105.9	23%

Notes: Value figures are CIF Japan. U.S. dollar conversions were made using average annual exchange rates from OANDA.com.

Source: Japan Trade Statistics (Ministry of Finance), compiled by McDowell Group.

surimi accounts for approximately half (33,000 mt) of Europe and Russia's total surimi consumption; this includes Alaska product routed through other countries.

The U.S. exported 56,804 mt of Alaskan pollock surimi to South Korea in 2014, which accounted for 44 percent of Alaskan pollock surimi exports. However, Korean import statistics suggest only 18,715 mt actually entered the country. The balance is likely held in bonded, duty-free cold storage warehouses before being shipped to other markets (primarily Japan, Europe, and Russia). Despite the prevalent re-export trade, South Korea is the second-largest buyer of Alaska surimi in terms of a single country (in most years). The 2012 Korea-U.S. Free Trade Agreement has deepened the economic ties between Korea and the U.S. and increased consumption of pollock surimi.[7] South Korea imported 128,200 mt of all surimi varieties in 2014 worth $226.4 million, with Alaska accounting for 15 percent of total surimi imports.

[7] (Yoo, 2013)

Alaska Pollock Surimi Competing Supply

There are two tiers in which Alaska pollock surimi has competition. One is the raw material, which is minced fish. The second is surimi production, which requires advanced food science technology to produce a variety of surimi products. Pollock surimi accounted for 26 percent of total surimi production over 2010-2014 (Table 7.15). Virtually all pollock surimi is produced in Alaska or comes from Alaskan fisheries. Tropical surimi dominates global surimi production, accounting for about two-thirds of total production. China, Vietnam, Thailand, and India are the largest tropical surimi producers.

Table 7.15: Global Surimi Production, in Metric Tons, 2010-2014.

Surimi Type	2010	2011	2012	2013	2014	5yr. Avg. Pct. of Supply	Major Producers
Alaska Pollock	160,900	208,800	227,100	216,000	213,000	26%	Alaska
Cold Water Fish	34,000	30,700	34,100	37,000	37,500	5%	WA/OR, Argentina, Chile
Tropical Fish	485,000	537,000	576,600	528,000	550,000	68%	China, Vietnam, Thailand, India
Other	33,000	19,000	20,500	8,500	4,500	1%	-
Total	**712,900**	**795,500**	**858,300**	**789,500**	**805,000**	-	-

Source: Future Seafood Group (via Undercurrent News).

Surimi is made from a variety of fish species. Alaskan pollock is the most widely used species, but other types of surimi utilize a range of other fish. Many countries have active fisheries that support surimi production. In terms of a single country, the U.S. is the second-largest surimi producer in the world. Most U.S. surimi production comes from Alaska (pollock) and the Pacific hake fishery off the coast of Washington and Oregon. As shown in Table 7.15, pollock accounts for 26 percent of surimi supply, a small share compared to tropical fish species which account for 68 percent of surimi production. Russia occasionally produces a relatively insignificant volume of surimi, relative to other producers. China, India, and Southeast Asia (including Thailand and Vietnam), are key tropical surimi producers, with China typically claiming the title of world's largest surimi producer. Argentina, Chile, and the Faroe Islands are important cold water surimi producers. It should be noted that surimi production statistics are not universally tracked. Although FAO compiles data on minced fish and surimi production, the manner in which data is categorized do not allow for comprehensive production accounting. As a result, industry estimates (which are based on public and private data) are a more reliable source of information.

7.3.3 Alaska Pollock Roe Wholesale Market Profile

Pollock roe commands the highest price of all major pollock products at $6.24 per kilo and was worth $151 million in total first wholesale value in 2014. It accounted for 11 percent of Alaskan pollock's total first wholesale value but only 4 percent of production volume (24,100 mt). Pollock roe is widely consumed as a condiment and during holidays in Japan. South Korea is the world's only other sizeable market.

Alaska Pollock Roe Product Description and Supply Chain

Pollock roe production occurs when the fish are spawning. Due to the variety of spawning timing within pollock stocks, the spawning season extends from November to May but most production occurs during the late winter and early spring. After the fish is headed, roe is extracted during the gutting process and rapidly frozen before deterioration occurs. Roe prices are tied to the quality of the roe, which varies greatly. Lower grade roe might have defects such as discoloring, broken skeins, or be discounted due to roe maturity (eggs are too young or too old). Product caught and processed at sea tends to command the highest prices with average prices of $7.50 per kilo compared to $4.90 shoreside.[8] Pollock roe is traditionally sold to wholesale buyers in frozen block form, packed into 49.5 lb. cases each containing three blocks of roe.

Pollock roe is an export product. Frozen Alaskan pollock roe is sold at auctions in Seattle, WA, while Russian pollock roe is often sold at auctions held in Busan, South Korea. However, larger volumes of Alaska product is sold directly to buyers through negotiated contracts. “Direct sales” have become more common in recent years, based on pricing discovered through the auction process. The pollock roe supply chain is vertically integrated for large companies that maintain a pipeline from the raw material all the way to distribution in markets in Japan and South Korea. In fact, 80 percent of Alaska’s pollock quota is shared by four large vertically-integrated companies: Trident Seafoods, Maruha Nichiro, Nissui, and American Seafoods.[9] Each of these companies own stakes in Alaska fishing vessels, Alaska shoreside plants, and distributors in Japan and South Korea.

After frozen pollock roe is exported to Asia, it eventually undergoes secondary processing. Japan, Korea, China, and in Thailand are common destinations, where it is processed by defrosting and brining the roe in spices or salt.[10] In Japan, pollock roe is often sold in the skein and consumed as salted roe (tarako) or spicy/marinated roe (karashi mentaiko). The product is commonly utilized as a condiment and as an ingredient in soups, rice balls (onigiri), rice dishes, and pastas. High quality pollock roe is a popular gift during holidays and consumed individually with sake.

Alaska Pollock Roe Production Analysis

Alaska pollock roe is an important element of the pollock product mix. Although it is a low-volume product, roe assumes the highest unit price of any pollock product. In 2014, only 24,100 metric tons was produced, but the wholesale value $151 million (11 percent of the species’ wholesale value).

Historically (prior to 2007), roe often accounted for one-third to one-fifth of Alaskan pollock’s total first wholesale value. It was a consistently valuable market. However, the percentage of roe value compared to all Alaskan pollock products has declined significantly in recent years. Since 2010, roe has only generated 9 to 12 percent of total first wholesale value. This market development has an even deeper impact considering there is virtually no trade-off with roe, unlike surimi and fillets which both utilize pollock flesh. Roe creates a substantial additional income stream (in addition to the meat), and is relatively inexpensive to process.

[8] AKFIN
[9] (Globefish, 2015)
[10] Industry Interview

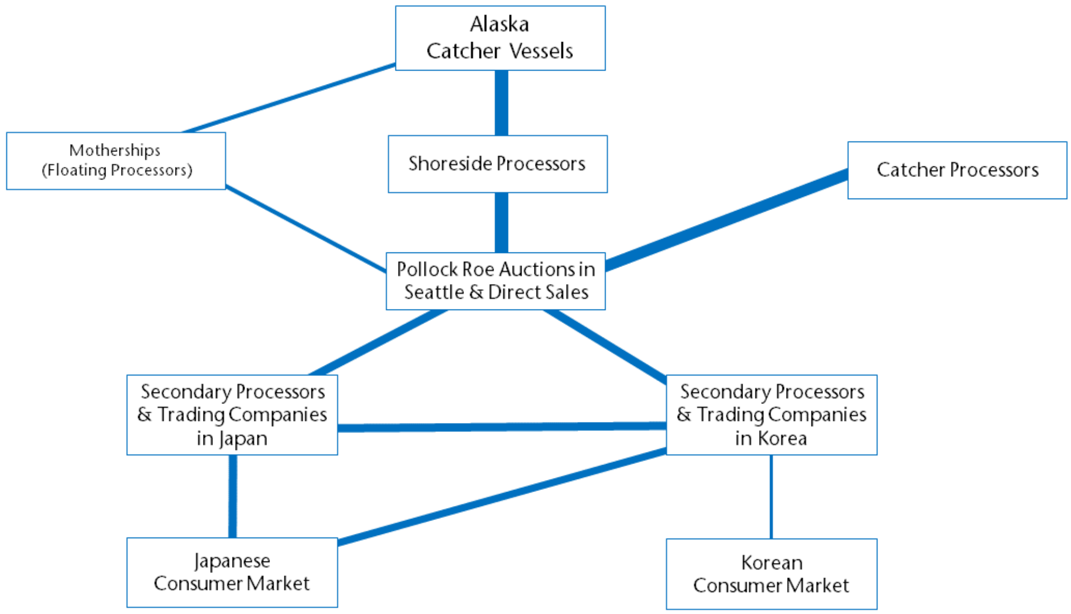

Figure 7.9: Alaskan Pollock Supply Chain for Roe.

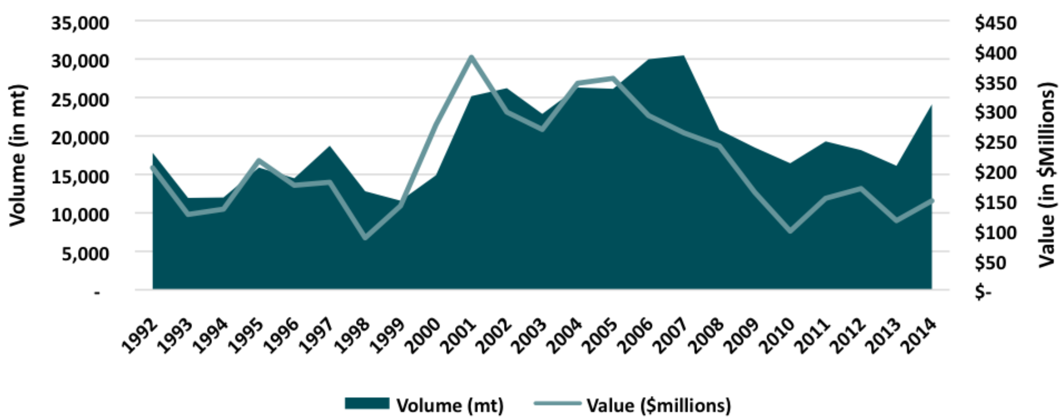

Figure 7.10: Total Pollock Roe Production and Value in Alaska, in Metric Tons, 1992-2014. **Source:** ADF&G (COAR).

Alaska Pollock Roe Key Market Analysis

Virtually all Alaskan pollock roe is exported to Japan or South Korea. In 2014, exports totaled 21,778 mt and $153 million Table 7.16. Japan is the dominant market, absorbing more than 90 percent of finished Alaskan pollock roe exports. South Korea is the only other sizeable market, but the majority of frozen pollock roe produced in Russia and Alaska generally passes through Korean auction houses (Russian product) or cold storage facilities before entering the Japanese market. A few Japanese companies operate secondary processing facilities in China, but industry contacts report very little product actually enters the vast Chinese consumer market.

Efforts to develop other pollock roe markets outside of Japan have been largely unsuccessful, but given declining Japanese consumption patterns and the weaker yen, finding additional roe markets is extremely important to the long term health of Alaska's pollock industry. The industry is exploring opportunities to utilize more mentaiko and tarako in sushi preparations, as well as marketing it as an ingredient in pasta sauces and investigating new products which might find appeal in other caviar markets.

Pollock roe supply has increased faster than demand in recent years. Larger production volumes, as well as a weaker yen and shifting Japanese consumer preferences, have resulted in lower prices and lower overall value for Alaskan pollock roe. Large inventories and a sharp increase in supply led to declining prices in 2014, and trade press reports suggest prices fell further during the spring 2015 roe auction in Seattle.

Table 7.16: U.S. Exports of Alaskan Pollock Roe by Country, in Metric Tons, 2010-2014.

	2010	2011	2012	2013	2014	Pct. Change from 2010-2013 Avg.
Japan	5,535	8,027	7,621	6,544	11,212	62%
South Korea	5,601	9,196	7,560	7,414	9,792	32%
China	138	312	554	901	764	61%
Other	3	4	172	108	10	-86%
Total Export Volume	**11,276**	**17,539**	**15,907**	**14,967**	**21,778**	**46%**
Total Export Value ($Mill.)	**$107.1**	**$158.4**	**$117.9**	**$114.2**	**$152.8**	**23%**
Avg. Export Price per Kilo	**$9.16**	**$9.48**	**$6.34**	**$8.96**	**$7.07**	**-17%**

Source: ASMI Alaska Seafood Export database, compiled by McDowell Group.

During the spring and fall, large pollock roe buyers come from Japan and South Korea to buy roe from Alaska producers in auction markets held in Seattle. Spring auctions produce significantly higher sales volumes. The same buyers also purchase Russian pollock roe at large auctions in Busan and Tokyo.[11]

Japan

Japan is the world's primary pollock roe market with imports of 44,800 mt in 2014, worth $330 million (Table 7.17). Pollock roe is consumed in a variety of ways in Japan, including in sushi rolls, rice balls, soups, noodle dishes, or by itself. High-grade roe traditionally is used in gift boxes for holidays and special occasions. In the retail market, mid-grade is sold as salted roe. Food service purchases tend to purchase lower quality roe for rice and noodle dishes.[12] Pollock roe is a traditional product in Japanese food culture, with consumption dating back to the mid-1900s.

Alaskan product accounted for 39 percent of the import volume between 2010 and 2014. Russia is the country's largest pollock roe supplier. Imports of Alaskan product increased 40 percent in 2014 versus the prior four-year average due to better roe yields and slightly higher TACs in Alaskan pollock fisheries. Total imports increased 18 percent versus the prior four-year average.

[11] (Nissui, n.d.)
[12] Industry Interview

Table 7.17: Japan Pollock Roe Imports, in Metric Tons, 2010-2014.

Exporter	2010	2011	2012	2013	2014	Pct. of Total (5yr. Avg.)
Russia	25,379	23,736	25,179	21,008	24,916	61%
U.S. (Alaska)	13,368	14,520	15,260	13,158	19,720	39%
Others	59	151	180	237	164	<1%
Total	**38,806**	**38,407**	**40,619**	**34,403**	**44,800**	**-**
Pct. from Alaska	**34%**	**38%**	**38%**	**38%**	**44%**	**-**

Source: Japan Trade Statistics (Ministry of Finance), compiled by McDowell Group.

In yen terms, total Japanese pollock roe imports tend to range from 30 to 35 billion yen but the value of the market in dollar terms fluctuates with exchange rates. Despite a 17 percent increase in import volume and a 7 percent increase in value (in yen terms) during 2014, Japan's import value of all pollock roe in U.S. dollar terms decreased 10 percent compared to the prior four-year average. Import volume and prices spiked in 2012. The March 2011 tsunami, which devastated many coastal Japanese communities, affected inventories, and led to a significantly weaker yen - a trend that continued until early 2013. Prices in both yen and dollars terms have declined substantially since 2012.

The Japanese pollock roe market - and by extension, the value of the pollock roe resource - is well defined with relatively steady demand. The value of roe is function of production volume in Russia and Alaska, as well as the strength or weakness of the yen. However, due to static (even slightly declining) demand, the product's unique niche, and a lack of alternative markets and uses, the upside potential of the Japanese market appears limited unless the consumer base can be expanded.

South Korea

South Korea is the second largest consumer of pollock roe, but it also is an intermediary buyer. An average of 14,222 mt of pollock roe imports were registered by the Korean Customs and Trade Development Institution between 2012 and 2014 (Table 7.18). However, Russia and Alaska sent 48,494 mt of pollock roe to South Korea per year during this period (see Table 11). Trade statistic discrepancies are likely due to product which is sent to Korea for auction, storage, or secondary processing. Korean import statistics suggest the Korean market consumes approximately a quarter of total pollock roe volume. Alaska supplies an estimated 21 percent of the Korean domestic market.

Korea is known for having less traditional tastes than Japan and has recently been in the spotlight for an emerging market for new roe products. Currently, lower grade pollock roe is marketed in Korea as a condiment mixed with other ingredients and spices.[13] Though is also consumed in spicy and salted roe products, like its Japanese neighbor. The Korean word for pollock roe is myeongtae.

7.3.4 Global Pollock Production and Competing Supply Analysis

Alaska pollock is fished almost entirely by Alaska and Russia, due to its distribution in the North Pacific Ocean. Japan, South Korea, and North Korea also harvest pollock, though in smaller volumes than Alaska or Russia. Pollock production has increased in recent years, from 2.83 million mt in 2010 to an estimated 3.38 million mt in 2014. Alaska harvested 1.44 million mt in 2014 and

[13] (Hui, 2006)

Table 7.18: South Korean Pollock Roe Trade, in Metric Tons, 2012-2014.

	2012	2013	2014	3-yr. Average
Exports Reported by Major Producers				
Russia	41,256	39,972	39,488	40,239
Alaska	7,560	7,414	9,792	8,255
Total	**48,816**	**47,386**	**49,280**	**48,494**
Actual Imports by Major Producer				
Russia	9,918	11,838	12,008	11,255
Alaska	2,415	3,425	3,061	2,967
Total	**12,333**	**15,263**	**15,069**	**14,222**
Export/Import Difference	**36,483**	**32,123**	**34,211**	**34,272**

Source: Global Trade Atlas, compiled by McDowell Group.

accounted for 43 percent of global supply. Despite increasing harvest volumes in recent years and providing the fish's namesake, Alaska is currently the world's second-largest pollock producer behind Russia (see Table 7.19).

Table 7.19: Global Pollock Harvest by Major Producer, in Metric Tons, 2010-2014.

Producer	2010	2011	2012	2013	2014	Pct. Change from 2010-2013 Avg.
Russia	1,584,527	1,579,792	1,632,631	1,558,721	1,625,000	2%
U.S. (Alaska)	883,416	1,274,965	1,302,815	1,362,213	1,440,471	19%
Japan	251,166	238,920	229,823	228,200	228,200	-4%
South Korea	46,795	48,793	39,026	24,342	24,300	-39%
Others	62,167	64,593	67,132	66,243	66,200	2%
Total	**2,828,070**	**3,207,063**	**3,271,426**	**3,239,719**	**3,384,171**	**8%**
Pct. from Alaska	**31%**	**40%**	**40%**	**42%**	**43%**	**-**

Source: FAO (1977-2013, non-Alaska), NMFS (1977-2014), and industry estimates (2014, non-Alaska).

Pollock has been harvested for many decades, but the U.S. did not play a significant role in the fishery until the passage of the Magnuson-Stevens Fishery and Conservation Act in 1976. The legislation laid the groundwork for consolidating control over territorial waters, and along with later amendments and other international agreements, provided unfettered access for U.S. fishing companies to Alaska pollock fisheries within 200 nautical miles of U.S. soil.

U.S. harvests began ramping up in the mid-1980s, displacing Japanese vessels in newly designated Alaskan waters. U.S. pollock harvests have been relatively consistent since 1989, producing an average of 1.30 million mt per year. Overall, pollock harvests have declined since the 1970s and 1980s due to tighter control over fishery access and the application of responsible fishery management practices.

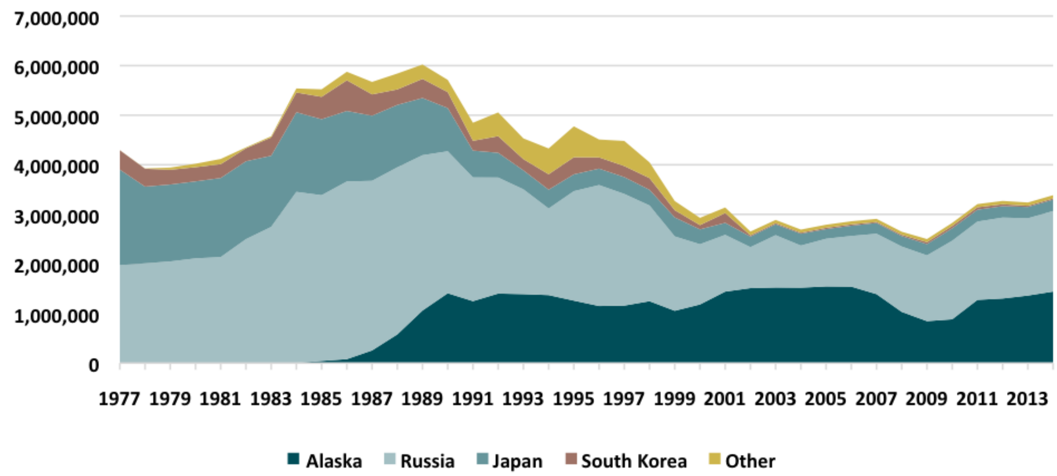

Figure 7.11: Global Harvest Volume of Alaska Pollock, in Metric Tons, 1977-2014.
Source: FAO (1977-2013, non-Alaska), NMFS (1977-2014), and McDowell Group estimates (2014, non-Alaska).

Several other species impact the market for pollock fillets and surimi. Pollock fillets compete with potential substitutes from other white fish fillets such as Atlantic and Pacific cod, haddock, saithe, hake, tilapia, pangasius (in order of importance). Surimi from tropical species (including threadfin bream, lizardfish, and big eye) and hake compete with pollock surimi.

Pollock supply likely increased in 2015, but supplies of most other competing whitefish species was expected to decline (Table 7.20). Cod and haddock production in Europe likely declined in 2015, which would have been supportive for the pollock fillet market but the weak euro and larger pollock TACs more than offset the effects of less competing whitefish species.

Table 7.20: Competing Whitefish Supply Trends.

Species	2013 Harvest (thousands mt)	Expected Trend for 2014-2015
Cod	1,821	Down 5%
Haddock	309	Down 3%
Hakes[1]	1,019	Down 6%
Saithe	309	Flat
Russian Pollock	1,559	Up 5%
Alaskan Pollock	1,362	Up 5%

Notes: [1]Includes major hake fisheries only.

Source: FAO (2013, non-Alaska), NMFS (2013), and Groundfish Forum 2014 (Expected Trends).

7.4. Pacific Cod Market Profile

Pacific cod (*Gadus macrocephalus*) is a whitefish found in the coastal Pacific Ocean from Alaska to California with the largest concentration found in the Gulf of Alaska and the Bering Sea. The largest of the Alaskan groundfish species, Pacific cod can reach a length of six feet. In 2014, Pacific cod accounted for 18 percent of total global cod harvest, with 154,584 metric tons in 2014 (Table 7.21). The first wholesale production was worth $469 million, or 19 percent of total Alaska groundfish value in 2014. Highly valued for their mild, white flesh, Pacific cod are primarily processed as fillets and head and gut (H&G).

Table 7.21: Summary Profile of Pacific Cod Wholesale Production and Markets, 2014.

Value and Volume		Key Products	H&G	Fillet	Other	
Wholesale Production (mt)	154,584	% of Value	70%	21%	9%	
Pct. of Global Cod Harvest (2013)	18%	Key Markets	China	Europe	U.S.	Other
First Wholesale Value ($millions)	$469	% of Final Sales	37%	14%	31%	18%
Pct. of Alaska Groundfish Value	19%	YoY Change	14%	-6%	31%	-11%
Production Sold to Export Markets	69%	Competing Species: Russian Pacific cod and Atlantic cod.				

Pacific Cod Production Analysis

In 2014, Pacific cod wholesale production was the second largest in terms of volume, following pollock, with production volume of 154,584 mt valued at $468.7 million. Cod production has steadily increased in the last ten years, with a 34 percent increase in volume in the last five years.

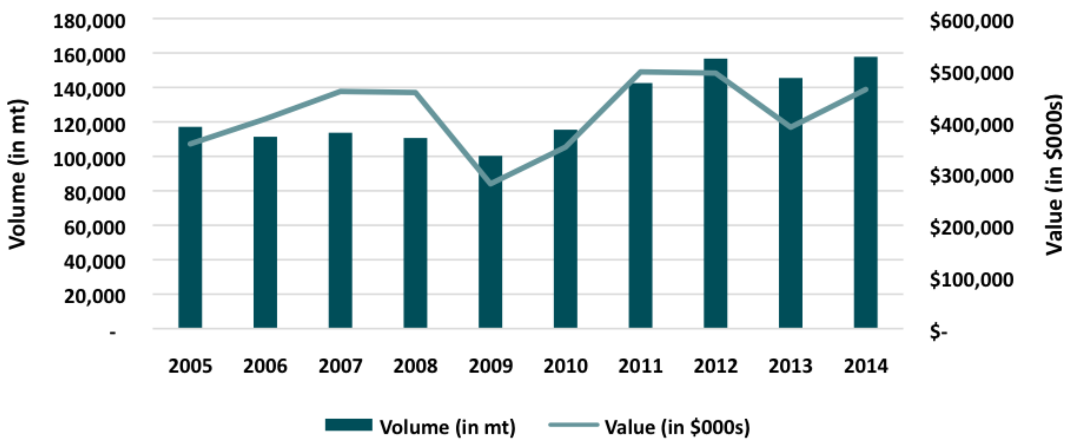

Figure 7.12: First Wholesale Volume and Value for Pacific Cod in Alaska, 2005-2014.

	2010	2011	2012	2013	2014
Wholesale Value (in $000s)	$351,461	$497,082	$497,082	$397,893	$468,776
Price per Ton	$3,042	$3,484	$3,154	$2,735	$3,033

Source: ADF&G (COAR).

In 2014, Alaska harvest of Pacific cod was almost entirely processed as H&G and fillets. H&G product accounted for 74 percent of production volume (114,510 mt) in 2014, and 67 percent of first wholesale value ($314 million). Fillets accounted for 12 percent by wholesale volume (18,268 mt) and 25 percent of first wholesale value ($117 million). Other products, including roe and fish meal, made up 14 percent of wholesale volume with 20,014 mt valued at $37 million (Table 7.22).

Table 7.22: Common Pacific Cod Products, Alaska Production, and Recovery Rates, 2014.

	Production Volume (in mt)	Production Value (in $000s)	Recovery Rate Range	Average Price per Kilo
H&G Eastern	87,815	$245,878	56-75%	$2.80
H&G Western	25,562	$57,705	56-75%	$2.26
Fillets, skinless/boneless	17,406	$112,363	18-39%	$6.46
Roe	5,251	$11,682	1-7%	$2.22
Other	18,551	$41,148	-	$2.22
Total Wholesale Production	**154,584**	**$468,776**		
Total Retained Fed. Harvest	**299,128**			

Notes: Volume in product-weight terms.

Source: NMFS Catch and Product Reports and Alaska Sea Grant (Crapo, Paust, & Babbit, 1993).

The H&G sector averaged $294.7 million in first wholesale value over the last five years (2010-2014).[14] Figure 2 shows overall Alaska production of H&G, which has been increasing. Most H&G cod is frozen and exported to China for secondary processing, mainly into fillets. Fillets are produced almost entirely at shoreside facilities and are frozen in shatterpack form, blocks, IQF, and fresh. The remainder of cod is mostly salted, minced, or dried.

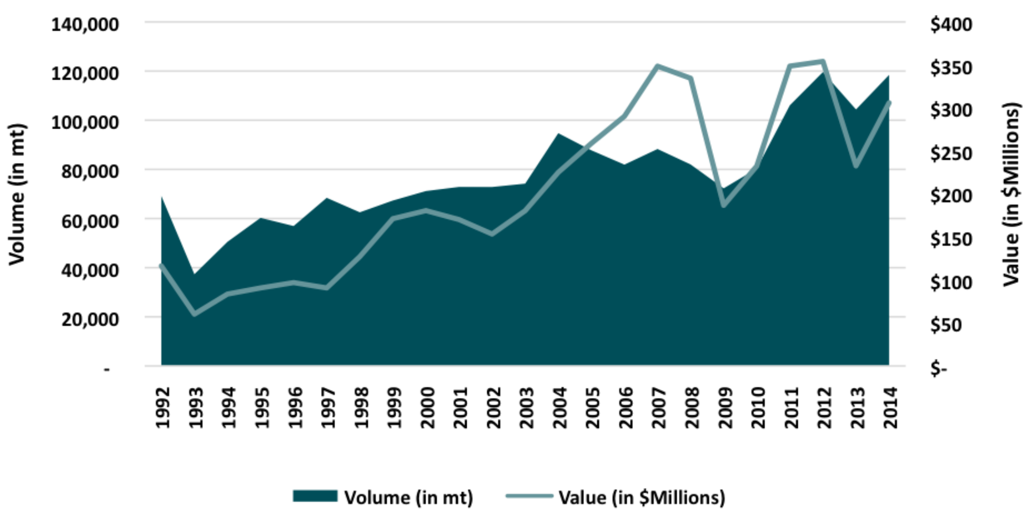

Figure 7.13: Pacific Cod H&G Production in Alaska, by Volume and Value, 1992-2014.
Source: ADF&G (COAR).

Pacific Cod H&G and Fillets Product Descriptions

Frozen H&G product provides a raw material to secondary processors that is not contaminated by viscera and blood. Cod are headed and gutted, either onshore or at-sea, and immediately frozen. Frozen H&G product must be thawed, cut, and then re-frozen, which causes fillets to lose some of their quality.

[14] ADF&G (COAR).

Most Alaska cod fillets are packaged as shatterpacks, consisting of frozen fillet blocks, while individual fillets are separated by plastic sheets, making them easier to separate without need to be thawed. IQF (individual quick frozen) fillets and loins are portions that are quickly frozen to preserve freshness. Shatterpack fillets are traditionally packed into 45 pound containers and sold to the grocery refresh market. Block fillet products are reprocessed into value-added breaded frozen portions.

Pacific Cod Supply Chain

H&G cod has the most complex supply chain. Most of the Pacific cod caught in Alaska is processed into frozen H&G and exported for secondary processing. While most frozen H&G product is exported, a portion is distributed to domestic secondary processing facilities. The largest reprocessing market is China, followed by Japan, U.S., and Europe. This secondary processing results in primarily frozen fillets and loins, but also includes breaded fish sticks, fillets, and other value added products. Foreign buyers also purchase H&G cod as a raw material for salt cod products, which are popular in Europe and Latin America.

A direct channel for H&G products in the U.S. are refresh markets, where it is thawed and filleted into portioned products. Refresh markets have increased in popularity in the U.S. within the last ten years. Other U.S. processors use H&G Alaska cod to produce breaded or coated sticks and portions for sale in grocery stores and food service outlets.

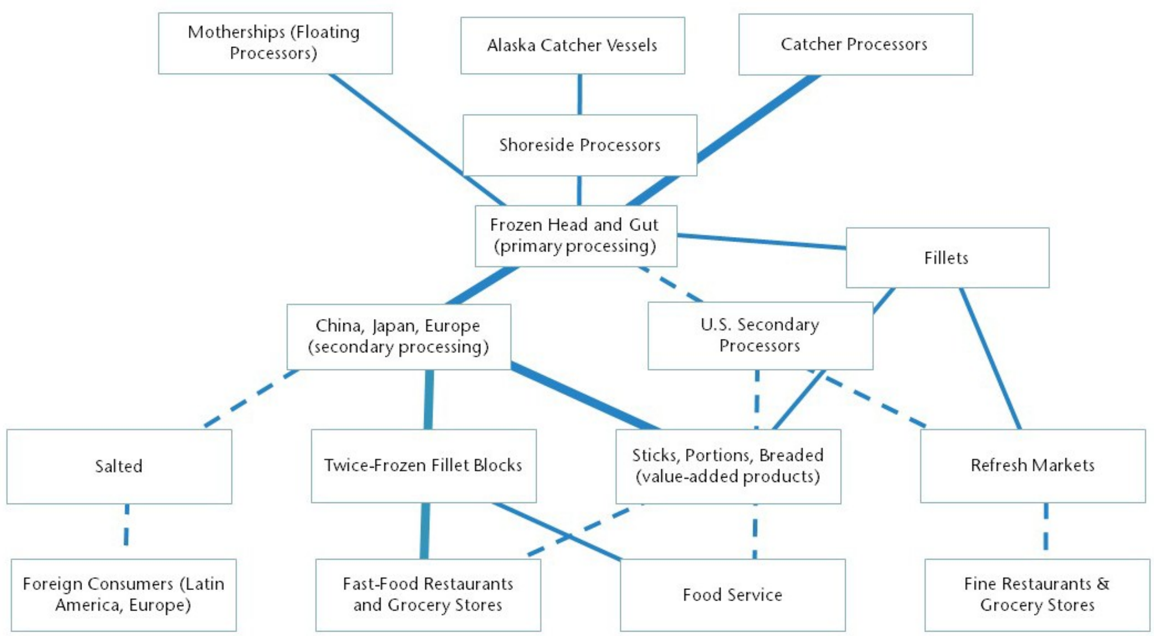

Figure 7.14: Pacific Cod Supply Chain.

In Alaska, cod fillets are reprocessed for both food service and retail as a whitefish product which is easy to thaw and cook from a retail outlet or as a mild seafood dish served at a variety of restaurants including fine dining to quick service. Chinese re-processors produce twice-frozen fillet blocks and breaded frozen portions which compete directly with once frozen cod products produced in Alaska, even though the quality is reported to be lower. The competition for cod fillets has reduced the

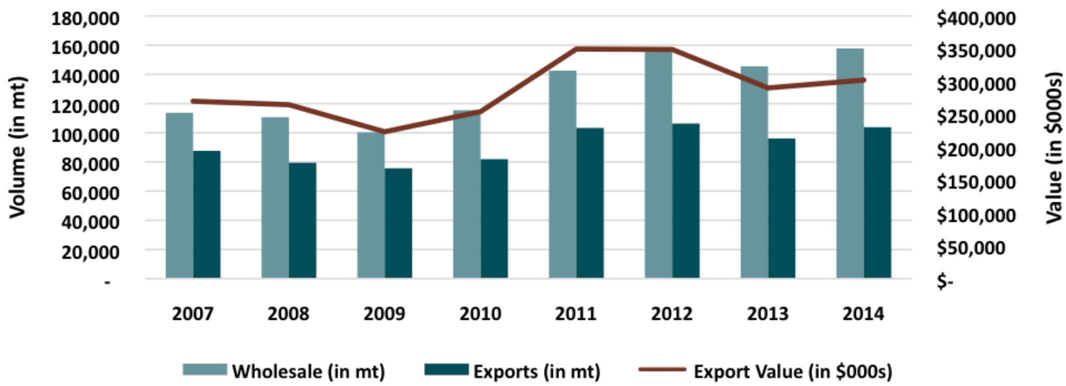

Figure 7.15: Pacific Cod H&G Wholesale Production and Exports, 2007-2014.
Source: ASMI Export Database.

value for cod exports from Alaska, which is shown in Figure 6. Many fillets are intended for the domestic market.

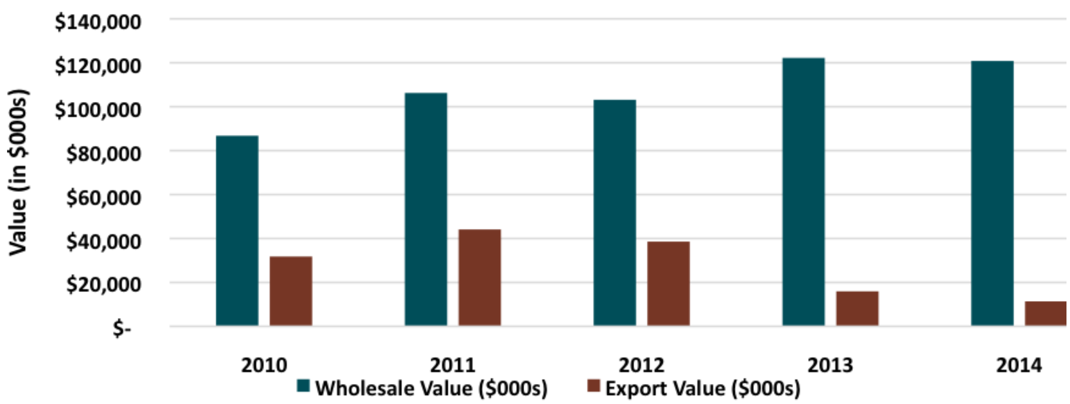

Figure 7.16: First Wholesale and Export Values for Pacific Cod Fillets, in $000s, 2010-2014.
Source: ADF&G (COAR) Reports, ASMI Export Database.

Pacific Cod Key Markets

In 2014, Alaska Pacific cod H&G exports totaled 100,542 mt, representing 97 percent of total cod exports (Figure 7.18).[15] Frozen H&G exports have been increasing. China is the largest importer of H&G Pacific cod, but most product is reprocessed for export. In 2014, China imported 55,600 mt of cod from the U.S. The next largest markets are Europe and Canada (Table 7.23).

Pacific cod fillets are primarily consumed in the U.S., Canada, and European markets. The domestic market, according to McDowell Group estimates, consumed 57 percent of fillets produced in Alaska- or an average of 9,613 mt from 2010-2014. In 2014, Alaska Pacific cod fillets had a first wholesale value of $120.8 million and an export value of $11.4 million, suggesting most product is sold into the domestic market. In the last five years, Canada and Europe are the largest foreign markets for

[15] ASMI Export Database.

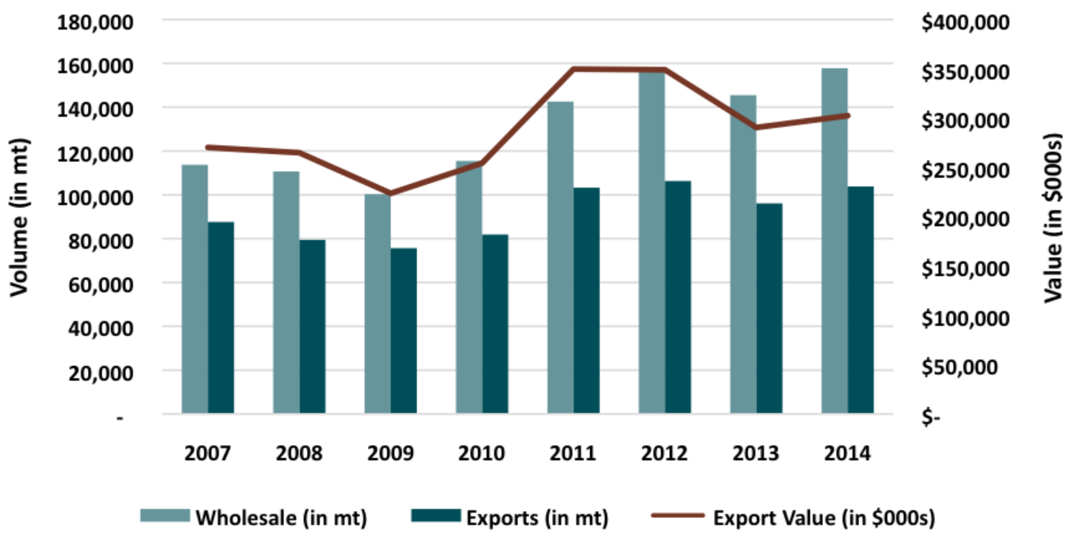

Figure 7.17: Total Alaska Cod Exports, by Volume and Value, 2007-2014.

Notes:

Source: ASMI Export Database.

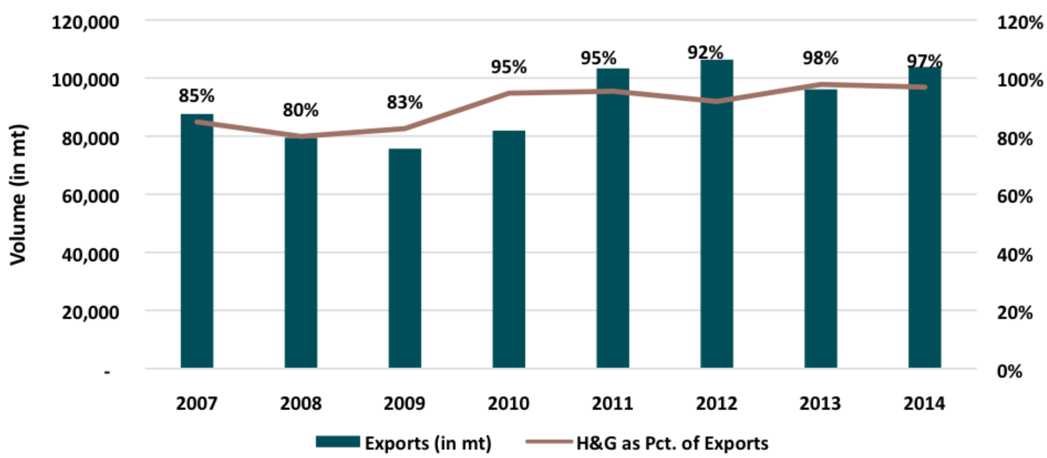

Figure 7.18: Pacific Cod H&G as Percent of Exports, 2007-2014.

Source: ASMI Export Database.

once frozen Alaska cod fillets, importing 41 percent of exported Alaska cod fillets over the last five years (2010-2014).

U.S. Market

Not differentiating between Pacific and Atlantic cod, the U.S. imported 66,421 mt of cod in 2014, valued at $392.5 million (Table 7.24). In 2014, fillets accounted for 90 percent of cod imports into the U.S., with the remainder divided between H&G and salted. The U.S. imported $304.1 million of cod fillets, a 19 percent increase over 2013 (Table 7.25). According to McDowell Group estimates, the U.S. market bought an estimated 57 percent of Alaska's cod fillet production from 2010-2014. Seventy-four percent of U.S. cod fillet import volume came from China in 2014. Approximately 15 percent of H&G production went to the domestic market to be reprocessed.

Table 7.23: Sales of H&G Pacific Cod to Key Markets, in Metric Tons, 2010-2014.

Market	2010	2011	2012	2013	2014	% of Total (5yr. Avg.)
China*	23,547	40,854	45,311	47,116	55,600	40%
Japan*	14,532	18,224	17,087	12,896	17,338	15%
Europe[1]	17,580	14,884	14,422	8,670	5,968	12%
South Korea*	6,203	5,784	5,472	7,684	5,372	6%
Canada	2,705	2,328	2,482	2,500	2,011	2%
Other	13,038	16,525	12,944	15,108	14,253	14%
Total Exports	**77,605**	**98,599**	**97,718**	**93,974**	**100,542**	**89%**
U.S. (Estimated)[2]	2,711	7,471	21,888	10,409	17,895	11%
Alaska Production	**80,316**	**106,070**	**119,606**	**104,383**	**118,437**	

Notes: *Denotes countries which primarily re-process and/or re-export product to other markets.
[1] Does not include Russia, Ukraine, or other minor European markets.
[2] Estimated based on annual production less calendar year exports.
Data pertains to primary exports only, does not portray product which may be re-exported to other markets.
Source: NMFS Trade Data, ASMI Alaska Seafood Export Database, and McDowell Group estimates.

Table 7.24: Total Cod Imports into U.S. Market, Volume and Value, 2010-2014.

	2010	2011	2012	2013	2014	Pct. Change Yr-0ver-Yr
Volume (in mt)	48,566	52,269	49,755	59,850	66,421	10%
Value (in $Millions)	$263.3	$327.1	$327.6	$341.5	$392.5	13%

Source: NMFS Foreign Trade.

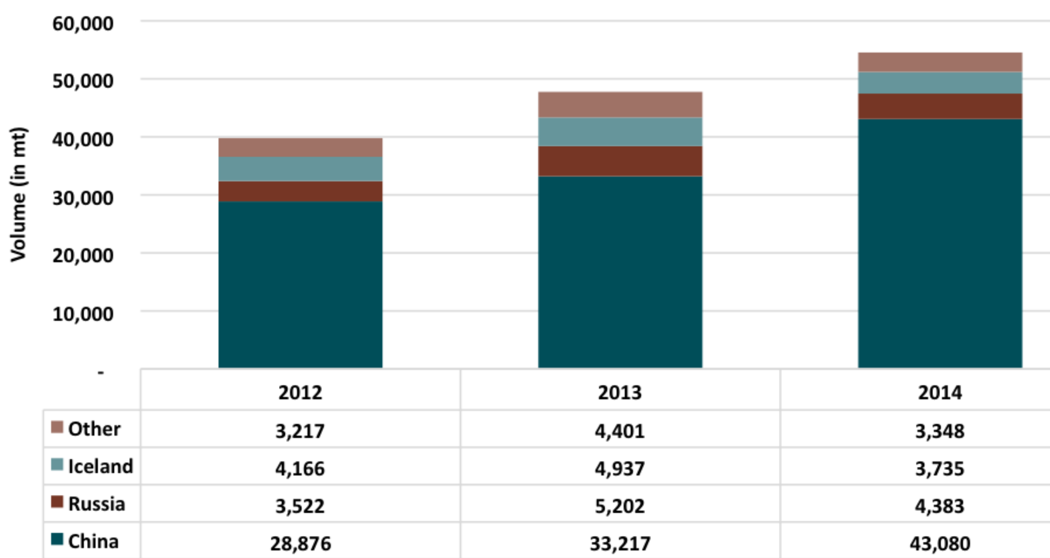

Figure 7.19: U.S. Imports of Cod Fillets from Major Producers, in Metric Tons, 2012-2014.
Source: Global Trade Atlas.

Cod is a popular menu item in the U.S. market. IQF fillets and shatterpack fillets of Pacific cod are used by fine restaurants, food service, fast food restaurants, and retail fish markets. Fillet blocks are utilized when the customer needs uniformity, such as in fish sandwiches or in "fish and chips" restaurants. Some grocery retailers utilize fillet block forms in the frozen aisle as value-added products, as well as at the retail fish counter, where fillets are thawed and displayed in a refreshed format.

Table 7.25: Total Imports and Price per Kilo for Cod Fillets into the U.S. Market, 2012-2014.

	2012		2013		2014	
	Value (in 000s)	Price per Kilo	Value (in 000s)	Price per Kilo	Value (in 000s)	Price per Kilo
China	$174,951	$6.06	$165,845	$4.99	$226,315	$5.25
Russia	$25,333	$7.19	$35,239	$6.77	$29,780	$6.79
Iceland	$31,230	$7.50	$29,135	$5.90	$26,715	$7.15
Thailand	$7,485	$7.11	$9,632	$6.30	$8,065	$6.56
Norway	$3,020	$6.82	$5,425	$5.97	$6,431	$5.77
Other	$11,690	$6.79	$10,815	$5.51	$6,865	$6.84
Total	**$253,710**	**$6.38**	**$256,092**	**$5.36**	**$304,171**	**$5.58**

Source: Global Trade Atlas.

China

China serves as a secondary processor for fillets by augmenting fillets with value-added product forms and re-exporting to markets such as Europe and the U.S (Table 7.26). Over the last five years, China has imported 40 percent of Alaska's cod, and trade with China increased 57 percent. Cod fillet blocks compete with Alaska produced cod fillet blocks in the U.S. and with European cod fillet blocks in the EU. There are other overseas markets that are also destinations for Chinese reprocessed cod products such as Brazil, which increased imports of cod fillets from China by 141 percent from 2013 to 2014.[16]

China imports H&G cod (both Pacific and Atlantic) as raw material for reprocessing. The two primary products from China are value-added products such as frozen sticks, portions such as loins or fillets, or breaded products. Cod fillet blocks compete with Alaska produced cod fillet blocks in the U.S. and with European cod fillet blocks in the EU.

Japan & South Korea

South Korea and Japan are key re-exporters for Alaska H&G cod, with a market share average of 24 percent over the last five years (2010-2014). In 2014, 17,338 mt were exported to Japan and 5,372 mt were exported to South Korea (Table 7.27). Much of the H&G cod product imported by South Korea or Japan is re-exported for destinations such as the U.S. or Europe. Japanese consumers typically consume cod in the wintertime, often used in soups, and traditionally prefer it in "kirimi" cut. South Korea buys H&G and also whole fish, consuming the entire fish. Cod is a mainstay on restaurant menus and a popular item cooked for home consumption.

Europe

Over the last five years (2010-2014), approximately 12 percent of Alaska cod exports have been to the European market. Europe's share of H&G imports has been decreasing, with 2014's export

[16] Global Trade Atlas.

Table 7.26: Primary Export Markets for Chinese Twice-Frozen Cod Fillets, in Metric Tons, 2012-2014.

	2012	2013	2014	Pct. Share of Total Exports
European Market	57,588	68,399	79,976	58%
U.S.	33,093	38,899	44,756	32%
Canada	3,237	4,568	4,918	4%
Brazil	1,386	1,649	3,987	3%
Other	3,904	4,777	4,982	4%
Total	**99,208**	**118,292**	**138,619**	**100%**

Notes: Figures may not sum due to rounding.

Source: Global Trade Atlas.

Table 7.27: Major Asian Markets for Alaska Cod, in Metric Tons, 2010-2014.

Export Market	2010	2011	2012	2013	2014
Japan	**17,068**	**22,158**	**17,616**	**13,176**	**17,572**
Fillet	1,836	3,911	464	67	46
H&G	14,532	18,224	17,087	12,896	17,338
Other	700	23	65	213	187
South Korea	**7,244**	**7,168**	**6,533**	**7,988**	**5,535**
Fillet	956	1,204	84	29	126
H&G	6,203	5,784	5,472	7,684	5,372
Other	86	179	977	275	36
Grand Total	**24,313**	**29,326**	**24,149**	**21,164**	**23,106**
Pct. of Total Exports	**30%**	**28%**	**23%**	**22%**	**22%**

Source: ASMI Export Database.

volume down 66 percent from 2010. Europe is traditionally a large end-market for cod, but Alaska Pacific cod is rerouted through China first. The increase of Chinese imports of H&G cod has been linked to high import duties into the European Union. The EU protects its domestic cod producers by maintaining high duties on imported cod fillets. Chinese H&G product does not have the same high level of tariffs in the EU. This modification in the supply chain can be linked to the H&G production increase in Alaska.[17]

When Atlantic cod stocks began to decline, Pacific cod was used as a substitute. In the last few years, the Atlantic cod supply has increased, leading to more global cod supply, which has reduced cod prices in Europe. In the last five years (2010-2014), 27 percent of Alaska cod fillets were exported to Europe (Table 7.28). Frozen seafood in Europe tends to be a more popular protein than in the U.S.[18] In food service, the common packaging are ten- kilo bags of frozen 500 gram (about 1.1 pounds) portions.

[17]Pers. comm. with Industry, 2015.
[18]Pers. comm. with Industry, 2015.

Table 7.28: European Imports of Pacific Cod Fillets from Major Producers, in Metric Tons, 2012-2014.

Exporter	2012	2013	2014	% of Total (3yr. Avg.)
China*	45,414	55,565	68,533	69%
U.S. (Alaska)	3,445	690	369	2%
Russia	10,871	25,884	36,572	30%
Total	**59,730**	**82,139**	**105,474**	

Notes: *Denotes re-exported Atlantic and Pacific cod.

Source: Global Trade Atlas, ASMI Alaska Seafood Export Database.

Northern Europe and Southern Europe are two distinct end markets for cod products. In the north, the primary end markets are Germany, the UK, and Norway. In Southern Europe, Spain and Portugal consume traditional dishes that incorporate salted cod.

Pacific Cod Competing Supply

In addition to Alaska, Russia and Japan are the next largest Pacific cod producers. Japan was the first nation to commercially fish for Pacific cod in Alaskan waters. The Asian nation still harvests Pacific cod, albeit in much smaller quantities than it did decades ago. The two largest suppliers of Pacific cod are the U.S. and Russia. There has been downward pressure on market prices for cod due to increased quotas in both the U.S. and Russia. More U.S. Pacific cod is processed in China as prices decrease, due to lower processing costs abroad.

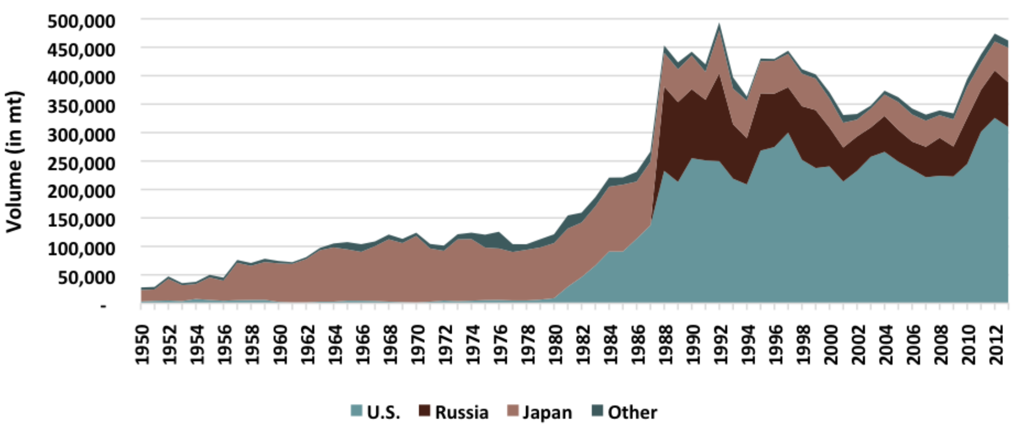

Figure 7.20: Global Supply of Pacific Cod, in Metric Tons, 1950-2013.

Source: FAO.

Competing Cod Species

There are two main species of cod, Pacific cod (*gadus macrocephalus*) and Atlantic cod (gadus morhua). Both are found in the northern hemispheres of the Atlantic and Pacific Oceans. Most end markets, cod do not differentiated between Pacific cod or Atlantic cod and they are generally considered almost identical substitutes for each other and. In 2014, it is estimated that 482,000 mt of Pacific cod and 1.2 million mt of Atlantic cod were harvested globally.

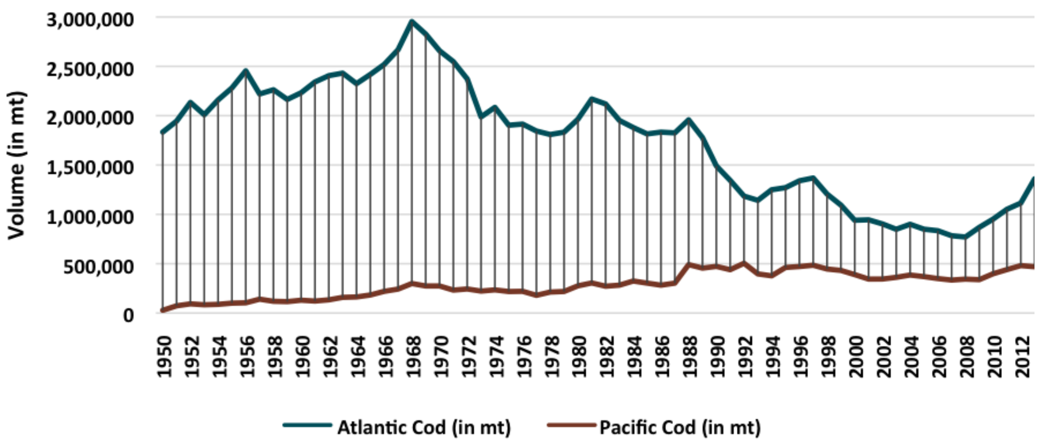

Figure 7.21: Global Supply of Atlantic and Pacific Cod, in Metric Tons, 1950-2013.
Source: FAO.

Fishing for Atlantic cod peaked in the mid-1970s, with global harvests near 3 million mt, nearly double the 2014 level. Stocks were overfished along the Atlantic coasts and served as case studies for collapsed fisheries. In recent years, the supply of Atlantic cod has dwindled with a reduction in harvests due to stocks being rebuilt to sustainable levels, while the demand in the EU for cod has increased. An easy substitute, Pacific cod began to be exported to fulfill demand for Atlantic cod. Pollock, the largest single species fishery in the world, has also been a substitute for Atlantic cod.

The U.S. fishery for Atlantic cod is very small and Pacific cod from the North Pacific (primarily Alaskan waters) accounts for almost all U.S cod harvest. Alaska accounted for 68 percent of global Pacific cod harvests over the last three years (2012-2014), with an average of 327,000 metric tons annually (Table 7.28). It contributed 19 percent to the global cod harvest over the same three year period. As shown in Figure 11, shatterpack cod from Alaska follows a similar price trend of Atlantic cod.

Table 7.29: Major Cod Producing Nations, in Metric Tons, 2012-2014.

	2012	2013	2014
Atlantic Cod Supply	**1,107**	**1,343**	**1,334**
Norway	358	472	465
Russia	334	435	432
Iceland	205	236	240
EU	149	132	130
Other	61	68	67
Pacific Cod Supply	**470**	**470**	**482**
U.S.	331	320	330
Russia	77	78	80
Japan	50	60	60
Korea	12	12	12
Total Cod Supply	**1,577**	**1,813**	**1,816**

Source: Groundfish Forum.

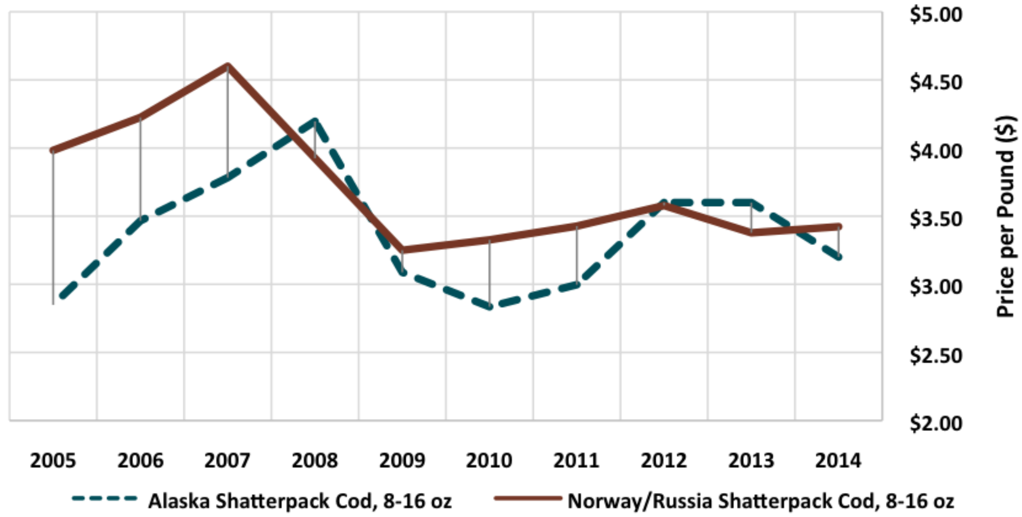

Figure 7.22: Comparison of Shatterpack Cod between U.S. and Competitors, 2005-2014.
Source: UBComtell.

7.5. Sablefish Market Profile

Sablefish (*anoplopoma fimbria*), known commonly as black cod, is a prized fish species found in waters from the Aleutian Island chain to Northern Mexico, with a larger distribution concentrated in the North Pacific Ocean, primarily in the Gulf of Alaska. Sablefish are a highly migratory fish that live along the continental slope and shelf gullies at depths of 200 meters and greater. The fish commands one of the highest ex-vessel prices of any species harvested in Alaska and is primarily exported into Asian markets. Sablefish accounted for $97.6 million of Alaska's total wholesale value in 2014 and 15 million pounds of the production volume.

Sablefish Product Description

Shoreside processors in Alaska receive sablefish deliveries either in the round or eastern cut, on ice. While there are various sablefish products, the primary product form for most Alaska processors is eastern cut H&G (headed and gutted, head removed just behind collar bone) (Table 7.30).

Table 7.30: Common Sablefish Products, 2014 Alaska Production Volume, and Recovery Rates (%).

	2014 Alaska Production (mt)	Average Recovery Rate Pct. from Round Weight	Recovery Rate Range
H&G, Eastern Cut	6,404	62%	60-67%
H&G, Western Cut	68	68%	67-71%
Pectoral Girdles (Collars)	207	6%	*N/A*
Fillets	49	50-64%	45-52%

Notes: Volume in product-weight terms.

Source: ADF&G (COAR) and Alaska Sea Grant (Crapo, Paust, & Babbit, 1993).

Sablefish is a premium-quality whitefish that can be smoked, grilled, and sautèed. It is sold in retail markets in frozen fillet form, often in a marinade. The species' high oil content and delicate texture make it a sought after product. It is primarily exported to wholesale buyers in Japan and other niche Asian markets, where most volume is eventually sold into high-end restaurants.

Sablefish Production and Supply Chain

The supply chain diagram illustrates the sablefish supply chain, from harvesters to consumers. Alaska sablefish is primarily harvested by relatively small boats (most less than 60') and delivered to shoreside plants either in the round or already headed/gutted. From there, the majority of product is sold in a frozen, H&G format to high-volume distributors in Japan and other Asian countries. These foreign importers sell product to secondary distributors in smaller volumes as well as directly to retail and restaurant. Product sold into the domestic market is typically filleted by primary processors in Alaska or secondary processors/distributors. Regardless of whether sablefish is exported or sold domestically, it typically passes through one or two distributors before being sold to consumers at the retail level.

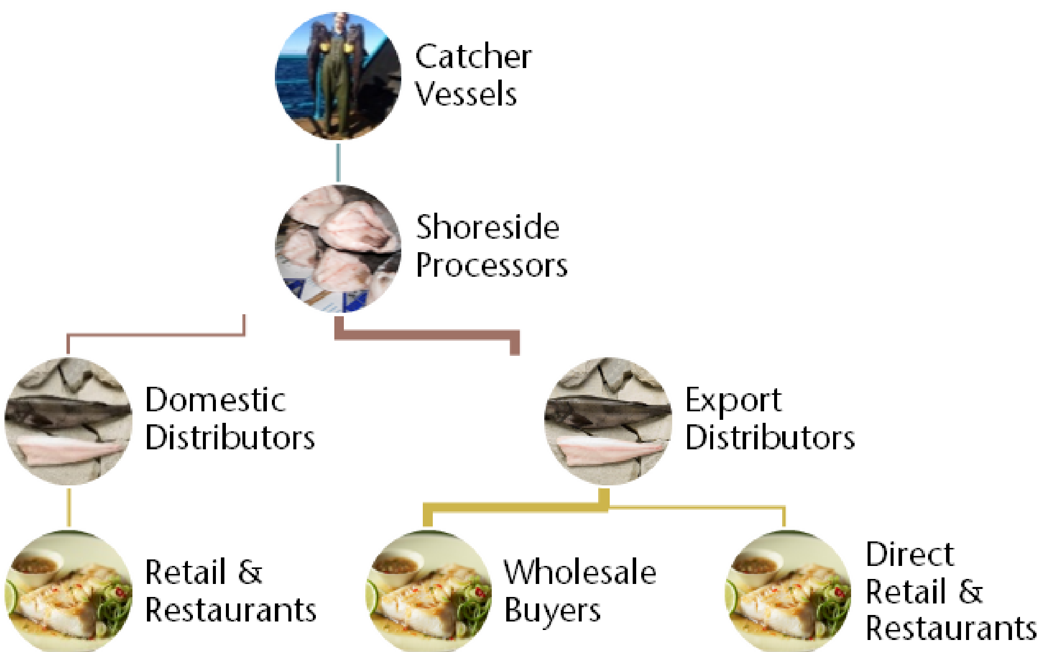

Figure 7.23: Global Distribution of Alaska Sablefish.

Sablefish Volume and Value

In the last ten years, Alaska fisheries have produced 71 percent of U.S. sablefish harvests. Volume peaked in the late 1980s at 28,000 mt in Alaska, doubling current landing levels of 12,200 mt. The state's sablefish production has been relatively stable since the late 1990s, but has declined each of the past two years (2013- 2014). The 2014 production volume was 59 percent lower than peak production levels, which averaged 21,200 mt between 1987 and 1990. The TAC declined in 2014, dipping 17 percent from the last three year average. The TAC for 2015 stabilized to 13,500 mt, following abundance trends. Lower recruitment rates are a cause of the decline in TAC from 2013-2016, but are projected to increase after 2016.[19]

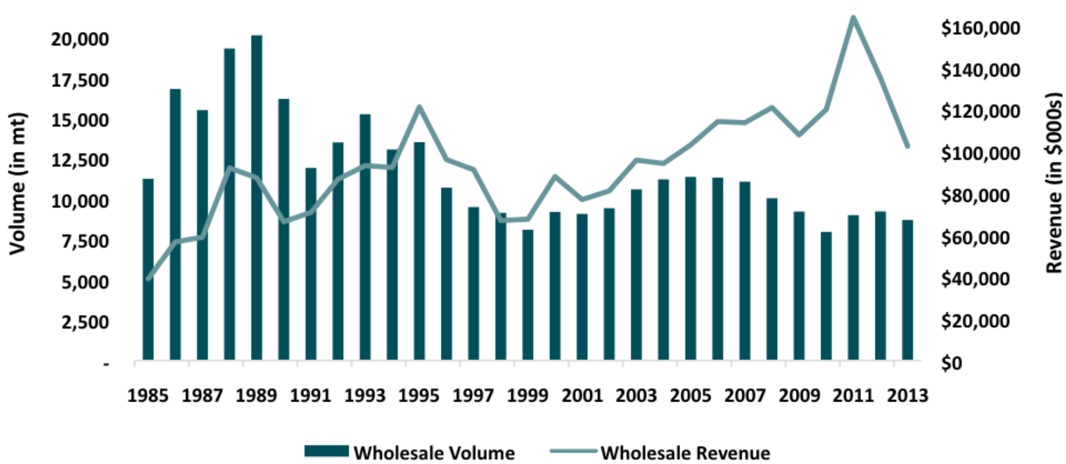

Figure 7.24: Alaska First Wholesale Volume and Value of Sablefish, 1985-2013.

Notes: Volume in product-weight terms.

Source: ADF&G (COAR).

Sablefish wholesale volume was roughly equivalent to halibut in 2014, with wholesale volumes near 6,500 mt for both species and wholesale values near $100 million dollars. Although they differ greatly in appearance and have different key markets, halibut and sablefish are similar in other regards. Both are high-value fish, are managed under the same IFQ program, and most are harvested using similar gear (primarily longline). The bulk of each species is harvested before and after the summer salmon fishing season, even though the season typically runs from March into November. Sablefish is delivered either eastern cut (dressed and iced) or in the round. Unlike halibut, which is sold either fresh or frozen, sablefish is almost entirely sold frozen.

The total wholesale value of sablefish was $98 million in 2014, a 26 percent decrease from the previous three year average. This percentage decrease is smaller than the decrease in volume from 2013, which measured to 21 percent.

Sablefish Price

Sablefish wholesale prices reached a record high of $8.27 per pound in 2011.[20] Since then, mean prices declined to $6.64 in 2012 and $5.34 in 2013. Smaller harvests led to higher prices in 2014, averaging $6.61 per pound. Volume is forecasted to be below historical averages in the next few years and prices are anticipated to remain high.

Fish size largely determines pricing in wholesale markets, but prices are also affected by quality, origin, supply, substitute fish prices, and the dollar-yen exchange rate. Sablefish are categorized by

[19](Hanselman, Lunsford, & Rodgveller, 2014)

[20]NMFS Sablefish Multi-Year Prices

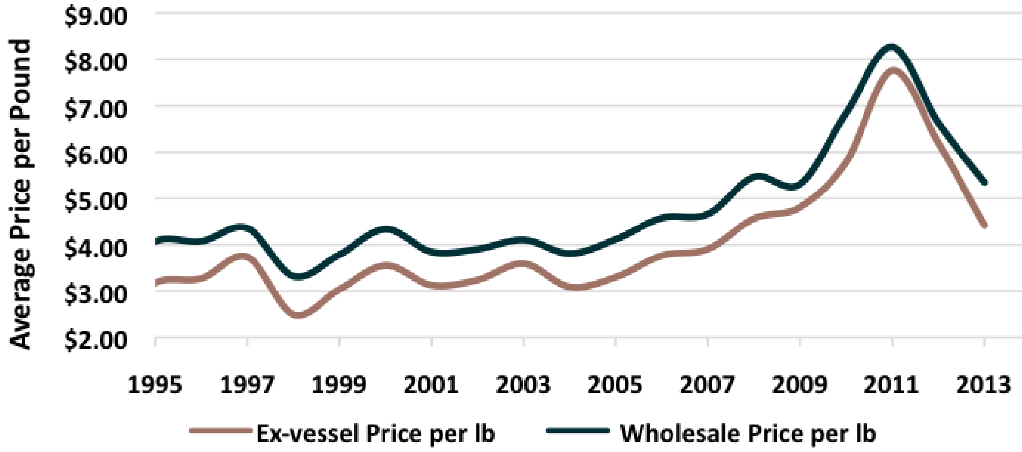

Figure 7.25: Alaska Wholesale and Ex-vessel Prices per Pound, 1995-2013.
Source: ADF&G (COAR).

weight: the larger the fish, the higher the price per pound.[21] Differences in wholesale prices often range from $0.75 to $1.50 for each additional pound.

Sablefish Key Market Analysis

Sablefish is primarily sold by the container load as a frozen, dressed (eastern-cut) product. Importers purchase containers of sablefish and then sell it to wholesale buyers, who in turn act as distributors or secondary processors for restaurants and retail markets.[22] Japan has been the primary market for Alaska sablefish extending back to the 1960s when Japanese fishing vessels began harvesting the species in waters off the coast of Alaska. China (including Hong Kong) and the U.S. are the next largest markets, and strong demand from those countries has pushed prices higher in recent years.[23]

U.S. sablefish exports are a reasonable proxy for global market share, as the U.S. accounted for just under 90 percent of global supply. In 2014, Japan account for 77 percent of U.S. exports by weight; HS (Harmonized System) codes typically do not allow for a more comprehensive market share analysis outside of U.S. exports or Japanese imports. Export volume has decreased since 2013, with overall revenues decreasing by 15 percent (Table 7.31).

Canada is the only other major sablefish exporter, producing roughly 11 percent of the global share. Canada's top two export markets are Japan and the U.S.; however, it is likely that a portion of frozen sablefish imported by U.S. buyers from Canada is re-exported to Asia.

Patagonian toothfish (*Dissostichus eleginoides*), also known as Chilean seabass, is the primary competitor with sablefish in high-end whitefish markets. It also features a high oil content and rich white meat.

Japan

[21] (Reynolds, 2015)
[22] (Reynolds, 2015)
[23] (Sackton, Near Record Prices for Sablefish May Mean Much Lower Consumption in Japan, 2015)

Table 7.31: 2014 U.S. Sablefish Exports to Global Markets.

	Volume (mt)	Revenue ($millions)	Pct. Change in Volume from 2013	Pct. Change in Revenue from 2013
Japan	5,131	$59.5	-24%	-16%
China/Hong Kong	595	8.5	-26%	-16%
Singapore	141	2.3	3%	25%
Europe	316	4.6	13%	48%
All other	482	6.7	-	-
Total	**6,665**	**$81.6**	**-23%**	-15%

Notes: Volume is in product-weight terms.

Source: NMFS Foreign Trade Data.

Japan imports more sablefish than all other countries combined, but its import share of large sablefish decreased in the last few years due to a strong dollar and increasing international demand.[24] Despite the recent downward trend in market share, Japan's sablefish market remains a key segment for the Alaska seafood industry. The country imported approximately 7,200 mt of frozen H&G sablefish in 2014, valued at $96.6 million (Table 7.32). Total imports in 2014 were one-third below the 2009 level of 10,600 mt, including a 14 percent decline between 2013 and 2014. Total imports in 2014 were 18 percent below the three year average of 7,900 mt, including a 15 percent decline between 2013 and 2014.

Sablefish supply, exchange rates, and availability of substitutes, such as mero (Patagonian toothfish), drive sablefish prices historically. A weaker yen and increasing demand in the U.S. and other export markets have pushed sablefish prices up in Japan (in both USD and yen).

Table 7.32: Japan Frozen H&G Sablefish Imports, by Major Trade Partner, 2009-2014.

Country of Origin	2009	2010	2011	2012	2013	2014
Import Volume (MT)						
U.S.	9,409	8,402	7,878	8,324	7,655	6,514
Canada	1,196	941	762	789	725	668
Total	**10,607**	**9,349**	**8,640**	**9,113**	**8,380**	**7,182**
Import Value ($Millions)						
U.S.	$117.0	$123.5	$151.2	$106.8	$90.3	$87.6
Canada	15.6	13.9	14.9	11.4	9.0	8.9
Total	**$132.6**	**$137.4**	**$166.0**	**$118.2**	**$99.3**	**$96.6**
Import Value/MT						
Avg. Total USD/MT	$9,409	$8,402	$7,878	$12,972	$11,850	$13,444
Avg. Yen/USD Exchange Rate	¥93.6	¥87.8	¥79.7	¥79.8	¥97.6	¥105.8
Est. Total Yen/MT (in ¥000s)	¥880	¥737	¥627	¥1,035	¥1,156	¥1,423

Notes: Volume is in product-weight terms.

Source: Global Trade Atlas and OANDA.

[24] Pers. comm. with Industry, 2015.

United States

Estimates for the five-year average of annual U.S. consumption of sablefish are around 2,895 mt, though the domestic market for sablefish has been increasing for several reasons (Table 7.33). First of all, high prices for Patagonian toothfish have pushed consumers toward substitutes, in particular sablefish. Another reason for the growing popularity of sablefish is its increased usage in Japanese restaurants and chefs in other premium outlets. Lastly, a significant weakening of the yen versus the dollar has reduced demand in Japan and increased the supply of sablefish available for the U.S. market.[25]

Table 7.33: Estimated U.S. Sablefish Market Supply, in Metric Tons, 2010-2014.

	Est. U.S. Wholesale Production	U.S. Imports	U.S. Exports	Est. U.S. Supply
2010	12,182	409	9,148	3,443
2011	12,960	833	13,088	705
2012	12,467	691	10,144	3,014
2013	11,259	268	8,646	2,881
2014	10,400	695	6,665	4,430
5yr. Average	**11,854**	**580**	**9,538**	**2,895**

Notes: Production and supply figures are quoted in product-weight terms, based on frozen H&G, eastern cut product.

Source: McDowell Group estimates, based on NMFS harvest and trade data.

China and Other Asian Markets

Sablefish has recently seen increased demand in China and other large Asian markets. China is the largest seafood producer in the world as well as a re-processor for Alaska seafoods.[26] Demand for high-quality fish has increased due to an expanding middle class, and in recent years, lavish government parties in China and Hong Kong drove an increase in exports until 2013 when the Chinese government curbed expenditures.[27] In 2013, U.S. export value was highest in Hong Kong and China, with values over $7.2 million and $2.4 million, respectively.

Sablefish Global Production and Competing Supply Analysis

In 2014, the U.S. harvested 16,500 mt of sablefish while Canada harvested 1,773 mt. Over the last five years, Alaska has harvested 65 percent of the global sablefish production. Current harvest levels are lower than historical averages, which has led to higher prices. For wholesale markets, this means volume will remain low and prices fairly high, however there are limitations.

A common substitute on the market, Patagonian toothfish, has a similar high oil content and rich flavor, and equivalent high prices. Patagonian toothfish production peaked at 41,000 mt in 2001 and harvest levels have been declining since. Many different countries fish for Patagonian toothfish with varying degrees of sustainable management. In the early 2000s, it was estimated that up to half of

[25] (Sackton, As Alaska sablefish season closes, prices reach record levels in Japan, 2014)
[26] (Alaska Seafood Marketing Institute, 2011)
[27] (China seafood sales feel pinch of corruption crackdown, 2013)

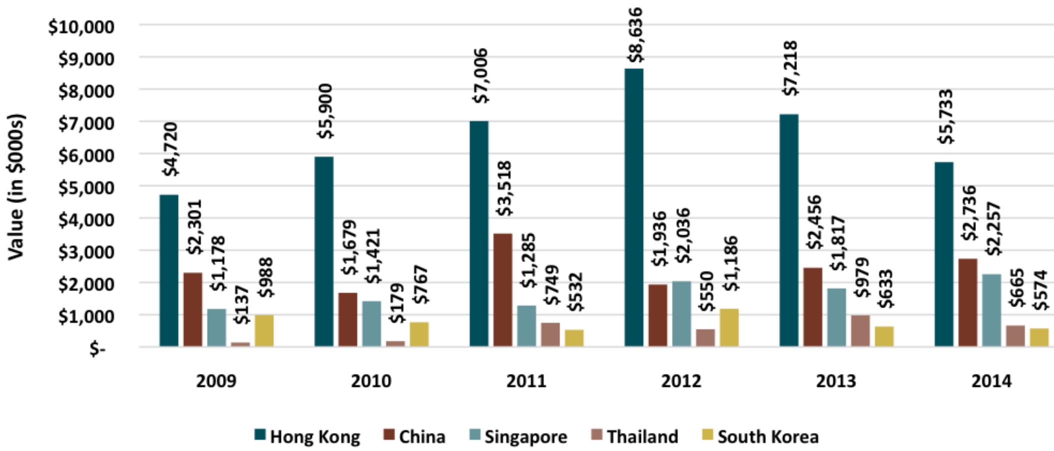

Figure 7.26: U.S. Exports of Sablefish by Top 5 Asia Countries (excluding Japan, in $000s), 2009-2014.
Source: Sonu 2014.

all harvests consisted of illegal, unreported fishing actual toothfish landings. This led to informed consumers moving to more sustainably harvested species, such as sablefish.[28]

Sablefish farming has not developed as anticipated. There are some sablefish farming ventures in British Columbia, with no evident impact on wild Alaska sablefish harvest or revenues. Canada's wild sablefish harvest is equivalent to that of California or Oregon, with 1,773 mt harvested in 2014.[29]

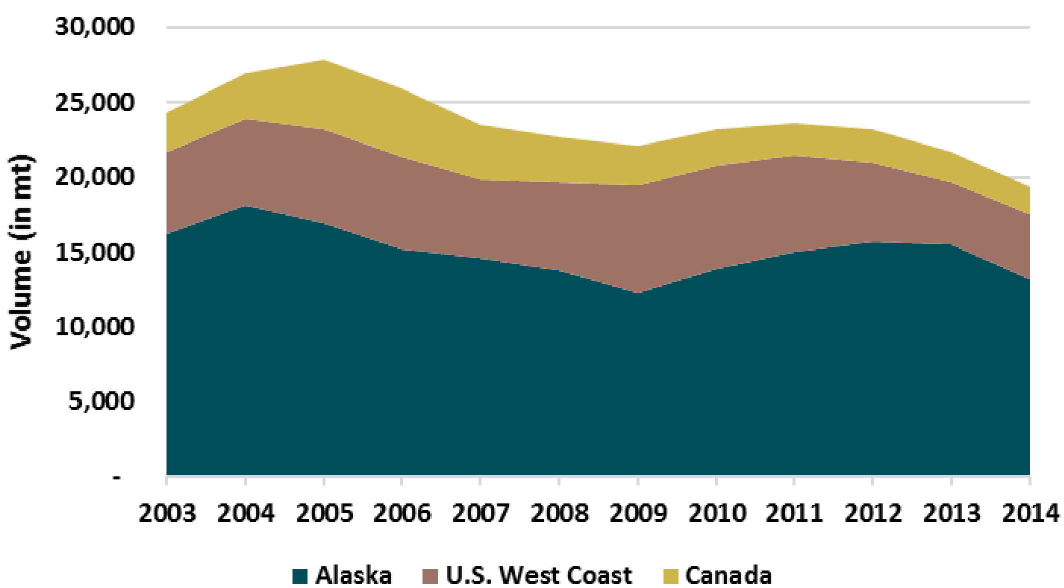

Figure 7.27: Global Supply of Sablefish, in Metric Tons, 2003-2014.
Notes: In 2014 Alaska comprised 65% share of the volume, U.S. West Coast 24% and Canada 10%.
Source: AKFIN.

[28] (Catarci, 2004)
[29] (Pacific Fisheries Catch Statistics, 2015)

7.6. Yellowfin Sole & Rock Sole Market Profiles

7.6.1 Yellowfin Sole

Yellowfin sole (*Limanda aspera*) is one of the most abundant flatfish in the eastern Bering Sea. Alaska is responsible for the majority of the global catch. Overall, the species represented 45 percent of the first wholesale value in 2014 of all Alaska flatfish, which also includes rock sole, arrowtooth flounder, flathead sole, turbot, and rex sole. Table 7.34 summarizes some of the key market statistics for yellowfin sole products from Alaska. Most of Alaska's yellowfin sole production is exported to China.

Table 7.34: Summary Profile of Yellowfin Sole Wholesale Production and Markets, 2014.

Value and Volume		Key Products	H&G	Whole	Other
Wholesale Production (mt)	93,794	% of Value	69%	12%	19%
Pct. of Global Flatfish Harvest (2013)	14%	Key Markets	China	S. Korea	Other
First Wholesale Value ($millions)	$97.8	% of 1st Sales	86%	13%	1%
Pct. of Alaska Groundfish Value	4%	YoY Change	-1%	6%	14%
Pct. of Alaska Flatfish Volume	53%	Competing Species:Other flatfish, Tilapia, Whitefish.			

Yellowfin Sole Product Description and Supply Chain

Yellowfin sole average 42 cm long (approximately 16.5 inches) and weigh 750 grams (1.6 pounds). The primary products produced in Alaska are frozen H&G (83 percent of production volume) and frozen whole fish (16 percent). Yellowfin sole is a white fish with delicate, sweet, and mild-tasting flesh. The most common H&G size is approximately 130-450 grams and most whole round fish are 200-700 grams.[30] Almost all yellowfin sole are exported to China where they are processed into fillets. These twice-frozen fillets are primarily sold as frozen skinless, boneless 2-4 ounce fillets. Sole are commonly served poached, sautèed, or steamed.

The supply chain for yellowfin sole begins with catcher processors in Alaska that export frozen H&G product to secondary processors in China. Secondary processors transform the fish into its frozen skinless, boneless fillets, primarily for re-export. Twice-frozen fillets are then sold to distributors who sell fish to retail and foodservice operators in Europe, Japan, and the United States.

Yellowfin Sole Production Volume and Value

Alaska produced 93,794 mt of yellowfin sole products in 2014 worth $97.8 million. The species accounted for 9.6 percent of total groundfish production volume and 4.2 percent of the total first wholesale value for groundfish species in 2014. Yellowfin sole are primarily harvested by the Amendment 80 fleet of catcher processors, which consists of 19 vessels. This fleet also targets other flatfish and rockfish species. From 2010 to 2014, flatfish accounted for the majority (60 percent) of Amendment 80 fleet harvests. The first wholesale value of yellowfin sole has been pushed lower due to an increase in whitefish competition.

[30] (Alaska Seafood Marketing Institute, 2012)

Yellowfin sole prices are highly dependent on when the fish are harvested. Fish caught in the winter, prior to spawning, command higher prices. Flesh quality declines significantly during and after spawning, resulting in lower prices.

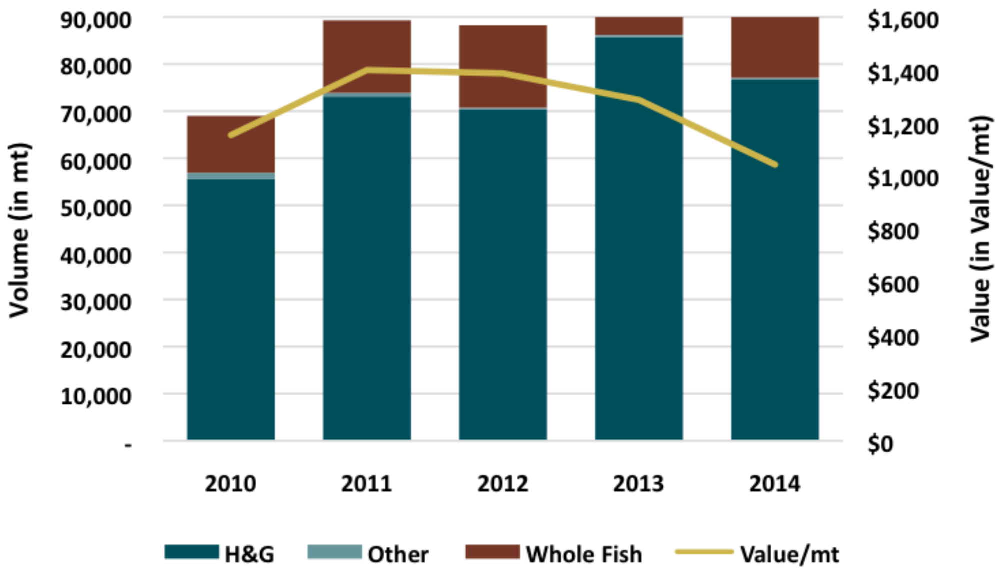

Figure 7.28: First Wholesale Volume and Value for Yellowfin Sole, 2010-2014.

	2010	2011	2012	2013	2014
Wholesale Value (in $Millions)	$69.0	$89.3	$88.2	$94.6	$93.8

Source: AKFIN.

7.6.2 Rock Sole

Rock sole (*Lepidopsetta polyxystra* and *bilineata*) is the second most abundant flatfish by wholesale volume (after yellowfin sole) from the Gulf of Alaska and the Bering Sea. Alaska is responsible for the majority of the global rock sole harvest. In 2014, rock sole accounted for 16 percent of the total first wholesale volume and 17 percent of wholesale value for Alaska flatfish (Table 7.35). Most of Alaska's rock sole production is exported to China, Japan, or South Korea as H&G or whole fish products. Rock sole generate higher unit value than yellowfin sole due to markets for their roe. This market profile summarizes production and markets for rock sole fisheries in Alaska.

Table 7.35: Summary Profile of Rock Sole Wholesale Production and Markets, 2014.

Value and Volume		Key Products	H&G	H&G w/ Roe	Whole
Wholesale Production (mt)	30,808	% of Value	51%	34%	11%
Pct. of Global Flatfish Harvest (2013)	6%	Key Markets	China	S. Korea	Other
First Wholesale Value ($millions)	$39.7	% of 1st Sales	85%	16%	1%
Pct. of Alaska GF/Crab Value	1.7%	YoY Change	-13%	36%	-70%
Pct. Flatfish Volume	17%	Competing Species:Other flatfish, Tilapia, Whitefish.			

Rock Sole Product Description and Supply Chain

Rock sole average about 61 cm in length (approximately 24 inches) and weigh between two to four pounds (900-1,800 grams).[31] The primary products produced in Alaska are frozen H&G (51 percent of production volume), frozen H&G with roe (34 percent), and whole fish (11 percent). The general H&G size is approximately 500-2,500 grams and whole round is 750-3,500 grams.[32]

Rock sole are primarily caught by catcher processors in Alaska targeting roe-bearing females. Most male rock sole are sold to China and the females with eggs are exported to Japan. Almost all H&G and whole round rock sole is processed in China into fillets that are re-exported into the U.S. It is primarily sold as frozen skinless, boneless 2-5 ounce fillets. It is also sold as H&G, roe-in to Japan, where it is a specialty item that is grilled whole. Rock sole is a delicate and mild- tasting whitefish. It is commonly served poached, sautéed, or steamed.

The short duration, high value roe fishery is unique to the flatfish species. During the spawning months, fish with roe intact are hand processed with roe-in, a more expensive processing technique than standard H&G.

Rock Sole Production Volume and Value

Alaska produced 30,808 mt of rock sole products in 2014 worth $39.7 million (Table 7.36). The species accounted for 3.2 percent of total groundfish production volume and 1.7 percent of groundfish value in 2014. Rock sole are primarily harvested by the Amendment 80 fleet of catcher processors. This fleet also targets flatfish and rockfish species. From 2010 to 2014, flatfish accounted for the majority (67 percent) while rockfish species accounted for 23 percent.

Table 7.36: Alaska Rock Sole Production Volume and Value, 2014.

	Volume (in mt)	Value (in $000s)	Recovery Range	Price per Kilo	Pct. of Total Volume	Pct. of Total Value
H&G	19,799	$20,463	60-79%	$1.03	64%	51%
H&G, roe-in	6,736	$13,434	60-79%	$1.99	22%	34%
Whole fish	3,729	$4,530	80-94%	$1.21	12%	11%
Other*	544	$1,309	22-92%	$2.41	2%	3%
Total	**30,808**	**$39,736**		**$1.29**	**100%**	**100%**

Notes: *Other includes fillets, which are hand processed. While only two percent of total value, they command the highest price per pound.

Source: ADF&G (COAR).

Rock sole is similar to other flatfish, except for the roe-in market. In 2014, a third of the total rock sole wholesale value came from H&G roe-in. H&G product with roe was worth nearly twice as much, on a per pound basis, as regular H&G product. H&G, H&G roe-in, and whole fish made up 98 percent of the total rock sole production volume in 2014.

[31](Washington Department of Fish and Wildlife, 2015)
[32](Alaska Seafood Marketing Institute, 2012)

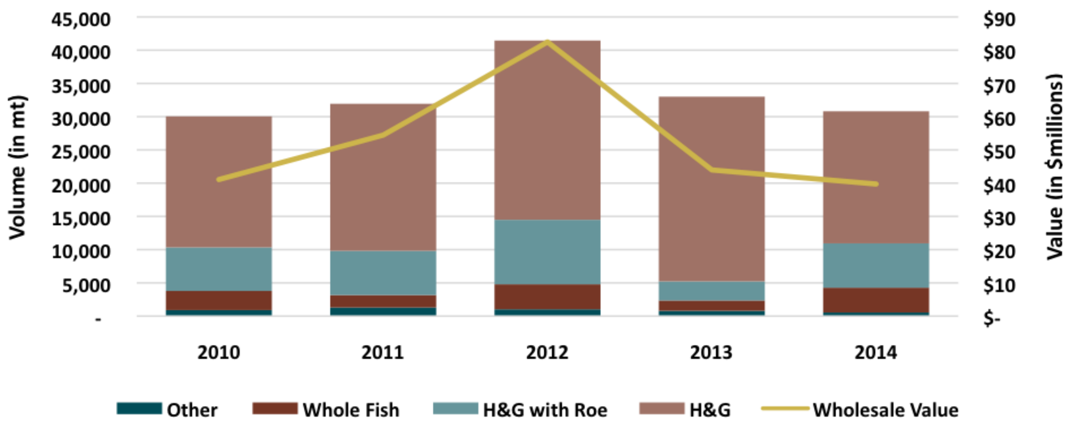

Figure 7.29: First Wholesale Volume and Value for Rock Sole, 2010-2014.
Source: AKFIN.

Key Market Analysis for Sole

Based on U.S. export statistics, roughly 82 percent of Alaska's yellowfin and rock sole is exported to China (Tables 7.37 and 7.38). The balance flows to South Korea, or remains in the U.S. market. Whole or H&G yellowfin sole is exported to re-processors in China where it is converted into individual frozen skinless, boneless fillets. The majority are re- exported back into North America and Europe for use in food service and for retail. A portion of yellowfin sole is sold as kirimi (slices of fish), which is popular in Japanese cafeterias.[33] Korea tends to purchase smaller fish, which tend to be cheaper per kilo.

Most rock sole is combined with other flatfish which is exported to China and reprocessed as frozen fillets and other products. The highest value product, H&G with roe intact, is consumed in Japan.

Table 7.37: U.S. Yellowfin Sole Exports by Major Country, in Metric Tons, 2013-2014.

	2013		2014		Yr.-Over-Yr. Pct. Change in Volume	Pct. Share of Exports
	Volume (in mt)	Value ($000s)	Volume (in mt)	Value ($000s)		
China	62,680	$89,057	62,095	$86,134	-1%	86%
South Korea	9,381	$12,775	10,017	$12,264	7%	14%
Other	28	$35	32	$161	11%	1%
Total	**72,089**	**$101,867**	**72,143**	**$98,559**	**0.08%**	**100%**

Source: NMFS Foreign Trade.

China

China is responsible for reprocessing most Alaska-caught yellowfin and rock sole, which is processed with other flatfish into frozen portioned fillets. Approximately 80 percent of all China's flatfish exports go to Europe, Japan, and the United States (Table 7.39). As China's economy grows, an increasing number of whole round sole remain in the domestic market. Both yellowfin and rock sole

[33]Pers. Comm. with Industry Representative (2015).

Table 7.38: U.S. Rock Sole Exports by Major Country, in Metric Tons, 2013-2014.

	2013		2014		Yr.-Over-Yr. Pct. Change in Volume	Pct. Share of Exports
	Volume (in mt)	Value ($000s)	Volume (in mt)	Value ($000s)		
China	18,989	$31,686	16,557	$26,336	-13%	85%
Japan	1,947	$3,495	2,649	$4,463	36%	14%
South Korea	503	$907	149	$254	-70%	1%
Other	256	$584	136	$295	-47%	1%
Total	**21,695**	**$36,671**	**19,491**	**$31,348**	**-10%**	**100%**

Source: NMFS Foreign Trade.

require hand processing, which is labor-intensive. Due to lower labor costs, much of the flatfish catch from Alaska is processed in China.

Table 7.39: China Flatfish Exports, by Value and Volume, 2012-2014.

	2012		2013		2014		Pct. Market Share (3yr Avg.)
	Value ($000s)	Volume (in mt)	Value ($000s)	Volume (in mt)	Value ($000s)	Volume (in mt)	
Europe	$97.9	20,140	$87.0	19,595	$99.1	24,939	29%
Japan	$99.0	18,416	$106.1	19,344	$106.2	20,577	26%
U.S.	$88.1	17,363	$95.5	18,852	$81.9	17,139	24%
Taiwan	$5.1	289	$19.9	984	$36.2	2,197	2%
Canada	$24.5	4,626	$26.0	4,844	$31.5	5,947	7%
Other	$27.5	7,289	$34.1	9,452	$39.3	11,896	13%
Total	**$342.2**	**68,123**	**$368.7**	**73,071**	**$394.2**	**82,695**	**100%**

Source: Global Trade Atlas.

Japan

Japan imports 4 percent of Alaska's frozen H&G rock sole, primarily females with roe intact. They also import reprocessed rock sole roe and kirimi from China. H&G fish are commonly grilled with the roe inside as a delicacy. According to industry experts, Japanese demand has decreased for this specialty product, resulting in lower prices. From 2013 to 2014, export volume increased by 19 percent, but the price per kilo decreased by 10 percent (Table 7.40).

Table 7.40: U.S. Rock Sole Exports to Japan, in Metric Tons, 2010-2014.

	2010	2011	2012	2013	2014	Yr.-Over-Yr. Pct. Change
Volume (in mt)	4,569	3,149	1,256	1,947	2,649	36%
Price per kilo	$1.38	$1.68	$1.63	$1.80	$1.69	-6%
Value (in $000s)	$6,325	$5,282	$2,048	$3,495	$4,463	28%

Source: NMFS Foreign Trade.

U.S. and Europe

The U.S. and Europe consume a large amount of flatfish, most of it processed in China. Flatfish include a variety of groundfish species such as sole, flounder, and plaice. Both end markets consume flounder in fast food restaurants as well as in grocery stores in the frozen aisle. In the U.S., about 75 percent of the sole and flounder imports enter through the East Coast, a region where flounder is a traditional meal.

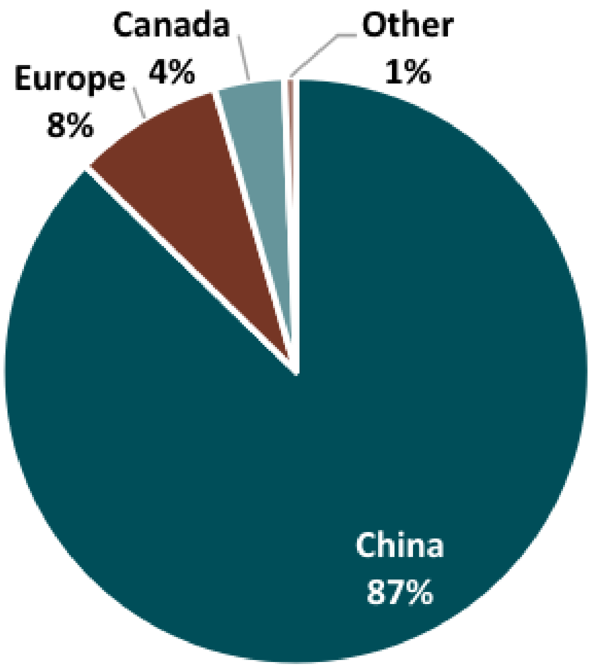

Figure 7.30: U.S. Imports of Sole, by Volume, 2014.
Source: NMFS Foreign Trade.

The unit value of imported frozen sole fillets (into the U.S.) from China is down 17 percent from the peak in 2012 (See Figure 4). Year-to-date import unit values through August 2015 for these frozen sole fillets are down 9 percent from calendar year 2014. The decline is likely to a number of factors, including more competing pollock supply, lower fuel costs, and a stronger U.S. dollar. In addition, Europe's harvests of plaice, a substitute for yellowfin sole, have increased leading to lower demand for yellowfin sole.

Prices of frozen sole fillets from China generally track the value per pound. of Alaska H&G flatfish product. However, the gap between primary and finished product has increased over the past decade supporting industry's claims of increasing secondary processing costs in China. Fuel is a major operating cost for flatfish catcher processors, accounting for approximately 20 percent of total expenses in 2013 for the Amendment 80 sector.[34] Converting the first wholesale value of H&G flatfish to a fillet basis suggests the value-added per pound - or cost of producing such products - increased from less than $0.20/lb. in 2006 to more than $0.70/lb. since 2013.

Other Markets

South Korea consumes some yellowfin sole domestically. The country is the end market for lower quality yellowfin that have already spawned. Koreans also highly value the whole fish appearance; marks and flaws in the gills and eyes detract from value in this market. A substantial portion of

[34] (Fissel, et al., 2014)

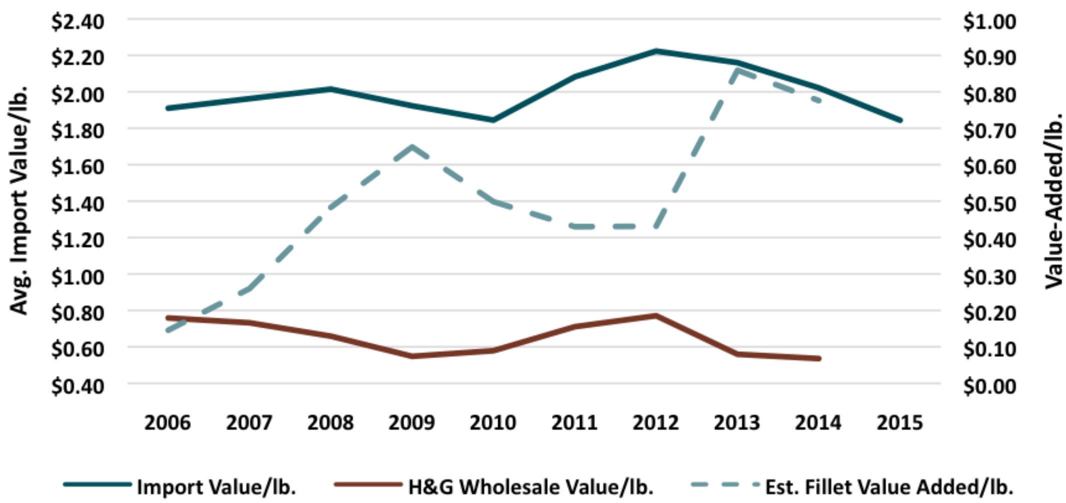

Figure 7.31: Average Unit Value of Sole Fillets from China vs. H&G First Wholesale Value, 2006-2015.

Notes: Figures reflect non-specific sole imports (fillets) and first wholesale value of Alaska flatfish (H&G only). Value added figures are estimated by applying a H&G-to-fillet recovery rate of 43 percent to H&G first wholesale average value/lb. Data for 2015 reflects year-to-date imports through August.

Source: NMFS Foreign Trade, AKFIN, and McDowell Group estimates.

the end market for whole fish is Korea. Brazil was a growing market until it recently banned fish imports with water-retention preservatives used to improve the quality of the flesh, which includes most twice-frozen yellowfin sole from China.[35]

Competing Flatfish Supply

Both yellowfin and rock sole are primarily processed at-sea in H&G format initially, destined for fillet processing in China. In the last five years, Alaska's first wholesale volume of flatfish includes 52 percent yellowfin sole, 20 percent rock sole, and 21 percent other species combined. Nearly all of the flatfish are caught by the Amendment 80 fleet, which targets schools of flatfish, depending on seasons. Yellowfin sole are targeted until they spawn, from winter until early spring. Rock sole are targeted during late winter-early spring, just before they spawn.

In terms of contributions to the global flatfish supply, Alaska yellowfin sole was about 14 percent of total flatfish supply volume and rock sole was 6 percent. Alaska's contribution to global production of flatfish has been increasing since the mid-1980s. Alaska flatfish continue to compete with species such as European plaice and dabs. Global flatfish supply has remained fairly constant over the past four decades, but the U.S. contribution increased from 10 percent in 1977 to 48 percent in 2013. Most Alaska sole and flounder ends up in either the U.S. or Europe. The U.S. end market allows for multiple species to be labeled as "flounder." However, Europe requires species to be labeled with the Latin name, which reduces the amount of sole sold as flounder.

[35]Pers. Comm. with Industry Representative, 2015.

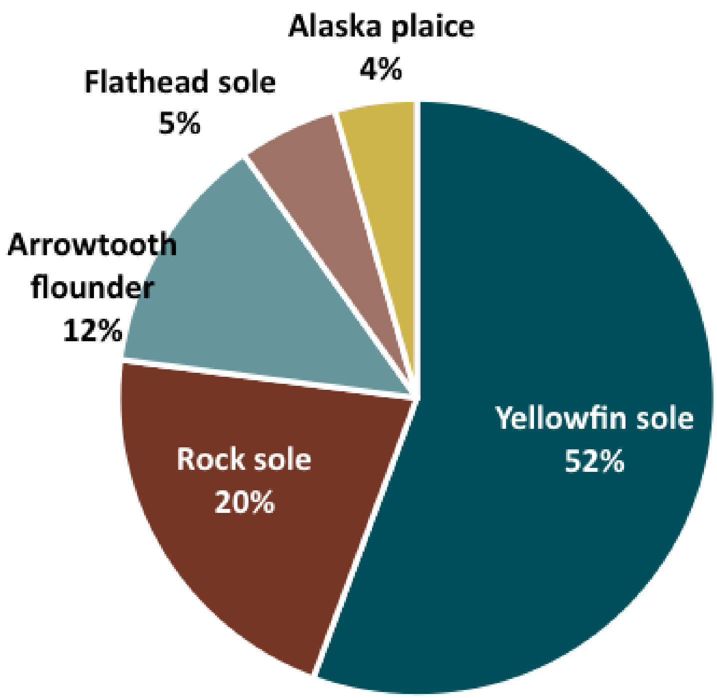

Figure 7.32: Alaska Flatfish Production, by First Wholesale Volume, 2010-2014.
Source: AKFIN.

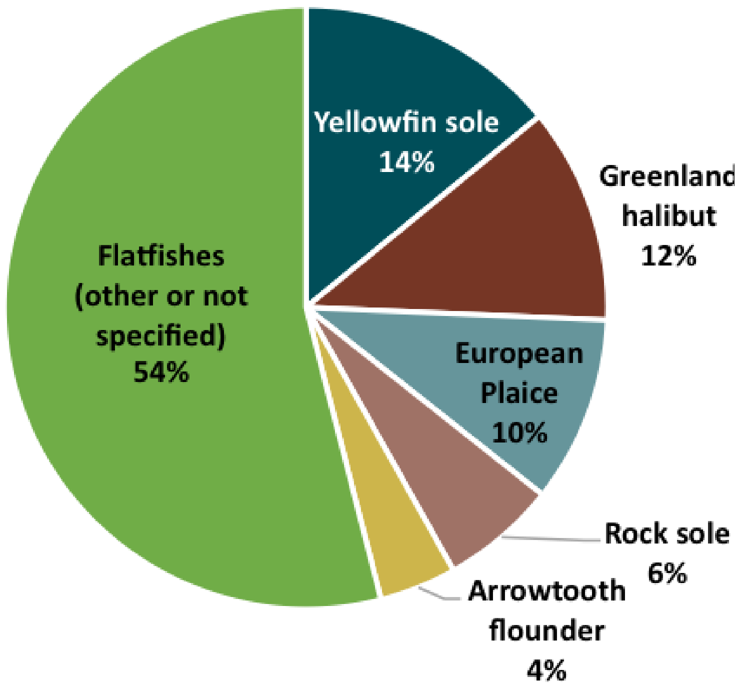

Figure 7.33: Average Global Production of Flatfish Species, by Volume, 2010-2013.
Source: FAO.

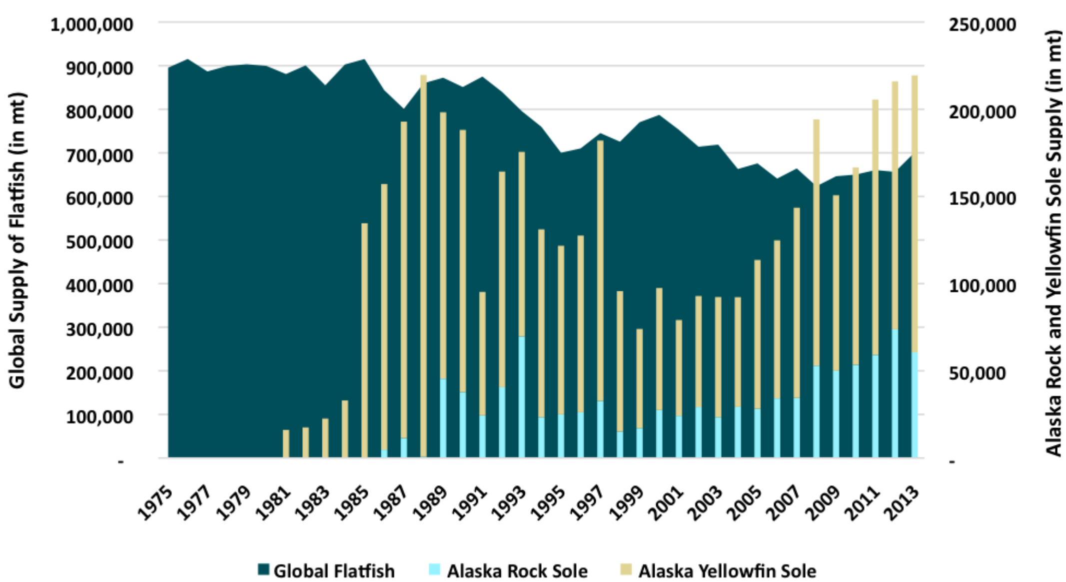

Figure 7.34: Global Flatfish Supply and Alaska Harvest of Yellowfin and Rock Sole, by Volume, 1975-2013.
Notes: Figures include all flatfish globally.
Source: FAO.

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8. ECONOMIC PERFORMANCE METRICS FOR NORTH PACIFIC GROUNDFISH CATCH SHARE PROGRAMS

8.1. Introduction

Catch share programs are a fishery management tool that allocates a secure share of the fishery resource to individual fishermen, fishing cooperatives, fishing communities, or other entities to harvest a fixed quantity of fish each year. Catch shares do not directly impact the total allowable catch (TAC) of each species, and are merely a mechanism to allocate the TAC across various individuals and user groups. The North Pacific region has been the most active region in the U.S. in developing catch share programs, and contains 6 of the 15 programs currently in operation throughout the U.S. These programs are the Western Alaska Community Development Quota (CDQ) (implemented in 1992), Alaska Halibut and Sablefish IFQ (implemented in 1995), American Fisheries Act (AFA) Pollock Cooperatives (implemented in 1999/2000), BSAI Crab Rationalization (implemented in 2005), Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80, implemented in 2008), and the Central Gulf of Alaska (GOA) Rockfish Program (extended the Rockfish Pilot Program in place from 2007-2011 and was implemented in 2012). The programs included in this report, which exclude the CDQ and BSAI Crab Rationalization programs but also includes Bering Sea Freezer Longline Catcher/Processors fishery, account for approximately 66% of all state and federal North Pacific groundfish landings in 2014 as reported in SAFE Table 1.

Catch share programs have a variety of designs which reflect unique circumstances in each fishery and stated goals of the program. In Alaska, these designs include individual fishing quota (IFQ) programs such as the Alaska Halibut and Sablefish IFQ program, cooperative programs such as AFA pollock, Amendment 80, and the Central GOA Rockfish Program, combined IFQ and cooperative programs such as the BSAI Crab Rationalization, as well as community allocation programs such as the CDQ program. There have been several stated goals for these programs, including: meeting conservation requirements, improving economic efficiency and/or flexibility, improving bycatch management, reducing excess capacity, eliminating derby fishing conditions, and improving safety at sea.

This section develops a consistent set of indicators to assess various dimensions of the economic performance of five catch share programs including the halibut IFQ program (which is managed by NOAA Fisheries and the International Pacific Halibut Commission), the sablefish IFQ program (implemented together with the halibut IFQ program but will be considered separately), the AFA pollock cooperatives program, the Amendment 80 program, and the central GOA Rockfish Program as well as one quasi catch share program, the Bering Sea Freezer Longline Catcher/Processors.

These indicators were developed by NOAA Fisheries' regional economists, anthropologists, and sociologists as the most representative indicators of economic performance for which data are available and can be regularly updated and were first summarized in Brinson and Thunberg (2013). They can be broken down into three general categories: catch and landings, effort, and revenue, and their descriptions are listed in Table 8.1.

The catch and landings metrics are the annual catch limit (ACL) or quota level, aggregate landings, the % of the quota that was utilized, as well as whether the ACL or quota was exceeded for any

Table 8.1: Definitions of Economic Performance Indicators.

Indicator	Definition
Catch and Landings	
Quota allocated to Catch Share Program	Annual quota of combined catch share program species, in terms of weight.
Aggregate landings	Annual total weight of combined catch share program species generated by vessels that fish quota.
% Utilization	Portion of target species TAC that is caught and retained within a fishing year. Aggregate Landings/Quota allocated to catch share program
Fishing Effort	
Season length index	The number of days in which at least one vessel was fishing divided by the number of days in the regulatory fishing season.
Active vessels	Annual number of vessels that fish quota and landing one or more pounds of any catch share program species.
Entities holding share	Annual total number of entities/individuals/vessel owners/permit holders receiving quota share at the beginning of the year.
Landings Revenue	
Aggregate revenue from Catch Share species	Annual total revenue of combined catch share program species generated by vessels that fish quota.
Average price	Aggregate revenue from catch share species/aggregate landings
Revenue per active vessel	Aggregate revenue/active vessels
Gini Coefficient	A measure of the evenness of the distribution of revenue among the active vessels. The Gini coefficient increases as revenues become more concentrated on fewer vessels.

species in the program. While the quota amount is set based on the biological condition of the species in the program, the landings and the percentage of the quota that is landed (% utilization) reflect economic conditions and regulatory constraints of the fishery.

The effort metrics are the season length index, the number of active vessels, and the number of entities holding share. The season length index is defined as the number of days in which at least one vessel was fishing divided by the number of days in the regulatory fishing season. This index enables the creation of a single unit-less metric of season length that can be aggregated over multiple areas or species with different season lengths within the same program. The index measures the relative proportion of the legal fishing season during which some or all vessels actively fished. The aggregate program level season length index is calculated as the weighted harmonic mean number of days in which at least one vessel was fishing by area using catch as weights and then divided by the regulatory fishing season length. The number of active vessels is one indicator of the scale of participation and effort in the fishery and can indicate changes in the expansion or consolidation of vessels in the fishery after rationalization. The number of entities holding share reflects the number of quota share owners that may be reduced as a result of consolidation or increase with new entrants over time and indicates the level of ownership accumulation in the fishery.

The revenue metrics are the aggregate revenue from catch share species, average prices of catch share species, the revenue per active vessel, and the Gini coefficient. Revenues are a function of the landings and prices, which may trend in opposite directions due to changes in the demand for the species that may or may not be caused by the movement to catch share management. Prices may be affected by catch share management, but they are also influenced by external factors such as substitute species, fluctuating exchange rates, changes in demand. While changes in prices cannot be solely tied to catch shares, they provide a useful metric to compare the performance of the fishery over time. The Gini coefficient is a measure of the evenness of the distribution of revenue among the active vessels which increases as revenues become more concentrated on fewer vessels or as marginal participants with low levels of revenue exit the fishery, and is useful to examine the distributional impacts of catch share programs across vessels.

Where possible, performance metrics are compared to a baseline period prior to catch share program implementation (typically the average of three years prior to program implementation). However, other factors that occur concurrently with, but are unrelated to, catch share implementation, such as changing market conditions or species biomass, will affect the economic performance of the fishery and are not accounted for in this analysis. Therefore, while these metrics may increase or decrease after catch share implementation, one should be cautious in assuming cause and effect. These metrics are useful to track changes in the economic performance of North Pacific catch share programs over time, but are not necessarily a comprehensive evaluation of the economic performance of these fisheries or of catch share programs in general. Some attempt is made to interpret the trends and provide context for the results, but a thorough examination of what is driving the trends is currently beyond the scope of this report and is left for future analysis.

8.2. North Pacific Halibut IFQ Program

Management Context

The North Pacific Halibut IFQ program was implemented simultaneously with the North Pacific Sablefish IFQ Program, but the sablefish IFQ program will be considered separately below. Halibut in the North Pacific are commercially caught by catcher vessels (CVs) that deliver their catch onshore and catcher/processor vessels (CPs) that catch and process their catch at sea using longline gear. Halibut are also caught as prohibited species catch (PSC) by vessels using trawl gear which means they cannot be retained by these vessels. The IFQ program only applies to halibut caught with longline gear in the directed commercial fishery. In addition to the directed commercial fishery, there are substantial recreational and subsistence sectors that depend on the halibut resource. Beginning in 2014, charter operators are able to lease a limited amount of commercial IFQ in areas 2C and 3A as part of the Pacific Halibut Catch Sharing Plan.[1] Additionally, through the Community Development Quota (CDQ) Program, a percentage of the Bering Sea and Aleutian Islands (BSAI) halibut catch limits, which varies by management area, is allocated to entities representing eligible Western Alaska communities designated in the Magnuson-Stevens Act. However, this section only examines the performance of the halibut IFQ portion of the program.

Halibut fisheries off the coast of Alaska are managed by two agencies: the International Pacific Halibut Commission (IPHC) and the North Pacific Fishery Management Council (NPFMC). The IPHC is responsible for assessment of the halibut stock and establishes the annual Total Constant

[1] http://alaskafisheries.noaa.gov/sustainablefisheries/halibut/csp/cspoverview0214.pdf

Exploitation Yield (which is comparable to an ACL for the directed commercial fishery). The NPFMC is responsible for allocating the catch limits established for the halibut management areas off the coast of Alaska among various user groups. The halibut IFQ program was developed by the NPFMC and implemented by NOAA Fisheries in 1995 to manage the directed commercial halibut fishery in Alaska. Prior to the IFQ program, the fishery operated as a derby and often only lasted a few days per year (but the season length varied by area). Quota Share (QS) was initially issued based on both historic and recent participation of persons who, in 1988, 1989, or 1990, owned or leased vessels with qualifying landings. QS were issued in amounts commensurate with creditable halibut landings during the "best five" of 7 years from 1984-1990. The primary objectives of the IFQ Program are to 1) eliminate gear conflicts; 2) address safety concerns; and 3) improve product quality and value.

The Halibut and Sablefish IFQ program is one of only two North Pacific groundfish catch share fisheries that include a cost recovery provision for 2014 in which the fishermen pay a fee based on the cost to the government to manage the program (the other is the Central GOA Rockfish Program). Recoverable costs cannot exceed 3% of the total ex-vessel value of the fishery and include the costs related to management, data collection, and enforcement of a Limited Access Privilege Program (LAPP) or Community Development Quota Program. Cost recovery began in 2000 for the halibut IFQ program and has ranged from $1.91 million to $3.11 million and 1.0% to 2.8% of the ex-vessel value of the fishery.[2]

Catch Share Privilege Characteristics

There are two forms of quota in the Halibut and Sablefish IFQ Program, QS and the annual allocation of IFQ in pounds derived from the QS. The QS are a revocable, indefinite privilege that entitles the holder to a share of the total area- and vessel class-specific IFQ allocated each year. Individuals as well as non-individuals (such as a corporation) can hold QS and IFQ. Prior to the beginning of each fishing season, IFQ is allocated to QS holders based upon their held QS, the total allowable catch (TAC) in each area which is recommended by the IPHC, and the total amount of QS in each management area (QS pool). QS and the resulting IFQ are designated for use in specific areas and on vessels of a specific size. These provisions are intended to limit catch by area and maintain a fleet with a range of vessel sizes. The IFQ Program also contains a number of QS and IFQ use restrictions, including use caps and designation of small QS blocks that are intended to prevent consolidation and maintain participation opportunities for small operations and new entrants. IFQ are valid only for one year, but there are rollover provisions that allow QS holders to carry over to the next year up to 10% of their unused IFQ and any overages (up to 10%) are taken from the following year's IFQ allocation. There are a total of 32 species and area specific quota allocations with a total of 55 unique types of halibut IFQ due to the existence of blocked and unblocked QS in some areas.

Catcher vessel QS are transferable to other initial issuees or to those who have become transfer-eligible through obtaining NOAA Fisheries' approval by submitting an Application for Eligibility to Receive QS/IFQ. To be eligible, potential QS/IFQ recipients must be a U.S. citizen and have 150 or more days of experience working as part of a harvesting crew in any U.S. commercial fishery. Halibut QS can be sold with or without the annual IFQ derived therefrom (plus adjustments from prior year QS used). However, CV IFQ can be leased annually to other eligible permit holders only

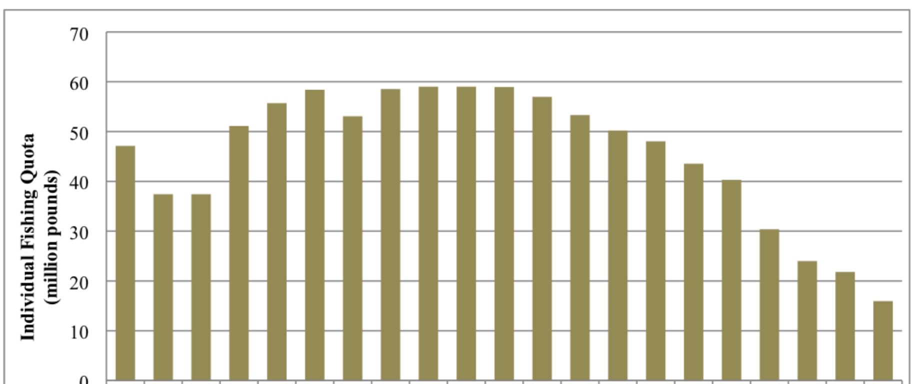
[2]The cost recovery fee for the Halibut and Sablefish IFQ Program is assessed for halibut and sablefish together, these numbers reflect our apportionment of the total fees collected to halibut based on the ratio of ex-vessel value.

under limited circumstances. Non-individual entities new to the program are only able to purchase QS or lease IFQ for the largest vessel class of "catcher/processor" quota (category A).

The IFQ Program has a number of excessive share provisions. There are QS holding caps on both individuals as well as entities. No person, individually or collectively, can hold/control more than 0.5%-1.5% of halibut QS in specific areas and combinations of areas. In addition, vessel use caps limit each vessel to harvesting from 0.5%-1% of the halibut TAC in specific areas and combinations of areas. Halibut CDQ fishing is not subject to excessive share provisions. There are also owner on board requirements for CV QS and IFQ to limit the use of hired skippers. The NPFMC and NOAA Fisheries have also implemented a revolving loan program to assist entry level and small vessel fishermen acquire loans. The loan program is funded through a portion of the cost recovery fees collected.

Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of IFQ allocated to the program, the landings of IFQ halibut, and the percentage of the IFQ that is landed (percent utilization). Annual metrics are compared with a "baseline" period prior to program implementation, which is the average of the three years prior to program implementation (1992-1994). Between the baseline and 2014, IFQ allocated and landings have fallen by 66% and 67%, respectively, while the percent utilization fell from 102.2% (on average exceeding the allocation) during the baseline to 98.9% in 2014. The IFQ and landings had an initial decline for 2 years after IFQ implementation, but then steadily increased to a high in 2002 of 58.1 million pounds caught of the total allocation of 59.1 million pounds (Figures 8.1 and 8.2). With the exception of keeping the same 59.1 million pound allocation in 2003, the IFQ and landings of IFQ halibut have dropped every year since 2002. The IFQ allocation and landings in 2014 are 73.0% and 72.9% less than their peak IFQ program values in 2002.



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Halibut	47.12	37.42	37.42	51.11	55.70	58.39	53.07	58.53	59.01	59.01	58.94	56.97	53.30	50.21	48.04	43.54	40.29	30.38	24.00	21.81	15.95

Figure 8.1: IFQ allocated under the halibut IFQ program.

Utilization initially fell from over 100% of the allocation to 86% in the first year after program implementation. While IFQ utilization varies from year to year, it has only dropped below 95% in two years, 1995 at 86% and 1998 at 92%, and overall averages 96.5% for all years following program implementation (Figure 8.3).

The statewide catch limit (similar to an ACL) was exceeded during the baseline period in 1993, but has not been exceeded since program implementation. Additionally, there were several area

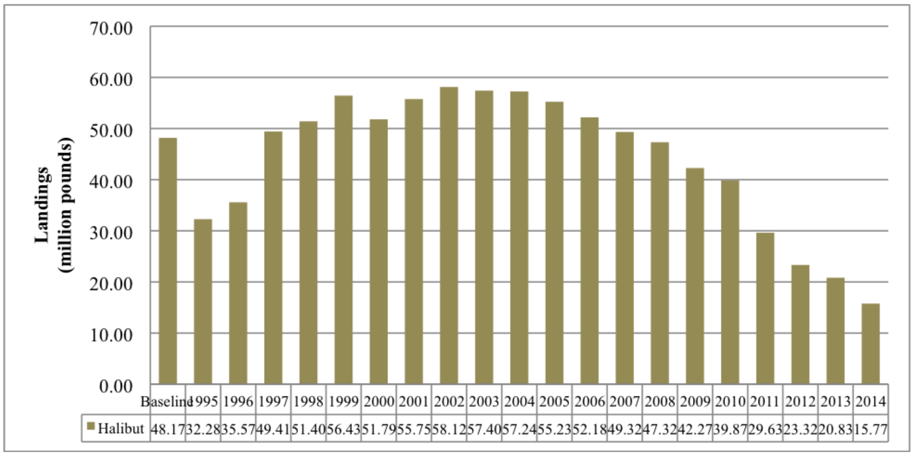


Figure 8.2: Landings of halibut in the halibut IFQ program.

allocations that were exceeded during the baseline period, 4 in 1992, 8 in 1993, and 5 in 1994. In contrast, only 4 area allocations have been exceeded since program implementation in 1995 including area 3B in 2003, areas 3A and 3B in 2010, and area 3A in 2014.

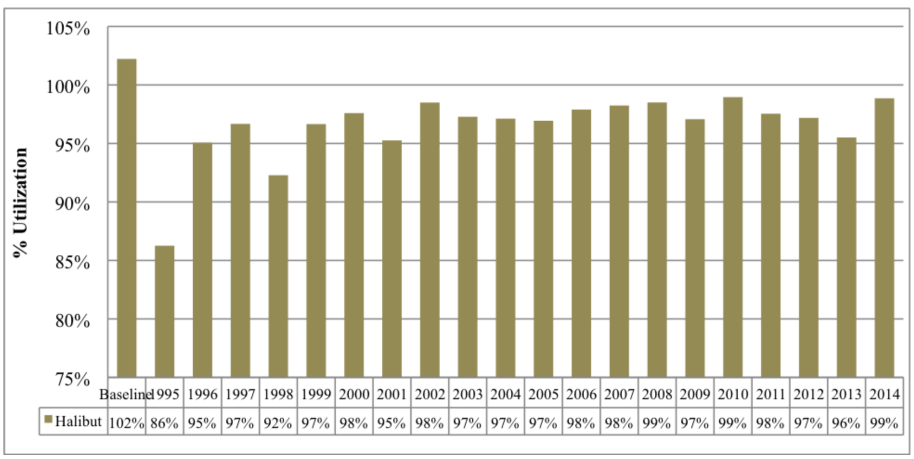


Figure 8.3: Percent of the allocated IFQ that is landed in the halibut IFQ program.

Effort Performance Metrics

The effort performance metrics include the season length index, the number of active vessels, and the number of entities holding QS. The season length index is defined as the number of days in which at least one vessel was fishing divided by the number of days in the regulatory fishing season. This index is necessary to create a single unit-less metric of season length that can be aggregated over all 8 areas, in which vessel participation varies throughout the season. This index measures the relative proportion of the legal fishing season during which some or all vessels actively fished for halibut IFQ. During the baseline, some areas were only open to fishing for halibut for a few days (for the most demanded areas) while others were open for most of the year. To calculate an aggregate halibut IFQ program season length index, we use the weighted harmonic mean number of days active by area using catch as weights and then divide by the regulatory fishing season length. For the baseline period, we assume a 246 day regulatory fishing season which is the number of days allowed for the first 8 years post-IFQ and is the best hypothetical season length to use to compare pre-IFQ with post-IFQ. Using these definitions, the season length index in the baseline period is 0.01, which corresponds to 3.27 active days per year during the baseline period. Upon implementation of the IFQ Program, fishing was allowed for 246 days and there were 176 active days in the halibut IFQ fishery in 1995 which corresponds to a season length index of 0.72. Over the course of the halibut IFQ program, the season length index has fluctuated between 0.68 - 0.81 (Figure 8.4), with 2014 using the lowest percentage of available time to fish.

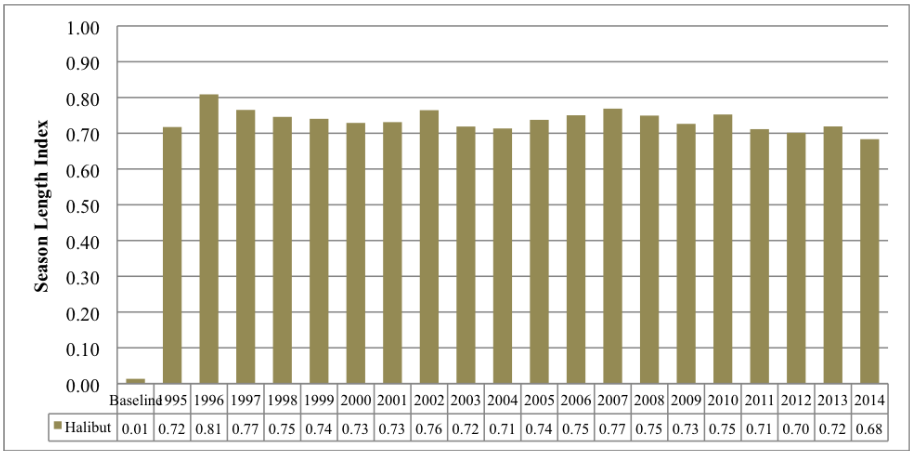


Figure 8.4: Halibut IFQ program season length index.

The number of active vessels reflects the number of halibut vessels with any commercial landings of IFQ Program halibut in a given year. The baseline value represents the average number of unique vessels per year with commercial halibut landings from 1992-1994. After IFQ program implementation, there was a 40% reduction in the number of active vessels overall, from 3,432 vessels in the baseline period to 2,060 vessels in 1995 (Figure 8.5). In years after program implementation (1996-2014), the average annual decrease in the number of active vessels fishing halibut was 4%, leaving 921 unique vessels active in the halibut IFQ fishery in 2014.

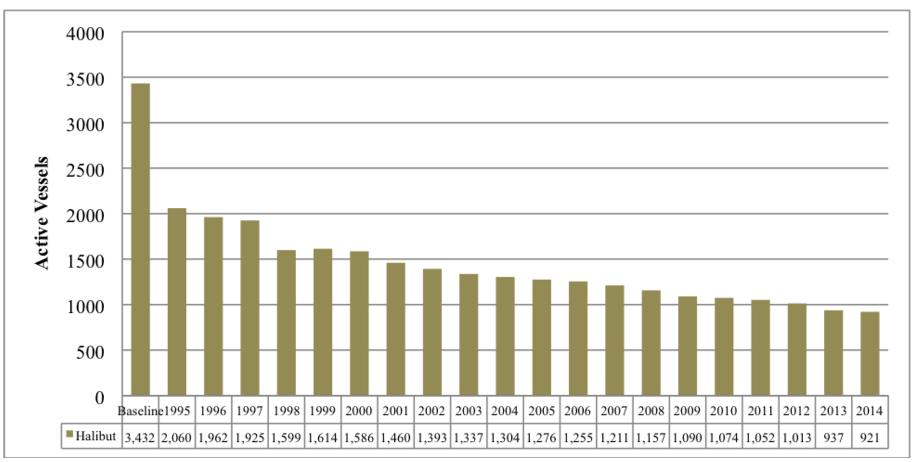


Figure 8.5: Number of active vessels in the halibut IFQ program.

There were 4,829 entities holding halibut QS at the beginning of the program. The number of entities has declined steadily since initial allocation. In 2014, 2,522 entities held QS, which is a reduction of 48% relative to the initial level (Figure 8.6).

Revenue Performance Metrics

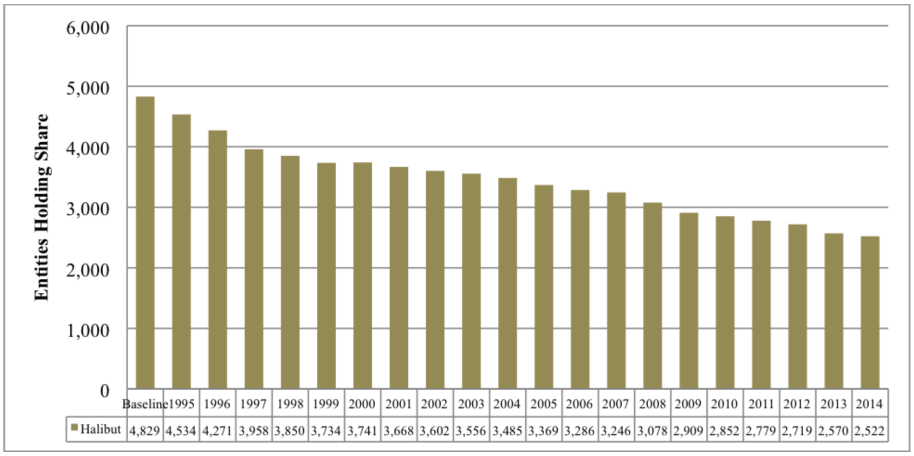


Figure 8.6: Number of entities holding QS in the halibut IFQ program.

The revenue performance metrics are the aggregate revenue from halibut IFQ, average prices of halibut IFQ, the revenue per active vessel, and the Gini coefficient which measures the concentration of revenues among active vessels. Revenues are adjusted for inflation by using the Gross Domestic Product (GDP) price deflator and are reported in 2010 equivalent dollars. Aggregate revenue from halibut IFQ has been higher for all years after program implementation relative to the baseline period (Figure 8.7). Halibut IFQ revenue was generally increasing through 2007, when revenues reached a peak of $223 million, but has declined since that time, falling to $90 million in 2014.

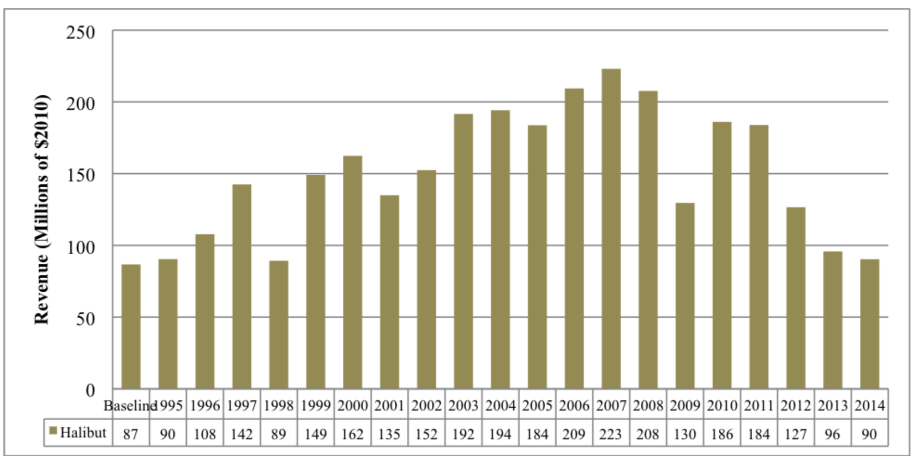


Figure 8.7: Halibut IFQ program revenue.

The average real price per pound of halibut has been higher in each year since program implementation, with the exception of 1998. Real average prices of halibut increased by 212% from $1.83/lb during the baseline to $5.73/lb in 2014 (Figure 8.8). There is substantial variation in the average prices which varied annually by -40% to 53% over the course of the halibut IFQ program, but there is a general upward trend with an average annual rate of change of 9.1%.

Halibut IFQ revenue per vessel has been above the baseline value for all years after program implementation as a function of both revenue increasing and the number of vessels declining relative to the baseline. The real revenue per active vessel increased by 288% from a baseline value of $25,000 to $102,000 in 2013 (Figure 8.9). Revenue per vessel increased from the baseline nearly

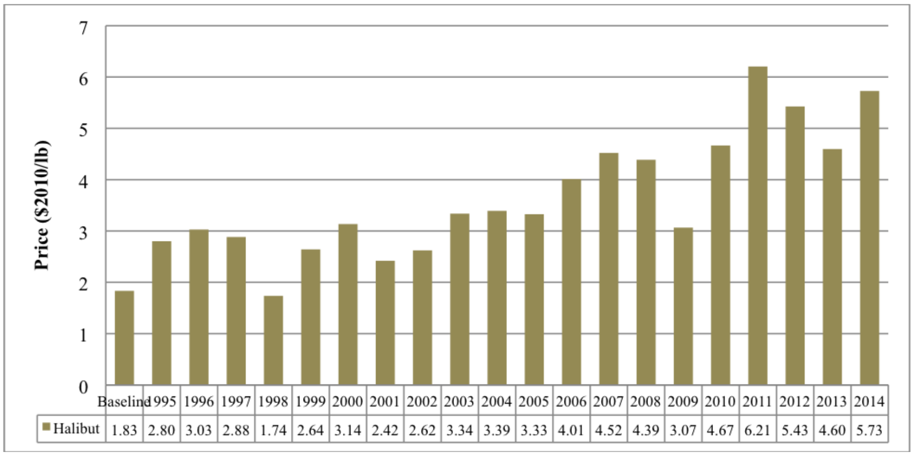


Figure 8.8: Halibut IFQ program price per pound.

every year and reached a high in 2007 at nearly $180,000 per vessel, but has generally declined after 2007, with a substantial reduction beginning in 2012.

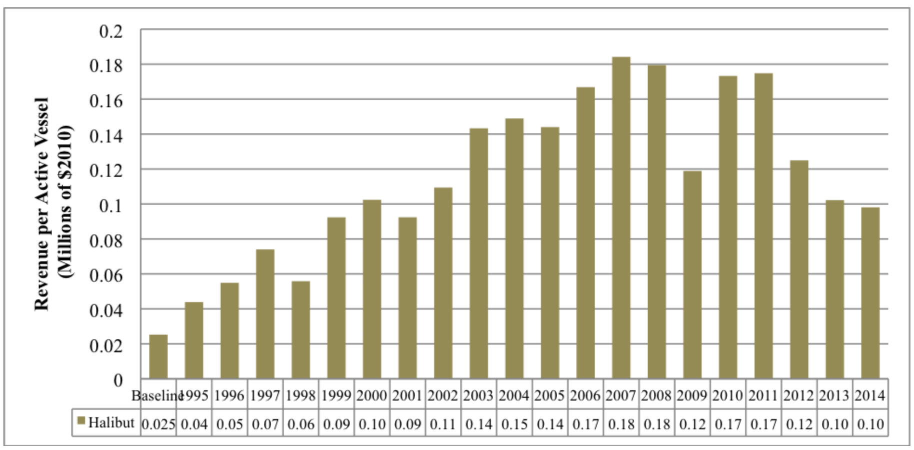


Figure 8.9: Halibut IFQ program revenue per active vessel.

The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the halibut IFQ program in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer vessels as the Gini coefficient increases. The Gini coefficient for the baseline period (Gini = 0.59) is lower than at any point since IFQ program implementation, which implies a more even distribution of vessel revenues before program implementation (Figure 8.10). After the initial increase in the Gini coefficient from 0.59 during the baseline to 0.66 in 1995, the Gini coefficient remained relatively stable after program implementation through 2011. The three most recent years have experienced a large decline in the gini coefficient from 0.70 in 2011 to the lowest Gini coefficient since program implementation of 0.60 in 2014.

8.3. North Pacific Sablefish IFQ Program

Management Context

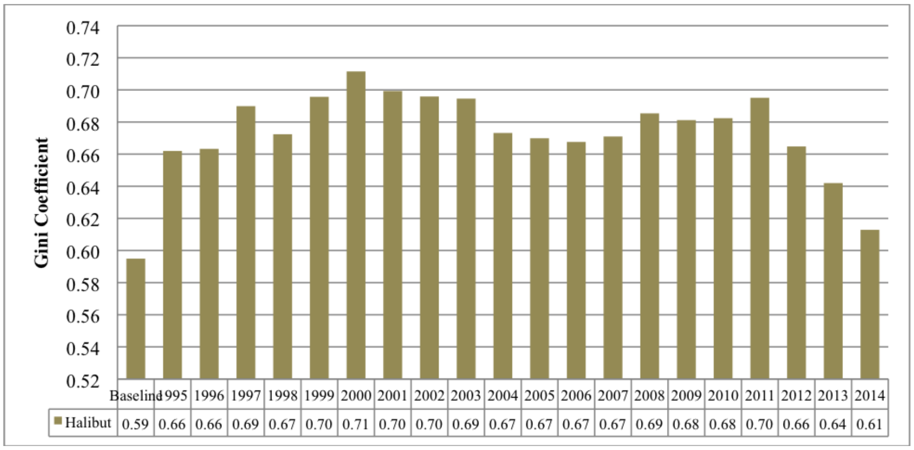


Figure 8.10: Halibut IFQ program Gini Coefficient.

The North Pacific Sablefish IFQ Program was implemented simultaneously with the North Pacific Halibut IFQ Program, but they will be assessed separately in this report. Sablefish (also known as black cod) in the North Pacific are commercially caught by catcher vessels (CVs) that deliver their catch onshore and catcher/processor vessels (CPs) that catch and process their catch at sea using longline (hook-and-line, jig, troll, and handline), pot, and trawl gear, but the IFQ program only applies to longline and pot gears. Twenty percent of the Bering Sea and Aleutian Islands (BSAI) sablefish total allowable catch (TAC) allocated to vessels using hook-and-line or pot gear and 7.5% of the sablefish TAC allocated to trawl gear are reserved for use in the Community Development Quota (CDQ) program. There is not a substantial recreational sector for sablefish in the North Pacific. Similar to the Halibut IFQ program, this section only examines the performance of the sablefish IFQ portion of the program.

The sablefish IFQ program was developed by the North Pacific Fishery Management Council (NPFMC) and implemented by NOAA Fisheries in 1995. The sablefish IFQ program is managed by the NPFMC, which is responsible for establishing Annual Catch Limits (ACLs) and TACs for sablefish and allocating TACs among various user groups. Prior to the IFQ program, the fisheries operated as a derby fishery which often lasted a few days per year in some management areas. Quota Share (QS) was initially issued to persons based on both historic and recent participation of persons who, in 1988, 1989, or 1990, owned or leased vessels with qualifying landings. Quota share were issued in amounts commensurate with creditable landings during the “best five” of 6 years 1985-1990. The primary objectives of the IFQ Program are to 1) eliminate gear conflicts; 2) address safety concerns; and 3) improve product quality and value.

The Halibut and Sablefish IFQ Program is one of only two North Pacific groundfish catch share fisheries that includes a cost recovery provision for 2014 whereby the fishermen are assessed a fee based on the cost to the government to manage the program (the other is the Rockfish Program). The costs that can be recovered include the costs related to management, data collection, and enforcement of a Limited Access Privilege Program (LAPP) or Community Development Quota Program, and cannot exceed 3% of the total ex-vessel value of the fishery. Cost recovery began in 2000 for sablefish IFQ and has ranged from $0.75 million to $2.28 million and 1.0% to 2.8% of ex-vessel value.[3]

[3]The cost recovery fee for the Halibut and Sablefish IFQ Program is assessed for halibut and sablefish together. These numbers reflect our apportionment of the total fees collected to sablefish based on the ratio of ex-vessel value.

Catch Share Privilege Characteristics

There are two forms of quota in the sablefish IFQ Program, QS and annual IFQ in pounds derived from QS. Quota shares are a revocable, indefinite privilege that entitles the holder to a share of the total area- and vessel class-specific IFQ allocated each year. Quota share holders can be individuals or non-individuals (such as a corporation). Prior to the beginning of each fishing season, IFQ is allocated to QS holders based upon their held QS, the total amount of quota in each management area (QS pool), and the total allowable catch (TAC) in each area. Quota shares and the derived IFQ are specified for use in particular areas and on vessels of a particular size. These conditions are intended to maintain a diverse fleet of vessels and limit catch by area. The IFQ program also includes use caps and small QS blocks that are intended to limit consolidation and maintain participation opportunities for small operations and new entrants. IFQ are valid only for one year, but there are provisions that allow QS holders to carry over to the next year up to 10% of their unused IFQ and any overages (up to 10%) are taken from the following year's IFQ allocation. There are a total of 18 species and area specific quota allocations with a total of 36 unique types of sablefish QS due to the existence of blocked and unblocked QS in each area.

Sablefish quota share can be sold with or without the annual IFQ derived from the quota share. Catcher vessel quota share can be transferred to other initial issuees or to those who have become eligible to receive QS by transfer. To be eligible, potential QS/IFQ recipients must be a U.S. citizen and have worked as part of a harvesting crew in any U.S. commercial fishery for at least 150 days. IFQ can be leased annually to other eligible permit holders under limited circumstances. Non-individual entities that are not initial issuees are only able to purchase QS or lease IFQ for the largest vessel class of "catcher/processor" quota (category A). The IFQ Program has a number of excessive share provisions. There are ownership caps on both individuals as well as entities. No individual can hold/control more than 1% of sablefish QS in specific areas and combinations of areas. In addition, vessel use caps limit each vessel to harvesting 1% of the sablefish TAC in specific areas and combinations of areas. Sablefish CDQ fishing is not subject to the excessive share provisions. There are also limits on the use of hired skippers through a requirement that the holder of QS be on board when using CV QS and IFQ. There is also a revolving loan program implemented by the NPFMC and NOAA Fisheries to assist entry level and small vessel fishermen acquire funding. The loan program is capitalized through a portion of the cost recovery fees collected.

Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of IFQ allocated to the program, the landings of IFQ sablefish, and the percentage of the IFQ allocated that is landed (percent utilization). Annual metrics are compared with a "baseline" period prior to program implementation, which is the average of the three years prior to program implementation (1992-1994). Between the baseline and 2014, the IFQ allocation and landings have fallen by 51% and 54%, respectively, while the percent utilization fell from 98% during the baseline to 90% in 2014. The IFQ allocation and landings have followed a cyclical pattern since the baseline with IFQ allocation and landings falling initially after program implementation to 1999, followed by an increase from 2000 to 2004, another decline between 2005 and 2010, an increase in 2011 and 2012, followed by a decline in 2013 and 2014 (Figures 8.11 and 8.12).

Figure 8.12 displays the landings of sablefish as part of the program and also separates the landings by CVs and CPs for all years of the program. Overall program landings have declined by 54% in 2014 relative to the baseline, but CV landings have declined by 52% while CP catch has declined by

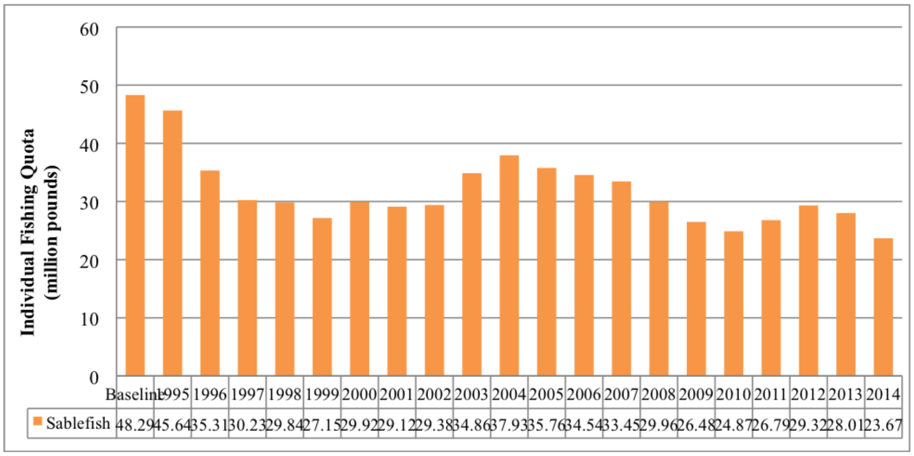


Figure 8.11: IFQ allocated to the sablefish IFQ program.

75%. CPs land on average 13% of the total landings, but the CP share has ranged from 9% in 1994 to 16% in 1999, after which point the CP share of the total landings has generally been declining to 6.5% in 2014.

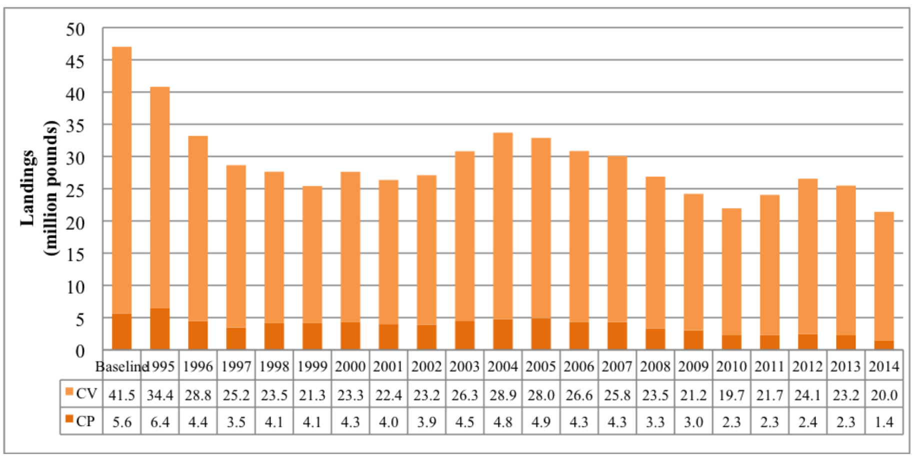


Figure 8.12: Landings of sablefish in the sablefish IFQ program.

Utilization initially fell after program implementation, and appears to be slightly counter-cyclical with the IFQ and landings, always at a lower than baseline level (Figure 8.13). However, while the utilization is lower after program implementation compared with the baseline, the annual catch limit (ACL) has not been exceeded in any year since implementation. In the three years prior to implementation, the utilization rates were 85%, 111%, and 99% of the available ACL, respectively, which skews the utilization rate of the baseline closer to 100% because of the overage in 1993. Additionally, there were several area-allocations that were exceeded during the baseline period, 3 in 1992, 5 in 1993, and 1 in 1994, while only 3 area allocations have been exceeded since program implementation in 1995.

Effort Performance Metrics

The effort performance metrics include season length index, the number of active vessels, and the number of entities holding QS. The season length index is defined as the number of days in which at least one vessel was fishing divided by the number of days in the regulatory fishing season. This

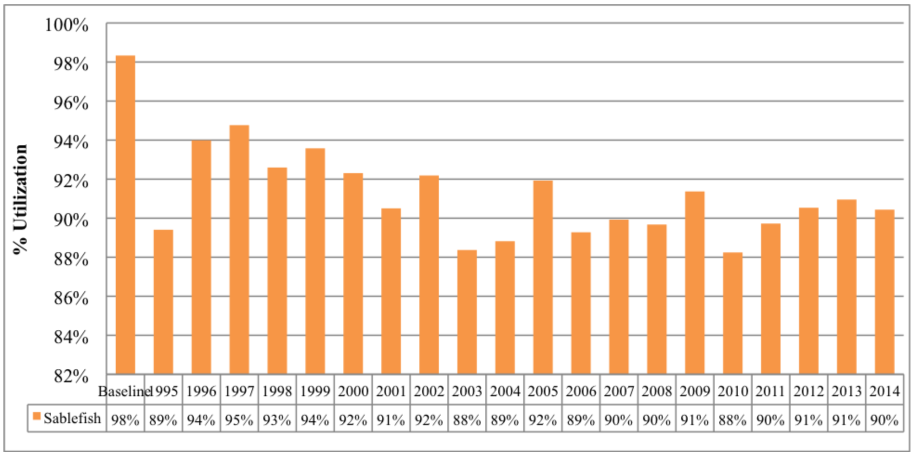


Figure 8.13: Percent of the IFQ allocation that is landed in the sablefish IFQ program.

index is necessary to create a single unit-less metric of season length that can be aggregated over all 6 sablefish areas, in which levels of vessel participation vary throughout the season. This index measures the relative proportion of the legal fishing season during which some or all vessels actively fished sablefish IFQ. During the baseline, some areas were only open to fishing for sablefish for a few days (for the most demanded areas) while others were open for most of the year. To calculate an aggregate sablefish IFQ program season length index, we use the weighted harmonic mean number of days active by area using catch as weights and then divide by the regulatory season length. For the baseline period, we assume a 246 day regulatory season length which is the number of days allowed for the first 8 years post-IFQ and is the best hypothetical season length to use to compare pre-IFQ with post-IFQ. Using these definitions, the season length index in the baseline period is 0.07. Upon implementation of the IFQ Program, fishing was allowed for 246 days and the season length index for 1995 was 0.96. The number of active days increased from a baseline average of 17 days to 235 days in 1995. Over the course of the sablefish IFQ program, the average number of active days is 238 per year and the season length index has fluctuated between 0.93 - 0.98 (Figure 8.14).

Figure 8.14: Sablefish IFQ program season length index.

The number of active vessels reflects the number of sablefish CVs and CPs with any commercial landings of IFQ Program sablefish in a given year. The baseline value represents the average number of unique vessels per year with commercial sablefish landings from 1992-1994. After program implementation, there was an initial 46% reduction in the number of active vessels overall, which decreased from 1,139 vessels in the baseline period to 610 vessels in 1995 (Figure 8.15). In the first year after program implementation, a larger share of CVs (47%) left the fishery than CPs (23%). In the following three years (1996-1998), the average annual decrease in the number of active vessels fishing sablefish was 8% (11% for CPs and 8% for CVs), but from 1999 to 2014 the decline has slowed to a 3% annual rate overall and for CPs and a 2% annual rate for CVs. This results in a 72% reduction in active vessels between the baseline and 2014.

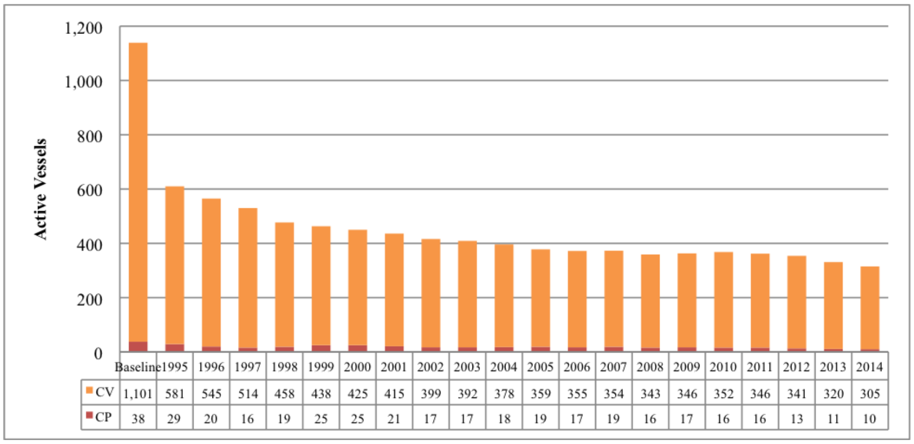


Figure 8.15: Number of active vessels in the sablefish IFQ program.

There were 1,054 entities holding Sablefish QS in 1995. The number of entities has declined over time to 836, or 21% fewer entities holding QS by 2014 (Figure 8.16).

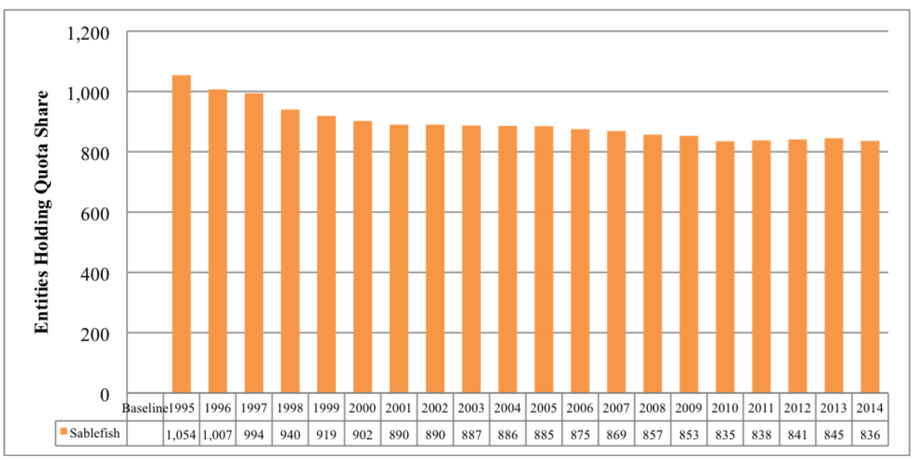
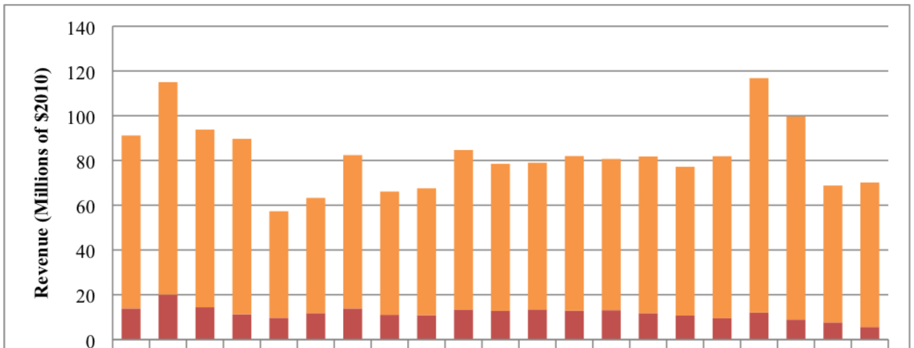


Figure 8.16: Number of entities holding QS in the sablefish IFQ program.

Revenue Performance Metrics

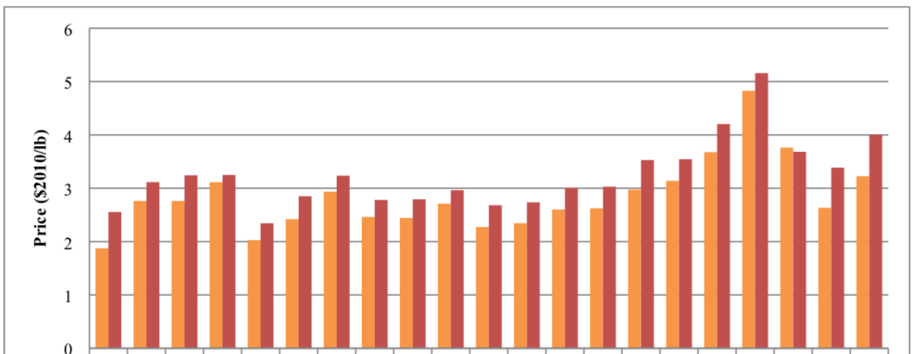
The revenue performance metrics are the aggregate revenue from sablefish IFQ, average prices of sablefish IFQ, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among the active vessels. Revenues are adjusted for inflation by using the Gross Domestic Product (GDP) price deflator and are reported in 2010 equivalent dollars. For the Sablefish IFQ Program, revenues are reported in their native format, such that the price received by CVs is the weighted annual ex-vessel price while the price received by CPs is the weighted annual first-wholesale price. This enables a comparison between the revenues that each type of vessel receives on offloading their catch from the vessel. In the first year of program implementation, sablefish IFQ revenue initially increased by 26% from $91 million during the baseline to $115 million in 1995 overall, which was the result of an increase of 45% for CPs and of 23% for CVs compared to the baseline (Figure 8.17). Sablefish IFQ revenue declined to a low in 1998 of $57 million and was below the peak in 1995 every year afterwards until 2011 which is a program level high of $117 million. However, sablefish IFQ revenue was back below the baseline level in 2013 and 2014 at $69 million and $70 million, respectively.



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CV	77.3	95.0	79.4	78.4	47.6	51.5	68.5	55.1	56.7	71.3	65.7	65.6	69.1	67.6	70.0	66.5	72.4	104.8	90.8	61.2	64.6
CP	13.9	20.0	14.4	11.3	9.7	11.8	13.9	11.0	10.9	13.4	12.8	13.4	12.9	13.1	11.8	10.7	9.5	12.0	8.9	7.6	5.6

Figure 8.17: Sablefish IFQ program revenue.

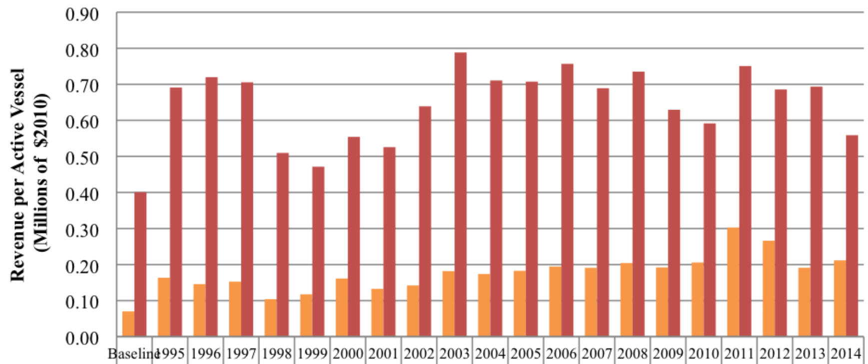
As the CV sector revenues are in ex-vessel value and CP sector revenues are in first wholesale value, the weighted average price per ton of sablefish varies by, and is reported separately for, each sector. The average price per pound of sablefish increased for both CVs and CPs since program implementation. Real average prices of sablefish increased by 68% from $1.95/lb during the baseline to $3.28/lb in 2014 with CVs benefiting more than the CPs with prices increasing by 72% and 57%, respectively (Figure 8.18). There is substantial volatility in average prices which have varied annually by -34% to 44% over the course of the sablefish IFQ program, with CPs receiving higher prices (real average price of $3.28) than CVs (real average price of $2.89). In addition CPs have a lower coefficient of variation in prices, indicating that CP prices are less variable than CV prices on an annual basis.



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CV	1.87	2.76	2.76	3.11	2.03	2.42	2.94	2.46	2.44	2.71	2.27	2.34	2.60	2.62	2.97	3.14	3.68	4.83	3.76	2.63	3.23
CP	2.55	3.11	3.24	3.25	2.34	2.85	3.24	2.78	2.79	2.96	2.68	2.74	3.00	3.03	3.53	3.54	4.20	5.16	3.68	3.39	4.00

Figure 8.18: Sablefish IFQ program price per pound.

Sablefish IFQ revenue per vessel increased by 178% from a baseline of $80,000 to $222,000 in 2014, with the majority of revenues accruing to the CVs which increased by 202% (from $70,000 in the baseline to $212,000 in 2014) while CP revenues increased by 39% (from $401,000 in the baseline to $559,000 in 2014) (Figure 8.19).



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CV	0.070	0.16	0.15	0.15	0.10	0.12	0.16	0.13	0.14	0.18	0.17	0.18	0.19	0.19	0.20	0.19	0.21	0.30	0.27	0.191	0.21
CP	0.401	0.69	0.72	0.71	0.51	0.47	0.55	0.53	0.64	0.79	0.71	0.71	0.76	0.69	0.74	0.63	0.59	0.75	0.69	0.694	0.56

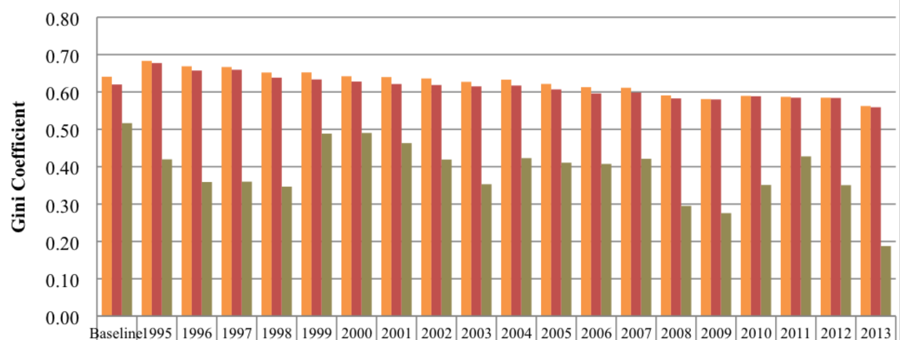
Figure 8.19: Sablefish IFQ program revenue per active vessel.

The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the sablefish IFQ program in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer vessels as the Gini coefficient increases. This is demonstrated in the difference in Gini coefficient for the baseline period for all vessels (Gini = 0.64) which implies a less even distribution in vessel revenues compared with the Gini coefficient for either the CVs only (Gini = 0.62) or for the CPs only (Gini = 0.52) (Figure 8.20). This is because the revenue per vessel among CVs and CPs is very different (Figure 8.19) and when all vessels are combined together in the Gini coefficient, it implies a less even distribution of revenue than examining the within vessel-type revenue distribution. There has been a general movement toward a more even distribution of vessel revenue in the sablefish IFQ program overall and for CVs since program implementation, falling from 0.64 and 0.62 to 0.55 and 0.54 in 2014, respectively. The distribution of CP revenue has become more even since program inception from 0.52 in the baseline to 0.34 in 2014, and while it shows a lot more variation throughout the years, the Gini coefficient has always been below 0.52 meaning that the revenue accruing to CPs has become more equal among vessels compared with the baseline. The Gini coefficient reached its lowest level for all sectors in 2014, which could be a result of marginal vessels exiting the fishery as the number of active vessels is at their lowest level for both sectors since before the baseline period (Figure 8.15).

8.4. American Fisheries Act (AFA) Pollock Cooperatives Program

Management Context

There are three types of vessels that participate in the Bering Sea and Aleutian Islands (BSAI) walleye pollock fishery: catcher vessels (CVs) that deliver their catch onshore, catcher/processors (CPs) that catch and process their catch at sea, and motherships that are at-sea processors receiving codends from CVs but do not catch any of their own fish. Pollock in the BSAI management area are targeted only with pelagic (midwater) trawl gear. Catches average approximately 1 million metric tons per year, which represents roughly 40% of global whitefish production and make it the largest



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sablefish	0.64	0.68	0.67	0.67	0.65	0.65	0.64	0.64	0.64	0.63	0.63	0.62	0.61	0.61	0.59	0.58	0.59	0.59	0.58	0.56
CV	0.62	0.68	0.66	0.66	0.64	0.63	0.63	0.62	0.62	0.61	0.62	0.61	0.60	0.60	0.58	0.58	0.59	0.58	0.58	0.56
CP	0.52	0.42	0.36	0.36	0.35	0.49	0.49	0.46	0.42	0.35	0.42	0.41	0.41	0.42	0.30	0.28	0.35	0.43	0.35	0.19

Figure 8.20: Sablefish IFQ program Gini Coefficient.

fishery in the United States by volume. Ten percent of the BSAI total allowable catch (TAC) is allocated to communities through the Community Development Quota (CDQ) Program. There is no recreational sector for pollock in the North Pacific.

The American Fisheries Act (AFA) Pollock Cooperatives Program was established by the U.S. Congress under the American Fisheries Act in 1998, and was implemented for the CP sector in 1999 and the CV and mothership sectors in 2000. The goals of the AFA were to resolve frequent allocation disputes between the inshore (CVs) and offshore (CPs and motherships) sectors and reduce externalities as a result of the race for fish. The AFA established minimum U.S. ownership requirements, vessel and processor participation requirements, defined the list of eligible vessels, finalized the TAC allocation among sectors, provided an allocation to the CDQ Program, and authorized the formation of cooperatives. The allocation of the Bering Sea TAC to the AFA (after the 10% allocation to the CDQ program and incidental catch allowance in other fisheries are deducted), is 50% to the CV sector, 40% to the CP sector, and 10% to the mothership sector. Additionally, nine vessels were decommissioned as part of the AFA for a total cost to the remaining participants of $90 million.

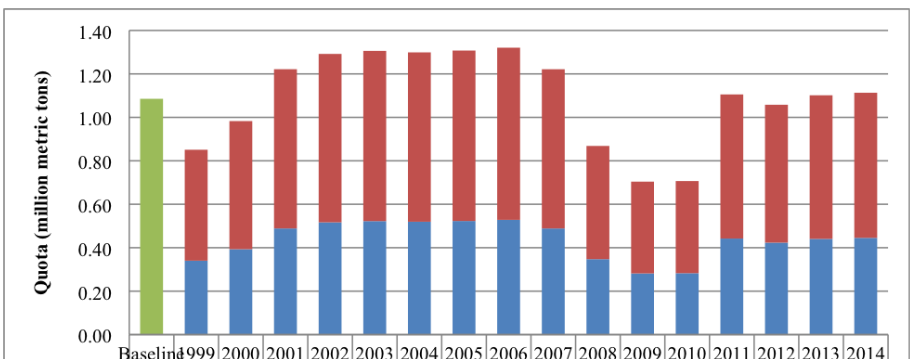
Catch Share Privilege Characteristics

Participation in the AFA pollock fishery is permitted only by the vessels listed in the American Fisheries Act, and those eligible vessels are authorized to form cooperatives which receive an allocation (exclusive harvest privilege) of a percentage of the Bering Sea pollock TAC from NOAA Fisheries. Seven inshore cooperatives have formed between CVs and eligible shoreside processors, and CVs are required to deliver 90% of their BSAI pollock to a cooperative member processor. The CV cooperatives are allocated a portion of the pollock TAC as a directed fishing allowance based on the catch history of its member vessels. The CP and mothership sectors have each formed a voluntary cooperative to receive and harvest the exclusive privilege allocated to the sector. Starting in 2011 with the passage of Amendment 91 to the BSAI Fishery Management Plan, incentive plan agreements (IPA) were put in place for AFA participants to self-regulate and reduce the number of incidentally caught salmon in the pollock fishery and allowed NOAA Fisheries to allocate transferable prohibited species catch (PSC) allowance for Chinook salmon to vessels in the pollock fishery.

Catch share privileges under the AFA are revocable, but were allocated in perpetuity. There is a single cooperative in the CP and mothership sectors, and contracts among members of the cooperative have been developed to allocate their catch across vessels. Catcher vessel cooperatives can exchange directed fishing allowance among their member vessels as they see fit, but since the CV cooperative allocations are based on the membership of their vessels, vessels have to change cooperatives to exchange CV directed fishing allowance across cooperatives. If a vessel owner decides to change cooperatives, the vessel is required fish for one year in the limited access fishery and is not allowed to participate in the cooperative system, unless the vessel owner's current cooperative approves delivery to another cooperative member processor. Catcher vessel cooperatives are also able to contract with non-member AFA eligible vessels to harvest a portion of their allocation. The contract must be approved by both the non-member vessel and that vessel's cooperative, which is similar to a quota lease. There are also excessive use caps in both the inshore harvesting and processing sectors which state that no entity can harvest more than 17.5% or process more than 30% of the directed fishing allowance of pollock allocated to the inshore sector.

Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of pollock TAC (quota) allocated to the program, the landings of AFA pollock, and the percentage of the quota allocated that is landed (percent utilization). These annual metrics are compared with a "baseline" period prior to program implementation, which is the average of the three years prior to any part of the program implementation (1996-1998). The baseline quota value represents the average total non-CDQ directed pollock allocation (inshore and offshore). For this report, the CV and mothership sectors are combined into a single CV sector which remains separate from the CP sector. Between the baseline and 2014, the overall quota has increased by 2.6%, while landings increased by 9.4%, and the percent utilization increased from 93.6% during the baseline to 99.8% in 2014 (Figures 8.21, 8.22, and 8.23). The quota and landings both fell the year after program implementation, but increased substantially thereafter and were relatively stable from 2001-2007. After a few small year classes of fish recruiting into the fishery, the quota was cut substantially in 2008 and remained low through 2010, leading to lower catches during those years. However, the quota increased in 2011 above the baseline level and remained near baseline levels for 2012-2014, which resulted in a slightly larger harvest and a larger share of the quota being utilized from 2012-2014 compared with the baseline.

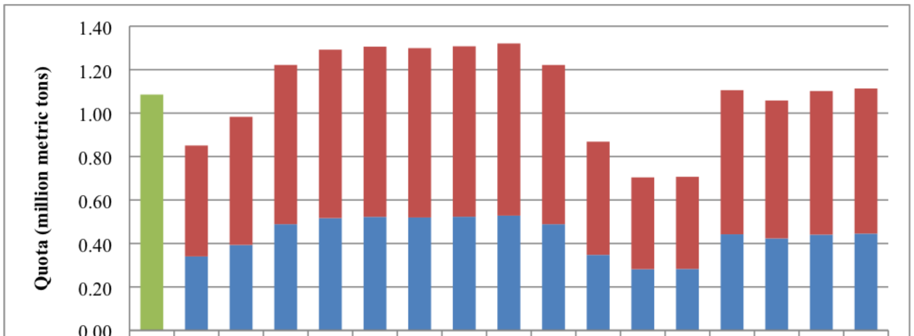


	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Baseline	1.085																
CV		0.511	0.590	0.733	0.775	0.784	0.779	0.785	0.792	0.733	0.521	0.422	0.424	0.663	0.635	0.661	0.668
CP		0.340	0.393	0.489	0.517	0.522	0.520	0.523	0.528	0.489	0.347	0.282	0.283	0.442	0.423	0.441	0.445

Figure 8.21: Quota allocated to the AFA Pollock Program.

Figure 8.22 also separates the landings by catcher vessel and mothership sectors (CV) and catcher/processor sector (CP) for all years of the program. Overall program landings have increased by 9.4% in 2014 relative to the baseline, but the CP sector landings declined by 10.2%

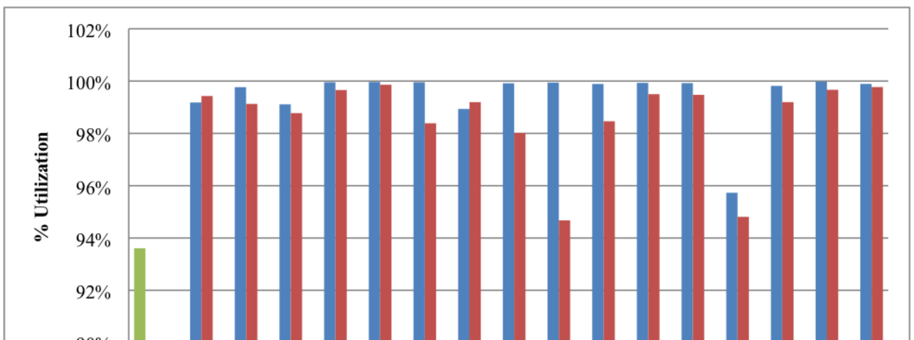
while the CV landings increased by 28.0%, which is largely a function of the reallocation of quota under the AFA. Prior to AFA, the offshore sector (motherships and CPs) were allocated 60% of the non-CDQ directed pollock TAC, leaving 40% for the inshore sector (CVs). The AFA changed the allocations to 40% for the catcher/processors (CP sector), 50% for the CV sector, and 10% for the mothership sector, and in this report the CV sector includes both CVs and mothership vessel landings.



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Baseline	1.085																
CV		0.511	0.590	0.733	0.775	0.784	0.779	0.785	0.792	0.733	0.521	0.422	0.424	0.663	0.635	0.661	0.668
CP		0.340	0.393	0.489	0.517	0.522	0.520	0.523	0.528	0.489	0.347	0.282	0.283	0.442	0.423	0.441	0.445

Figure 8.22: Landings of AFA pollock.

As a result of ending the race for fish, utilization (% of the quota that is landed) increased substantially after the AFA. With the exception of the CV sector in 2007 and both sectors in 2011, utilization has always been above 98% since program implementation. With the exception of 1999 and 2005, the CP sector has always exceeded the utilization of the CV sector, which is interesting as 1999 was the year in which the CP sector had active cooperatives and the CV sector did not.



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Baseline	93.61																
CP		99.18	99.77	99.11	99.95	99.96	99.96	98.93	99.91	99.94	99.89	99.93	99.92	95.73	99.81	99.98	99.89
CV		99.43	99.13	98.77	99.66	99.86	98.39	99.19	98.01	94.68	98.46	99.50	99.47	94.81	99.20	99.67	99.77

Figure 8.23: Percent of the allocated quota that is landed in the AFA Pollock Program.

Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of entities receiving an exclusive harvest privilege in the AFA pollock program (quota), and the season length index. The season length index is defined as the number of days in which at least one vessel was fishing divided by the maximum regulatory season length permissible for the fishery, equal to 286 days (opening on

January 20th and closing on November 1st). This index measures the relative proportion of the legal fishing season during which some or all vessels actively fished for pollock. For the baseline period, we assume the same 286 day regulatory open period which allows for a relative comparison of the season length pre-AFA with post-AFA. During the baseline, the average number of active days was 103, resulting in a season length index of 0.36. Upon implementation of the AFA, vessels increased the amount of time fishing and the number of active days increased to 174 days in 1999 and 239 days in 2000, which implies a season length index of 0.61 and 0.83, respectively. Since 2001, the number of active days has varied between 193 and 245 days, which implies that the season length index has fluctuated between 0.67 - 0.86 (Figure 8.24).

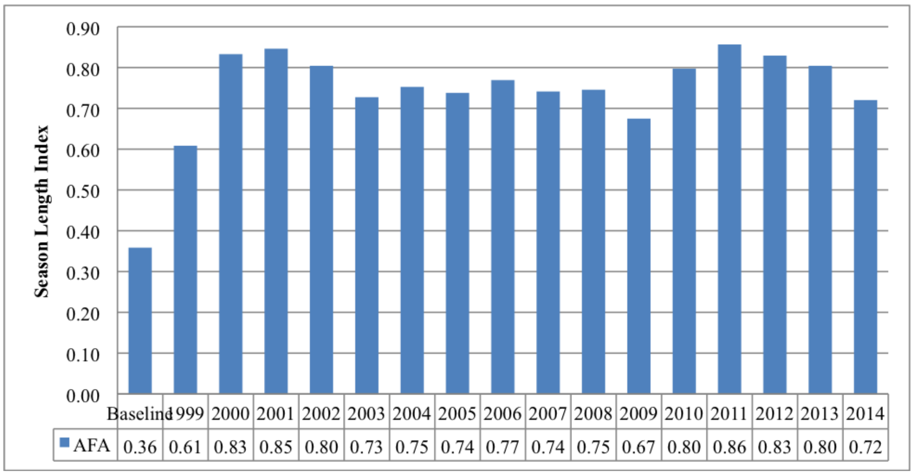


Figure 8.24: AFA Pollock Program season length index.

The number of active vessels reflects the number of AFA pollock CV and CP vessels with any commercial landings of AFA pollock in a given year. The baseline value represents the average number of unique vessels per year with commercial pollock landings from 1996-1998. After program implementation, the number of active vessels declined from 147 in the baseline to 140 in 1999 and down to 113 in 2000 which represents a decline of 23% between the baseline and 2000 (Figure 8.25). There was actually a small increase in the number of CVs in 1999 since AFA had not yet been implemented for that sector, but the number of CVs declined to 98 in 2000 and remained relatively stable in the low nineties and high eighties thereafter. The number of CPs declined from 34 during the baseline period to 23 in 1999 and then down to 15 in 2000, and remained between 14 and 18 in all years since.

The number of entities receiving an exclusive harvest privilege in the AFA Pollock Program, defined as the number of unique AFA permits for CVs and CPs, remained nearly constant from 2000 through 2012 between 130-133 entities but declined to 127 and 124 in 2013 and 2014, respectively (Figure 8.26). This is likely due to the fairly restrictive provisions in the original AFA to restrict removing or replacing vessels, but may change in the near future as new AFA vessel replacement provisions are enacted.

Revenue Performance Metrics

The revenue performance metrics are the aggregate revenue from AFA pollock, average prices of AFA pollock, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among the active vessels. Revenues are adjusted for inflation by using the GDP price deflator and are reported in 2010 equivalent dollars. For the AFA Pollock Program, revenues are

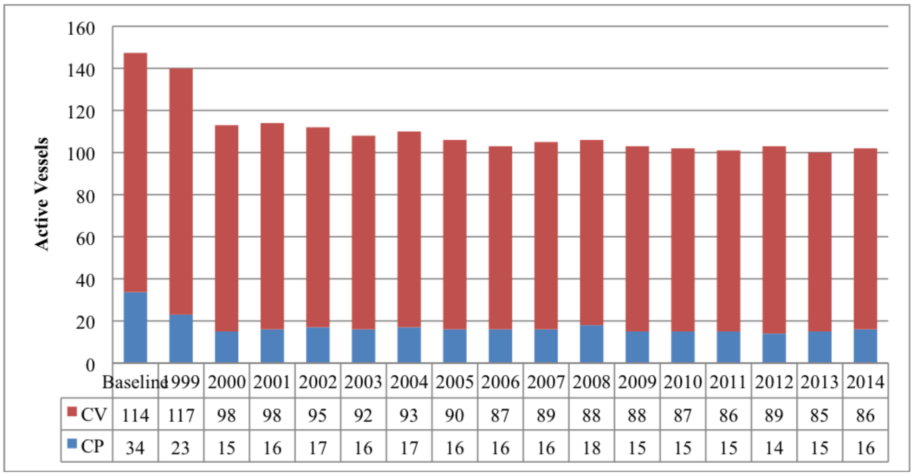


Figure 8.25: Number of active vessels in the AFA Pollock Program.

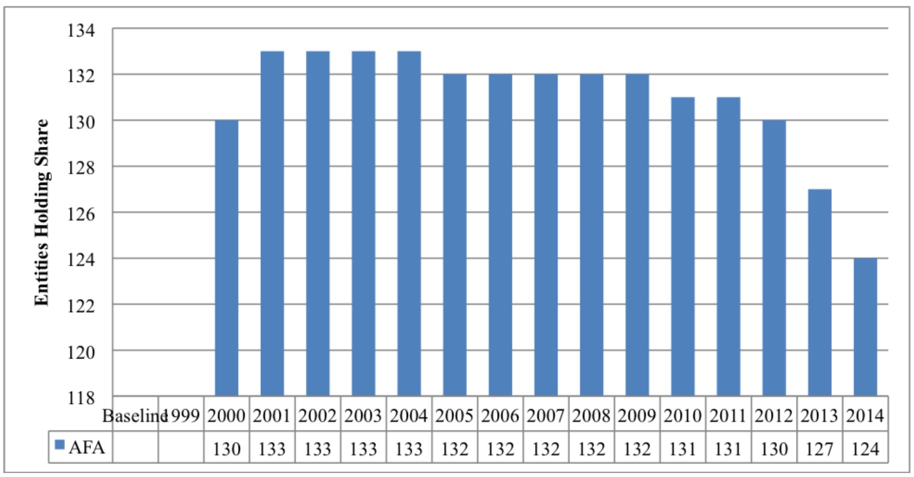
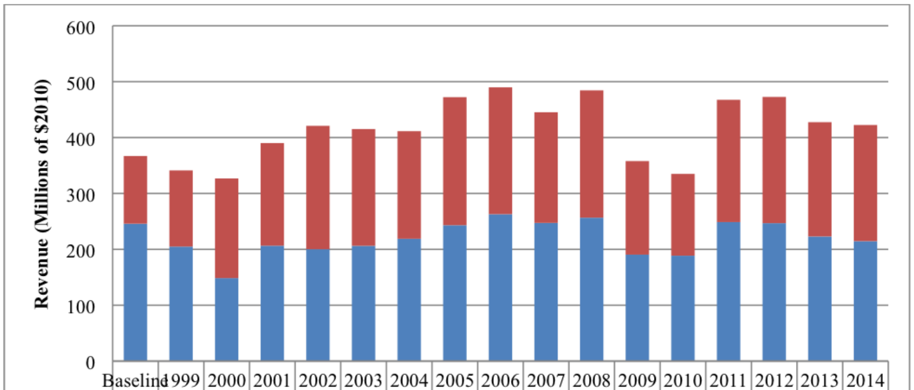


Figure 8.26: Number of entities receiving an exclusive harvest privilege in the AFA Pollock Program.

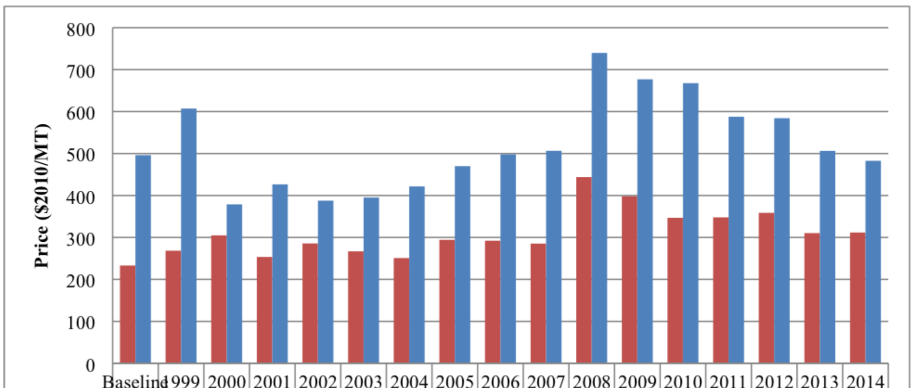
reported in their native format, such that the price received by CVs is the weighted annual ex-vessel price while the price received by CPs is the weighted annual first wholesale price. This enables a comparison between the revenues that each type of vessel receives on offloading their catch from the vessel. Total program revenue declined the first two years of the program from $367 million during the baseline to $341 million and $327 million in 1999 and 2000, respectively (Figure 8.27). Aggregate revenues were above the baseline levels for 12 of the 16 years since program implementation, from 2001-2008 and 2011-2014. The highest annual pollock revenue occurred in 2006 at $490 million.

As the CV sector revenues are in ex-vessel value and CP sector revenues are in first wholesale value, the average price per ton of pollock varies by, and is reported separately for, each sector. Real average prices of pollock increased between the baseline and 2014 by 34% from $233/ton to $312/ton ex-vessel for CVs and declined 3% from $496/ton to $483 first wholesale for CPs (Figure 8.28). The CV sector experienced a larger increase in price compared with the CP sector since implementation of the AFA program, and prices for the CV sector have always been higher compared with the baseline while prices for the CP sector were below baseline prices for 7 of the 16 years. There is some variation in annual average prices, which varied annually from -38% to 46% for CPs and from -17% to 56% for CVs over the course of the AFA Pollock Program, and the CPs have a higher coefficient of variation in prices (0.21) than the CVs (0.18).



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CV	121	136	178	184	221	209	192	229	227	198	228	167	146	219	226	204	208
CP	246	205	149	207	200	206	219	243	263	247	257	191	189	249	247	223	215

Figure 8.27: AFA Pollock Program revenue.



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CV	233	268	305	254	286	267	251	294	292	285	444	398	347	348	359	310	312
CP	496	607	379	426	388	395	422	470	498	506	740	677	668	588	584	506	483

Figure 8.28: AFA Pollock Program price per metric ton.

Both the CV and CP sectors experienced a near doubling in revenue per vessel over the course of the AFA Pollock Program, by 127% for CVs (from $1.06 million during the baseline to $2.42 million in 2014) while CP revenue per vessel increased by 83% (from $7.32 million in the baseline to $13.42 million in 2013) (Figure 8.29). Both sectors also experienced an increase in real revenue per vessel in all years compared with the baseline value.

Due to a portion of the catch missing harvesting vessel identification prior to the implementation of the NOAA Fisheries Catch Accounting System (CAS) in 2003, the Gini coefficient for the AFA Pollock Program is presented only for 2003 through 2013. The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the AFA Pollock Program in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer vessels as the Gini coefficient increases. This is demonstrated in the difference in Gini coefficient for 2003 for all vessels (Gini = 0.52) which implies a less even distribution of vessel revenues compared with the Gini coefficient for either the CVs only (Gini = 0.37) or for the CPs only (Gini = 0.15) (Figure 8.30). This is because the revenue per vessel among CVs and CPs is very different (Figure 8.29) and when all vessels are combined together in the Gini coefficient, it implies a less even distribution of revenue

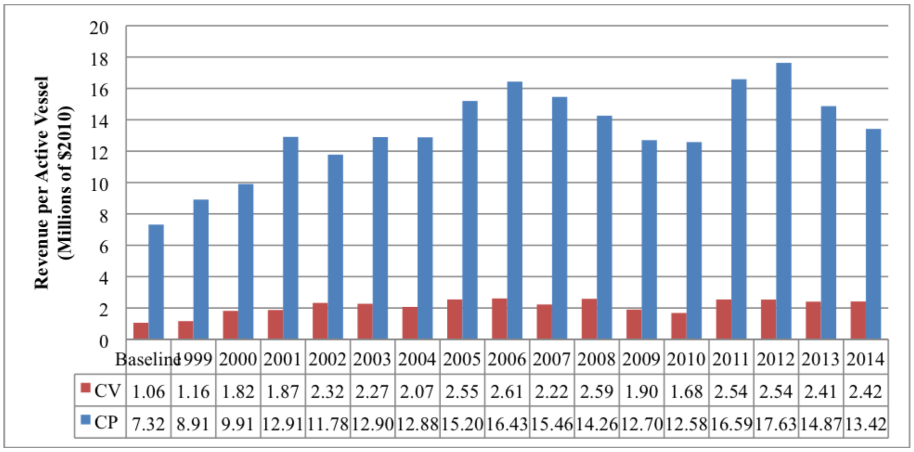


Figure 8.29: AFA Pollock Program revenue per active vessel.

than examining the within vessel-type revenue distribution. There has been a slight increase in vessel revenue concentration since 2003 in the AFA Pollock program overall. The Gini coefficient for the overall AFA program increased from 0.52 to 0.54 between 2003 and 2014, the CV sector's Gini coefficient returned to the same baseline level of 0.37 in 2014, while the CP sector Gini coefficient increased from 0.15 during 2003 to 0.23 in 2014.

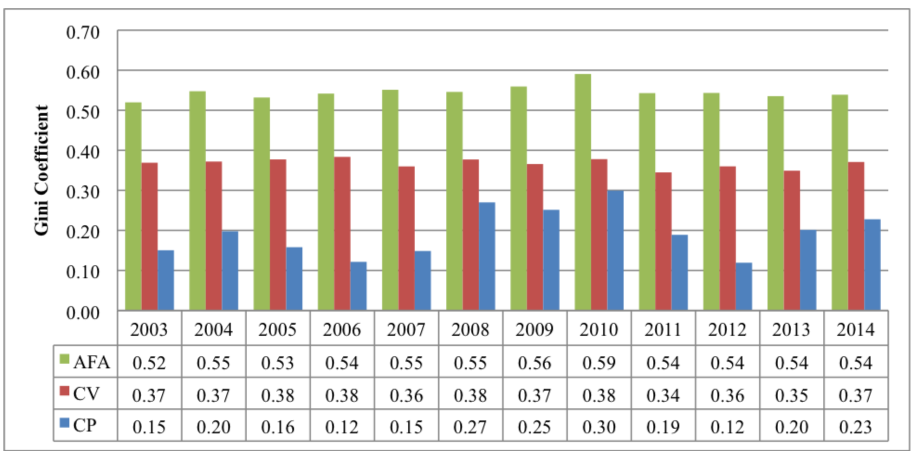


Figure 8.30: AFA Pollock Program Gini coefficient.

8.5. BSAI non-Pollock Trawl Catcher-Processor Groundfish Cooperatives (Amendment 80) Program

Management Context

The Bering Sea/Aleutian Islands non-Pollock Trawl Catcher-Processor Groundfish Cooperatives Program (also known as Amendment 80) was implemented in 2008 for those groundfish catcher/processors (CPs) fishing in the Bering Sea/Aleutian Islands (BSAI) region that were not specifically listed as eligible to participate in the American Fisheries Act (AFA) Pollock Cooperatives Program. NOAA Fisheries identified 28 CP vessels that are eligible to participate in the Amendment 80 Program (Amendment 80 sector) and has issued Amendment 80 quota share (QS) to 27 eligible persons. The program provides an allocation of six groundfish species including Atka mackerel, Aleutian Islands Pacific ocean perch, flathead sole, Pacific cod, rock sole, and yellowfin sole, a prohibited species catch (PSC) allowance for halibut and crab, as well as sideboard limits for five species in the Gulf of Alaska (GOA) to Amendment 80 vessels and authorizes them to form cooperatives. Amendment 80 vessels are typically smaller in size and processing capacity than the AFA CPs. Prior to the Amendment 80 program, these vessels primarily produced headed and gutted products, but as the race for fish has been eliminated and Amendment 80 initially implemented increased groundfish retention standards, they are increasingly producing other product forms[4].

The goal of the Amendment 80 program was to improve retention, utilization, and reduce bycatch for the Amendment 80 sector. The program also includes sideboard allowances in the GOA for pollock, Pacific cod, Pacific Ocean perch, northern rockfish, pelagic shelf rockfish (dusky rockfish) to limit these vessels' participation in other fisheries to their historic levels. One cooperative formed in 2008 that included 16 of 24 participating vessels while the other vessels participated in the Amendment 80 limited access sector until 2011 when those vessels formed a second cooperative.

Catch Share Privilege Characteristics

Amendment 80 QS are tied to the participating vessels and are allocated to their cooperative based on the vessel's catch history. Amendment 80 vessels that do not join a cooperative do not receive an exclusive harvest privilege and must fish in the Amendment 80 limited access sector. Amendment 80 QS can be transferred by selling the vessel, its permits, and accompanying catch history. It is also possible to sell Amendment 80 QS separate from an Amendment 80 vessel under specific circumstances, but sellers are required to include all allocated Amendment 80 QS species in the sale, and therefore would be precluded from participating in the Amendment 80 fishery. Amendment 80 cooperatives can transfer annual QS pounds, called cooperative quota (CQ), to other Amendment 80 vessels within and between cooperatives. Amendment 80 catch share privileges are revocable, but were allocated in perpetuity. The Amendment 80 Program has an excessive share provision that limits a person to holding 30% of the QS and CQ assigned to the Amendment 80 sector. Vessel use caps also limit an Amendment 80 vessel to harvesting 20% of the Amendment 80 species catch limits allocated to the Amendment 80 sector.

Catch and Landings Performance Metrics

The catch and landings performance metrics for the Amendment 80 Program include the amount of Amendment 80 species allocated to the program, the landings of Amendment 80 species in the Amendment 80 Program, and the percentage of Amendment 80 species allocated to the program that is landed (percent utilization). Annual metrics are compared with a "baseline" period prior to program implementation, which is the average of the three years prior to program implementation (2005-2007). Between the baseline and 2014, species allocations and landings have increased by 12% and 16%, respectively (Figures 8.31 and 8.32). Aggregate species allocations to the Amendment 80 program has increased relative to the baseline level every year since program implementation, and was substantially above the baseline level from 2008-2010. This is largely the result of the groundfish species allocation process in the BSAI management area. The aggregate catch of all federally managed groundfish species may not exceed 2 million metric tons, which is thought to be the maximum amount of catch that can be sustainably harvested from the BSAI ecosystem. As shown in the previous section, AFA pollock (plus CDQ and incidental catch of pollock) makes up a

[4]NOAA Fisheries removed the requirement for vessels to meet the Groundfish Retention Standards (78 FR 12627, February 25, 2013). Under the current rules, the Amendment 80 cooperatives annually report groundfish retention performance, but there is no longer a minimum retention standard.

majority of the 2 million ton cap in most years because pollock is a highly valued target species. This means Amendment 80 species catch limits are not necessarily driven by the biology of those species, but are largely a function of the biomass of pollock. Most Amendment 80 species total allowable catches (TAC) are set well below their acceptable biological catch (ABC), and the TACs of species allocated to the Amendment 80 Program cannot be increased without reducing the TAC of some other BSAI groundfish species.

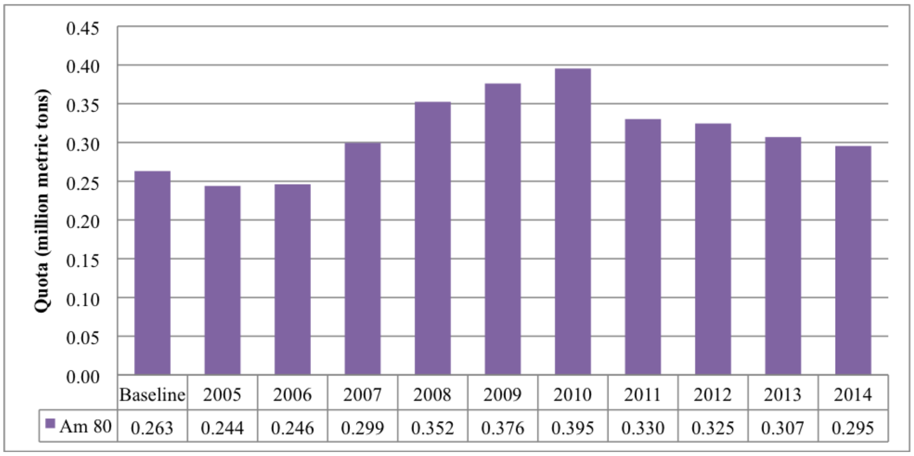


Figure 8.31: Aggregate quota allocated to the Amendment 80 Program.

As a result of the historically low AFA pollock TACs from 2008-2010, the allocations of Amendment 80 species to the Amendment 80 Program was much larger than during the baseline. Similarly, the landings in the Amendment 80 program were larger than their baseline levels in all years following implementation (Figure 8.32).

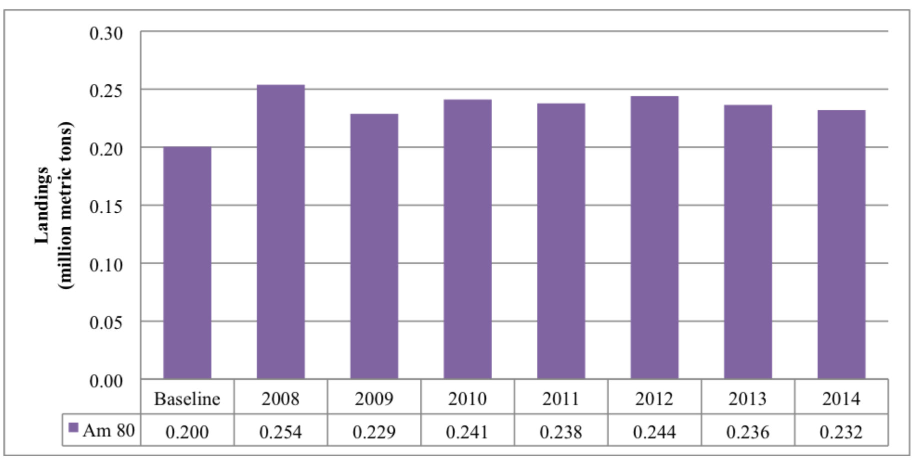
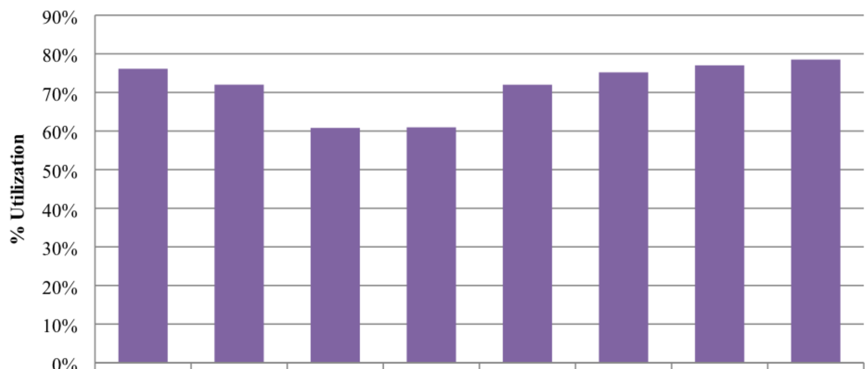


Figure 8.32: Aggregate landings of species allocated to the Amendment 80 Program.

Even as landings have increased in the Amendment 80 program, the percent utilization fell from 76.1% during the baseline to 60% in 2009 and 2010, but increased above the baseline level in 2013 and 2014 (Figure CS33). The lowest utilization rate occurred in 2009 at 60.81% in a year when the aggregate quota was 43% larger than the quota available during the baseline and aggregate landings were 14% larger than during the baseline. Target species landings are also limited by the vessels' allocation of halibut PSC, and also increasingly by the allocation of the Pacific cod TAC to the Amendment 80 Program, which is less than the sector's historical harvest levels. The inability of these vessels to catch the entire quota is also a function of the program having only between 18 and 22 vessels active in the fishery, all of which are operating near their maximum capacity.



	Baseline	2008	2009	2010	2011	2012	2013	2014
Am 80	76.14%	72.02%	60.81%	60.96%	72.00%	75.20%	77.02%	78.52%

Figure 8.33: Percent of the allocated quota that is landed in the Amendment 80 Program.

Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of entities holding Amendment 80 QS, and the season length index. The season length index is defined as the number of days in which at least one vessel was fishing divided by the maximum regulatory season length possible for the fishery, equal to 346 days, which is an opening on January 20th and closure on December 31st.[5] This index measures the relative proportion of the legal fishing season during which some or all vessels actively fished Amendment 80 species allocations each year. For the baseline period, we assume the same 346 day regulatory open period which allows for a constant comparison of the season length before and after the implementation of Amendment 80. During the baseline, the average number of active days for these vessels was 258, the maximum regulatory season length was 346, and therefore the season length index in the baseline period was $258/346 = 0.75$. After implementation of Amendment 80, vessels were better able to manage their halibut PSC use when targeting Amendment 80 species and increased their number of active days to an average of 325 days from 2008-2014, which implies an average season length index of 0.94 over that same period (Figure 8.34).

The number of active vessels reflects the number of Amendment 80 eligible CP vessels with any reported landings of Amendment 80 species in a given year. The baseline value of 22 vessels represents the average number of unique vessels per year from 2005-2007. After program implementation there were still 22 vessels active in the fishery, which is not surprising given that overcapitalization is not a problem in this fishery and reducing capacity was not identified as an objective of the program (Figure 8.35). The number of active vessels declined from 2008 to 2009 from 22 to 21 active vessels as a result of the sinking of the *F/V Alaska Ranger*. There was also a decrease of one vessel in 2010, 2012, and 2013, which leaves the total number of active vessels in 2014 at 18.

There were 28 entities (vessels) that were deemed eligible for the Amendment 80 program before implementation of the program. The owner of one eligible CP did not elect to apply for and receive

[5] The maximum regulatory season length was 347 days in 2008 and 2012 due to the leap year.

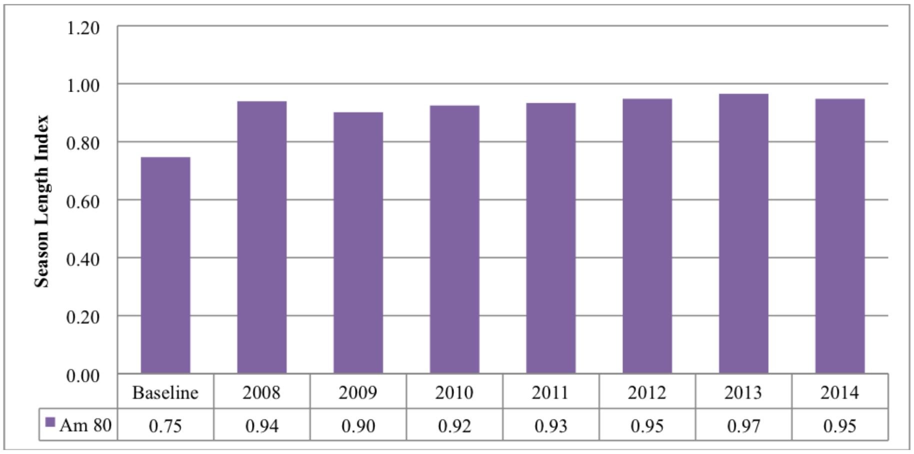


Figure 8.34: Amendment 80 Program season length index.

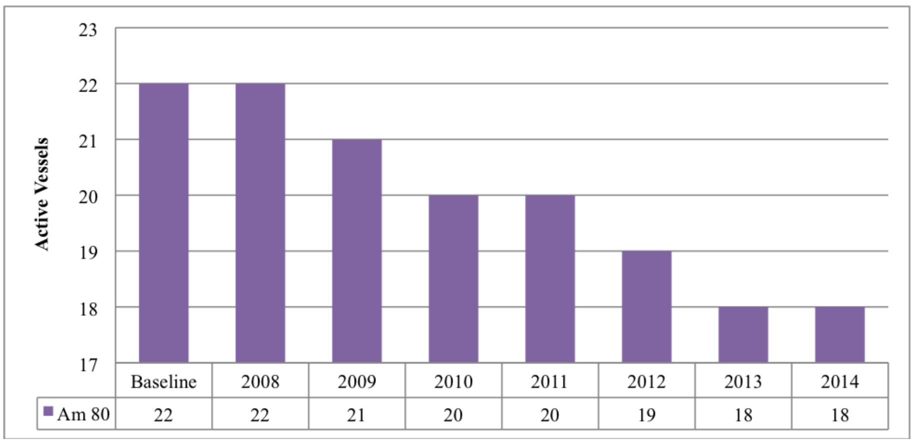


Figure 8.35: Number of active vessels in the Amendment 80 Program.

Amendment 80 QS because the vessel fishes exclusively in the GOA, which accounts for the one less entity holding share since program implementation (Figure CS36).[6]

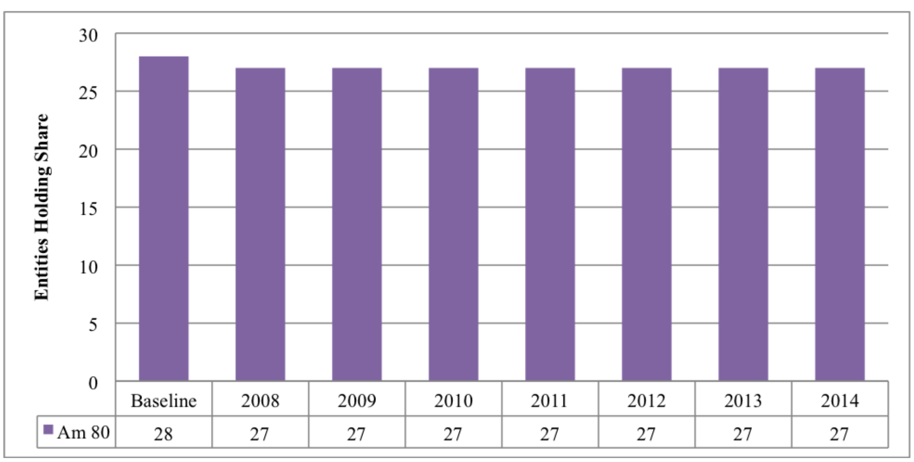
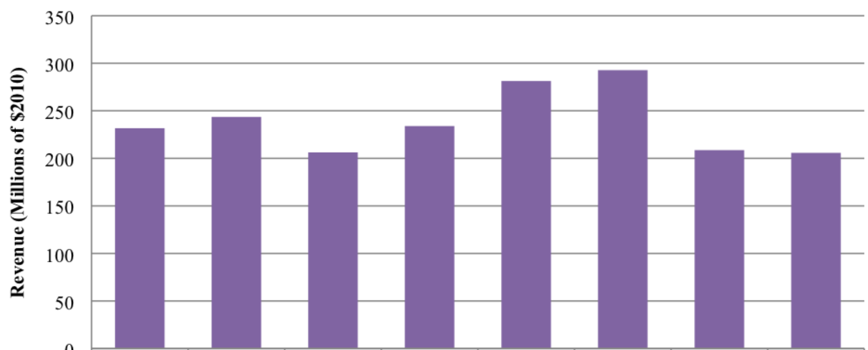


Figure 8.36: Number of entities holding quota share in the Amendment 80 Program.

[6]The baseline number of entities (vessels) was obtained from the regulations in Table 31 of the final rule implementing the program. Available online here: http://www.alaskafisheries.noaa.gov/frules/72fr52668.pdf.

Revenue Performance Metrics

The revenue performance metrics are the aggregate revenue from Amendment 80 Program species, average prices of Amendment 80 species, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among active vessels. As all vessels in the Amendment 80 program are CPs, revenues are reported as first wholesale value of the processed fish products that are offloaded from the vessels. First wholesale revenues are adjusted for inflation by using the GDP price deflator and are reported in 2010 equivalent dollars. In the first year of program implementation, Amendment 80 revenue initially increased by 5% in 2008 to $244 million overall (Figure 8.37). Amendment 80 revenue declined to $206 million in 2009 which is below the baseline revenue, but revenues were above the baseline levels for 2008 and 2010-2012 after program implementation, while dropping below baseline values in 2013 and to a low in 2014.



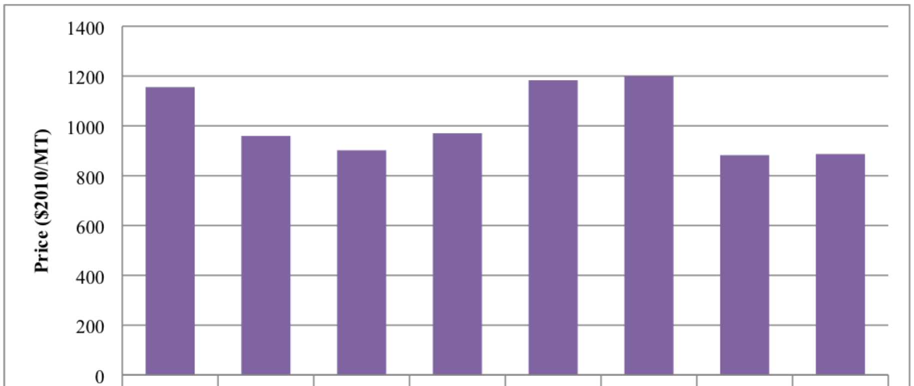
	Baseline	2008	2009	2010	2011	2012	2013	2014
Am 80	231.69	243.57	206.29	233.97	281.34	292.76	208.63	205.78

Figure 8.37: Amendment 80 Program first wholesale revenue.

The weighted average real price per metric ton of all Amendment 80 species declined below the baseline level for the first three years of the program, increased above baseline price levels during the following two years (2011-2012), but fell to their lowest level in 2013 and 2014. Real average prices of Amendment 80 species decreased by 23% from $1,156/ton during the baseline to $887/ton in 2014 (Figure 8.38). Real weighted average prices do not vary as much as in many of the other programs, possibly because reported Amendment 80 prices are aggregated over several species and vessels have the ability to change targets to species with higher prices, with annual changes that range between -26% and 22% over the course of the Amendment 80 Program.

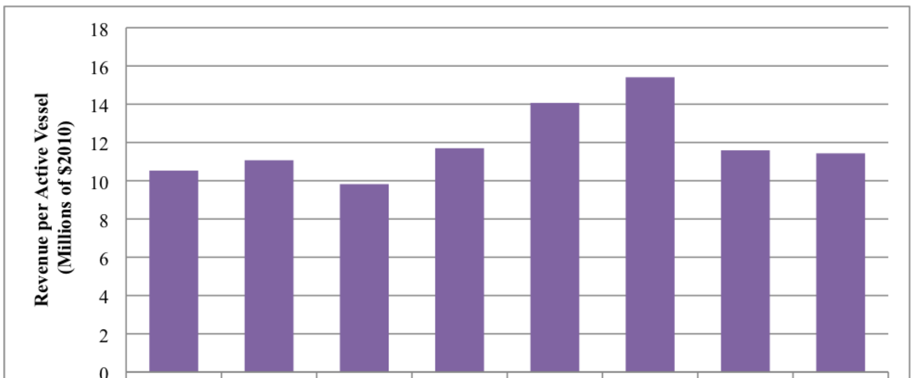
Amendment 80 first wholesale revenue per vessel increased by 8.6% from a baseline of $10.53 million to $11.43 in 2014 (Figure 8.39). Revenues per vessel were below their baseline level in 2009, but were above the baseline for all other years of the program.

The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the Amendment 80 program in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer vessels as the Gini coefficient increases. There has been an overall movement toward a more even distribution of vessel revenues over the course of the Amendment 80 Program from a baseline level of 0.25 to a level of 0.21 in 2014 (Figure 8.40). The distribution of vessel revenues was most concentrated in 2009 with a Gini coefficient of 0.28, but was below the baseline level for all other years of the program. The low Gini coefficient for all years is a function of the relative



	Baseline	2008	2009	2010	2011	2012	2013	2014
Am 80	1,156	960	902	970	1,183	1,200	882	887

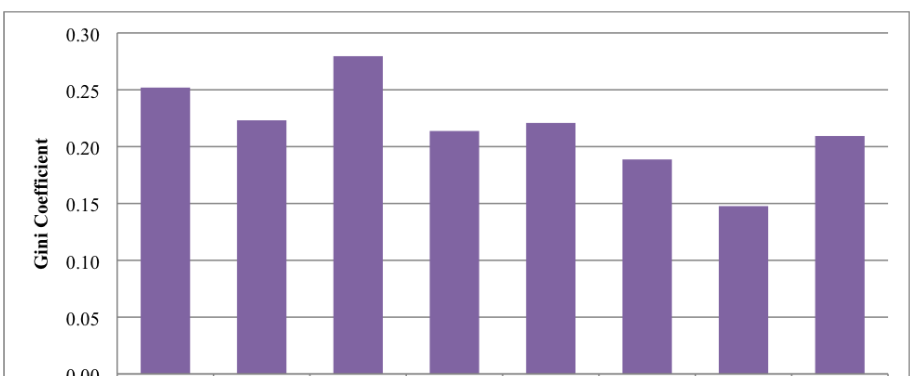
Figure 8.38: Amendment 80 Program weighted average price per metric ton across all species.



	Baseline	2008	2009	2010	2011	2012	2013	2014
Am 80	10.53	11.07	9.82	11.70	14.07	15.41	11.59	11.43

Figure 8.39: Amendment 80 Program revenue per active vessel.

similarity of the Amendment 80 vessels and the small number of active vessels, all of which operate at near-maximum capacity.



	Baseline	2008	2009	2010	2011	2012	2013	2014
Am 80	0.25	0.22	0.28	0.21	0.22	0.19	0.15	0.21

Figure 8.40: Amendment 80 Program Gini coefficient.

8.6. Bering Sea/Aleutian Islands Freezer Longline Catcher/Processors (Hook-and-Line Catcher/Processor Sector Targeting Pacific Cod)

Management Context

The Bering Sea/Aleutian Islands (BSAI) Freezer Longline Catcher/Processors (also known as the Freezer Longliners) are a group of catcher/processor (CP) vessels that are eligible to harvest the hook-and-line CP sector allocation for BSAI Pacific cod. Since 2003, Freezer Longliners are required to have hook-and-line Pacific cod CP endorsements on their federal groundfish License Limitation Program (LLP) license to target Pacific cod using hook-and-line gear and process the catch onboard. These Freezer Longliners are allocated a fixed percentage of the targeted BSAI Pacific cod allocation that is allocated to the hook-and-line CP sector. From 2000 to 2007, the hook-and-line CP sector was allocated 40.8% of the BSAI Pacific cod non-Community Development Quota (CDQ) total allowable catch (TAC). The passage of Amendment 85 increased their share of the BSAI targeted Pacific cod TAC to 48.7% from 2008 to the present. In 2007, the sector voted to obtain a $35 million NOAA Fisheries loan to purchase and retire 4 groundfish LLP licenses with hook-and-line CP endorsements. The Longline Catcher Processor Subsector Single Fishery Cooperative Act was passed by Congress in 2010 and allows Freezer Longliners participating in the BSAI directed Pacific cod fishery to form a single harvest cooperative. The Act also requires NOAA Fisheries to implement regulations to allow the establishment of a harvest cooperative within two years of receiving a request from at least 80% of the eligible hook-and-line CP LLP license holders. However, while the vessels participating in this fishery have formed a voluntary cooperative (the Freezer Longline Conservation Cooperative or FLCC), they have not taken steps that would require NOAA Fisheries to write regulations allowing the formation of a cooperative. The voluntary cooperative has been operating since the B season of 2010, and this report separates the 2010 A and B seasons to delineate the beginning of what is essentially a voluntary catch share program in the B season of 2010. While this sector is not currently recognized as a Limited Access Privilege Program (LAPP) or a catch share program by NOAA Fisheries, they are included in this report because since the second half of 2010, the sector effectively operates as a catch share program.

Catch Share Privilege Characteristics

Similar to the CP and mothership sectors in the AFA program, the FLCC is a voluntary cooperative formed to coordinate harvests among its member vessels. The hook-and-line CP sector is currently allocated 48.7% of the BSAI non-CDQ Pacific cod TAC. As described in the previous section, NOAA Fisheries has not implemented regulations for a cooperative program, therefore NOAA Fisheries has not issued BSAI Pacific cod quota share to the Freezer Longliners. There are 8 other sectors fishing for Pacific cod in the BSAI which also receive a sector allocation, but only the Amendment 80 sector has formed a cooperative among of all of its member vessels to coordinate the harvest of Pacific cod under a catch share program. However, the formation of the FLCC allows Freezer Longliners within the sector to arrange private contracts among vessel owners to specify the allocation of catch among member vessels to maximize the value of their allocation.

Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of the BSAI Pacific cod TAC allocated to hook-and-line CP sector (which can be caught only by the Freezer Longliners in the Federal Exclusive Economic Zone), the landings of Pacific cod by the Freezer Longliners, and the percentage of the hook-and-line CP Pacific cod sector allocation that is landed (percent utilization).

Annual metrics are reported for the years 2003-2014 and do not include a "baseline" period because this sector is not yet formally defined as a catch share program by NOAA Fisheries. Between 2003 and 2014, the sector allocation and landings have increased by 19% and 7%, respectively, while the percent utilization fell from 99.7% in 2003 to 89.9% in 2014 (Figures 8.41, 8.42, and 8.43).

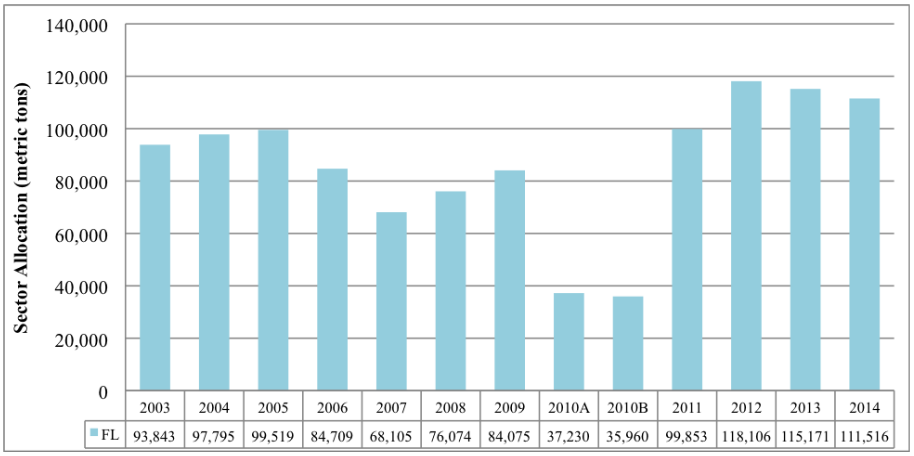


Figure 8.41: Freezer Longline sector allocation for BSAI Pacific cod.

The sector allocation and landings have varied between 2003 and 2014, with the two highest sector allocations occurring in 2012 and 2013 and the highest landings occurring in 2012 followed by 2013. The landings in 2014 were slightly below those in 2012 and 2013 but were still above the 2003-2013 average. The sector allocation and landings varied from lows of 68,105 metric tons and 67,980 metric tons in 2007 to highs of 118,106 metric tons and 112,934 metric tons in 2012, respectively.

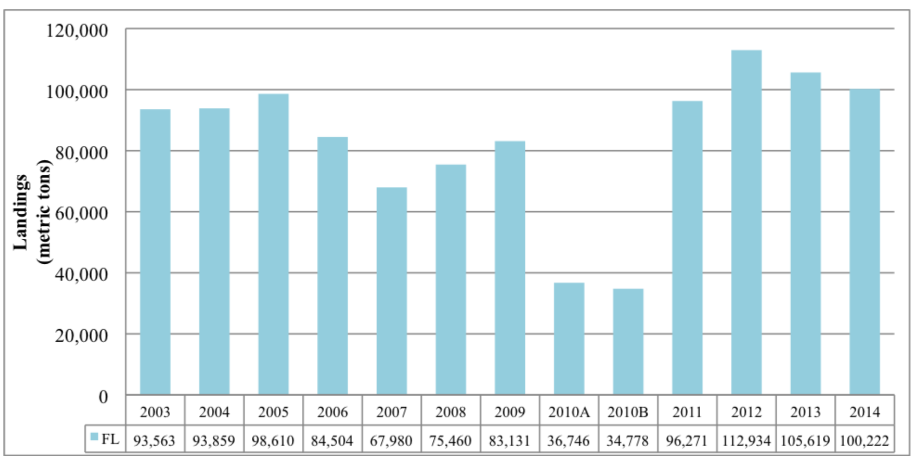


Figure 8.42: Landings of BSAI Pacific cod by Freezer Longline vessels.

Utilization was above 95% from 2003-2012, but fell to 91.7% in 2013 and 89.9% in 2014. Sector allocation utilization was above 98% in 2003 and from 2005-2010 A season (Figure 8.43). However, since the formation of the voluntary cooperative in the 2010 B season, utilization has been declining, particularly in 2013 and 2014. The Pacific cod hook-and-line CP sector allocation was exceeded in 2003, from 2005-2009, and for the 2010 A season based on total catch (retained weight plus the estimated weight of discards), however the allocation has not been exceeded since the formation of the voluntary cooperative in the B season of 2010. As the Pacific cod hook-and-line CP sector is only 1 of 9 sectors harvesting Pacific cod, the aggregate federal BSAI Pacific cod TAC was only exceeded in 2003, 2007, and 2010. However, since 2006 the BSAI Pacific cod Federal TAC has been set to account for a State-managed fishery for Pacific cod inside State of Alaska waters, and the overall target catch (Federal TAC plus State guideline harvest level (GHL)) was not exceeded in 2007 and 2010. The acceptable biological catch (ABC) has not been exceeded in any year since 1994.

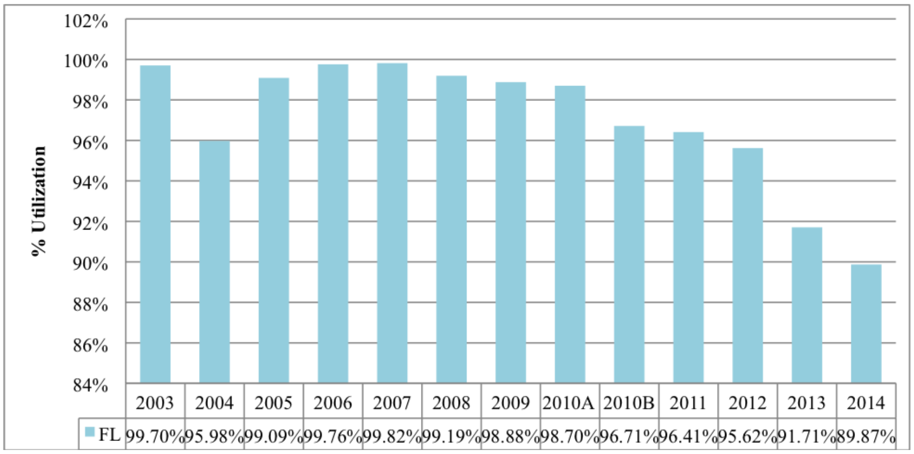


Figure 8.43: Percent of the BSAI Pacific cod sector allocation caught by eligible Freezer Longline vessels.

Effort Performance Metrics

The effort performance metrics include the season length index, the number of active vessels, and the number of hook-and-line CP LLP licenses. The season length index is defined as the number of days in which at least one vessel was fishing divided by the maximum regulatory season length possible for the fishery, equal to 365 days in normal years and 366 days in leap years. This index measures the relative proportion of the legal fishing season during which some or all vessels actively fished the hook-and-line CP sector allocation. Prior to the formation of the FLCC (2003-2009), the average number of active days for these vessels was 145 days (season length index = 0.40) while in the first three full years after the formation of the FLCC (2011-2013) they have used 365 and 366 days (season length index = 1.00) in an attempt to catch their entire allocation (Figure 8.44). However, the number of active days fell to 348 in 2014, resulting in a slightly lower season length index of 0.95, but still substantially above pre-cooperative levels. This change in the amount of the season that is utilized is what would be expected with the ending of a race for fish that likely occurred prior to the formation of the FLCC.

The number of active vessels reflects the number of Freezer Longline vessels with any commercial landings of BSAI Pacific cod in a given year. The number of active vessels was quite stable between 2003 and 2009 at an average of approximately 39 vessels, but after the formation of the FLCC, only approximately 30 vessels continued to fish in 2011-2013. One additional vessel did not fish in 2014 resulting in 29 active vessels for a decline of 25% since 2003.

There were 46 license limitation program (LLP) licenses with endorsements to operate as a CP with hook-and-line gear in the Bering Sea or Aleutian Islands in 2003 and 36, or 22% less, by 2014 (Figure CS46).

Revenue Performance Metrics

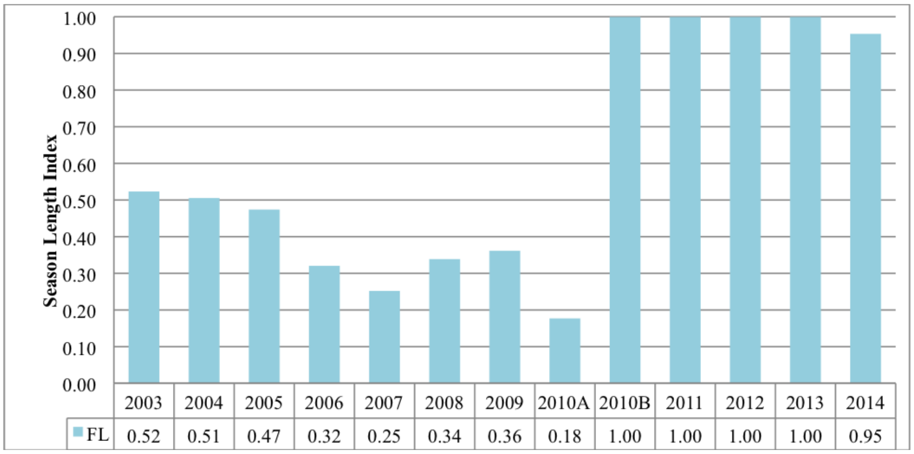


Figure 8.44: Freezer Longline sector season length index.

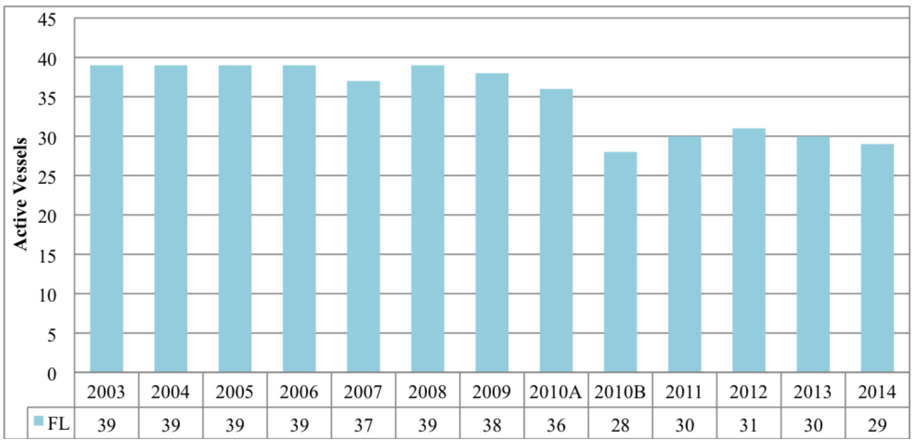


Figure 8.45: Number of active Freezer Longline vessels.

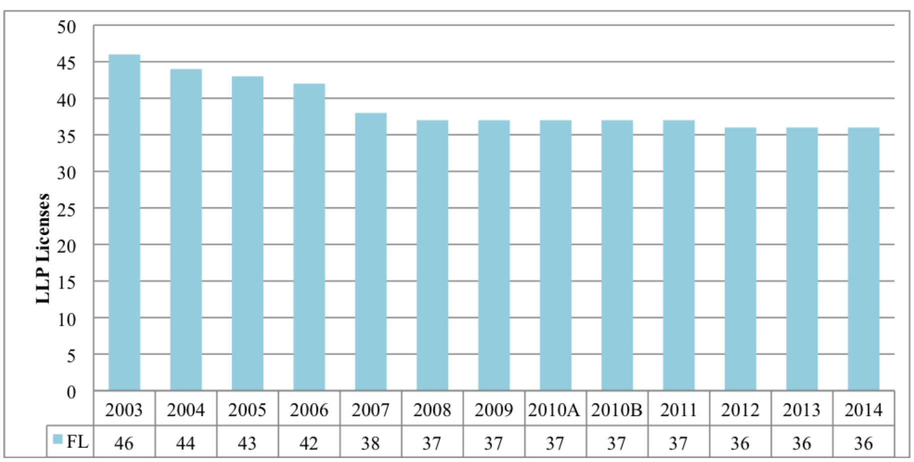
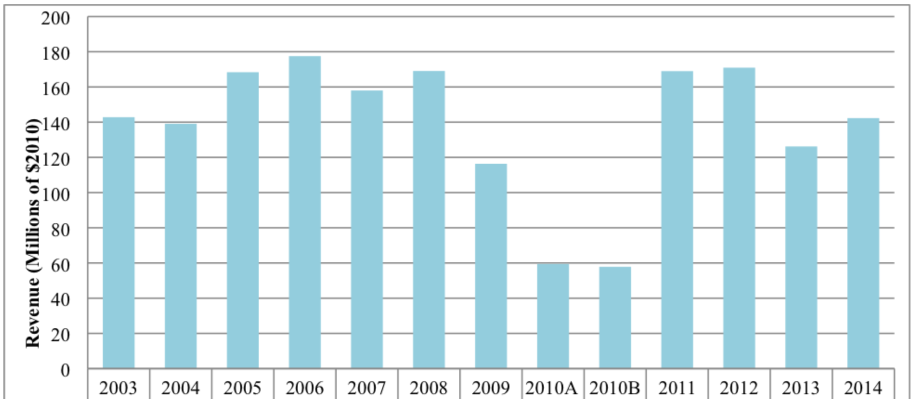


Figure 8.46: Number of LLP licenses with endorsements to operate as a CP with hook-and-line gear in the Bering Sea or Aleutian Islands.

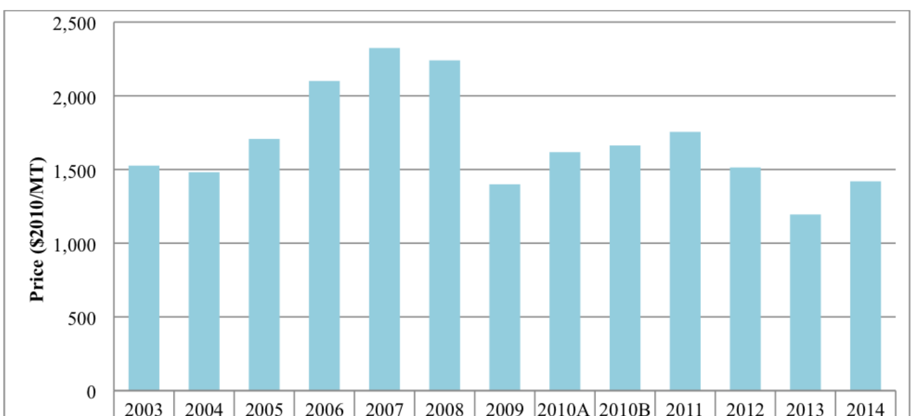
The revenue performance metrics are the aggregate revenue from BSAI Pacific cod, average prices of Pacific cod, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among the active vessels. Revenues are adjusted for inflation by using the GDP price deflator and are reported in 2010 equivalent dollars. Real first wholesale revenue remained largely unchanged from $143 million in 2003 to $142 million in 2014, with an overall average of $149.7 million from 2003-2014 (Figure 8.47). Even with the two highest sector allocations and landings over the period 2003-2014 in 2012 and 2013, first wholesale revenues were higher in 2006 than either 2012 and 2013 which is a result of the substantial decline in Pacific cod prices from 2009-2014 (Figure 8.48).



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012	2013	2014
FL	142.81	139.08	168.37	177.51	157.99	169.06	116.36	59.44	57.84	168.98	170.96	126.21	142.30

Figure 8.47: Freezer Longline sector BSAI Pacific cod first wholesale revenue.

The average price per ton of Pacific cod received by Freezer Longline vessels was on average $1,504/ton from 2003-2004, increased to a high of $2,324/ton in 2007, but experienced a dramatic decline to $1,400 in 2009. Prices rebounded somewhat from 2010-2012, averaging $1,668 from 2010-2012 (Figure 8.48), but then fell to a new low of $1,197/ton in 2013. Prices in 2014 were back up to their 2009 levels at $1,420/ton. The price decline over the past six years is likely the result of increased supply of substitute products for Pacific cod including Atlantic cod and other whitefish species. Prices have decreased by 7% between 2003 and 2014, and the price in 2014 was 39% below the peak prices observed in 2007.



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012	2013	2014
FL	1,526	1,482	1,707	2,101	2,324	2,240	1,400	1,618	1,663	1,755	1,514	1,195	1,420

Figure 8.48: Freezer Longline sector BSAI Pacific cod price per metric ton.

Revenue per active vessel in the Freezer Longline sector increased by 34% of $3.7 million in 2003 to $4.9 million in 2014 (Figure 8.49). As a result of the FLCC, there were fewer active vessels in the 2010 B season and in 2011-2014 compared with previous time periods, which has resulted in an increase in revenue per active vessel for this sector.

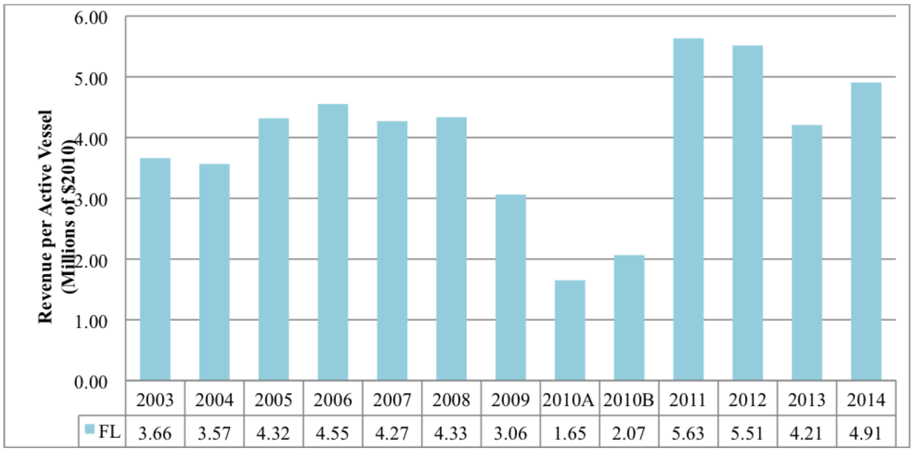


Figure 8.49: Freezer Longline sector revenue per active vessel.

The Gini coefficient measures the evenness of the distribution of revenue among vessels in the hook-and-line CP sector in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer vessels as the Gini coefficient increases. Between 2003 and 2006, there was a decline in the Gini coefficient (movement toward a more even distribution) from 0.22 in 2003 to 0.13 in 2006 (Figure 8.50). However, vessel revenues became more concentrated from 2007-2012, with a 2012 Gini coefficient of 0.27, but fell to 0.21 in 2013 and 0.24 in 2014. The formation of the voluntary cooperative in the 2010 B season allowed a number of vessels to exit the fishery which concentrated the revenues on a smaller number of vessels which lead to a relatively large 23% increase in the Gini coefficient between the 2010 A and 2010 B seasons.

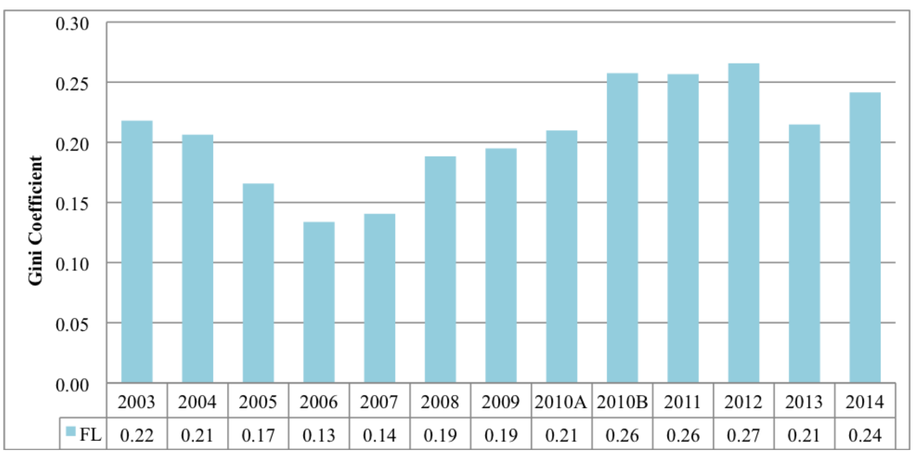


Figure 8.50: Freezer Longline sector BSAI Pacific cod Gini coefficient.

8.7. Central Gulf of Alaska Rockfish Program

Management Context

The Central Gulf of Alaska Rockfish Program (Rockfish Program) that was implemented in 2012 is a ten year extension of a pilot program that ran from 2007-2011 under similar regulations.

Prior to 2007, the fishery operated under the License Limitation Program (LLP). The Rockfish Program is a cooperative program that allocates exclusive harvesting privileges to catcher vessel (CV) and catcher/processor (CP) vessel cooperatives using trawl gear for rockfish primary and secondary species as well as an allocation for halibut prohibited species catch (PSC). The rockfish primary species are northern rockfish, Pacific Ocean perch, and pelagic shelf (dusky) rockfish. The rockfish secondary species are Pacific cod, rougheye rockfish, shortraker rockfish, sablefish, and thornyhead rockfish. The rockfish program also includes a small entry level longline fishery, but vessels participating in the entry level longline fishery are not eligible to join cooperatives, are not allocated exclusive harvest privileges, and therefore do not hold quota share.

The Rockfish Program was designed to improve resource conservation and improve economic efficiency by establishing cooperatives that receive exclusive harvest privileges. The four goals of the program are to 1) reduce bycatch and discards; 2) encourage conservation-minded practices; 3) improve product quality and value; and 4) provide stability to the processing labor force. The Rockfish Program allows CPs to form cooperatives and allows CVs to form cooperatives in association with shoreside processors in Kodiak, AK, but these CVs are not required to deliver to the processor with which their cooperative has formed an association. This allows shoreside processors in Kodiak to better time deliveries of rockfish and salmon in the summer months.

At present, the Rockfish Program is one of only two North Pacific groundfish catch share programs that include a cost recovery provision whereby the fishermen are assessed a fee based on the cost to the government to manage the program (the other is the Halibut and Sablefish IFQ Program). The costs that can be recovered include the costs related to management, data collection, and enforcement of a Limited Access Privilege Program (LAPP) or Community Development Quota Program, and cannot exceed 3% of the total ex-vessel value of the fishery. Cost recovery was not part of the Rockfish Pilot Program (2007-2011), but it was implemented in 2012 with the implementation of the Rockfish Program. Cost recovery fees are assessed for harvests of Rockfish Program primary and secondary species by participants using trawl gear. Cost recovery fees are not assessed for harvests of Rockfish Program species by participants in the limited entry longline fishery because they do not receive an exclusive harvest privilege. In 2013, the Rockfish Program fee was $217,709 and was approximately 1.6% of the total revenue in the fishery.[7]

Catch Share Privilege Characteristics

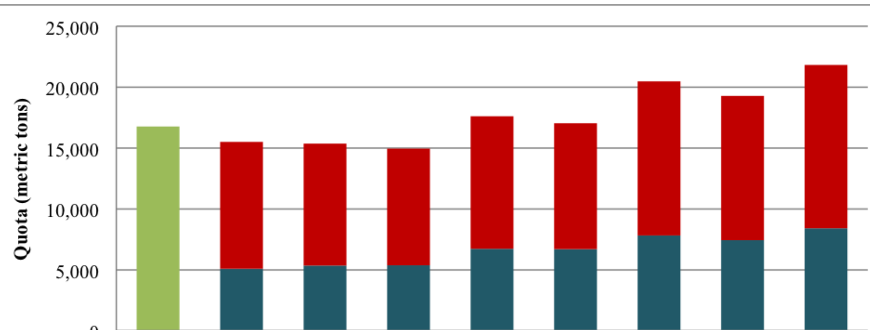
Rockfish Program quota share (QS) are allocated to eligible LLP license holders, but that LLP license must be assigned to a Rockfish Program cooperative in order to participate in the Rockfish Program. Cooperative quota (CQ) for Rockfish Program primary species, secondary species, and halibut PSC is allocated annually to each cooperative based on the QS holdings of its membership. Quota share for Rockfish Program primary species were allocated to eligible LLP license holders based on their catch history of those species, so the LLP owners have a limited ability to sell their QS, which can be transferred only by selling their LLP license on which the Rockfish Program QS is designated. Cooperatives within a sector can transfer CQ within and between cooperatives, subject to excessive share limits. Catcher vessel cooperatives cannot transfer CQ to CP cooperatives, but CP cooperatives are allowed to transfer CQ to cooperatives in either sector (with the exception of rougheye or shortraker rockfish CQ).

[7]It is important to note that this is total value of the fishery where CP revenues are reported in first wholesale value and CVs revenues are reported as ex-vessel values and does not involve down-weighting the CP revenue into ex-vessel value terms, as would be required to determine whether the cost recovery fees exceed 3% of the ex-vessel value of the LAPP program.

The Rockfish Program allocated revocable shares and the Rockfish Program is only authorized until December 31st, 2021 (10 years from the start of the program). The Rockfish Program includes excessive share provisions. No person may hold or use more than 4% of the CV QS and resulting CQ, or 40% of the CP QS and resulting CQ. No CV co-op may hold or use more than 30% of the CV QS issued under the program. No vessel may harvest more than 8% of the CV CQ or 60% of the CP CQ. No processor may receive or process more than 30% of the CV CQ.

Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of Rockfish Program species total allowable catches (TACs) allocated to the program, the landings of Rockfish Program species in the Rockfish Program, and the percentage of allocated species that are landed (percent utilization). Annual metrics are compared with a "baseline" period prior to the implementation of the Rockfish Pilot Program in 2007, which is the average of the three years prior to Rockfish Pilot Program implementation (2004-2006). Compared with the baseline, the species TAC allocations and landings in 2014 increased by 30% and 37%, respectively, while the percent utilization increased from 87.1% during the baseline to 91.5% in 2014 (Figures 8.51, 8.52, and 8.53). The species TAC allocations and landings have been relatively stable between the baseline and 2011, with a large increase in allocations and landings occurring in the first year of the Rockfish Program (2012).



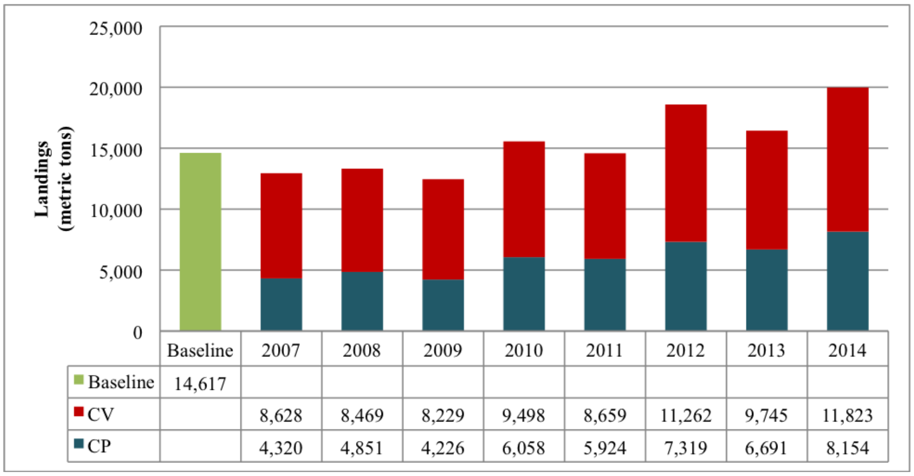
	Baseline	2007	2008	2009	2010	2011	2012	2013	2014
Baseline	16,774								
CV		10,411	10,010	9,577	10,876	10,330	12,646	11,841	13,405
CP		5,098	5,358	5,380	6,737	6,708	7,830	7,441	8,418

Figure 8.51: Rockfish Program species allocated to the Rockfish Program.

Figure 8.52 also separates the landings by CVs and CPs for all years of the program. Overall program landings have increased by 37% in 2014 relative to the baseline, with CV landings increasing by 38% and CP landings increasing by 34%. CPs land on average 39% of the total Rockfish Program landings, but the CP share decreased from 42% during the baseline to 37% during the Rockfish Pilot Program (2007-2011), and increased to 40% in the first three years of the Rockfish Program (2012-2014).

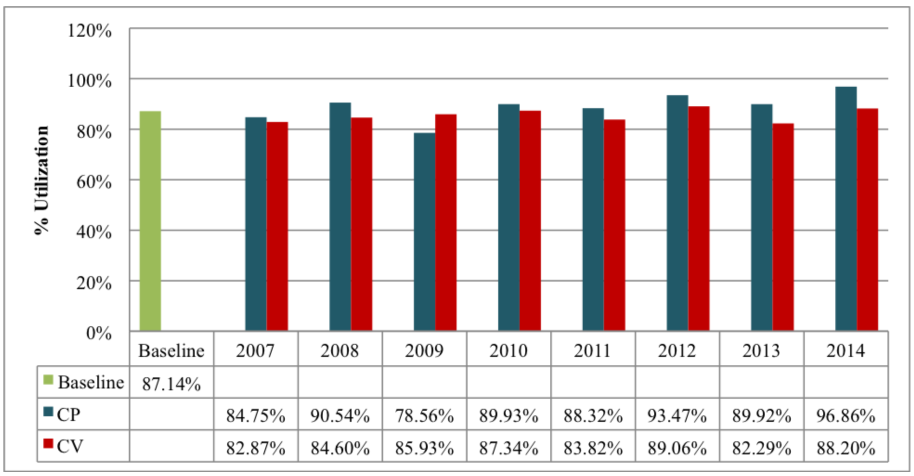
Utilization of the allocated species by sector is reported in Figure CS53. The percent utilization of the CV sector has increased since 2007, rising from 83% in 2007 to 88% in 2014. Utilization by the CP sector is higher than the utilization by the CV sector in all years except 2009, but it is much more variable than the CV sector, experiencing a low of 79% in 2009 and a high of 97% in 2014.

Effort Performance Metrics



	Baseline	2007	2008	2009	2010	2011	2012	2013	2014
Baseline	14,617								
CV		8,628	8,469	8,229	9,498	8,659	11,262	9,745	11,823
CP		4,320	4,851	4,226	6,058	5,924	7,319	6,691	8,154

Figure 8.52: Aggregate landings of all Rockfish Program species in the Rockfish Program.



	Baseline	2007	2008	2009	2010	2011	2012	2013	2014
Baseline	87.14%								
CP		84.75%	90.54%	78.56%	89.93%	88.32%	93.47%	89.92%	96.86%
CV		82.87%	84.60%	85.93%	87.34%	83.82%	89.06%	82.29%	88.20%

Figure 8.53: Percent of the allocated species that are landed in the Rockfish Program.

The effort performance metrics include the season length index, the number of active vessels, and the number of entities holding Rockfish Program QS. The season length index is defined as the number of days in which at least one vessel was fishing divided by the maximum regulatory season length possible for the fishery, equal to 199 days in all years (opening on May 1st and closing on November 15^{th}). This index measures the relative proportion of the legal fishing season during which some or all vessels actively fished Rockfish Program species allocations. The number of active days for these vessels increased significantly from 12 days during the baseline to an average of 164 days per year from 2007-2014, which corresponds to a season length index of $12/199 = 0.06$ during the baseline and averaged $164/199=0.82$ from 2007-2014 (Figure 8.54).

The number of active vessels reflects the number of Rockfish Program CVs and CPs with any commercial landings of Rockfish Program species in a given year, and includes the entry-level longline CVs as active vessels in the program. The total number of active vessels has increased from 42 vessels during the baseline to 50 vessels participating in the fishery in 2014. The number of CVs has varied from 33 and 52 vessels, while the number of CPs varied between 4 and 9 vessels, but has remained at 5 from 2011-2014 (Figure 8.55). It is interesting to note that 4 CPs landed 33% of the total program landings in 2007 while 38 CVs landed the remaining 67% of the Rockfish Program species allocations.

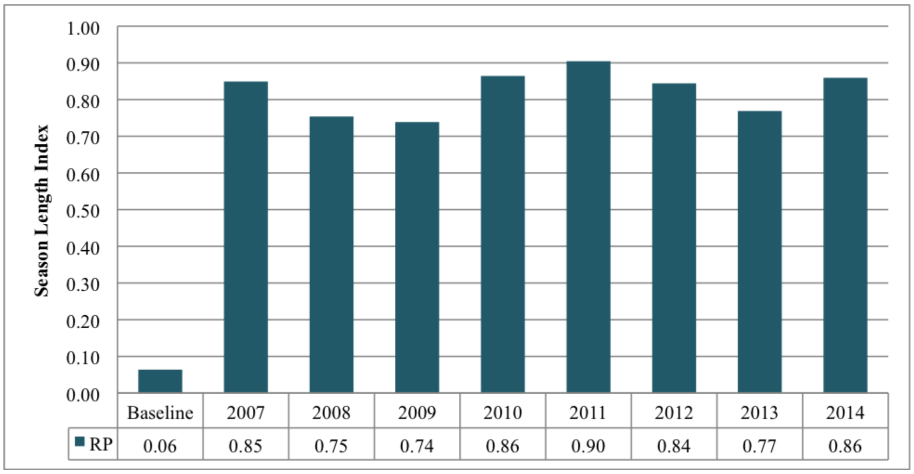


Figure 8.54: Rockfish Program season length index.

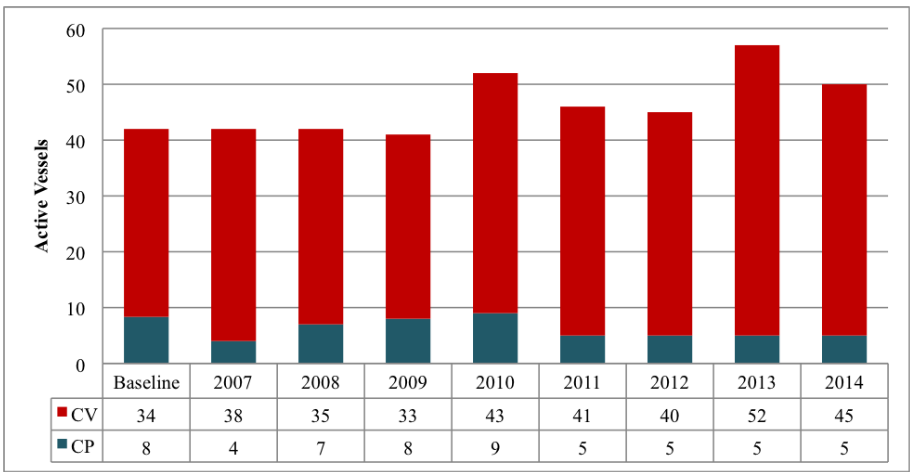


Figure 8.55: Number of active vessels in the Rockfish Program.

The number of entities holding QS (LLP licenses) in the Rockfish Program has been increasing throughout the Rockfish Pilot Program (2007-2011) and has remained stable at 57 LLP licenses for the duration of the Rockfish Program (2012 to 2014) (Figure 8.56).

Revenue Performance Metrics

The revenue performance metrics are the aggregate revenue from Rockfish Program species, average prices of Rockfish Program species, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among the active vessels. Revenues are adjusted for inflation by using the GDP price deflator and are reported in 2010 equivalent dollars. For the Rockfish Program, revenues are reported in their native format, such that the price received by CVs is the weighted annual ex-vessel price while the price received by CPs is the weighted annual first-wholesale price. This enables a comparison between the revenues that each type of vessel receives on offloading their catch from the vessel. Rockfish Program revenue has increased by 31% between the baseline and 2014, from \$12.38 million during the baseline to \$16.27 million in 2014 (Figure 8.57). The CP sector experienced a 29% increase in revenues while the CV sector experienced a 36% increase in average revenues from 2007-2014 compared with the baseline. While landings have increased for both sectors

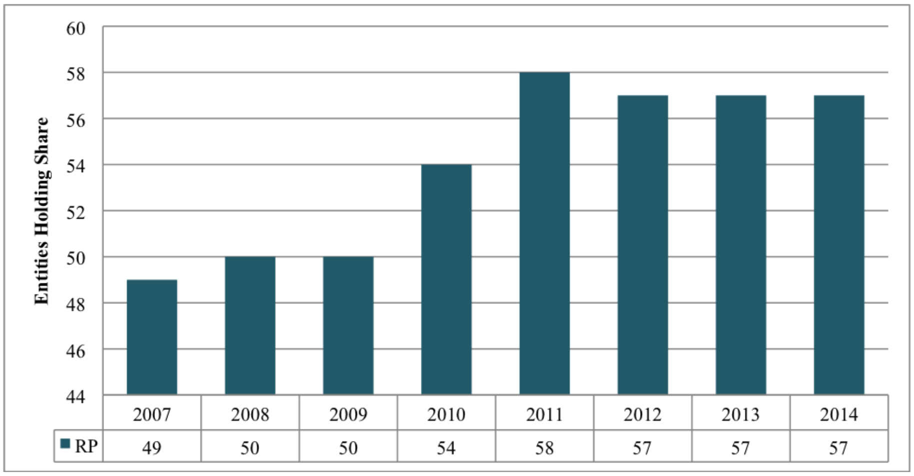


Figure 8.56: Number of entities holding QS in the Rockfish Program.

in 2014 relative to the baseline, as shown below, overall prices have decreased with the CP sector experiencing a 12% decline but prices increased by 1% for the CV sector.

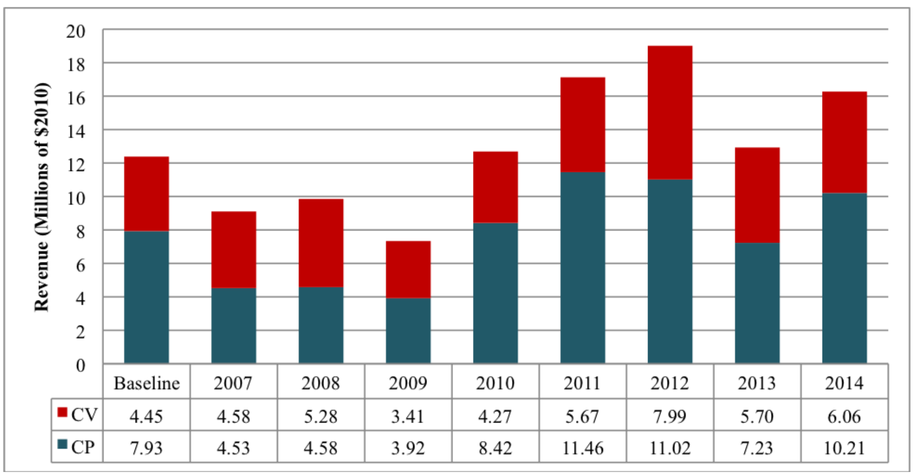
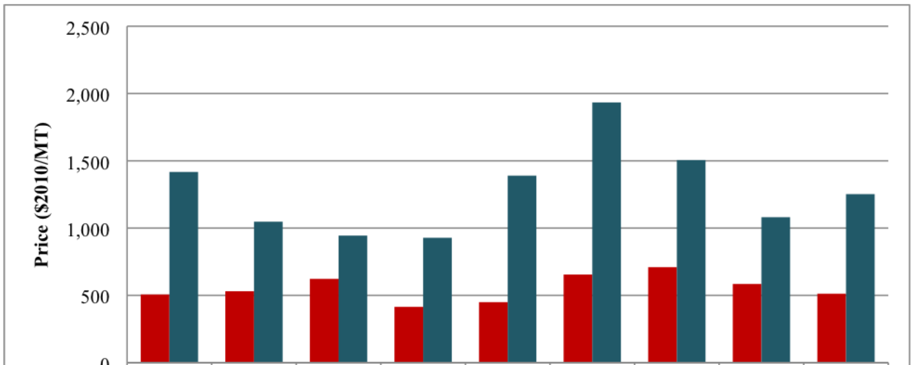


Figure 8.57: Rockfish Program revenue.

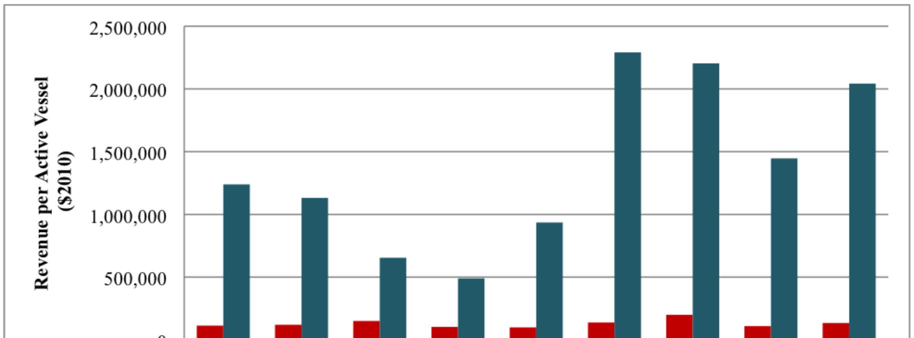
As the CV sector revenues are in ex-vessel value and CP sector revenues are in first wholesale value, the weighted average price per ton of Rockfish Program species varies by, and is reported separately for, each sector. Real weighted average prices of Rockfish Program species increased between the baseline and 2014 by 1.2% from $506/ton to $512/ton for CVs, but declined 12% from $1,417/ton to $1,252 for CPs (Figure 8.58). There is substantial variation in the average prices for each sector which varied annually from -28% to 50% for CPs and from -33% to 46% for CVs between 2007 and 20143, and the CPs have a higher coefficient of variation in prices at 0.25 than the CVs at 0.17.

Rockfish Program revenue per vessel overall increased by 23% from $265,089 during the baseline to $325,403 in 2014. The CV revenue per vessel increased from $113,681 during the baseline to $134,620 during 2014, while revenue per CP increased by 65% (from $1.24 million during the baseline to $2.04 million in 2014) (Figure 8.59). The decrease in CV revenue per vessel from 2012 to 2013 is partly a function of a number of new entry-level longline vessels participating in the fishery in 2013, with relatively low revenues compared with the trawl vessels.



	Baseline	2007	2008	2009	2010	2011	2012	2013	2014
CV	506	531	623	415	450	655	709	585	512
CP	1,417	1,048	944	928	1,390	1,934	1,506	1,081	1,252

Figure 8.58: Weighted average of all Rockfish Program species price per metric ton.



	Baseline	2007	2008	2009	2010	2011	2012	2013	2014
CV	113,679	120,521	150,723	103,462	99,300	138,276	199,763	109,574	134,620
CP	1,239,008	1,131,516	654,318	490,302	935,481	2,291,241	2,203,729	1,446,354	2,042,447

Figure 8.59: Rockfish Program revenue per active vessel.

The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the Rockfish Program in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer vessels as the Gini coefficient increases. This is demonstrated in the difference in Gini coefficient for the baseline for all Rockfish Program (RP) vessels (Gini = 0.69) which implies a less even distribution of vessel revenues compared with the Gini coefficient for either the CVs only (Gini = 0.45) or for the CPs only (Gini = 0.44) (Figure 8.60). This is because the revenue per vessel among CVs and CPs is very different (Figure 8.59) and when all vessels are combined together in the Gini coefficient, it implies a less even distribution of revenue than examining the within vessel-type revenue distribution. The Gini coefficient of Rockfish Program vessel revenue for all vessels increased from 0.69 during the baseline to 0.73 in 2014, which suggests an increase in concentration in vessel revenues among all vessels. The CV sector experienced an increase in the Gini coefficient from 0.45 during the baseline to 0.56 in 2014. The CP sector experienced a substantial decline in the Gini coefficient (movement toward a more even distribution), from 0.44 during the baseline to an average of 0.17 from 2011-2014, which suggests the 5 remaining CP vessels participating in the Rockfish Program from 2011-2014 have a more equal split of revenues than the 8 vessels that participated in the baseline.

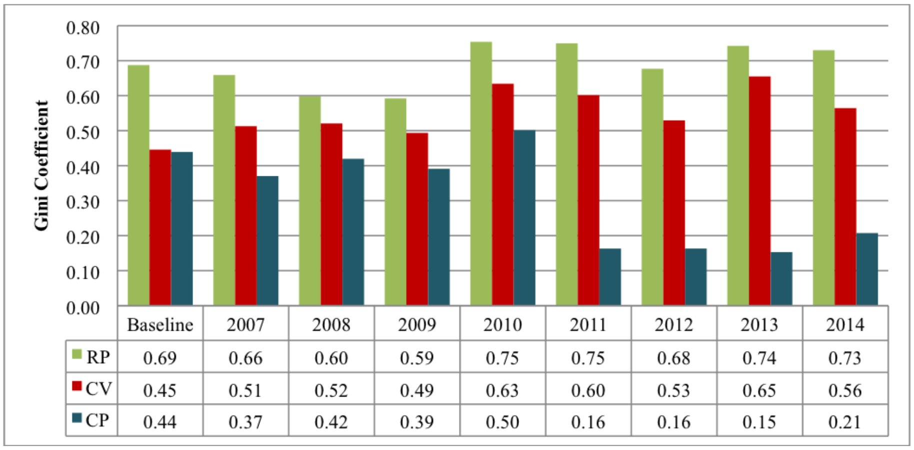


Figure 8.60: Rockfish Program Gini coefficient.

8.8. Discussion and Conclusion

This report summarizes economic performance metrics from 5 catch share programs and the Bering Sea Freezer Longline Catcher/Processors fishery in the North Pacific for a period prior to program implementation through 2014. Table 8.2 reports the percentage changes between 2014 and 2013 for each of the 10 performance metrics listed in Table 8.1 for all programs in this report. This table reflects short term changes in the economic conditions of the program for 2014 relative to 2013.

Quota and landings declined in 4 of the 6 programs, with halibut experiencing a 27% decline. The percent utilization fell in two programs but remained constant in one and increased in three others. The season length index declined in 4 of 5 programs. Active vessels fell in 4 of 6 programs with Rockfish Program decreasing by 12%. There was little change in the number of entities holding share in any program, but three experienced declines of 1 or 2%. Revenue declined mildly in 3 programs, increased by 2% in another, and increased by 13% and 26% in the Freezer Longline fishery and the Rockfish Program, respectively. Prices increased in 5 programs with prices for the Freezer Longline fishery, the Sablefish IFQ program, and the Halibut IFQ program going up by 19%, 21%, and 25%, respectively. Revenue per vessel declined slightly in three programs, but increased by 7%, 17%, and 43% in the Sablefish IFQ program, Freezer Longline fishery, and Rockfish Program, respectively. The Gini coefficient decreased (more equal distribution) in three programs but increased (less equal distribution) in the other three with Freezer Longline fishery and Amendment 80 increasing by 12% and 42%, respectively.

It is also useful to compare the economic performance of our catch share programs in 2014 to a longer term average of performance to provide additional context for these metrics. Table 8.3 reports the percentage changes between 2014 and the mean values from the previous 5 year period (2009-2013) for each of the 10 performance metrics listed in Table 8.1.

Table 8.2: Percentage change in Catch Share Performance Metrics for 2013 to 2014.

Catch Share Program	Quota	Landings	% Utilization	Season Length	Active Vessels	Entities	Revenue	Price	Revenue per vessel	Gini*
Halibut	-27%	-24%	4%	-5%	-2%	-2%	-6%	25%	-4%	-5%
Sablefish	-15%	-16%	-1%	-3%	-5%	-1%	2%	21%	7%	-3%
AFA	1%	1%	0%	-10%	2%	-2%	-1%	-2%	-3%	1%
Non-Pollock CPs	-4%	-2%	2%	-2%	0%	0%	-1%	1%	-1%	42%
Freezer Longline	-3%	-5%	-2%	-2%	-3%	0%	13%	19%	17%	12%
GOA Rockfish	13%	22%	7%	12%	-12%	0%	26%	4%	43%	-2%

Notes: * Color scheme is reversed to indicate that increases in the Gini reflect increases in inequality of revenues across vessels.

Table 8.3: Catch Share Performance Metrics 2014 values compared with the average of 2009-2013.

Catch Share Program	Quota	Landings	% Utilization	Season Length	Active Vessels	Entities	Revenue	Price	Revenue per vessel	Gini*
Halibut	-50%	-49%	2%	-5%	-11%	-9%	-37%	20%	-29%	-9%
Sablefish	-13%	-12%	0%	0%	-11%	-1%	-21%	-10%	-11%	-6%
AFA	19%	21%	1%	-9%	0%	-5%	3%	-16%	2%	-3%
Non-Pollock CPs	-15%	-2%	13%	1%	-8%	0%	-16%	-14%	-9%	0%
Freezer Longline	37%	30%	-6%	8%	-6%	-2%	22%	-8%	29%	0%
GOA Rockfish	22%	29%	6%	4%	4%	3%	18%	-7%	13%	4%

Notes: * Color scheme is reversed to indicate that increases in the Gini reflect increases in inequality of revenues across vessels.

Trends in quota and landings were very different across programs. The AFA Pollock program, Freezer Longline fishery, and Rockfish Program experienced an increase in quota of 19%, 37%, and 22, while the Sablefish IFQ program, Amendment 80, and the Halibut IFQ program experienced declines of 13%, 15%, and 50%, respectively. Landings trends were similar with three programs experiencing increases while the other three decreased. The percent utilization fell only in one programs, remained constant in one, and increased in the other four. The season length index declined in two and increased in three. Active vessels fell in 4 of 6 programs with the Halibut IFQ program and Sablefish IFQ program each decreasing by 11%. There has been a slight decrease in the number of entities holding share in any program, with four experiencing declines. Revenue declined substantially in 3 programs (Halibut, Sablefish, and Amendment 80), increased by 3% in another (AFA Pollock), and increased by 18% and 22% in the Rockfish Program and the Freezer Longline fishery, respectively. Prices decreased in 5 programs with prices for the Halibut IFQ program going up by 20%. Revenue per vessel declined in three programs, but increased by 2%, 13%, and 29% in the AFA Pollock program, Rockfish Program, and the Freezer Longline fishery, respectively. The Gini coefficient decreased (more equal distribution) in one program (Rockfish Program) but remained constant in two (Amendment 80 and Freezer Longline fishery) and increased (less equal distribution) in the other three with increasing (the AFA Pollock program, the Sablefish IFQ program, and the Halibut IFQ program).

Comparing 2014 with the previous 5 years, the Halibut IFQ program experienced declines in 7 of the 10 economic performance metrics with quota, landings, and revenue declining by 50%, 49%, and 37%, respectively. The sablefish IFQ program also experienced declines in 7 of the 10 performance metrics but its declines were less substantial than in the Halibut IFQ program with declines in quota, landings, and revenue of 13%, 12%, and 21%, respectively. The AFA Pollock program had increases in 6 metrics and declines in only 3. Quota, landings, and revenue all increased by 19%, 21%, and 3%, respectively. The landings increases did not translate into much increased revenue as prices for pollock fell 16%. Six performance metrics declined for the Amendment 80 program with quota, landings, and revenue all decreasing by 15%, 2%, and 16%, respectively. However, the program was able to increase its utilization by 13% over the same period. The Freezer Longline fishery had increases in 5 metrics with quota, landings, and revenue all increasing by 37%, 30%, and 22%, respectively. The Rockfish Program appears to have had the most success over the past five years as eight metrics increased over this period and quota, landings, and revenue all increased by 22%, 29%, and 18%, respectively, even in the face of a 6% decrease in prices.

8.9. References

Brinson, A.A., and E. Thunberg. 2013. The Economic Performance of U.S. Catch Share Programs. U.S. Dept. of Commer., NOAA Technical Memorandum NMFS-F/SPO-133a, 159p.

9. BSAI NON-POLLOCK TRAWL CATCHER-PROCESSOR GROUNDFISH COOPERATIVES (AMENDMENT 80) PROGRAM: SUMMARY OF ECONOMIC STATUS OF THE FISHERY

This report summarizes the economic status of the BSAI non-pollock groundfish trawl catcher-processor fleet (referred to in the following as the Amendment 80 fleet) over the most recent five-year period following implementation of the rationalization program in 2008 under Amendment 80 (A80) to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (FMP). This report provides additional detail to supplement information provided elsewhere in the Groundfish SAFE Economic Status Report; a general overview of the program and results of a set of economic performance metrics calculated for the fishery for the period 2005-2007 (the pre-program reference period) and annually for 2008-2014 are provided in the Economic Performance Metrics for North Pacific Groundfish Catch Share Programs section of the report (see especially Figures 8.21-8.30 and accompanying text). In addition, details regarding catch, production, and value of BSAI and Gulf of Alaska groundfish species allocated to A80 fleet are provided in Section 4 of the Annual Fishery Statistics section.

As a requirement of the A80 program designed by the North Pacific Fishery Management Council, annual economic reports are submitted to NMFS by vessel owners and QS permit holders, providing detailed data on vessel costs, earnings, employment, quota transfers, and capital improvements. The Economic Data Report (EDR) program is a mandatory annual reporting requirement for A80 entities, and supplements data provided by in-season monitoring and data collection programs, including eLandings catch accounting and the North Pacific Groundfish Observer program. Beginning with implementation of the A80 program in 2008, EDR data collection program has collected annual economic census data, with the most recent available data representing results from the 2013 calendar year of operations.[1]

Among the goals of A80 is improving economic incentives to increase retention and utilization, and reduce bycatch by the commercial catcher-processor (CP) fleet using trawl gear in the non-pollock groundfish fisheries. The structure of the program was developed to encourage fishing practices and use of vessel capital with lower discard rates and to mitigate the costs of increased retention requirements[2] by improving the opportunity to increase the value of harvest species while improving operational efficiency and lowering costs.

The BSAI non-pollock groundfish trawl CP sector is composed of vessel-entities representing the 24 CPs with history of harvesting groundfish in the BSAI, but that did not qualify for inclusion in

[1]The EDR program is managed collaboratively by Alaska Fisheries Science Center (AFSC) and Pacific States Marine Fisheries Commission (PSMFC), with guidance and oversight from the North Pacific Fishery Management Council (NPFMC, Council). Further information regarding the data collection program, including protocols and results of data quality assessment and controls, is provided in database documentation available from Alaska Fisheries Science Center, Economic and Social Sciences Research Program.

[2]Concurrent with passage of A80, the Council also developed a groundfish retention standard (GRS) program for A80 catcher-processors by establishing a minimum retention schedule for the sector, beginning at 65% roundweight retention for 2008, and increasing by 5% increments to 85% for 2011 and subsequent years. Due to high compliance costs for the GRS program, A80 vessels and cooperatives were granted exemptions to the standard under emergency rule beginning in 2010, and the GRS program requirements were permanently rescinded under Amendment 93 to the FMP (77 FR 59852, October 1, 2012), effective March, 2013.

the rationalization of the CP pollock fishery under the American Fisheries Act. Of the original 24 CPs electing to enroll in the catch share program, 22 remained operational as of implementation of the program in 2008, of which 18 vessels continued to operate during 2014. Species allocated to the A80 fleet include: Aleutian Islands Pacific ocean perch, BSAI Atka mackerel, BSAI flathead sole, BSAI Pacific cod, BSAI rock sole, and BSAI yellowfin sole. In addition, the A80 cooperatives and vessels receive allocations of Pacific halibut and crab prohibited species catch (PSC) for use while fishing in the BSAI, and groundfish sideboard limits and halibut PSC for use in the Gulf of Alaska. A80 allocates the six target species and five prohibited species in the BSAI to the CP sector and allows qualified vessels to form cooperatives. These voluntary harvest cooperatives coordinate use of the target allocations, incidental catch allowances and prohibited species allocations among active member vessels. From 2008-2010, 16 vessels formed a single cooperative (identified as the Best Use Cooperative, renamed Alaska Seafood Cooperative in 2010), with the remainder operating in the limited-access fishery. Since 2011, all vessels are in one of two cooperatives, with the Alaska Groundfish Cooperative being formed with nine member vessels/LLP licenses.

To assess the performance of the fleet under the rationalization program and subsequent changes in fishery management, statistics reported below are intended to indicate trends in a variety of economic indicators and metrics. The reported statistics provide a general overview of fishery performance over time, and are not intended as a rigorous statistical analysis of specific hypotheses regarding economic efficiency or other performance metrics. These generally include changes in the physical characteristics of the participating vessel stock, including productive capacity of vessel physical plant (freezer and processing line capacity and maximum potential throughput) and fuel consumption rates, efficiency and diversification of processing output, investment in vessel capital improvements, operational costs incurred for fishing and processing in the A80 fisheries and elsewhere, and employment and compensation of vessel crews and processing employees. As noted above, these results complement the analysis presented in the catch share metrics section of the Groundfish Economic Status Report for the A80 program for the period 2007-2013. The reader is referred thereto for a comparative presentation of trends in the following: aggregate quota allocations, catch, and quota utilization rates; season length; QS ownership and vessel participation; and earnings concentration among participating vessels. The reader is also referred to the Council's recently completed Five-Year Review of the program for a more detailed and comprehensive analysis of economic effects of A80 (Northern Economics, 2014).

In the following tables, annual statistics are reported for fleet or fishery aggregate total values and vessel-level average (median) values. All monetary values in the report are presented as inflation-adjusted 2014 equivalent U.S. dollars, consistent with data presented in other sections of the Groundfish Economic Status Report. Due to the small number of reporting entities, some results are suppressed to protect the confidentiality of proprietary information, as indicated in tables by the symbol "–". The total count of non-zero reported values are shown in the tables (under the heading "Obs" or "Vessels"); vessel-level median statistics (calculated over reported non-zero values) is reported to represent the average; arithmetic means for the reported indicators can be derived as needed by users of this report by dividing the aggregate total value shown by either the associated number of non-zero observations, or alternately by the total count of vessels (where different). It should be noted, however, that for many of the reported statistics, the underlying data is highly variable and/or irregularly distributed, such that the arithmetic mean may be a poor representation of the population average value.

9.1. Fleet Characteristics and Production Capacity

Table 9.1 shows fleet aggregate and median vessel values for physical size and capacity of the currently active vessel stock in the fishery for 2010-2014. A80-qualified vessels holding quota share and active in EEZ fisheries in the BSAI remained at 18 during 2014, having remained largely stable at 20 vessels from 2010-2012. The initial reduction from 22 active vessels the first year of the program (2008) to 20 in 2012 was due to loss of one vessel at sea (the Alaska Ranger) and the inactivity of the Tremont, which last fished in 2008; subsequent reduction in the number of active vessels is indication of further efficiency-driven consolidation and capital improvement in the remaining fleet. Statistics on aggregate and average fleet physical capacity indicate no changes from 2013, during which there was a relatively small decrease in aggregate capacity compared to the previous period; aggregate net and gross tonnage across the fleet declined by 2% and less than 1%, respectively, but with substantial increases in median values for the remaining fleet (e.g. median net- and gross tonnage metrics increasing 26% and 30%) compared to the average over the 2010-2012 period. This is consistent with the smaller vessels exiting the fleet and investment in improvements to expand the physical capacity of remaining vessels.

Table 9.2 displays statistics for vessel physical processing capacity, including total aggregate and median number of processing lines on the active fleet and the median estimated throughput in processed pounds per hour, shown for whole-fish products and products over all. There were a total of 28 processing lines in the active fleet of 18 vessels during 2014, which has declined slightly from 30 in 2010, concurrent with two vessels exiting the active fleet, and the number of distinct products produced from the median vessel has also declined slightly to a total of 16. Maximum production throughput, on a median vessel basis, increased incrementally over the 2010-2013 period, but declined from 4.62 in 2013 to 4.3 t per hour in 2014, while maximum throughput of whole-fish product increased from 3.32 to 3.88 t per hour in 2014.

Table 9.3 displays statistics for vessel freezer capacity, in terms of cold storage capacity and maximum operating throughput capacity of plate freezers. Cold storage capacity in the fleet has remained largely constant at approximately 7,500 t, but declined to an estimated 7,345 t in 2013. Reported data for freezer throughput capacity indicates that vessel-level average throughput has increased from approximately 2.89 to 3.92 t per hour over the 2010-2013 period, and remained unchanged in 2014. As freezer throughput is commonly cited as the principal limiting factor in processing capacity on A80 CP's, this result indicates a significant increase in the production capacity of the fleet.

Table 9.1: Amendment 80 Fleet Characteristics - Vessel Size, including Tonnage, Length, Beam Width, Horsepower, and Fuel Capacity, Fleet Total and Median Vessel Values

	Obs	Gross Tonnage		Net Tonnage		Length Overall (ft)		Beam (ft)		Shaft Horsepower		Fuel Capacity (million gal)	
Year	Count	Median	Total	Median	Total	Median	Total	Median	Total	Median	Total	Median	Total
2010	20	775	15,285	403	8,589	177	3,424	39	758	2,385	47,475	77,920	1.78
2011	20	775	15,285	403	8,568	177	3,434	39	748	2,385	47,400	77,920	1.77
2012	20	775	15,880	403	8,712	177	3,434	40	761	2,385	47,400	77,920	1.82
2013	18	1,008	15,495	506	8,451	185	3,218	40	706	2,560	45,075	89,077	1.77
2014	18	1,008	15,495	506	8,451	185	3,218	40	706	2,560	45,075	89,077	1.77

Source: Amendment 80 Economic Data Reports.

Table 9.2: Amendment 80 Fleet Characteristics - Processing Line Capacity, including Production Variety and Throughput

	Obs	Processing Lines on Vessel		Species Processed	Total No. Products Processed (species+product)	Any Product, Max Throughput (mt/hr)	Whole-fish Product, Max Throughput (mt/hr)
Year	Count	Total	Median	Median	Median	Median	Median
2010	20	30	1	12	18	3.85	3.32
2011	19	29	1	12	17	3.92	3.31
2012	19	29	1	12	16	4.43	3.22
2013	18	28	1	12	16	4.62	3.32
2014	18	28	1	12	16	4.30	3.88

Source: Amendment 80 Economic Data Reports.

Table 9.3: Amendment 80 Fleet Characteristics - Vessel Freezer Capacity, including Volume and Throughput

	Obs	Freezer Hold Capacity (t)		Maximum Freezing Capacity (t/hr)	
Year		Median	Total	Median	Total
2010	20	317.51	7,576.07	2.89	60.01
2011	20	308.76	7,076.30	3.64	64.21
2012	20	317.51	7,558.92	3.90	67.08
2013	18	336.57	7,345.19	3.92	64.28
2014	18	336.57	7,345.19	3.92	64.28

Source: Amendment 80 Economic Data Reports.

Table 9.4: Amendment 80 Vessel Fuel Consumption Rates - Median Values, by Vessel Activity

	Obs	Fishing/ Processing (gal/hr)	Steaming Loaded (gal/hr)	Steaming Empty (gal/hr)
Year	Count	Median	Median	Median
2010	20	97	95	94
2011	20	97	95	93
2012	20	100	105	96
2013	18	103	121	100
2014	18	103	121	101

Source: Amendment 80 Economic Data Reports.

Table 9.5: Amendment 80 Fleet Fuel Consumption - Fleet Total and Median Vessel Annual Fuel Use, by Vessel Activity

	Obs	Fishing/Processing		Steaming Empty		Steaming Loaded	
Year	Count	Median (1000 Gal)	Total (million Gal)	Median (1000 Gal)	Total (million Gal)	Median (1000 Gal)	Total (million Gal)
2010	20	485	9.73	66	1.45	68	1.46
2011	20	457	10.16	85	1.74	63	1.44
2012	20	445	9.26	70	1.31	89	1.64
2013	18	520	9.7	67	1.2	79	1.5
2014	18	551	10.09	63	1.19	88	1.52

Source: Amendment 80 Economic Data Reports.

Table 9.4 shows median values for reported estimates of average hourly fuel consumption rate, in gallons per hour (gph), of A80 vessels during fishing and processing, steaming loaded, and steaming empty operational modes, and Table 9.5 shows aggregate and vessel median annual fuel consumption (gallons) by operational mode and annual total. Median reported hourly fuel use rates vary by activity: 101 gph steaming empty, 103 gph fishing and processing, and 121 steaming loaded for 2014. Rates have generally increased over the most recent 5-year period, most notably for steaming loaded (it should be noted that rates reported by individual vessels commonly vary by 10-15 gallons per hour from year to year), reflecting the increase in average tonnage within the currently active fleet. Total A80 fleet fuel consumption in fishing and processing during 2014 was 10.1 million gallons, and

12.8 million gallons in total, including fuel used in vessel transiting, both approximately equal to the average over the 2010-2014 period.

9.2. Fishing Effort - A80 Vessel Days at Sea

Table 9.6 reports fleet aggregate and median statistics for vessel activity days reported in EDR data from 2010-2014, representing counts of days during which the vessel undertook fishing operations in A80 and other fisheries, processing operations in A80 and other fisheries, days on which the vessel was in transit (not fishing or processing) or offloading in port, and inactive in shipyard. Note that counts of days fishing and days processing are not mutually exclusive; a given calendar day may be counted as a day fishing as well as a day processing in A80 fisheries, and counts of days processing are generally inclusive of days fishing. As such, the results as reported give a relative account of the distribution of fleet activity among different activities and an approximation of the cumulative duration of vessel use in a given activity. Aggregate and median activity days in the A80 target fisheries continued a downward trend through 2012, when days processing totaled 3,425 (185 days on average), but reversed the trend in 2013 and 2014; with the fleet reduced to 18 active vessels, total fleet days processing in 2014 increased to 3,615, and 213 days on a median vessel basis. Participation in fisheries other than those included in the A80 program (primarily sideboard allowances in the Gulf of Alaska) is more variable from year to year, with 12 vessels active during 2013 and 2014, down from 17 in 2011-2012. Median number of days processing in non-A80 fisheries varies somewhat, from 32 in 2011 to 27 in 2014. Fleet aggregate days processing is more variable, increasing to 818 during 2014 despite the relatively small number of participating vessels, indicating a small number of vessels with much higher than average activity days outside of A80 fisheries.

Table 9.6: Amendment 80 Fleet Activity - Days Fishing and Processing by Fishery, and Days in Transit/Offloading and Inactive in Port, Fleet Total and Median Vessel Values

		Stat	2010	2011	2012	2013	2014
Amendment 80 Fisheries	Days Fishing	Obs	20	20	19	18	18
		Median	182	175	178	200	209
		Total	3,639	3,405	3,395	3,513	3,567
	Days Processing	Obs	20	20	19	18	18
		Median	189	173	185	200	213
		Total	3,747	3,454	3,425	3,559	3,615
All Other Fisheries	Days Fishing	Obs	14	17	17	12	12
		Median	30	32	30	28	27
		Total	535	812	735	648	818
	Days Processing	Obs	14	17	17	12	12
		Median	30	32	30	28	27
		Total	534	819	730	649	818
Non-Fishing and Inactive	Days Travel/Offload	Obs	20	20	20	18	18
		Median	77	80	69	80	65
		Total	1,681	1,956	1,682	1,560	1,401
	Days Inactive	Obs	20	20	20	18	18
		Median	81	78	98	74	73
		Total	1,928	1,857	2,089	1,466	1,301

Source: Amendment 80 Economic Data Reports.

9.3. Catch, Production, and Value

Table 9.7 reports annual fleet aggregate and vessel average values for catch, discard, volume of production in roundweight and finished weight terms (in t), and estimated wholesale value of finished processed volume (in US$, all years adjusted to 2014-equivalent value), stratified by A80, all other target fisheries in the BSAI, and all fisheries in the Gulf of Alaska.[3] Total catch (retained and discarded) aggregated over the six targeted A80 species (Atka mackerel, flathead sole, rock sole, yellowfin sole, Pacific cod, and Pacific Ocean perch) declined in 2014 to 258 thousand t, 255 thousand t retained and 3.2 thousand t discard, with the rate of discard declining over the period, from 4.93% in 2010 to 1.24% in 2014. Total catch of other species in the BSAI increased to 97.7 thousand t in 2014, with retained catch of 73.9 thousand $t$and discard of 23.8 thousand t(a discard rate of 32.2%). Total catch in GOA fisheries nearly doubled for 2014, to 42.2 thousand t, with a retained catch of 39.2 thousand $t$and discard of 3.0 thousand t; the discard rate of 7.56% during 2014 represents a decline of nearly 60% from the previous four-year average of 18.6%.

Finished production and value information displayed in Table 9.7 indicate 2010-2014 total finished production over all A80 target species varying between 155-167 thousand $t$per year, and gross wholesale revenue value varying between $245 million - $340 million over the period. Finished volume and value in 2014 were 158.2 thousand $t$and $252.3 million t, respectively. This represented a 1% decrease in volume from 2013 and a 2.6% increase in revenue due to a modest increase in average prices for A80 species during 2014. Finished production during 2014 of 38.7 thousand $t$and 21.3 thousand $t$in non-A80 target species in the BSAI and GOA, respectively, produced gross wholesale value of $57.2 and $44.6 million. Finished production volume by A80 vessels in GOA fisheries increased by over 82% from 2013 to 2014, with first wholesale value increased by over 91%.

Table 9.8 presents a summary of annual volume and revenue for product sales for A80 vessels, over all fisheries, vessel income from other sources (e.g., tendering, charters, cargo transport), and sales of fishery permits. As of 2014, no A80 entities have sold interests in fishery permits, and only one vessel has reported revenue derived from vessel use other than fishing and processing in each of 2010, 2012, 2013, and 2014 (revenue values suppressed for confidentiality). Fishery product sales volume and revenue includes all sales during the year, including product sold from inventory held from prior year, and does not include production completed but not sold during the year. Total reported volume of finished product sold during 2014 was 202.9 thousand t, with first wholesale value of $346.6 million.

[3]Note that discrepancies between Table 9.8 and Table 9.7 statistics for finished production volume and product value reflect different data sources for these tables and estimation methods employed in attributing wholesale value to catch accounting production volumes in the latter.

Table 9.7: Amendment 80 Fleet Annual Catch, Discard, Finished Production Volume and Value, by Fishery and Region, Fleet Total and Median Vessel Values

		Fleet Aggregate Total (1000 t)							Average per Active Vessel, median (t)					
	Year	Obs	Retained (1000t)	Discard (1000t)	Discard Rate	Production (round Weight)	Production (finished Weight)	Production Value, ($mill.)	Retained (1000t)	Discard (1000t)	Discard Rate	Production (round Weight)	Production (finished Weight)	Production Value, ($mill.)
BSAI - Amendment 80 target fishery/species	2010	20	257.5	12.7	4.93 %	247.3	154.9	$ 263.4	1,521	44	3.01 %	1,518	820	$ 1.55
	2011	20	262.3	6.5	2.48 %	259.2	163.6	$ 339.8	1,368	15	1.80 %	1,356	719	$ 1.93
	2012	20	265.0	6.8	2.57 %	261.7	167.2	$ 340.2	1,386	26	1.77 %	1,528	790	$ 2.02
	2013	18	260.4	6.8	2.61 %	260.8	159.8	$ 245.9	2,175	26	1.80 %	2,195	1,202	$ 2.07
	2014	18	255.0	3.2	1.24 %	254.2	158.2	$ 252.3	1,950	12	1.02 %	1,823	1,001	$ 1.67
BSAI - All other fishery/species	2010	20	63.2	20.5	32.43 %	56.3	34.3	$ 48.6	170	127	27.71 %	216	122	$ 0.19
	2011	20	62.1	17.5	28.10 %	56.9	34.8	$ 63.4	123	92	16.56 %	194	107	$ 0.32
	2012	20	60.4	13.5	22.40 %	55.1	34.0	$ 67.6	71	78	15.19 %	197	100	$ 0.28
	2013	18	70.9	20.3	28.61 %	63.3	37.9	$ 55.2	198	166	17.37 %	173	94	$ 0.28
	2014	18	73.9	23.8	32.22 %	64.9	38.7	$ 57.2	224	209	23.35 %	420	217	$ 0.44
GOA - All fishery/species	2010	16	21.4	5.3	24.60 %	21.0	12.2	$ 28.7	31	4	13.75 %	28	16	$ 0.05
	2011	16	24.3	4.4	18.17 %	24.3	13.8	$ 41.9	32	4	13.57 %	23	12	$ 0.05
	2012	16	24.2	3.4	14.06 %	23.7	13.2	$ 35.2	27	4	12.69 %	17	11	$ 0.04
	2013	13	20.5	3.6	17.64 %	20.7	11.7	$ 23.3	26	4	16.42 %	20	11	$ 0.04
	2014	10	39.2	3.0	7.56 %	36.6	21.3	$ 44.6	48	2	4.16 %	38	23	$ 0.06

Notes: All dollar values are inflation-adjusted to 2014-equivalent value. Fleet aggregate catch and production volumes are shown in 1000s of metric tons(t), and fleet aggregate and average revenue values are shown in $million.

Source: Amendment 80 Economic Data Reports

Table 9.8: Amendment 80 Fleet Annual Revenue from All Sources, including Volume and Value of Total Fishery Product Sales, Other Vessel Income, and License Sales, Fleet Total and Median Vessel Values

		Volume (1,000t)			Revenue ($million)		
	Year	Obs	Median	Total	Obs	Median	Total
Total Fishery Product Sales	2010	20	9.76	183.48	20	$ 14.69	$ 319.96
	2011	20	10.17	196.97	20	$ 20.65	$ 422.18
	2012	20	9.39	198.31	20	$ 19.45	$ 405.52
	2013	18	10.38	195.42	18	$ 15.87	$ 314.07
	2014	18	10.65	202.93	18	$ 17.95	$ 346.64
Other Income from Vessel Operations	2010	-	-	-	1	$ *	$ *
	2011	-	-	-	0	$ -	$ 0.00
	2012	-	-	-	1	$ *	$ *
	2013	-	-	-	1	$ *	$ *
	2014	-	-	-	0	$ -	$ 0.00
LLP License Sales, All	2010	-	-	-	0	$ -	$ -
	2011	-	-	-	0	$ -	$ 0.00
	2012	-	-	-	0	$ -	$ -
	2013	-	-	-	0	$ -	$ -
	2014	-	-	-	0	$ -	$ -

Notes: All dollar values are inflation-adjusted to 2014-equivalent value. Fleet aggregate catch and production volumes are shown in 1000s of metric tons(t), and fleet aggregate and average revenue values are shown in $million. "*", indicates value is suppressed for confidentiality.

Source: Amendment 80 Economic Data Reports.

9.4. Quota Share Transfers

Table 9.9 reports information available for A80 quota share (QS) lease transfer activity over the period since the program was implemented. Transfer activity within the fishery has been limited, largely reflecting the continued operation of most of the eligible vessels. Due to the small number of transfers, with the exception of lease transfers of yellowfin sole QS during 2014, reporting of these results is largely limited to the number of QS permits for which owners reported some volume of lease transfer activity, either as lessor or lessee. The number of QS permit holders leasing out QS to A80 vessels has ranged from zero (0) to as many as 9, and vessels leasing QS permits from A80 QS permit holders ranges from 0 to 8; the most active leasing has occurred in yellowfin sole QS, in 2012 and 2014, respectively. During 2014, a total of 18 thousand t of yellowfin sole QS was leased, for a total of $1.3 million (not shown in Table 9.9), or approximately $70 per t.

9.5. Capital Expenditures and Vessel Operating Costs

Table 9.10 reports capital expenditures in the fishery for investments in on-board fishing and processing equipment, maintenance and improvements to the vessel and onboard equipment, and other capital expenditures associated with operations of the vessel. Data reported exclude any expenditures for onshore equipment or facilities, and reflect the capitalized cost of new investments purchased during the year; payments for principal and debt servicing on financed assets previously purchased are not included. Due to the infrequency of large investments, capital expenditures by category vary widely at both the fleet- and vessel level, with many owners reporting no expenditures for one or more categories of investment in some or most years. Total fleet aggregate capital expenditures have varied between $8.9-$18.4 million over the 2010-2014 period, $14.2 million during 2014. On an average basis, aggregate capital expenditure has varied between $531 thousand to a high of $885 thousand, the latter occurring in 2013. General maintenance and improvements in vessel capital, including hull, propulsion, onboard electronics and other equipment, exclusive of fishing and processing equipment, have comprised the largest and most frequently reported category of investment overall (accounting for 53% of all capital investment costs reported over the period). Thirteen vessels reported such investment in 2014, totaling nearly $6.7 million, with a median of $395,000.

Table 9.11 summarizes the reported annual costs incurred by A80 CPs as operating expenses for fishing and processing operations, by expense item and year, and provides results of prorata indexing for each cost item in terms of cost per day (fleet aggregate and median vessel-activity days), cost per t of finished product for the year, and as a ratio of cost to aggregate revenue. Costs are grouped into the following categories: materials (fuel, lubrication and fluids, production and packaging materials, and raw fish purchases); gear (repair and maintenance, fishing gear, and equipment leases); labor costs (including wage and payroll tax payments for fishing crews, processing employees, and other on-board personnel, benefits and other payroll-related costs, and food and provisions); overhead (administrative costs and insurance); fees; and freight services. It should be noted that the categorized expenses constitute the majority of operating costs incurred, but are not inclusive of all expenses (notably, quota lease costs that are incurred by a small number of vessels cannot be reported due to confidentiality; see Table 9.9 below). As such, the cost-to-revenue index, along with other prorata indices, provides a relative index of profitability in the fishery, but does not represent a comprehensive metric of operating profit.

Aggregate operating expenses for the active fleet during 2014 totaled $261 million, up 5.6% from $247 million in 2013. Consistent with previous years, labor costs, including direct wages, benefits, and at-sea provisions, represented the largest category of expenses at $105 million in total (40% of total operating costs for the year), with a median vessel cost of $5.6 million. Direct payments to labor totaled $89 million for 2014, including approximately $14 million paid to fishing crews, $44 million to processing employees, and $31 million to other on-board employees (captains and other officers, engineers, and others). On a daily basis, aggregate fishing crew payment during 2014 was $2,734, and represented 4.15% of total gross revenue, with processing labor accounting for 12.65% of gross revenue.

Fuel costs for the fleet for 2014 were largely unchanged from 2013, totaling $49 million, 19% as a proportion of overall costs, and approximately $2.6 million on a median vessel basis. Repair and maintenance expenses for 2014 decreased to $28 million across the fleet, representing 10.6% of overall costs, and $1.5 million on a median basis. General administrative and insurance costs increased to $20.5 million and $12.7 million, respectively (7.8% and 4.9% of total aggregate expenses). The remaining operating cost items shown in Table 9.11, including fishing gear purchase, vessel and equipment lease costs, freight and shipping, and taxes and fees, made up an additional 16.8% of total operating expenses for 2014. Reported operating costs for 2014 in total accounted for $1,287 per t of finished product sold, approximately 75% of total sales revenue.

Table 9.9: Amendment 80 Quota Share (QS) Transfer and Lease Activity

	Year	QS Leased To Others	QS Leased From Others
Atka mackerel	2010	4	1
	2011	5	1
	2012	0	0
	2013	0	0
	2014	0	0
Flathead sole	2010	0	0
	2011	0	1
	2012	1	1
	2013	0	0
	2014	0	0
Rockhead sole	2010	0	0
	2011	0	1
	2012	4	3
	2013	0	0
	2014	0	0
Yellowfin sole	2010	0	0
	2011	5	3
	2012	9	3
	2013	7	3
	2014	7	8
Pacific cod	2010	4	1
	2011	1	5
	2012	1	1
	2013	3	3
	2014	0	0
Pacific Ocean perch	2010	2	1
	2011	2	2
	2012	3	1
	2013	0	0
	2014	1	0
Other species	2010	0	0
	2011	2	1
	2012	0	1
	2013	0	0
	2014	0	2
Halibut PSC	2010	0	0
	2011	0	0
	2012	1	0
	2013	0	0
	2014	0	0
Crab PSC	2010	0	0
	2011	0	0
	2012	0	0
	2013	0	0
	2014	0	0

Notes: Quantity and value of lease transfers cannot be shown due to confidentiality restrictions.

Source: Amendment 80 Economic Data Reports.

Table 9.10: Amendment 80 Fleet Capital Expenditures by Category and Year, Fleet Total and Median Vessel Values

	Year	Obs	Expenditure Per Vessel, Median ($1,000)	Total Fleet Expenditure ($million)	Percent Of Total Annual Capital Expenditures
Fishing gear	2010	8	$ *	$ *	* %
	2011	9	$ 105.56	$ 1.32	15 %
	2012	10	$ 280.36	$ 2.96	16 %
	2013	9	$ 76.23	$ 1.53	9 %
	2014	9	$ 70.37	$ 0.93	7 %
Other capital expenditures	2010	4	$ *	$ *	* %
	2011	8	$ 145.20	$ 1.91	21 %
	2012	7	$ 100.20	$ 0.87	5 %
	2013	8	$ 112.43	$ 0.86	5 %
	2014	10	$ 171.45	$ 4.40	31 %
Processing gear	2010	13	$ 162.25	$ 3.07	28 %
	2011	10	$ 157.76	$ 2.51	28 %
	2012	14	$ 82.90	$ 3.13	17 %
	2013	9	$ 142.30	$ 5.04	28 %
	2014	8	$ 113.87	$ 2.19	16 %
Vessel and other onboard equipment	2010	15	$ 115.00	$ 5.65	51 %
	2011	11	$ 130.63	$ 3.16	35 %
	2012	18	$ 67.35	$ 11.45	64 %
	2013	11	$ 554.47	$ 10.58	59 %
	2014	13	$ 395.00	$ 6.67	48 %
Total over all capital costs	2010	15	$ 555.03	$ 10.88	- %
	2011	11	$ 539.14	$ 8.89	- %
	2012	18	$ 530.82	$ 18.41	- %
	2013	11	$ 885.43	$ 18.01	- %
	2014	13	$ 750.69	$ 14.18	- %

Notes: All dollar values are inflation-adjusted to 2014-equivalent value. Fleet average dollar values are shown in $1,000 and total aggregate values are shown in $millions. “*” indicates value is suppressed for confidentiality.

Source: Amendment 80 Economic Data Reports.

Table 9.11: Amendment 80 Fleet Fishing and Processing Operating Expenses, by Category and Year, Fleet Total and Median Vessel Values, with Prorata Indices

		Year	Obs	Cost Per Vessel, Median ($1,000)	Total Fleet Cost ($million)	Cost Percent Of Total Annual Expenses	Cost/Vessel - Day Fleet, Total $US	Cost/t Sold Fleet, Total $US	Cost Percent Of Total Vessel Revenue
	Food and Provisions	2010	17	$ 297	$ 5.02	2.02 %	$ 935	$ 27	1.57 %
		2011	17	$ 359	$ 5.79	1.91 %	$ 1,064	$ 29	1.37 %
		2012	17	$ 348	$ 5.75	1.90 %	$ 1,103	$ 29	1.42 %
		2013	15	$ 344	$ 5.79	2.35 %	$ 1,135	$ 30	1.84 %
		2014	15	$ 291	$ 6.11	2.34 %	$ 1,159	$ 30	1.76 %
	Labor Payment, Fishing Crew	2010	20	$ 663	$ 14.19	5.71 %	$ 2,641	$ 77	4.43 %
		2011	20	$ 914	$ 17.79	5.88 %	$ 3,268	$ 90	4.21 %
		2012	20	$ 795	$ 17.02	5.62 %	$ 3,266	$ 86	4.20 %
		2013	18	$ 667	$ 13.27	5.38 %	$ 2,601	$ 68	4.23 %
		2014	18	$ 792	$ 14.40	5.52 %	$ 2,734	$ 71	4.15 %
Labor	Labor Payment, Other Employees	2010	20	$ 1,494	$ 30.27	12.19 %	$ 5,635	$ 165	9.46 %
		2011	20	$ 2,002	$ 38.09	12.59 %	$ 6,997	$ 193	9.02 %
		2012	20	$ 2,114	$ 38.96	12.87 %	$ 7,477	$ 196	9.61 %
		2013	18	$ 1,662	$ 29.32	11.88 %	$ 5,745	$ 150	9.34 %
		2014	18	$ 1,663	$ 30.93	11.85 %	$ 5,870	$ 152	8.92 %
	Labor Payment, Processing Employees	2010	20	$ 1,982	$ 44.22	17.81 %	$ 8,232	$ 241	13.82 %
		2011	20	$ 2,695	$ 54.17	17.90 %	$ 9,952	$ 275	12.83 %
		2012	20	$ 2,666	$ 54.10	17.87 %	$ 10,381	$ 273	13.34 %
		2013	18	$ 1,992	$ 40.56	16.43 %	$ 7,947	$ 208	12.91 %
		2014	18	$ 2,264	$ 43.84	16.79 %	$ 8,321	$ 216	12.65 %
	Other Employment Related Costs	2010	20	$ 428	$ 9.33	3.76 %	$ 1,737	$ 51	2.92 %
		2011	20	$ 545	$ 12.44	4.11 %	$ 2,285	$ 63	2.95 %
		2012	20	$ 519	$ 9.81	3.24 %	$ 1,883	$ 49	2.42 %
		2013	18	$ 605	$ 10.43	4.23 %	$ 2,044	$ 53	3.32 %
		2014	18	$ 557	$ 10.30	3.95 %	$ 1,955	$ 51	2.97 %

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Table 9.11: Continued

		Year	Obs	Cost Per Vessel, Median ($1,000)	Total Fleet Cost ($million)	Cost Percent Of Total Annual Expenses	Cost/Vessel - Day Fleet, Total $US	Cost/t Sold Fleet, Total $US	Cost Percent Of Total Vessel Revenue
Gear	Fishing Gear	2010	20	$ 432	$ 8.77	3.53 %	$ 1,632	$ 48	2.74 %
		2011	20	$ 366	$ 9.62	3.18 %	$ 1,768	$ 49	2.28 %
		2012	19	$ 395	$ 9.58	3.17 %	$ 1,839	$ 48	2.36 %
		2013	18	$ 479	$ 8.61	3.49 %	$ 1,687	$ 44	2.74 %
		2014	18	$ 396	$ 7.80	2.99 %	$ 1,481	$ 38	2.25 %
	Freight	2010	20	$ 74	$ 1.67	0.67 %	$ 311	$ 9	0.52 %
		2011	20	$ 65	$ 1.86	0.61 %	$ 341	$ 9	0.44 %
		2012	20	$ 67	$ 1.86	0.61 %	$ 356	$ 9	0.46 %
		2013	18	$ 87	$ 1.84	0.75 %	$ 361	$ 9	0.59 %
		2014	18	$ 109	$ 2.33	0.89 %	$ 442	$ 11	0.67 %
	Lease Expenses	2010	6	$ 5	$ 0.14	0.06 %	$ 27	$ 1	0.05 %
		2011	7	$ 7	$ 0.09	0.03 %	$ 17	$ 0	0.02 %
		2012	8	$ 10	$ 0.11	0.04 %	$ 21	$ 1	0.03 %
		2013	6	$ 8	$ 0.08	0.03 %	$ 15	$ 0	0.02 %
		2014	5	$ 18	$ 0.10	0.04 %	$ 19	$ 0	0.03 %
	Repair and Maintenance	2010	20	$ 1,799	$ 41.34	16.65 %	$ 7,695	$ 225	12.92 %
		2011	19	$ 1,527	$ 36.21	11.97 %	$ 6,652	$ 184	8.58 %
		2012	20	$ 1,778	$ 43.37	14.33 %	$ 8,323	$ 219	10.70 %
		2013	18	$ 1,907	$ 35.96	14.56 %	$ 7,045	$ 184	11.45 %
		2014	18	$ 1,511	$ 27.57	10.56 %	$ 5,233	$ 136	7.95 %

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Table 9.11: Continued

		Year	Obs	Cost Per Vessel, Median ($1,000)	Total Fleet Cost ($million)	Cost Percent Of Total Annual Expenses	Cost/Vessel - Day Fleet, Total $US	Cost/t Sold Fleet, Total $US	Cost Percent Of Total Vessel Revenue
Overhead	General Administrative Cost	2010	16	$ 771	$ 12.12	4.88 %	$ 2,256	$ 66	3.79 %
		2011	16	$ 1,209	$ 28.24	9.33 %	$ 5,189	$ 143	6.69 %
		2012	20	$ 744	$ 28.33	9.36 %	$ 5,438	$ 143	6.99 %
		2013	18	$ 555	$ 13.40	5.43 %	$ 2,626	$ 69	4.27 %
		2014	16	$ 1,272	$ 20.46	7.84 %	$ 3,883	$ 101	5.90 %
	Insurance	2010	20	$ 523	$ 11.19	4.51 %	$ 2,084	$ 61	3.50 %
		2011	20	$ 523	$ 14.22	4.70 %	$ 2,612	$ 72	3.37 %
		2012	20	$ 596	$ 16.04	5.30 %	$ 3,079	$ 81	3.96 %
		2013	17	$ 572	$ 9.45	3.83 %	$ 1,852	$ 48	3.01 %
		2014	17	$ 703	$ 12.67	4.85 %	$ 2,405	$ 62	3.66 %
Services	Freight and Storage	2010	8	$ 1,523	$ 15.21	6.13 %	$ 2,832	$ 83	4.75 %
		2011	4	$ *	$ *	* %	$ *	$ *	* %
		2012	4	$ *	$ *	* %	$ *	$ *	* %
		2013	4	$ *	$ *	* %	$ *	$ *	* %
		2014	7	$ 2,962	$ 20.31	7.78 %	$ 3,854	$ 100	5.86 %
Fees	Cooperative Costs	2010	14	$ 77	$ 1.10	0.44 %	$ 204	$ 6	0.34 %
		2011	16	$ 84	$ 1.34	0.44 %	$ 247	$ 7	0.32 %
		2012	16	$ 83	$ 1.21	0.40 %	$ 232	$ 6	0.30 %
		2013	14	$ 92	$ 1.10	0.44 %	$ 215	$ 6	0.35 %
		2014	14	$ 67	$ 0.96	0.37 %	$ 183	$ 5	0.28 %
	Fish Tax	2010	20	$ 87	$ 2.08	0.84 %	$ 387	$ 11	0.65 %
		2011	20	$ 104	$ 2.19	0.72 %	$ 402	$ 11	0.52 %
		2012	20	$ 143	$ 3.22	1.06 %	$ 617	$ 16	0.79 %
		2013	18	$ 161	$ 3.25	1.31 %	$ 636	$ 17	1.03 %
		2014	18	$ 152	$ 2.78	1.06 %	$ 527	$ 14	0.80 %
	Observer	2010	20	$ 203	$ 3.97	1.60 %	$ 738	$ 22	1.24 %
		2011	20	$ 204	$ 3.84	1.27 %	$ 705	$ 19	0.91 %
		2012	19	$ 196	$ 3.75	1.24 %	$ 720	$ 19	0.92 %
		2013	18	$ 209	$ 3.76	1.52 %	$ 738	$ 19	1.20 %
		2014	18	$ 213	$ 3.86	1.48 %	$ 733	$ 19	1.11 %

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Table 9.11: Continued

		Year	Obs	Cost Per Vessel, Median ($1,000)	Total Fleet Cost ($million)	Cost Percent Of Total Annual Expenses	Cost/Vessel - Day Fleet, Total $US	Cost/t Sold Fleet, Total $US	Cost Percent Of Total Vessel Revenue
Materials	Fuel	2010	20	$ 1,968	$ 37.78	15.21 %	$ 7,032	$ 206	11.81 %
		2011	20	$ 2,230	$ 46.78	15.46 %	$ 8,595	$ 238	11.08 %
		2012	20	$ 2,491	$ 48.12	15.90 %	$ 9,234	$ 243	11.87 %
		2013	18	$ 2,778	$ 49.27	19.95 %	$ 9,653	$ 252	15.69 %
		2014	18	$ 2,619	$ 48.91	18.73 %	$ 9,283	$ 241	14.11 %
	Lubrication and Fluids	2010	20	$ 101	$ 5.71	2.30 %	$ 1,064	$ 31	1.79 %
		2011	20	$ 116	$ 8.30	2.74 %	$ 1,524	$ 42	1.97 %
		2012	19	$ 116	$ 2.42	0.80 %	$ 465	$ 12	0.60 %
		2013	18	$ 136	$ 2.70	1.09 %	$ 529	$ 14	0.86 %
		2014	18	$ 109	$ 2.39	0.91 %	$ 453	$ 12	0.69 %
	Product and Packaging Materials	2010	20	$ 182	$ 4.16	1.67 %	$ 774	$ 23	1.30 %
		2011	20	$ 262	$ 4.77	1.58 %	$ 876	$ 24	1.13 %
		2012	20	$ 253	$ 5.20	1.72 %	$ 998	$ 26	1.28 %
		2013	18	$ 224	$ 4.83	1.96 %	$ 947	$ 25	1.54 %
		2014	18	$ 284	$ 5.38	2.06 %	$ 1,020	$ 26	1.55 %
	Raw Fish Purchases	2010	1	$ *	$ *	* %	$ *	$ *	* %
		2011	1	$ *	$ *	* %	$ *	$ *	* %
		2012	1	$ *	$ *	* %	$ *	$ *	* %
		2013	1	$ *	$ *	* %	$ *	$ *	* %
		2014	0	$ -	$ 0.00	0.00 %	$ 0	$ 0	0.00 %

Continued on next page.

Table 9.11: Continued

	Year	Obs	Cost Per Vessel, Median ($1,000)	Total Fleet Cost ($million)	Cost Percent Of Total Annual Expenses	Cost/Vessel - Day Fleet, Total $US	Cost/t Sold Fleet, Total $US	Cost Percent Of Total Vessel Revenue
	2010	20	$ 12,645	$ 248.00	100.00 %	$ 46,222	$ 1,353	77.61 %
Total	2011	20	$ 18,574	$ 303.00	100.00 %	$ 55,589	$ 1,536	71.67 %
Over All	2012	20	$ 17,920	$ 303.00	100.00 %	$ 58,085	$ 1,526	74.64 %
Expenses	2013	18	$ 16,621	$ 247.00	100.00 %	$ 48,380	$ 1,264	78.62 %
	2014	18	$ 15,979	$ 261.00	100.00 %	$ 49,556	$ 1,287	75.33 %

Notes: All dollar values are inflation-adjusted to 2014-equivalent value; average dollar values are shown in $1000 and total aggregate values are shown in $million. "*" indicates value is suppressed for confidentiality.

Source: Amendment 80 Economic Data Reports.

9.6. Employment

Table 9.12 displays aggregate and median statistics for employment in the fleet, in terms of total number of individuals employed during all or part of the year, and the number of positions on-board vessels at a given time, by labor category. Total fishing crew positions for the fleet in aggregate was 106, largely constand over the last three years, and the total number of individuals participating as crew during 2013 was 239, increased from 214 in 2013. Median crew positions per vessel has remained unchanged at 6, while the median number of distinct crew members employed per vessel increased from 8 to 11, indicating an increase in the level of turnover for fishing crew during 2014. Processing employment shows the same pattern over the most recent 3-year period, remaining largely constant at about 445 total positions, while median number of positions per vessel is largely constant at 23-24. In contrast, employment of other types of positions, which include officers, engineers, and others involved in onboard management and record-keeping, decreased to a total 150 positions across the fleet during 2014 from the previous high of 170 during 2012.

Table 9.12: Amendment 80 Fleet Employment, Fishing, Processing, and Other Positions On-Board, Fleet Total and Median Vessel Values

		Year	Obs	Median	Total
Fishing	Number of Employees During the Year	2010	20	13	294
		2011	20	9	234
		2012	20	10	242
		2013	18	8	214
		2014	18	11	239
	Positions on Board	2010	20	6	114
		2011	20	6	111
		2012	20	6	107
		2013	18	6	105
		2014	18	6	106
Processing	Number of Employees During the Year	2010	20	67	1,567
		2011	20	61	1,234
		2012	20	52	1,296
		2013	18	59	1,183
		2014	18	75	1,300
	Positions on Board	2010	20	23	476
		2011	20	23	473
		2012	20	23	448
		2013	18	23	437
		2014	18	24	449
Other	Number of Employees During the Year	2010	20	19	549
		2011	20	18	356
		2012	20	20	436
		2013	18	19	383
		2014	18	18	347
	Positions on Board	2010	20	7	145
		2011	20	7	150
		2012	20	7	170
		2013	18	7	160
		2014	18	7	140

Notes: Average positions on board reflects the number of individuals employed at one time, by employment category; number of employees during the year counts each unique person employed over the course of the year. The latter reflects turnover in employment when compared to the average number of positions.

Source: Amendment 80 Economic Data Reports.

9.7. Citations

Northern Economics, Inc., 2014. Five-Year Review of the Effects of Amendment 80. Prepared for the North Pacific Fishery Management Council. September, 2014.

10. COMMUNITY PARTICIPATION IN NORTH PACIFIC GROUNDFISH FISHERIES

The U.S. Census Bureau's 2013 American Community Survey reports a total of 355 "Places" in Alaska; these are cities, towns, and communities with populations.[1] The breadth of fishing involvement in Alaskan communities is significant. This substantial degree of participation points toward the significance of fishery-related activity to the overall economy and social organization of Alaska. This section is meant to serve as an overview of the state as a whole. It provides aggregate information for these communities as well as a context in which to interpret this information. The data in this section is expected to be updated every two to three years.

10.1. People and Places

10.1.1 Location

Vast in scale and diverse in latitude and topography, Alaska exhibits tremendous variation in its climate, from maritime climatic zones in the Gulf of Alaska to arctic zones in the far north. All regions, however, are influenced to some extent by storms from the North Pacific Ocean as they move eastward from Asia. There is also a great deal of variability in Alaska's weather from one year to the next, primarily due to the shifting path of the jet stream.

Climate, topography and latitude all have an influence on the ecology of Alaska's different regions, and these ecological differences in turn determine the species composition of fish and patterns of human use. Alaska's diverse marine and terrestrial ecosystems provide habitat for 436 fish species, including 52 freshwater or anadromous species and 384 saltwater species.[2] From pelagic species to estuarine species to freshwater fish living in inland lakes and streams, Alaska produces a huge volume of aquatic life. The people who live in Alaska—Native groups whose ancestral history in the region stretches back thousands of years, and newly arrived residents alike—have co-evolved with Alaska's marine life, and have come to depend on it for their livelihoods.

The geographical dispersion of Alaska's communities reflects several phenomena. From an ecological perspective, these communities, with a few exceptions, are located on or near the coastline where dependence on marine resources would be expected to be high. Their locations also reflect historical settlement patterns, first by Alaska Natives, and by Europeans beginning in the 18th century.

10.1.2 Demographic Profile

Alaskan fishing communities represent a diversity of demographic, socio-economic and historical conditions. In terms of size, some communities are large municipalities that serve as regional economic hubs, such as Anchorage, while other communities are relatively isolated and have only

[1] U.S. Census Bureau (2013). *Profile of selected social, economic and housing characteristics of all places within Alaska.* Datasets utilized include the 2013 5-year estimates from the American Community Survey. Retrieved August 11, 2015 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

[2] Armstrong, Rober H. (1996) *Alaska's Fish: A guide to selected species. Anchorage: Alaska Northwest Books.*

a few dozen inhabitants. There are 145 city governments in Alaska[3] and 16 organized boroughs (Bockhorst 2001).[4] A First Class City, or Home Rule City, must have at least 400 permanent residents. A city may incorporate as Second Class if it has 25 voters. In the rest of the U.S., the difference between a 400-person and a 25-person (voter) community would hardly be recognized, since both communities would be considered quite small. But in Alaska, a population of 400 is relatively substantial. Between 2009 and 2013, 18 CDPs did not have a positive population. Of the 337 Census communities (Places) in Alaska with a positive population in 2013, 58.5% (197 communities) had fewer than 400 residents, while 6.5% (22 communities) had fewer than 25 residents (Table 10.1). In comparison, other states have a very small percentage of their populations living in communities of less than 400.

Table 10.1: Census Places with a positive population in Alaska by population size, and cumulative percent in 2013.

Population	Number of Census Places	Cum. %	Mean	Median	Min	Max
≤25	22	6.5%				
25-400	175	58.5%				
400-4,000	112	91.7%				
4,000-20,000	24	98.8%				
20,000+	4	100%				
Total population	*700,300*		*1,972*	*248*	*0*	*295,237*

Source: U.S. Census Bureau (2013). *Profile of selected social, economic and housing characteristics of all places within Alaska.* Datasets utilized include the 2013 5-year estimates from the American Community Survey. Retrieved August 11, 2015 from `http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml`.

One of the most important stories that emerges is how quickly many Alaskan communities have experienced demographic change. Population numbers in certain communities have swelled in recent years, a trend that is in large measure driven by fisheries-related activities. Unalaska, for example, was transformed from a community of less than 200 in 1970 into a booming small city of 4,362 residents in between 2009 and 2013.[5] This dramatic transformation coincided with the Magnuson-Stevens Fisheries Management and Conservation Act's "Americanization" of the groundfish fleet in North Pacific waters and the subsequent growth of the fish processing industry, both onshore and at sea. Communities in Southeast Alaska underwent a similar transformation in response to the growth of the international market in salmon, which has been tempered in recent years by foreign competition from the salmon farming industry. In general, communities that have experienced rapid population growth have also seen an influx of racial and ethnic minorities-particularly Asians and Latinos-as the fishing industry has become a global enterprise that draws labor from around the world. By contrast, many Native communities that participate in commercial fishing have lived in situ for centuries and have maintained relatively stable populations since the beginning of U.S. Census data collection. Some communities have experienced population decline in recent years as

[3] Incorporated cities are automatically recognized by the Census as Places.

[4] Bockhorst, Dan. (2001). *Local Government in Alaska.* February 2001. Alaska Department of Community and Economic Development: Anchorage. Retrieved November 5, 2012 from `http://www.commerce.state.ak.us/dca/lbc/pubs/Local_Gov_AK.pdf`.

[5] U.S. Census Bureau (2013). *Profile of selected social, economic and housing characteristics of all places within Alaska.* Datasets utilized include the 2013 5-year estimates from the American Community Survey. Retrieved August 11, 2015 from `http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml`.

local economic conditions (especially those recently influenced by global trends) make getting by more difficult and opportunities elsewhere draw residents away.

When considering a snapshot of the nation's population as provided by the decennial U.S. Census, the population is segmented into racial categories (White, Black, Alaska Native or American Indian, Asian, Native Hawaiian or Other Pacific Islander, Some Other Race, and Two or More Races) as well as ethnic categories (Hispanic or Non-Hispanic). For purposes of comparison, Table 10.2 provides the racial and ethnic distribution seen both across Alaska and the U.S.

One of the most interesting characteristics of Alaskan communities is the bi-modal nature of racial structure. Throughout the state, most commonly, communities either have a significant majority of the community that considers themselves White or a majority that considers themselves to be Alaska Native. For example, in the 2009-2013 American Community Survey, 33.2% (118 communities) exhibited at least 75% White residents and 37.7% (134 communities) exhibited more than 75% Native Alaskan residents. Many of the communities with the highest percentages of White residents are located in Southeast Alaska or on the Kenai Peninsula, both areas which had a large boom of White settlers partly because of resource extraction-Southeast Alaska in the late 1800s and early 1900s, and the Kenai Peninsula in the 1950s. Today, both areas are also the densest sites of sport fishing in the state, providing sport lodges and a plethora of guiding services. The communities with the highest percentages of Native residents are predominantly located in Western Alaska. Western Alaska is home to a predominantly Native population, in part because the region has a less extensive history of European colonization and natural resource extraction compared to other areas of the state.

The remaining categories of racial and ethnic groups are not nearly as abundant. The largest communities in the state contain higher percentages of Black or African American residents than many other communities (Fairbanks 11.2% in 2000 and 9.5% in 2009-2013, Anchorage 5.8% and 5.9% in 2009-2013, and Juneau 0.8% and 0.9% in 2009-2013). The remaining communities with higher percentages of Black residents are located for the most part in on the Alaska Peninsula and Aleutian Islands.

The communities with the largest percentages of Asian residents are primarily major fishing ports with large fish processing plants. Fish processing remains an under-studied sector of Alaska's fisheries; however, according to anecdotal evidence, Asian migrant workers, particularly from the Philippines and other areas of Southeast and East Asia, make up a large portion of fish processing workers in many communities. Akutan, for example, has a particularly high percentage of Asian processing workers (43.2% of the 2009-2013 estimated population). About 71.5% (46.7% in 2000) of communities did not include any Asian residents.

Between 2009-2013, only about 8.5% of communities included any Native Hawaiians or Other Pacific Islanders, compared to 27.3% in 2000. Many of the communities with the highest percentages of Native Hawaiian or Other Pacific Islanders are small communities where one person or one family can have a large impact on overall percentages. On average, Alaskan communities were only 1.8% Hispanic in 2000 and 2.4% Hispanic in 2009-2013, with a range of 0% to 20.8% in 2000 and 0% to 59.1% in 2009-2013. Communities with the highest percentage of Hispanic residents tend to be heavily involved in fish processing, which provides job opportunities for seasonal workers. Many of these communities are located on the Alaska Peninsula and the Aleutian Islands.

The ratio of men to women in many Alaskan communities tells the peculiar story of labor mobility in industries such as fishing and oil extraction. Most of the communities have more men than women, but this is particularly true of communities that rely heavily on fishing and fish processing. When compared to the overall U.S. population, which is approximately equally distributed between men and women (49.1% male in 2000 and 49.2% in 2009-2013), and even when compared to the overall population of the State of Alaska (51.7% male in 2000 and 52.2% in 2009-2013), a majority of the communities are more heavily skewed toward male residents. Over 70% in 2000 and 44.8% in 2009-2013 of Alaskan communities had male percentage greater than the state average. A considerable number of those communities which have the highest ratio of men to women are located in Southwest Alaska (in the Alaska Peninsula and Aleutian Islands), and in Southeast Alaska. Both of these areas are heavily involved in commercial fishing and fish processing, labor sectors that tend to be male-dominated.

By contrast, large communities, communities with less transient employment opportunities, and some traditional Native communities, tend to be much more balanced in terms of gender composition. Anchorage (50.6% male in 2000 and 50.9% in 2009-2013), Ketchikan (50.4% male in 2000 and 53.1% in 2009-2013), and Juneau (50.4% male in 2000 and 51.4% in 2009-2013) are all relatively balanced in terms of gender composition and all have large populations by Alaska standards. These communities also have a wider variety of employment opportunities such as tourism, finance, real estate, communications, government, mining, timber, and oil and gas industries. These more metropolitan communities follow the relatively balanced gender pattern of other major metropolitan areas in the United States. Some remote and largely Native communities, such as Newhalen (50% male in 2000 and 43.1% in 2009-2013) and Hooper Bay (49.7% male in 2000 and 52.2% in 2009-2013), have very balanced gender structures as well, in part because of the somewhat more limited commercial fishing opportunities; neither community had a fish processing plant. Iliamna, Kasaan, Point Baker and Rampart all have exactly balanced gender structures; each of these communities has a population under 100 and lack commercial crew or processing employment. Some communities have more females than males, but this is considerably less common, with only 28.5% of Alaskan communities having more than 50% women.

The age structure in many of Alaskan communities is also telling. The average median age of communities was 32.7 years in 2000 and 35.5 years in 2009-2013, somewhat younger than the U.S. median of 35.3 years in 2000 and 37.3 in 2009-2013. This indicates a slight trend toward a young working-age population with few elderly residents for the entire State of Alaska. Approximately 56.3% of Alaskan communities have a lower median age than the U.S. average. This is due in part to the physical demands of the work and the transient nature of employment in fishing and fish processing. It is also influenced by the relative absence of the elderly in the small coastal communities of Alaska, except in traditionally Alaska Native communities. These trends are also represented graphically in Figure 10.1.

10.2. Current Economy

There were 307,990 Alaskan residents employed throughout the state in 2013, compared to 284,000 in 2000. The government sector-including state and local levels-was the largest in terms of employment figures, with 69,644 jobs in 2013 and 74,500 jobs in 2000. In 2000, this was followed by services/miscellaneous (73,300), trade (57,000), transportation, communications and utilities (27,300), manufacturing (13,800, with seafood processing contributing the bulk of jobs at 8,300)

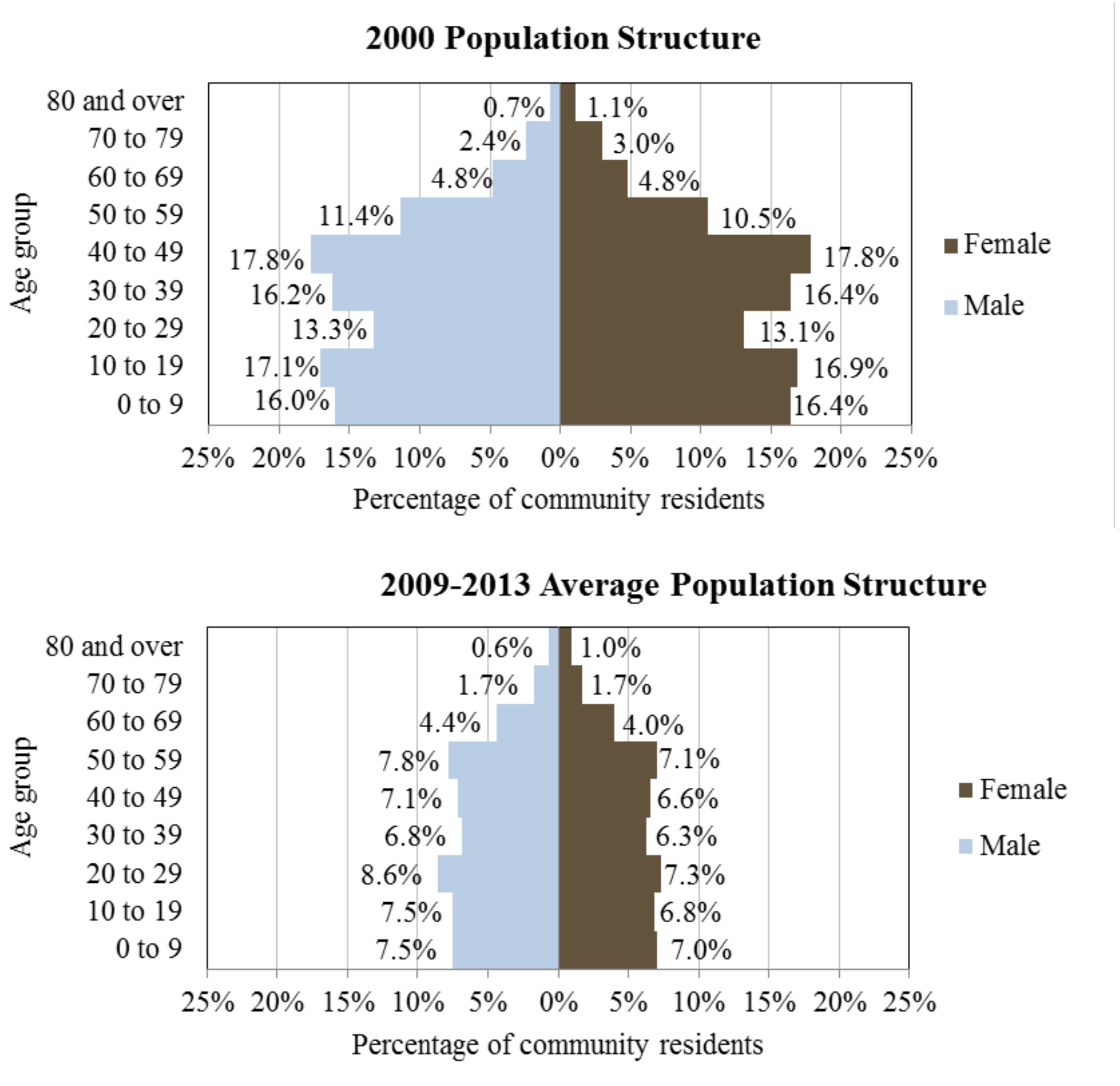

Figure 10.1: Population structure of the population as a whole in Alaska.
Source: U.S. Census Bureau. (n.d.). *Profile of selected social, economic and housing characteristics of all places within Alaska.* Datasets utilized include the 2000 Decennial Census (SF1 100% and SF3 sample data) and 2013 5-year estimates from the American Community Survey. Retrieved August 11, 2015 from `http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml`.

and mining (10,300, with oil and gas extraction contributing the most jobs at 8,800). This changed slightly in 2013 to where trade transportation and utilities (62,919 or 20.4%) providing the most jobs, followed by educational and health services (44,716 or 14.5%), leisure and hospitality (30,240 or 9.8%) and professional and business services (27,768 or 9.0%).[6] Employment in commercial fishing

[6]Statistics in this paragraph are sourced from 1) Alaska Department of Labor and Workforce Development. (2001). The Year 2000 in Review: Growth Picks up in Alaska in 2000. *Alaska Economic Trends 2001.* Anchorage: Alaska Department of Labor and Workforce Development; and 2) Alaska Department of Labor and Workforce Development (n.d.). *Alaska Local and Regional Information Database.* Retrieved August 11, 2015 from `http://live.laborstats.alaska.gov/alari/`.

has declined over the past decade. Despite this decline, the commercial fishing and fish processing industries remain an important factor in Alaska's employment picture.[7]

Marine species were among the earliest and most important of Alaska's commercial resources, especially marine mammals. The fur trade, based on sea otter and fur seals, drove the economics of the Russian colonial empire. Commercial whaling was an important factor in the late 19th century. Some marine mammal populations have recovered from over-exploitation, while other populations remain low or are declining, affecting subsistence users and commercial fisheries.

Commercial fisheries began in the mid-1800s with salted cod, salmon, and herring, and later canned salmon. Lucrative offshore fisheries were conducted by fishing fleets from Russia, Japan and Korea, until the 1976 Magnuson Fishery Conservation and Management Act claimed the area between 3 and 200 miles offshore as the exclusive economic zone of the U.S.[8] Crab and other shellfish, herring, halibut, salmon and groundfish have all contributed to this important industry for the state, supporting a fishing economy that ranges from family fishing operations to multinational corporations, and transforming the social landscape by the immigration of workers from around the world.

Alaska's economic, social and cultural milieu continues to evolve. Major industries including oil, military and commercial fishing remain tremendously important to the state's continued growth. At the same time, new sectors such as tourism have begun to contribute noticeably to Alaska's economy. Cruise ships, recreational fishing excursions, cultural tourism and eco-tourism are on the rise as people from around the world discover Alaska's unique character.

10.3. Infrastructure

The accessibility of Alaskan communities varies tremendously, largely due to significant varying levels of economic development across different regions of Alaska. While some communities such as Anchorage, Dutch Harbor/Unalaska, and Bethel have airport facilities capable of handling jet aircraft, others have only small airstrips; still others are accessible primarily by sea. Many small communities in the Bethel and Dillingham Census Areas of Western Alaska, for example, have no roads at all, relying primarily on marine and river transport, and in some places, winter ice landing strips; ground transportation in these areas is by ATVs in the summer and snowmobiles in the winter.

Similarly, there is a great deal of variation between the communities in terms of fisheries-related and other marine facilities, also reflecting significant differences in economic development. Some of the larger communities, such as Juneau and Kodiak, serve as major commercial fishing and seafood processing centers. These communities have more than one boat harbor with moorage for hundreds of vessels, several commercial piers as well as numerous shoreside processing plants. By contrast, many smaller coastal communities, especially in Western and Northern Alaska, lack dock and harbor facilities. Many of these communities do not have stores, and residents rely on coastal supply shipments by barge from Seattle. Where there are no harbor facilities, residents must use

[7] Carothers, Courtney and Jennifer Sepez. (2005). Commercial Fishing Crew Demographics and Trends in the North Pacific. Poster presented at the *Managing Our Nation's Fisheries: Focus on the Future* Conference, Washington D.C., March 2005. Available at `ftp://ftp.afsc.noaa.gov/posters/pCarothers01_comm-fish-crew-demographics.pdf`.

[8] Rigby, Phillip W., Ackley, David R., Funk, Fritz, Geiger, Harold J., Kruse, Gordon H., and Murphy, Margaret C. (1995). *Management of the Marine Fisheries Resources of Alaska.* Regional Information Report 5J95-04. Juneau, AK: Alaska Department of Fish and Game.

small skiffs to offload the supplies and lighter them to shore. Although fishing activity occurs in these areas and provides a vital source of employment and income, the relative underdevelopment of infrastructure and facilities remains a significant barrier to economic development.

In addition to marine facilities, there is tremendous variation in access to other types of facilities, such as hospitals, hotels, and shopping centers. A few large metropolises and many smaller micropolises serve as regional hubs, providing an array of services to surrounding villages.

10.4. Involvement in North Pacific Fisheries

10.4.1 Fish Taxes in Alaska

Taxes generated by the fishing industry, particularly the fish processing sector, are a very important revenue source for communities, boroughs and the state. The Fisheries Business Tax, begun in 1913, is levied on businesses that process or export fisheries resources from Alaska. The tax is generally levied on the act of processing, but it is often referred to as a "raw fish tax," since it is based on the ex-vessel value paid to commercial fishers for their catch. Tax rates vary under the Fisheries Business Tax, depending on a variety of factors, including how well established the fishery is, and whether processing takes place on a shoreside or offshore processing facility. Although the Fisheries Business Tax is typically administered and collected by the individual boroughs, revenue from the tax is deposited in Alaska's General Fund. According to state statute, each year the state legislature appropriates half the revenue from the tax to the municipality where processing takes place or to the Department of Community and Economic Development. The Fisheries Business Tax contributed $18.2 million in fiscal year 2000 and $45 million in fiscal year 2013 to total Alaska state revenue. [9]

In addition to the Fisheries Business Tax, the state has collected the Fisheries Resource Landing Tax since 1993. This tax is levied on processed fishery resources that were first landed in Alaska, whether they are destined for local consumption or shipment abroad. This tax is collected primarily from catcher-processor and at-sea processor vessels that process fishery resources outside of the state's three-mile management jurisdiction, but within the U.S. Exclusive Economic Zone, and bring their products into Alaska for transshipment to other locales. Fishery Resource Landing Tax rates vary from 1% to 3%, depending on whether the resource is classified as "established" or "developing." According to state statute, all revenue from the Fishery Resource Landing Tax is deposited in the state's General Fund, but half of the revenue is available for sharing with municipalities. The Fishery Resource Landing Tax contributed $2.2 million in fiscal year 2000 and $13.4 million in fiscal year 2013 to total Alaska state revenue. Taken together, the Fisheries Business Tax and the Fishery Resource Landing Tax make up only a small portion of Alaska's budget, contributing only 0.87% of total state fiscal revenues in both 2000 and 2013.[10]

[9] Figures are reported in two sources: (1) Alaska Department of Revenue, Tax Division. (2000). *Fiscal Year 2000 Annual Report.* Anchorage: Alaska Department of Revenue. Retrieved November 5, 2012 from `http://www.tax.alaska.gov/programs/annualrpt2000.pdf`. (2) Alaska Department of Labor and Workforce Development (n.d.). *Alaska Local and Regional Information Database.* Retrieved August 11, 2015 from `http://live.laborstats.alaska.gov/alari/`.

[10] Figures are reported in two sources: (1) Alaska Department of Revenue, Tax Division. (2000). *Fiscal Year 2000 Annual Report.* Anchorage: Alaska Department of Revenue. Retrieved November 5, 2012 from http://www.tax.alaska.gov/programs/annualrpt2000.pdf. (2) Alaska Department of Revenue, Tax Division 2013. *2013 Annual Report.* Retrieved August 11, 2015 from: http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1095r.

In addition to these state taxes, many communities have developed local tax programs related to the fishing industry. These include taxes on raw fish transfers across public docks, fuel transfers, extraterritorial fish and marine fuel sales, and fees for bulk fuel transfer, boat hauls, harbor usage, port and dock usage, and storing gear on public land. There is no one source for data on these revenue streams; however, many communities report them in their annual municipal budgets. In addition, a request was made to communities to report this information in the 2011 AFSC survey. Where this information was provided, it has been reported in each community's profile.

10.4.2 Commercial Fishing

In particular, fisheries in Alaska have a high volume of landings compared to other areas of the country. The industry supplies the largest source of employment in the state through harvesting and processing jobs, and the economic activity of fishing produces important sources of both private and public (tax) income. Each of these topics will be discussed more below. Together, they indicate that Alaska is a very important contributor to U.S. fisheries, and that the fishing industry is a very important aspect of Alaska's economy.

A notable characteristic of Alaska fisheries from a statewide perspective is that the types of fisheries conducted are fairly diverse. Groundfish, salmon, crab, and herring all make substantial contributions to the state's fishery profile, and except for herring, each of those resource groupings involves multiple species which can be very different from one another. These fisheries are engaged in by a diverse fishing fleet with vessels ranging in size from small skiffs to more than 300 feet. These vessels utilize many harvest methods, including pelagic trawl, bottom trawl, troll, longline, purse seine, drift gillnet, setnet, pot, jig, and other commercial gear types. Divided, as they are, by species, gear type, vessel size and management area, the state limited entry permit system issues harvest permits in 326 different categories.[11] However, this diversity at the state level does not necessarily translate to communities. While a few communities, such as Kodiak, participate in the broadest range of fisheries, most communities are sustained largely by a single dominant fishery and/or gear type.

The North Pacific's commercial fisheries have changed through time with increased technology, man-power, demand, and legislation. The 1860s saw the earliest commercial fishing efforts by U.S. vessels in Alaskan waters, primarily targeting Pacific cod.[12] After the purchase of Alaska from Russia in 1867, U.S. interest in Alaska fisheries increased. Salmon and herring were two of the earliest commercial fisheries in Alaska. In the late 1800s, the product was salted for storing and shipment.[13] Improved canning technology and expanded markets led to dramatic growth in the Alaska salmon industry, with 59 canneries throughout Alaska by 1898 and 160 in operation by 1920.[14] With the development of diesel engines, commercial fisheries for Pacific halibut and groundfish had also expanded north to the Gulf of Alaska (GOA) and into the Bering Sea region

[11] State of Alaska, Commercial Fisheries Entry Commission. (2011). *Current Fishery Codes Description Table.* Retrieved November 5, 2012 from `http://www.cfec.state.ak.us/misc/FshyDesC.htm`.

[12] Rigby, Phillip W., Ackley, David R., Funk, Fritz, Geiger, Harold J., Kruse, Gordon H., and Murphy, Margaret C. (1995). *Management of the Marine Fisheries Resources of Alaska.* Regional Information Report 5J95-04. Juneau, AK: Alaska Department of Fish and Game.

[13] Woodby, Doug, Dave Carlile, Shareef Siddeek, Fritz Funk, John H. Clark, and Lee Hulbert. (2005). *Commercial Fisheries of Alaska.* Alaska Dept. of Fish and Game, Special Publication No. 05-09. Retrieved December 29, 2011 from `http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf`.

[14] Clark, McGregor, Mecum, Krasnowski and Carroll. 2006. "The Commercial Salmon Fishery in Alaska." *Alaska Fisheries Research Bulletin* 12(1):1-146. Alaska Dept. of Fish and Game. Retrieved January 4, 2012 from `http://www.adfg.alaska.gov/static/home/library/PDFs/afrb/clarv12n1.pdf`.

by the 1920s.[15] Catch of herring for bait began around 1900. A boom in processing herring for fish meal and oil took place from the 1920 to 1960s, and sac roe fisheries developed in the 1970s to provide high value product to Japanese markets. By the mid-1900s, fisheries were also developing for crab, shrimp and other shellfish, as well as an expanding variety of groundfish species. Substantial commercial exploitation of crab began in the 1950s with the development of Bering Sea king crab fisheries. Today, king crab harvests are well below their peak in 1980, when crab fisheries rivaled the highly profitable salmon industry in terms of landings value.[16]

Groundfish. The earliest commercial venture by U.S. vessels in the North Pacific was in 1865, when the first schooner reached the Bering Sea to explore the Pacific cod resource. The Pacific cod fishery had its peak at about 1916 to 1920 and then declined until approximately 1950.[17] By the 1880s, the commercial fishery for halibut had also expanded north from Washington State and B.C. to the inside waters of Southeast Alaska, with sablefish targeted as a secondary fishery.[18] With the rise of diesel engines in the 1920s, the range of fishing vessels expanded, and more consistent commercial exploitation of halibut and groundfish extended into the Gulf of Alaska and Bering Sea regions.[19]

The groundfish fisheries off of Alaska have been fished by a series of foreign nations; including Japan, Russia and Canada as major players. Canada was very active in the fishing of halibut in Alaska waters, but after 1980 the Canadian fishery in U.S. waters was phased out. Japan has been involved in flounder (yellowfin sole) and the pollock fishery, as has Russia. The flounder fisheries by both Japan and Russia declined with the collapse of yellowfin sole, with the peak in the fishery having been in 1960 at about 500,000 metric tons. More heavily targeted by both the Russians and the Japanese was the pollock fishery which started in the 1960s by Japanese trawlers. The peak of the pollock catch was in 1972 with over 1.7 million metric tons harvested by the Japanese in the Bering Sea. Russian maximum harvests of Pollock were also during this time, but were on somewhat of a smaller scale of 300,000 metric tons per year. The Bering Sea was also fished during the 60s and 70s by a small Korean fleet. The maximum total foreign catch of pollock, flatfish, rockfish, cod, and other groundfish was in 1972 at 2.2 million metric tons. The foreign fleets also moved into the Gulf of Alaska in 1960 and targeted additional species. Additional foreign nations became involved and added to this time of overexploitation including: Taiwan, Poland, West Germany, and Mexico. By the 1970s it was in Alaska's obvious interest to control foreign involvement. The groundfish fishery was Americanized with the MSFCMA in 1976, and by 1991 the foreign fishers had been transitioned out and the entire American groundfish fisheries were harvested by U.S. vessels.

[15]International Pacific Halibut Commission. 1978. *The Pacific Halibut: Biology, Fishery, and Management.* Technical Report No. 16 (Revision of No. 6).

[16]Woodby, Doug, Dave Carlile, Shareef Siddeek, Fritz Funk, John H. Clark, and Lee Hulbert. (2005). *Commercial Fisheries of Alaska.* Alaska Dept. of Fish and Game, Special Publication No. 05-09. Retrieved December 29, 2011 from `http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf`.

[17]Rigby, Phillip W., Ackley, David R., Funk, Fritz, Geiger, Harold J., Kruse, Gordon H., and Murphy, Margaret C. (1995). *Management of the Marine Fisheries Resources of Alaska.* Regional Information Report 5J95-04. Juneau, AK: Alaska Department of Fish and Game.

[18]Woodby, Doug, Dave Carlile, Shareef Siddeek, Fritz Funk, John H. Clark, and Lee Hulbert. (2005). *Commercial Fisheries of Alaska.* Alaska Dept. of Fish and Game, Special Publication No. 05-09. Retrieved December 29, 2011 from `http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf`.

[19]Thompson, William F. and Norman L. Freeman (1930). *History of the Pacific Halibut Fishery.* Report of the International Fisheries Commission. Number 5. Retrieved June 1, 2012 from `http://ww.iphc.int/publications/scirep/Report0005.pdf`.

The fisheries changed with the introduction of the first independent factory trawler in 1980 and subsequent over-harvest.[20]

Federally managed groundfish species have been organized into a License Limitation Program (LLP) permitting system. In addition to federal groundfish fisheries, the state manages parallel fisheries for Pacific cod and walleye pollock along the southern coast of the Aleutian Islands and Alaska Peninsula, Kodiak Island, and Gulf of Alaska. The Total Allowable Catch (TAC) set by NMFS in each fishery applies to both federal and parallel harvest. In addition to federally-managed groundfish fisheries, beginning in 1997, 'state-waters fisheries' for Pacific cod were initiated in Prince William Sound, Cook Inlet, Chignik, Kodiak, and the southern Alaska Peninsula areas. Management plans for state-waters fisheries are approved by the Alaska Board of Fisheries (BOF), and guideline harvest limits (GHL) are set by the ADF&G. Typically, state-waters fisheries are opened once federal and parallel fisheries close. In addition, the ADF&G manages lingcod fisheries in both state and EEZ waters off Alaska, and beginning in 1998, management of black rockfish and blue rockfish in the GOA was transferred from NMFS to ADF&G.[21]

In 1995, management of the commercial Alaskan halibut and sablefish fisheries shifted from limited entry to a system of catch shares. Motivations for the shift included overcapitalization, short seasons, and the derby-style fishery that led to loss of product quality and safety concerns. As a result of program implementation, the number of shareholders and total vessels participating in the halibut and sablefish fisheries declined substantially, and product quality has improved. This shift to catch shares has been controversial, raising concerns about equity of catch share allocation, reduced crew employment needs, and loss of quota from coastal communities to outside investors. The program includes allocation of the annual TAC of halibut and sablefish to commercial fishermen via Individual Fishing Quota (IFQ), and in the Bering Sea – Aleutian Islands (BSAI) region, quota shares are also allocated to six Community Development Quota (CDQ) non-profit organizations representing 65 communities in Western Alaska.[22] Managers of CDQ organizations authorize individual fishermen and fishing vessels to harvest a certain portion of the allocated CDQ.[23]

Although the 1995 catch share program implementation resulted in many benefits to commercial fishermen, processors, and support businesses, an unintended consequence was that many quota holders in smaller Alaskan communities either transferred quota outside the community or moved out of smaller communities themselves. In addition, as quota became increasingly valuable, entry into halibut or sablefish fisheries became difficult. In many cases, it was more profitable for small-scale operators to sell or lease their quota rather than fish it due to low profit margins and high quota value. While this issue had been addressed for the BSAI region through the CDQ program, these factors also lead to decreased participation in communities traditionally dependent on the halibut or sablefish fisheries in other regions of Alaska. To address this issue, the North Pacific Fishery Management Council (NPFMC) implemented the Community Quota Entity (CQE) program in

[20] Rigby, Phillip W., Ackley, David R., Funk, Fritz, Geiger, Harold J., Kruse, Gordon H., and Murphy, Margaret C. (1995). *Management of the Marine Fisheries Resources of Alaska.* Regional Information Report 5J95-04. Juneau, AK: Alaska Department of Fish and Game.

[21] Woodby, Doug, Dave Carlile, Shareef Siddeek, Fritz Funk, John H. Clark, and Lee Hulbert. (2005). *Commercial Fisheries of Alaska.* Alaska Dept. of Fish and Game, Special Publication No. 05-09. Retrieved December 29, 2011 from `http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf`.

[22] Fina, Mark. 2011. "Evolution of Catch Share Management: Lessons from Catch Share Management in the North Pacific." Fisheries, Vol. 36(4). Retrieved September 12, 2012 from `http://www.fakr.noaa.gov/npfmc/PDFdocuments/catch_shares/Fina_CatchShare_411.pdf`.

[23] International Pacific Halibut Commission. 2012. Pacific Halibut Fishery Regulations 2012. Retrieved October 16, 2012 from `http://www.iphc.int/publications/regs/2012iphcregs.pdf`.

2005. Under the program, eligible communities could form a non-profit corporation to purchase and manage quota share on their behalf. As of 2010, the Prince of Wales Island Community Holding Corporation, which represents the City of Craig, was the only CQE non-profit that had purchased quota share.[24] More recently, at the October 2012 meeting of the NPFMC, Council members voted to approve a new catch sharing plan for halibut that would combine the allocations given to the commercial and recreational sectors.[25]

Halibut and sablefish are primarily caught using longline gear on vessels of between approximately 50 to 100 feet in length,[26] although some state-managed sablefish fisheries in inside waters allow for use of pot, jig, hand-troll gear, or bottom-trawl gear.[27] Groundfish are still caught in trawl nets and some of this is delivered to onshore processors or floating processors, but the majority are caught on large catcher/processors the size of a football field and frozen at sea.

Walleye pollock remains a top volume fishery in Alaska despite limitations placed on the fishery due to concerns about Steller sea lion populations. Between the late 1970s and the early 1990s, Steller sea lion populations in the western Gulf of Alaska (GOA) and Aleutian Islands (AI) declined by almost 80%. Pollock is a primary food source for the Steller sea lion, and expansion of the high volume pollock fishery into the AI region in the 1970s was implicated in the decline.[28] In order to protect Steller sea lions, pollock fisheries management measures include time and area closures around critical sea lion habitat, and reductions in total allowable catch (TAC) that can be harvested from critical habitat areas.[29] In addition, NMFS listed the eastern Aleutian Islands population segment of Steller sea lions as endangered under the Endangered Species Act in 2011. Conflict still occurs, however, as the decision was legally challenged and NMFS is redoing its analysis regarding whether the population should continue to be listed.

10.4.3 Fish Landings and Processing

One notable aspect of many Alaskan fisheries is the high volume of processing activity that occurs offshore on floating processors. Because this document focuses on "fishing communities" as defined in the MSFMCA (16 U.S.C 38 §1802 (16) and further specified in NMFS guidelines,[30,31] we are primarily concerned with inshore processing activity. Offshore activities are relevant insofar as

[24] North Pacific Fishery Management Council. (2010). Review of the Community Quota Entity (CQE) Program under the Halibut/Sablefish IFQ Program. Retrieved October 23, 2012 from: `http://www.fakr.noaa.gov/npfmc/PDFdocuments/halibut/CQEreport210.pdf`.

[25] North Pacific Fishery Management Council. (2012). Draft for Public Review: Regulatory Amendment for a Catch Sharing Plan for the Pacific Halibut Charter Sector and Commercial Setline Sector in International Pacific Halibut Commission Regulatory Area 2C and Area 3A âĂŞ Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis. Anchorage. Retrieved November 21, 2012 from `http://www.fakr.noaa.gov/analyses/halibut/drafthalibut_csp0912.pdf`.

[26] Gay, Joel. (1997). Commercial fishing in Alaska. Alaska Geographic, 24(3).

[27] Woodby, Doug, Dave Carlile, Shareef Siddeek, Fritz Funk, John H. Clark, and Lee Hulbert. (2005). Commercial Fisheries of Alaska. Alaska Dept. of Fish and Game, Special Publication No. 05-09. Retrieved December 29, 2011 from `http://www.adfg.alaska.gov/FedAidPDFs/sp05-09.pdf`.

[28] Prince William Sound Science Center. (2007). *Steller Sea Lion Research.* Retrieved November 21, 2012 from `http://www.pwssc.org/research/biological/Stellar/ssl.shtml`.

[29] Alaska Department of Fish and Game. (2012). *Walleye Pollock Species Profile.* Retrieved November 21, 2012 from `http://www.adfg.alaska.gov/index.cfm?adfg=walleyepollock.main`.

[30] National Oceanic and Atmospheric Administration. (1998). *50 CFR Part 600, Magnuson-Stevens Act Provisions; National Standard Guidelines; Final Rule.* Federal Register 63 (84): 24211-24237.

[31] National Oceanic and Atmospheric Administration. (2001). *Guidance for Social Impact Assessment* in Appendix 2G, page 13. Retrieved from `http://www.st.nmfs.gov/st1/econ/cia/sia_appendix2g.pdf`.

they affect local communities through purchase and loading of goods and services, employment, employee furloughs, and processed product offloading. Fish processed offshore and offloaded in Alaska communities as processed product is converted into a whole fish weight by NOAA for statewide tabulation.[32] Offshore product is not credited to specific communities.

The amount of landings in each community depends in large part on the community's proximity to productive fisheries, the size of the local fleet, and existing port facilities. In addition, the fish processing industry provides vital employment opportunities, income sources, and tax revenues for many Alaskan communities. In many cases, it is the most value-added point in the fishery process. Whether a community serves as a processing center, and whether fish processing is economically productive for a community, depend on a number of factors including location, population size, proximity to major fishing fleets, and the composition of species being processed.

Tables 10.3 and 10.4, below, list the top ten communities by weight and value of landings purchased by local fish buyers. Not surprisingly, in both 2000 and 2013, Dutch Harbor ranked highest both in terms of ex-vessel weight of landings and in terms of the monetary value of landings. In both 2000 and 2013, Akutan, ranked second in terms of weight, comes in behind Kodiak in terms of value. This is likely because Akutan is located along the Aleutian Island chain and processes primarily pollock and other groundfish species, a high volume, low per-unit value niche, while Kodiak processes salmon, halibut and other high-value species. This shows that geographic location affects community access to particular species of fishery resources, and this access in turn exerts an important influence on the community's economic vitality.

In addition to the value-per-unit factor affected by the types of fish processed, the structure of processing differs by community. For example, Akutan, with only a single shoreside processing facility present between 2000 and 2013, processed a greater volume of fish than Kodiak with its 13 shoreside processors in 2000 and 12 in 2013. This underscores the profitability of operating many small-scale specialty processors in a high per-unit value market such as Kodiak.

Seventy one communities had fish buyers that filed fish tickets with the CFEC in 2013. Twenty-three communities included at least 10 fish buyers, 22 communities had 3 to 9 fish buyers, 5 communities had 2 fish buyers, 21 communities had 1 fish buyer, and 366 communities did not have an active fish buyer present in 2013.[33] Similarly few communities have shoreside processing facilities available to them. Again, 65 had shoreside processing facilities that filed Intent to Operate declarations with ADF&G in 2016 (Table 10.5). Of these, two communities had 10 or more shoreside processing facilities, 9 had 6 to 10 shoreside facilities, 7 had 3 to 5 shoreside facilities, 10 had two shoreside facilities, and 37 had one shoreside facility.

Alaska communities participate in all groundfish fisheries. In 2013, 34 communities had Pacific cod landings, 9 communities had pollock landings, 26 communities had sablefish landings, and 34 communities had landings of other groundfish species. Throughout Alaska, the most involved communities tend to focus on a wide range of species (Tables 10.6 to 10.9). For example, Kodiak is among the top 10 producing communities in Alaska for all groundfish fisheries summarized in Tables 10.6, 10.7, 10.8 and 10.9.

[32] National Oceanic and Atmospheric Administration. (2003). *Commercial Fisheries Landings: Data Caveats.*

[33] Alaska Department of Fish and Game. (2015). Data on Alaska fish processors. ADF&G Division of Commercial Fisheries. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

10.4.4 Labor in Alaska's Commercial Fishing Industry

The commercial fishing sector is the largest private employer in Alaska. The fishing industry provides a variety of employment opportunities, including fishing, processing, transport, and dock and harbor work. In 2013, total of 212 communities had at least one resident that held a CFEC fishing permit. According to the CFEC, in 2000 there were 21,009 commercial fisheries permits sold to Alaska residents; 58% of which were actively fished. The number of permits issued to residents of Alaskan communities declined over the decade to 17,764 in 2013 with 56.5% being actively fished.

The number of licensed Alaskan crew members employed annually in Alaskan commercial fisheries has ebbed and flowed over recent decades, from more than 20,140 in 1993 to approximately 10,461 in 2003 to 12,094 in 2013.[34] In addition, the number of communities with at least one licensed crew member has decreased from 209 in 2000 to 195 in 2013. The decline is likely due to a combination of declining salmon prices, fishery management policy changes, and other factors. Although the majority of licensed crew members are Alaska residents, the labor pool also draws from Washington, other U.S. states, and around the world. The industry remains male-dominated, with women accounting for just 14% of licensed crew over the past decade. In addition, personnel turnover is high; the average crew member holds a license for just 1.8 years.[35] Similar declines were seen in the total number of vessels primarily owned by Alaskan residents, vessels homeported in Alaskan communities and vessels landing catch in Alaskan communities.

The employment data collected by the U.S. Census noticeably under-represents those involved in the fishing industry. The figures originate from Census form questions which are phrased in a way that likely deters answers from self-employed persons (as most fishermen are). In the results of the Census, agriculture, forestry, fishing and hunting were combined together into one reported figure, which makes it difficult to discern which individuals were involved in the fishing portion of the category. In addition, processing sector employment data is not available to at the community level. However, processing sector data is available at a higher aggregation level, such as at regional levels. Employment information for the important offshore processing sector is also not discussed because the effect on Alaska communities is indirect and is brokered for the most part out of Seattle.

[34] Alaska Department of Fish and Game. (2015). *Alaska sport fish and crew license holders, 2000 – 2013.* ADF&G Division of Administrative Services. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[35] Carothers, Courtney and Jennifer Sepez. (2005). Commercial Fishing Crew Demographics and Trends in the North Pacific. Poster presented at the *Managing Our Nation's Fisheries: Focus on the Future* Conference, Washington D.C., March 2005. Available at `ftp://ftp.afsc.noaa.gov/posters/pCarothers01_comm-fish-crew-demographics.pdf`.

Table 10.2: Racial distribution of the Alaskan and U.S. populations in 2000 and 2009-2013.

Population in 2000				
	Alaska		**U.S.**	
Total population	**626,932**		**281,421,906**	
One race	592,786	94.6%	274,595,678	97.6%
Two or more races	34,146	5.4%	6,826,228	2.4%
White	434,534	69.3%	211,460,626	75.1%
Black or African American	21,787	3.5%	34,658,190	12.3%
American Indian and Alaska Native	98,043	15.6%	2,475,956	0.9%
Asian	25,116	4.0%	10,242,998	3.6%
Native Hawaiian and Other Pacific Islander	3,309	0.5%	398,835	0.1%
Some other race	9,997	1.6%	15,359,073	5.5%
Hispanic or Latino (of any race)	25,852	4.1%	35,305,818	12.5%
Not Hispanic or Latino	601,080	95.9%	246,116,088	87.5%
Population between 2009 and 2013				
	Alaska	**U.S.**		
	Alaska		**U.S.**	
Total population	**700,300**		**311,536,594**	
One race	663,559	92.1%	302,804,261	97.2%
Two or more races	56,757	7.9%	8,732,333	2.8%
White	481,638	66.9%	230,592,579	74.0%
Black or African American	25,033	3.5%	39,167,010	12.6%
American Indian and Alaska Native	101,273	14.1%	2,540,309	0.8%
Asian	39,200	5.4%	15,231,962	4.9%
Native Hawaiian and Other Pacific Islander	8,013	1.1%	526,347	0.2%
Some other race	8,402	1.2%	14,746,054	4.7%
Hispanic or Latino (of any race)	42832	5.9%	51,786,591	16.6%
Not Hispanic or Latino	677,484	94.1%	259,750,003	83.4%

Source: Source: U.S. Census Bureau. (n.d.). *Profile of selected social, economic and housing characteristics of all places within Alaska.* Datasets utilized include the 2000 Decennial Census (SF1 100% and SF3 sample data) and 2013 5-year estimates from the American Community Survey. Retrieved August 11, 2015 from `http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml`

Table 10.3: Top Ten Communities by Total Landings (ex-vessel weight) in 2000 and 2013.

	Year 2000			Year 2013		
Rank	**Community**	**Pounds Landed**	**# of Fish Buyers**	**Community**	**Pounds Landed**	**# of Fish Buyers**
1	Unalaska/ Dutch Harbor	790,615,622	29	Unalaska/ Dutch Harbor	887,837,859	19
2	Akutan	454,088,595	3	Akutan	473,808,736	5
3	Kodiak	285,432,670	27	Kodiak	429,601,730	33
4	Cordova	160,147,624	50	Ketchikan	207,906,919	80
5	Sitka	90,524,003	147	Cordova	156,203,511	24
6	Sand Point	72,981,686	4	Petersburg	112,259,480	38
7	King Cove	72,282,637	9	King Cove	95,492,603	4
8	Naknek	35,571,247	17	Sitka	85,519,613	115
9	Valdez	24,965,242	13	Seward	69,432,290	13
10	Seward	22,146,235	18	Valdez	68,217,207	15

	2000	**2013**
Top Ten Communities: Total Fish Buyers	**317**	**350**
Top Ten Communities: Combined Landings (weight)	**911,156 tons**	**2,586,279 tons**
Total Statewide Landings (weight)	**992,809 tons***	**3,061,111 tons***

Notes: Total tons of fish landed in Alaskan communities. Landings for the top ten communities listed here sum to 91.8% of landings made in all Alaskan communities in 2000 and 84.5% of landings made in all Alaskan communities in 2013.

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). *Alaska fish ticket data.* Data compiled by Alaska Fisheries Information Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 10.4: Top 10 Communities by Total Landings (ex-vessel value) in 2000 and 2013.

	Year 2000			Year 2013		
Rank	**Community**	**Pounds Landed**	**# of Fish Buyers**	**Community**	**Landing Value**	**# of Fish Buyers**
1	Unalaska/Dutch Harbor	174,458,581	29	Unalaska/Dutch Harbor	243,436,046	19
2	Kodiak	96,713,090	27	Kodiak	163,225,982	33
3	Akutan	71,843,628	3	Akutan	111,335,971	5
4	Cordova	46,809,522	50	Ketchikan	109,283,858	80
5	Sitka	45,817,665	147	Naknek	102,260,353	24
6	Seward	37,227,769	18	Cordova	99,827,625	24
7	King Cove	34,738,413	9	Petersburg	73,511,925	38
8	Homer	32,999,514	37	Sitka	71,637,243	115
9	Naknek	20,724,575	17	Saint Paul Island	59,388,559	8
10	Petersburg	19,870,902	36	King Cove	55,455,536	4

	2000	**2013**
Top Ten Communities: Total Fish Buyers	**317**	**346**
Top Ten Communities Combined Landings (U.S. dollars)	**$581.2 million**	**$1,089.3 million**
Total Landings made in Alaskan communities (U.S. dollars)	**$1,232.3 million***	**$1,529.4 million***

Notes: Total value of all landings made in Alaskan communities. The value of landings for the top ten communities listed here sum to 79% of the value of all landings made in Alaskan communities in 2000 and 71% of landings made in all Alaskan communities in 2013.

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). *Alaska fish ticket data.* Data compiled by Alaska Fisheries Information Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 10.5: Communities with more than three shoreside processors in 2000 and 2013.

	Year 2000			Year 2013		
Rank	**Community**	**# of Shoreside Processors**	**# of Fish Buyers**	**Community**	**# of Shoreside Processors**	**# of Fish Buyers**
1	Anchorage	17	8	Kodiak	12	33
2	Kodiak	15	27	Anchorage	10	17
3	Juneau	13	31	Juneau	9	91
4	Naknek	13	17	Kenai	9	28
5	Homer	12	37	Naknek	9	24
6	Kenai	11	11	Cordova	9	24
7	Sitka	10	147	Petersburg	8	38
8	Ketchikan	10	80	Unalaska/ Dutch Harbor	8	19
9	Cordova	9	50	Ketchikan	7	80
10	Petersburg	9	36	Sitka	6	115
11	Unalaska/ Dutch Harbor	8	29	Seward	6	13
12	Haines	6	87	Homer	5	32
13	Yakutat	5	21	Craig	5	32
14	Seward	5	18	Yakutat	4	14
15	Valdez	5	13	Egegik	4	9
16	Craig	4	27			
17	Egegik	4	6			
18	Kasilof	4	3			
19	Soldotna	4	0			

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 10.6: Top 10 communities Engaged in Pacific Cod Production in 2013 (ranked by ex-vessel value of landings in the community).

Community	Number of vessels delivering landings[1]	Number of fish buyers purchasing Pacific cod[1]	Pounds landed in community (thousands)[1]	Ex-vessel value of landings (thousands)[1]	Number of vessels owned by residents that fished for Pacific cod[2]	Pounds landed by locally owned vessels (thousands)[1]	Ex-vessel value of landings made by locally owned vessels (thousands)[1]
Akutan	132	4	62,608	$15,652	3	*	*
Unalaska/ Dutch Harbor	138	13	56,346	$15,030	7	4,746	$1,391
Kodiak	254	12	56,503	$14,707	130	41,072	$10,784
Sand Point	104	1	*	$8,673	37	10,694	$2,830
King Cove	78	3	*	$5,655	14	8,519	$2,269
Adak	20	3	*	$4,400	1	*	*
Homer	121	12	3,853	$1,169	90	17,173	$4,760
Seward	77	5	3,104	$884	12	5,143	$1,363
Juneau	50	2	*	$390	31	125	$73
Whittier	6	1	*	$191	0	0	$0

Notes: Indicates confidential data.

Source: [1] Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.
[2] Alaska Commercial Fisheries Entry Commission. (2015). Alaska commercial fishing permits, permit holders, and vessel licenses, 2000-2013. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

Table 10.7: Top 10 Communities Engaged in Pollock Production in 2013 (ranked by ex-vessel value of landings in the community).

Community	Number of vessels delivering landings[1]	Number of fish buyers purchasing Pollock[1]	Pounds landed in community (thousands)[1]	Ex-vessel value of landings (thousands)[1]	Number of vessels owned by residents that fished for Pollock[2]	Pounds landed by locally owned vessels (thousands)[1]	Ex-vessel value of landings made by locally owned vessels (thousands)[1]
Unalaska/ Dutch Harbor	62	5	793,819	$122,854	2	*	*
Akutan	60	2	*	*	0	-	-
Kodiak	125	8	176,337	$30,987	48	100,878	$16,602
King Cove	41	1	*	*	9	541	$71,707
Sand Point	30	1	*	*	10	3,835	$522
Seward	27	2	*	*	4	4	$0.04
Homer	4	3	*	*	40	115	$16
Adak	5	1	*	*	0	-	-
Sitka	1	1	*	*	1	0.004	$0.001
Juneau	0	0	-	-	0	-	-

Notes: Indicates confidential data.

Source: [1] Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.
[2] Alaska Commercial Fisheries Entry Commission. (2015). Alaska commercial fishing permits, permit holders, and vessel licenses, 2000-2013. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

Table 10.8: Top 10 Communities Engaged in Sablefish Production in 2013 (ranked by ex-vessel value of landings in the community).

Community	Number of vessels delivering landings[1]	Number of fish buyers purchasing Sablefish[1]	Pounds landed in community (thousands)[1]	Ex-vessel value of landings (thousands)[1]	Number of vessels owned by residents that fished for Sablefish[2]	Pounds landed by locally owned vessels (thousands)[1]	Ex-vessel value of landings made by locally owned vessels (thousands)[1]
Seward	102	8	4,110	$13,552	9	870	$2,141
Kodiak	111	10	3,366	$12,836	38	1,704	$6,794
Sitka	112	4	4,516	$11,426	60	3,173	$8,359
Yakutat	47	3	*	*	0	-	-
Sand Point	42	1	*	*	0	-	-
Juneau	52	3	*	*	25	838	$2,573
Petersburg	44	3	*	*	34	2,678	$7,852
Unalaska/ Dutch Harbor	34	3	*	*	3	*	*
Cordova	36	2	*	*	10	391	$1,170
Akutan	25	1	*	*	0	-	-

Notes: Indicates confidential data.

Source: [1] Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

[2] Alaska Commercial Fisheries Entry Commission. (2015). Alaska commercial fishing permits, permit holders, and vessel licenses, 2000-2013. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

Table 10.9: Top Communities Engaged in Production of Other Groundfish Species in 2013 (ranked by ex-vessel value of landings in the community).

Community	Number of vessels delivering landings[1]	Number of fish buyers purchasing other groundfish species[1]	Pounds landed in community (thousands)[1]	Ex-vessel value of landings (thousands)[1]	Number of vessels owned by residents that fished for other groundfish species[2]	Pounds landed by locally owned vessels (thousands)[1]	Ex-vessel value of landings made by locally owned vessels (thousands)[1]
Kodiak	229	10	64,127	$10,567	97	23,441	$3,949
Sitka	284	22	872	$1,044	196	683	$812
Seward	133	7	873	$473	11	168	$87
Kenai	4	3	*	*	2	*	*
Craig	51	5	128	$167	31	86	$106
Juneau	111	4	205	$157	55	149	$124
Yakutat	76	4	163	$134	19	22	$31
Homer	136	8	212	$112	82	1,005	$462
Cordova	57	4	217	$97	15	57	$31
Petersburg	103	5	171	$89	86	305	$187

Notes: Indicates confidential data.

Source: [1] Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2015). Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

[2] Alaska Commercial Fisheries Entry Commission. (2015). Alaska commercial fishing permits, permit holders, and vessel licenses, 2000-2013. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

A. ADDITIONAL ECONOMIC DATA TABLES

A.1. Ex-vessel Value and Price Data Tables: alternative pricing based on CFEC fish tickets

These tables present ex-vessel prices and value utilizing prices derived from ADF&G fish tickets priced by the Alaska Commercial Fisheries Entry Commission (CFEC). This provides an alternative source of ex-vessel prices to the Commercial Operator Annual Report (COAR) purchasing data that has historically been used to assemble Tables 16-24. CFEC fish ticket prices reflect individual transactions reported on shoreside and mothership landing reports, adjusted by analysts with consideration to COAR buying data, and therefore may be subject to additional scrutiny. Work is ongoing to analyze and characterize differences between the two pricing methods, and we are working with industry to get their perspective on which source may best reflect the pricing conditions faced by their companies. Until we have finalized this inquiry we will retain the CFEC pricing in this appendix. Note that Tables 16.B-24.B are valid only for the years after 2003.

Table 16.B: Real ex-vessel value of the catch in the domestic commercial fisheries off Alaska by species group, 2004 - 2014 ; calculations based on CFEC fish tickets ($ millions, base year = 2014)

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
2004	201.5	310.2	17.0	205.2	636.0	1,369.9
2005	199.1	371.1	17.4	201.2	773.9	1,562.6
2006	162.6	361.5	11.4	222.2	821.5	1,579.3
2007	211.8	434.4	17.3	244.3	815.5	1,723.3
2008	283.1	452.3	28.0	228.4	991.4	1,983.2
2009	210.9	423.4	26.1	146.9	606.8	1,414.1
2010	247.8	559.6	23.7	215.2	708.5	1,754.9
2011	311.9	640.9	11.3	215.0	926.2	2,105.2
2012	327.9	547.7	22.3	148.9	966.7	2,013.5
2013	241.8	689.2	16.5	113.1	885.9	1,946.6
2014	244.1	546.0	11.5	106.7	795.4	1,703.7

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2014 dollars by applying the Producer Price Index for unprocessed and packaged fish by applying the Personal Consumption Expenditure Index at (https://research.stlouisfed.org/fred2/series/PCEPI)

Source: NMFS Alaska Region Blend and Catch-Accounting System estimates, At-Sea Production Report, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, Fisheries of the United States (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 17.B: Percentage distribution of ex-vessel value of the catch in the domestic commercial fisheries off Alaska by species group, 2004 - 2014 ; calculations based on CFEC fish tickets.

Year	Shellfish	Salmon	Herring	Halibut	Groundfish
2004	14.7 %	22.6 %	1.2 %	15.0 %	46.4 %
2005	12.7 %	23.7 %	1.1 %	12.9 %	49.5 %
2006	10.3 %	22.9 %	0.7 %	14.1 %	52.0 %
2007	12.3 %	25.2 %	1.0 %	14.2 %	47.3 %
2008	14.3 %	22.8 %	1.4 %	11.5 %	50.0 %
2009	14.9 %	29.9 %	1.8 %	10.4 %	42.9 %
2010	14.1 %	31.9 %	1.4 %	12.3 %	40.4 %
2011	14.8 %	30.4 %	0.5 %	10.2 %	44.0 %
2012	16.3 %	27.2 %	1.1 %	7.4 %	48.0 %
2013	12.4 %	35.4 %	0.8 %	5.8 %	45.5 %
2014	14.3 %	32.0 %	0.7 %	6.3 %	46.7 %

Notes: These estimates report the distribution of the value of catch from both federal and state of Alaska fisheries.

Source: NMFS Alaska Region Blend and Catch-Accounting System estimates, At-Sea Production Report, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, Fisheries of the United States. (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 18.B: Ex-vessel prices in the groundfish fisheries off Alaska by area, gear, and species, 2010 - 2014 ; calculations based on CFEC fish tickets ($/lb, round weight)

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska
	Year	Fixed	Trawl	Fixed	Trawl	All Gear
Pollock	2010	0.117	0.166	0.129	0.142	0.144
	2011	0.141	0.161	0.172	0.142	0.143
	2012	0.146	0.170	0.161	0.157	0.158
	2013	0.166	0.170	0.155	0.147	0.149
	2014	0.109	0.124	0.113	0.127	0.127
Sablefish	2010	3.689	2.844	3.588	1.595	3.599
	2011	4.935	4.032	4.883	1.791	4.844
	2012	3.968	3.246	3.506	1.013	3.824
	2013	2.785	2.333	2.720	1.173	2.729
	2014	3.452	2.664	3.319	1.173	3.368
Pacific Cod	2010	0.270	0.231	0.300	0.230	0.271
	2011	0.319	0.299	0.218	0.224	0.246
	2012	0.342	0.310	0.194	0.238	0.239
	2013	0.277	0.237	0.327	0.203	0.279
	2014	0.294	0.251	0.184	0.209	0.214
Flatfish	2010	0.051	0.100	0.044	0.147	0.141
	2011	0.056	0.091	0.065	0.180	0.169
	2012	0.072	0.108	0.049	0.199	0.191
	2013	0.051	0.117	0.496	0.160	0.157
	2014	0.064	0.092	0.407	0.161	0.151
Rockfish	2010	0.634	0.181	0.404	0.228	0.216
	2011	0.697	0.259	0.526	0.345	0.316
	2012	0.801	0.265	0.501	0.289	0.290
	2013	0.816	0.196	0.579	0.213	0.221
	2014	0.750	0.187	0.560	0.213	0.212
Atka Mackerel	2010	*	0.277	0.054	0.209	0.210
	2011	0.016	0.364	0.151	0.265	0.267
	2012	0.131	0.386	0.152	0.293	0.295
	2013	*	0.366	0.318	0.322	0.324
	2014	*	0.363	0.326	0.322	0.324

Notes: 1) Prices are for catch from both federal and state of Alaska fisheries.
2) Prices do not include the value added by at-sea processing except for the value added by dressing fish at sea where the fish have not been frozen. The unfrozen landings price is calculated as landed value divided by estimated or actual round weight.
3) Trawl-caught sablefish, rockfish and flatfish in the BSAI and trawl-caught Atka mackerel in both the BSAI and the GOA are not well represented by on-shore landings. A price was calculated for these categories from product-report prices; the price in this case is the value of the product divided by the calculated round weight and multiplied by a constant 0.4 to correct for value added by processing.
4) The "All Alaska/All gear" column is the weighted average of the other columns.
"*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch Accounting System, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, At-Sea Production Report, (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 19.B: Ex-vessel value of the groundfish catch off Alaska by area, vessel category, gear, and species, 2010 - 2014 ; calculations based on CFEC fish tickets ($ millions)

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
Hook & Line	Sablefish	2010	72.8	5.3	78.2	5.2	4.7	9.9	78.0	10.0	88.0
		2011	105.0	8.3	113.4	7.4	4.6	12.0	112.4	12.9	125.3
		2012	94.5	6.1	100.6	6.1	4.1	10.2	100.6	10.2	110.8
		2013	64.5	4.2	68.7	3.5	2.9	6.5	68.0	7.1	75.1
		2014	69.1	4.2	73.3	4.0	1.5	5.5	73.1	5.8	78.8
	Pacific Cod	2010	8.2	5.1	13.4	0.4	57.3	57.7	8.7	62.4	71.1
		2011	10.7	3.4	14.1	0.8	49.5	50.3	11.4	52.9	64.4
		2012	13.1	1.6	14.7	0.7	46.2	46.9	13.8	47.8	61.6
		2013	6.6	2.4	9.0	0.7	93.6	94.2	7.2	95.9	103.2
		2014	7.9	3.5	11.4	0.8	42.3	43.1	8.6	45.8	54.5
	Flatfish	2010	0	0	0	*	0.3	0.3	0	0.3	0.3
		2011	0	0	0	*	0.3	0.3	0	0.3	0.3
		2012	0	0	0	*	0.3	0.3	0	0.3	0.3
		2013	0	*	0	*	0.8	0.8	0	0.8	0.8
		2014	0	*	0	*	0.7	0.7	0	0.7	0.7
	Rockfish	2010	1.4	0.1	1.5	0.1	0.3	0.3	1.5	0.4	1.8
		2011	1.3	0.1	1.4	0.1	0.1	0.2	1.4	0.2	1.7
		2012	1.8	0.1	2.0	0.1	0.2	0.3	1.9	0.3	2.2
		2013	2.1	0.1	2.2	0.1	0.1	0.2	2.1	0.2	2.4
		2014	1.6	0.1	1.7	0.1	0.1	0.2	1.6	0.2	1.9
	All Species	2010	82.9	10.8	93.7	5.7	65.0	70.7	88.6	75.8	164.4
		2011	117.6	12.1	129.7	8.3	58.3	66.5	125.8	70.4	196.2
		2012	110.4	8.0	118.3	6.8	56.0	62.8	117.2	64.0	181.2
		2013	73.7	6.7	80.5	4.3	103.0	107.2	78.0	109.7	187.7
		2014	79.1	7.9	87.0	4.8	47.3	52.1	83.9	55.2	139.1

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Table 19.B: Continued

		Year	Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
			Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
Pot	Pacific Cod	2010	20.0	-	20.0	11.4	3.7	15.1	31.4	3.7	35.1
		2011	33.3	*	33.3	18.2	1.3	19.5	51.5	1.3	52.7
		2012	28.7	*	28.7	19.9	2.2	22.0	48.6	2.2	50.8
		2013	18.3	-	18.3	16.5	*	16.5	34.7	*	34.7
		2014	25.2	-	25.2	20.2	4.4	24.6	45.3	4.4	49.8
Trawl	Pollock	2010	27.4	0.3	27.6	146.7	104.6	251.4	174.1	104.9	279.0
		2011	27.8	0.4	28.1	223.3	148.6	372.0	251.1	149.0	400.1
		2012	37.8	0.4	38.2	235.0	178.3	413.3	272.8	178.7	451.6
		2013	34.7	0.4	35.1	216.4	193.4	409.8	251.2	193.8	445.0
		2014	38.2	0.5	38.7	187.7	172.1	359.8	225.9	172.6	398.5
	Sablefish	2010	2.9	2.5	5.4	0	0.4	0.4	2.9	2.9	5.7
		2011	4.7	3.5	8.2	0	0.3	0.3	4.7	3.8	8.5
		2012	2.9	2.8	5.7	*	0.5	0.5	2.9	3.3	6.2
		2013	2.1	2.0	4.1	*	0.5	0.5	2.1	2.5	4.6
		2014	2.7	2.5	5.2	*	0.2	0.2	2.7	2.7	5.4
	Pacific Cod	2010	9.2	0.6	9.8	11.3	18.5	29.8	20.5	19.1	39.7
		2011	9.9	0.5	10.4	17.8	18.1	35.9	27.7	18.6	46.3
		2012	12.9	0.4	13.3	28.1	17.4	45.5	41.0	17.9	58.9
		2013	9.7	0.4	10.1	20.9	18.6	39.5	30.6	19.0	49.6
		2014	12.2	0.7	12.9	17.0	19.1	36.1	29.3	19.8	49.0
	Flatfish	2010	3.8	2.2	5.9	0.2	73.1	73.3	4.0	75.2	79.2
		2011	4.1	2.5	6.6	0.5	102.2	102.7	4.6	104.7	109.3
		2012	3.5	2.1	5.6	0.5	117.0	117.5	4.0	119.1	123.1
		2013	4.3	2.8	7.1	0.3	95.3	95.5	4.6	98.1	102.6
		2014	4.7	4.1	8.8	0.8	90.2	91.0	5.4	94.3	99.7

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Table 19.B: Continued

		Year	Gulf of Alaska Catcher Vessel	Gulf of Alaska Catcher Processor	Gulf of Alaska All Sectors	Bering Sea & Aleutian Islands Catcher Vessel	Bering Sea & Aleutian Islands Catcher Processor	Bering Sea & Aleutian Islands All Sectors	All Alaska Catcher Vessel	All Alaska Catcher Processor	All Alaska All Sectors
Trawl	Rockfish	2010	2.5	6.6	9.1	0	10.7	10.7	2.5	17.3	19.8
		2011	2.9	8.7	11.5	0	20.4	20.5	2.9	29.1	32.0
		2012	6.1	8.1	14.2	0	16.8	16.8	6.1	24.9	31.0
		2013	4.2	4.8	9.0	0	15.8	15.8	4.2	20.6	24.8
		2014	4.0	6.3	10.3	0.1	16.0	16.2	4.2	22.3	26.5
	Atka Mackerel	2010	0	0.7	0.7	0	29.8	29.8	0	30.5	30.5
		2011	0	0.8	0.8	0.1	29.1	29.2	0.1	29.9	30.0
		2012	0	0.6	0.6	0	30.0	30.0	0	30.6	30.6
		2013	0	0.7	0.7	0	16.0	16.0	0	16.6	16.6
		2014	0	0.8	0.8	0	21.7	21.7	0	22.5	22.5
	All Species	2010	46.6	13.1	59.7	158.4	237.9	396.3	205.0	251.1	456.0
		2011	50.7	16.7	67.4	241.8	319.1	560.9	292.5	335.8	628.2
		2012	64.6	14.7	79.4	263.7	361.0	624.8	328.4	375.8	704.2
		2013	56.6	11.1	67.7	237.6	339.9	577.6	294.2	351.0	645.3
		2014	62.5	14.9	77.4	205.8	320.0	525.8	268.3	334.9	603.2
All Gear	Pollock	2010	27.4	0.3	27.7	146.7	105.6	252.3	174.1	105.9	280.0
		2011	27.8	0.4	28.2	223.3	150.4	373.7	251.1	150.8	401.9
		2012	37.9	0.4	38.3	235.0	179.9	414.9	272.9	180.3	453.2
		2013	34.8	0.4	35.2	216.4	194.9	411.4	251.2	195.3	446.6
		2014	38.3	0.5	38.7	187.7	173.5	361.2	226.0	173.9	399.9
	Sablefish	2010	75.7	7.9	83.5	5.2	5.0	10.2	80.9	12.9	93.8
		2011	110.1	11.8	122.0	12.7	4.9	17.6	122.8	16.8	139.5
		2012	97.4	8.9	106.3	6.1	4.6	10.7	103.5	13.5	117.0
		2013	66.8	6.2	73.0	3.5	3.4	7.0	70.3	9.7	80.0
		2014	71.8	6.8	78.5	4.0	1.7	5.7	75.7	8.5	84.2

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Table 19.B: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
All Gear	Pacific Cod	2010	37.5	5.8	43.2	23.2	79.5	102.7	60.6	85.3	145.9
		2011	53.8	3.9	57.7	36.7	68.9	105.6	90.6	72.8	163.4
		2012	54.7	2.0	56.8	48.6	65.8	114.4	103.4	67.8	171.2
		2013	34.5	2.8	37.3	38.1	112.1	150.2	72.6	114.9	187.5
		2014	45.3	4.2	49.5	38.0	65.8	103.8	83.2	70.0	153.3
	Flatfish	2010	3.8	2.2	6.0	0.2	73.3	73.6	4.0	75.5	79.5
		2011	4.1	2.5	6.6	0.5	102.6	103.1	4.6	105.1	109.7
		2012	3.5	2.1	5.6	0.5	117.3	117.8	4.0	119.4	123.4
		2013	4.3	2.8	7.1	0.3	96.1	96.3	4.6	98.9	103.5
		2014	4.7	4.1	8.8	0.8	90.9	91.7	5.4	95.0	100.5
	Rockfish	2010	3.9	6.7	10.5	0.1	11.0	11.1	3.9	17.7	21.6
		2011	4.2	8.8	12.9	0.1	20.6	20.7	4.3	29.3	33.6
		2012	8.0	8.2	16.1	0.1	17.0	17.1	8.1	25.2	33.2
		2013	6.3	4.9	11.2	0.1	15.9	16.0	6.4	20.8	27.2
		2014	5.6	6.4	12.0	0.2	16.1	16.3	5.8	22.5	28.3
	Atka Mackerel	2010	0	0.7	0.7	0	29.8	29.8	0	30.5	30.5
		2011	0	0.8	0.8	0.1	29.1	29.2	0.1	29.9	30.0
		2012	0	0.6	0.6	0	30.0	30.0	0	30.6	30.6
		2013	0	0.7	0.7	0	16.0	16.0	0	16.6	16.6
		2014	0	0.8	0.8	0	21.7	21.7	0	22.5	22.5
	All Species	2010	149.8	23.9	173.7	175.5	306.6	482.1	325.2	330.5	655.8
		2011	202.3	28.8	231.1	273.5	378.6	652.1	475.8	407.4	883.2
		2012	204.0	22.7	226.7	290.5	419.2	709.7	494.5	441.9	936.4
		2013	149.0	17.8	166.8	258.4	442.9	701.3	407.4	460.7	868.1
		2014	167.3	22.8	190.1	230.9	371.7	602.6	398.1	394.5	792.7

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. Ex-vessel value is calculated using prices on Table 18b. Please refer to Table 18b for a description of the price derivation. All groundfish includes additional species categories. The value added by at-sea processing is not included in these estimates of ex-vessel value. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch Accounting System, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, At-Sea Production Report (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 20.B: Ex-vessel value of Alaska groundfish delivered to shoreside processors by area, gear and catcher-vessel length, 2005 - 2014 ; calculations based on CFEC fish tickets ($ millions)

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	2005	53.1	24.3	0.3	3.9	11.1	1.9	57.1	35.4	2.1
	2006	60.9	30.7	0.2	6.2	13.2	3.6	67.2	43.9	3.8
	2007	70.1	31.4	0	5.8	16.4	2.7	75.9	47.8	2.7
	2008	81.4	33.1	0.3	9.4	16.5	3.8	90.8	49.6	4.1
	2009	63.3	24.8	*	5.4	7.9	1.7	68.7	32.8	1.7
	2010	74.5	28.8	*	7.0	10.9	2.9	81.5	39.7	2.9
	2011	109.0	42.6	*	12.3	15.4	4.0	121.4	58.0	4.0
	2012	101.1	38.6	*	15.4	10.6	3.6	116.5	49.2	3.6
	2013	68.5	24.0	*	11.7	8.2	3.2	80.2	32.1	3.2
	2014	78.1	27.0	-	17.0	7.8	2.3	95.1	34.7	2.3
Trawl	2005	7.2	28.3	-	*	83.8	102.3	7.2	112.0	102.3
	2006	7.2	31.4	-	*	92.6	110.3	7.2	124.0	110.3
	2007	7.7	29.6	-	*	88.0	96.9	7.7	117.6	96.9
	2008	12.1	38.1	*	*	103.4	118.0	12.1	141.5	118.0
	2009	6.0	23.9	-	*	69.9	81.3	6.0	93.8	81.3
	2010	8.8	37.8	-	*	60.4	67.8	8.8	98.2	67.8
	2011	7.2	43.5	-	*	96.3	104.7	7.2	139.8	104.7
	2012	13.9	50.8	-	*	107.0	114.6	13.9	157.7	114.6
	2013	8.6	48.0	-	*	93.1	106.7	8.6	141.0	106.7
	2014	12.3	50.2	-	*	81.3	92.7	12.3	131.5	92.7
All Gear	2005	60.3	52.6	0.3	3.9	94.9	104.2	64.3	147.5	104.4
	2006	68.2	62.1	0.2	6.2	105.8	113.8	74.4	167.9	114.1
	2007	77.8	61.0	0	5.8	104.3	99.6	83.7	165.4	99.6
	2008	93.5	71.2	0.3	9.4	119.9	121.7	102.9	191.1	122.0
	2009	69.3	48.7	*	5.4	77.8	83.0	74.7	126.5	83.0
	2010	83.3	66.6	*	7.0	71.2	70.7	90.3	137.8	70.7
	2011	116.2	86.1	*	12.3	111.7	108.7	128.6	197.8	108.7
	2012	114.9	89.4	*	15.4	117.5	118.3	130.3	206.9	118.3
	2013	77.1	71.9	*	11.7	101.2	109.9	88.8	173.2	109.9
	2014	90.3	77.2	-	17.0	89.0	95.0	107.4	166.2	95.0

Notes: These estimates include only catch counted against federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-Accounting System and At-Sea Production Report, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, ADF&G COAR production data (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 21.B: Ex-vessel value per catcher vessel for Alaska groundfish delivered to shoreside processors by area, gear and catcher-vessel length, 2005 - 2014 ; calculations based on CFEC fish tickets ($ thousands)

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	2005	59	204	55	60	174	125	62	235	143
	2006	61	245	60	96	210	296	65	295	316
	2007	67	283	9	81	282	222	71	339	224
	2008	75	315	75	120	271	376	82	376	369
	2009	62	256	*	78	168	210	66	275	187
	2010	72	303	*	103	227	320	77	345	288
	2011	98	463	*	171	275	497	109	496	442
	2012	91	471	*	241	230	403	104	464	363
	2013	74	324	*	149	174	358	84	328	358
	2014	83	385	-	334	185	255	100	374	255
Trawl	2005	266	554	-	*	1,180	3,934	266	1,218	3,934
	2006	279	641	-	*	1,285	4,241	279	1,305	4,241
	2007	286	644	-	*	1,222	3,728	286	1,321	3,728
	2008	432	866	*	*	1,477	4,213	432	1,590	4,213
	2009	213	542	-	*	1,043	3,011	213	1,103	3,011
	2010	352	879	-	*	974	2,513	339	1,227	2,513
	2011	300	966	-	*	1,395	3,878	300	1,704	3,878
	2012	578	1,080	-	*	1,646	4,094	578	1,923	4,094
	2013	332	1,090	-	*	1,432	3,953	332	1,720	3,953
	2014	454	1,167	-	*	1,332	3,434	454	1,623	3,434
All Gear	2005	66	327	55	56	708	2,541	69	633	2,547
	2006	67	381	60	92	790	2,995	72	724	3,001
	2007	74	402	9	74	809	2,621	78	738	2,622
	2008	85	494	60	113	922	3,203	92	889	3,129
	2009	67	358	*	71	689	2,371	72	639	2,305
	2010	80	501	*	97	648	1,964	85	726	1,911
	2011	104	648	*	169	893	3,105	114	1,014	3,019
	2012	103	709	*	223	1,059	3,196	116	1,118	3,112
	2013	83	626	*	145	904	3,054	92	978	3,054
	2014	95	702	-	321	865	2,639	111	972	2,639

Notes: These estimates include only catch counted against federal TACs. “*” indicates a confidential value; “-” indicates no applicable data or value.

Source: NMFS Alaska Region Catch-Accounting System and At-Sea Production Report; Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, ADF&G COAR production data (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

A.2. Expanded Economic Data Tables for Rockfish Ex-vessel Sector

Table 22.B: Ex-vessel value of the groundfish catch off Alaska by area, residency, and species, 2010 - 2014 ; calculations based on CFEC fish tickets ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2010	13.3	14.4	47.2	205.1	60.5	219.5
	2011	11.9	16.3	55.7	318.1	67.6	334.3
	2012	15.6	22.7	60.1	354.7	75.7	377.4
	2013	13.0	22.1	60.1	351.3	73.1	373.4
	2014	15.1	23.6	51.6	309.6	66.7	333.2
Sablefish	2010	46.2	37.6	2.4	7.9	48.5	45.5
	2011	67.3	54.7	7.3	10.3	74.6	65.0
	2012	58.4	48.3	3.0	7.7	61.4	55.9
	2013	40.4	32.5	4.1	5.2	44.6	37.7
	2014	44.7	34.1	1.9	3.7	46.6	37.8
Pacific Cod	2010	29.2	14.1	27.6	75.1	56.8	89.1
	2011	42.4	15.4	25.8	79.8	68.2	95.2
	2012	42.7	14.0	26.7	87.7	69.4	101.8
	2013	25.6	11.7	39.4	110.8	65.0	122.6
	2014	36.0	13.4	27.0	76.8	63.1	90.2
Flatfish	2010	2.2	3.8	20.6	53.0	22.8	56.7
	2011	1.8	4.8	8.2	94.8	10.0	99.6
	2012	1.4	4.2	1.3	116.4	2.8	120.6
	2013	1.6	5.5	5.3	91.1	6.9	96.6
	2014	1.8	7.0	5.2	86.6	7.0	93.5
Rockfish	2010	3.3	7.2	0.3	10.8	3.6	18.0
	2011	2.2	10.8	0.5	20.2	2.7	30.9
	2012	4.1	12.1	0.1	17.0	4.2	29.1
	2013	3.5	7.7	0.2	15.8	3.7	23.5
	2014	3.0	8.9	0.1	16.2	3.2	25.1
Atka Mackerel	2010	0.1	0.6	0	29.8	0.1	30.4
	2011	0	0.8	0	29.2	0	30.0
	2012	0	0.6	0	30.1	0	30.6
	2013	0	0.7	0	16.0	0	16.6
	2014	0	0.8	0	21.7	0	22.5
All Groundfish	2010	95.4	78.5	98.6	383.6	194.0	462.1
	2011	127.1	104.0	98.0	554.1	225.2	658.1
	2012	123.9	103.2	92.8	616.9	216.7	720.0
	2013	85.4	81.6	110.2	593.5	195.6	675.1
	2014	102.0	88.4	86.2	516.3	188.2	604.7

Notes: These estimates include only catches counted against federal TACs. Ex-vessel value is calculated using prices on Table 18b. Please refer to Table 18b for a description of the price derivation. Catch delivered to motherships is classified by the residence of the owner of the mothership. All other catch is classified by the residence of the owner of the fishing vessel. All groundfish include additional species categories. For catch for which the residence is unknown, there are either no data or the data have been suppressed to preserve confidentiality.

Source: NMFS Alaska Region Catch Accounting System, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, At-Sea Production Report (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 23.B: Ex-vessel value of groundfish delivered to shoreside processors by processor group, 2009 - 2014 ; calculations based on CFEC fish tickets ($ millions)

Region	2009	2010	2011	2012	2013	2014
Bering Sea Pollock	174.3	172.5	247.7	262.8	230.2	247.4
AK Peninsula/Aleutians	10.1	5.7	12.0	19.7	14.9	14.1
Kodiak	42.3	60.1	79.0	87.7	68.8	80.6
South Central	25.7	26.8	44.3	36.5	26.0	28.6
Southeastern	28.6	31.2	41.9	39.9	26.2	28.3
All Regions	281.0	296.4	424.9	446.5	366.1	399.0

Table 24.B: Ex-vessel value of groundfish as a percentage of the ex-vessel value of all species delivered to shoreside processors by processor group, 2009 - 2014 ; calculations based on CFEC fish tickets (percent)

Region	2009	2010	2011	2012	2013	2014
Bering Sea Pollock	61.4	58.2	59.2	64.2	63.3	67.0
AK Peninsula/Aleutians	5.4	2.6	4.4	7.2	5.8	4.7
Kodiak	37.1	45.6	43.7	49.2	41.5	54.0
South Central	16.7	9.4	17.0	15.6	9.7	14.4
Southeastern	15.6	13.7	13.9	15.4	8.2	12.0
All Regions	30.5	25.6	29.6	32.9	26.7	31.8

Notes: These tables include the value of groundfish purchases reported by processing plants, as well as by other entities, such as markets and restaurants, that normally would not report sales of groundfish products. Keep this in mind when comparing ex-vessel values in this table to gross processed-product values in Table 34. The data are for catch from both federal and state of Alaska fisheries. The processor groups are defined as follows: "Bering Sea Pollock" are the AFA inshore pollock processors including the two AFA floating processors. "AK Peninsula/Aleutian" are other processors on the Alaska Peninsula or in the Aleutian Islands. "Kodiak" are processors on Kodiak Island. "South Central" are processors west of Yakutat and on the Kenai Peninsula. "Southeastern" are processors located from Yakutat south.

Source: Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, ADFG intent to process (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R1: Rockfish retained catch off Alaska by area, gear, and species, 2005-2014 (100 metric tons, round weight).

		Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GOA	FIX	Northern	*	0.02	0.01	0.01	0.00	0.00	*	*	0.00	0.00
		Other	2.89	3.03	3.38	3.56	3.45	3.08	2.46	2.84	3.02	1.67
		Popa	0.13	0.01	0.00	*	*	0.00	0.00	*	*	0.00
		Rougheye	1.15	1.45	1.34	1.36	1.03	1.14	1.12	1.24	1.17	1.00
		Shortraker	1.61	1.71	1.59	1.93	1.51	1.53	1.22	1.66	1.34	1.25
		Dusky	0.39	0.19	0.35	0.19	0.11	0.10	0.14	0.12	0.25	0.19
		Thornyhead	3.19	3.87	3.70	3.30	3.20	3.15	3.23	4.25	4.85	4.69
	TWL	Northern	43.20	45.03	40.83	38.69	38.30	38.42	33.10	49.49	46.79	41.13
		Other	3.61	2.37	3.08	2.23	2.97	2.66	3.06	4.17	1.71	5.13
		Popa	105.97	125.27	124.71	119.48	120.98	149.69	132.87	141.94	121.77	159.88
		Rougheye	1.21	1.19	1.42	1.40	1.21	2.30	3.42	3.56	3.26	5.10
		Shortraker	2.60	3.40	3.46	2.91	2.49	1.73	3.05	3.01	2.73	3.17
		Dusky	21.07	22.51	32.58	35.67	29.89	29.82	24.44	38.39	29.69	29.46
		Thornyhead	3.33	2.97	3.68	3.18	2.52	1.79	2.14	1.41	1.99	4.61
BSAI	FIX	Northern	0.01	0.01	0.00	*	0.11	0.67	0.01	0.05	0.03	0.02
		Other	1.39	1.67	1.28	1.21	1.67	1.99	1.48	1.71	1.42	1.17
		Popa	0.00	*	0.04	*	0.00	0.01	0.01	0.01	0.00	0.03
		Rougheye	0.04	0.09	0.23	0.28	0.21	0.28	0.09	0.22	0.04	0.01
		Shortraker	0.40	0.49	0.30	0.24	0.37	0.73	0.36	0.33	0.12	0.13
	TWL	Northern	9.56	10.74	8.73	15.31	19.71	32.87	26.07	20.49	18.13	21.88
		Other	1.92	2.00	2.27	2.91	2.59	3.85	6.02	6.19	4.66	5.98
		Popa	87.27	106.20	155.55	169.58	144.74	173.35	232.68	233.42	308.39	313.82
		Rougheye	0.71	1.63	1.11	1.21	1.44	1.64	1.35	1.45	2.59	1.74
		Shortraker	0.89	0.81	1.32	0.78	0.99	1.57	2.63	2.57	2.49	0.93

Notes: These estimates include only catch counted against federal TACs. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch Accounting System estimates (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R2: Real ex-vessel value of the catch rockfish off Alaska by area, gear, and species, 2005-2014; calculations based on COAR ($1,000, base year = 2014).

Area	Gear	Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GOA	FIX	Northern	*	2.5	1.7	0.3	0.2	0.3	*	*	0.0	0.2
		Other	604.5	599.4	670.8	762.8	677.0	562.3	526.5	818.1	781.7	452.3
		Popa	1.9	1.6	0.5	*	*	0.1	0.3	*	*	0.1
		Rougheye	83.8	120.7	115.9	102.5	84.0	91.2	92.2	117.5	93.6	87.6
		Shortraker	150.1	138.8	125.7	166.1	116.4	118.7	105.8	184.6	131.3	138.2
		Dusky	24.9	16.4	18.9	13.4	6.7	5.9	10.2	11.3	19.6	19.0
		Thornyhead	578.5	779.2	756.4	695.4	615.0	615.8	649.8	859.3	1,037.5	872.0
	TWL	Northern	992.7	1,559.8	1,446.9	1,482.9	733.5	1,010.1	1,079.3	2,873.5	2,087.0	1,595.2
		Other	85.2	83.0	112.3	86.8	63.2	75.5	100.2	242.0	77.1	185.8
		Popa	2,450.1	4,394.5	4,558.9	4,344.2	2,194.9	4,013.5	4,579.8	8,316.0	5,583.6	6,423.9
		Rougheye	33.3	50.2	59.2	56.4	32.6	67.9	120.6	201.6	151.4	209.5
		Shortraker	75.2	129.6	128.1	119.6	56.8	53.6	110.8	173.7	126.5	129.9
		Dusky	489.5	775.8	1,162.5	1,380.7	779.5	836.5	824.6	2,227.2	1,313.0	1,149.1
		Thornyhead	131.7	162.1	195.5	186.6	111.3	116.4	138.0	132.0	157.2	385.2
BSAI	FIX	Northern	1.5	0.8	0.2	*	22.0	133.5	2.0	7.6	7.1	2.1
		Other	221.6	269.4	178.6	221.4	341.8	400.1	244.3	261.9	311.0	165.1
		Popa	0.1	*	5.3	*	0.4	1.3	1.9	1.1	0.8	4.4
		Rougheye	5.6	13.1	30.1	44.9	40.7	53.9	6.7	29.7	6.7	0.9
		Shortraker	64.1	74.4	41.0	39.2	72.1	139.2	55.4	49.2	24.1	15.7
	TWL	Northern	342.7	392.5	440.4	412.0	546.5	1,270.8	1,675.8	1,035.8	555.1	861.2
		Other	185.1	157.7	180.6	273.9	150.7	344.1	632.1	539.3	444.5	653.4
		Popa	4,731.1	6,153.5	6,838.4	6,346.5	5,600.4	8,881.9	17,874.8	14,928.8	14,317.9	16,498.2
		Rougheye	45.1	92.8	47.0	60.2	84.3	90.8	85.2	88.5	117.5	80.1
		Shortraker	53.2	72.2	47.5	77.0	71.9	141.5	326.9	279.5	217.0	74.9

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2014 dollars by applying the Producer Price Index for unprocessed and packaged fish (series number WPU0223) from the Bureau of Labor Statistics at: http://data.bls.gov/cgi-bin/srgate.

Source: NMFS Alaska Region Blend and Catch-Accounting System estimates, At-Sea Production Reports, Commercial Operators Annual Reports (COAR), Fisheries of the United States (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R3: Ex-vessel prices of rockfish off Alaska by area, gear, and species, 2005-2014; calculations based on COAR ($/lb, round weight).

		Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GOA	FIX	Northern	*	0.70	0.70	0.21	0.30	0.50	*	*	0.36	0.26
		Other	0.95	0.90	0.90	0.97	0.89	0.83	0.97	1.30	1.17	1.23
		Popa	0.06	0.60	0.71	*	*	0.67	0.50	*	*	0.64
		Rougheye	0.33	0.38	0.39	0.34	0.37	0.36	0.38	0.43	0.36	0.40
		Shortraker	0.42	0.37	0.36	0.39	0.35	0.35	0.39	0.50	0.44	0.50
		Dusky	0.29	0.40	0.24	0.33	0.29	0.27	0.32	0.42	0.36	0.44
		Thornyhead	0.82	0.91	0.93	0.96	0.87	0.89	0.91	0.92	0.97	0.84
	TWL	Northern	0.10	0.16	0.16	0.17	0.09	0.12	0.15	0.26	0.20	0.18
		Other	0.11	0.16	0.16	0.18	0.10	0.13	0.15	0.26	0.20	0.16
		Popa	0.10	0.16	0.17	0.16	0.08	0.12	0.16	0.27	0.21	0.18
		Rougheye	0.12	0.19	0.19	0.18	0.12	0.13	0.16	0.26	0.21	0.19
		Shortraker	0.13	0.17	0.17	0.19	0.10	0.14	0.16	0.26	0.21	0.19
		Dusky	0.10	0.16	0.16	0.18	0.12	0.13	0.15	0.26	0.20	0.18
		Thornyhead	0.18	0.25	0.24	0.27	0.20	0.30	0.29	0.43	0.36	0.38
BSAI	FIX	Northern	0.73	0.72	0.32	*	0.92	0.90	0.74	0.69	0.97	0.62
		Other	0.72	0.73	0.63	0.83	0.93	0.91	0.75	0.69	0.99	0.64
		Popa	0.74	*	0.63	*	0.92	0.90	0.74	0.69	0.98	0.62
		Rougheye	0.66	0.68	0.60	0.73	0.88	0.88	0.35	0.62	0.82	0.48
		Shortraker	0.73	0.69	0.61	0.75	0.89	0.86	0.71	0.67	0.91	0.54
	TWL	Northern	0.16	0.17	0.23	0.12	0.13	0.18	0.29	0.23	0.14	0.18
		Other	0.44	0.36	0.36	0.43	0.26	0.41	0.48	0.40	0.43	0.50
		Popa	0.25	0.26	0.20	0.17	0.18	0.23	0.35	0.29	0.21	0.24
		Rougheye	0.29	0.26	0.19	0.23	0.27	0.25	0.29	0.28	0.21	0.21
		Shortraker	0.27	0.40	0.16	0.45	0.33	0.41	0.56	0.49	0.40	0.36

Notes: 1) Prices are for catch from both federal and state of Alaska fisheries.
3) Trawl-caught rockfish in the BSAI and trawl-caught are not well represented by on-shore landings. A price was calculated for these categories from product-report prices; the price in this case is the value of the product divided by the calculated round weight and multiplied by a constant 0.4 to correct for value added by processing.
4) The "All Alaska/All gear" column is the weighted average of the other columns.
"*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch Accounting System, Commercial Operators Annual Report (COAR), At-Sea Production Reports, (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R4: Number of vessels that caught rockfish off Alaska by area, gear, and species,2005-2014.

		Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
GOA	FIX	Northern	3	6	5	4	4	6	2	2	5	8
		Other	45	66	66	61	64	57	63	50	50	54
		Popa	5	5	4	2	3	5	5	3	3	4
		Rougheye	42	49	48	46	41	37	39	40	37	34
		Shortraker	39	43	47	41	37	37	39	33	34	32
		Dusky	20	24	27	25	25	23	25	28	26	24
		Thornyhead	48	56	51	46	47	42	44	42	42	38
	TWL	Northern	21	17	19	21	24	24	26	24	25	22
		Other	18	15	16	18	23	23	24	25	22	20
		Popa	26	21	24	25	28	30	30	30	26	23
		Rougheye	19	18	20	19	25	27	25	26	18	21
		Shortraker	18	19	14	17	21	23	24	22	16	19
		Dusky	25	21	23	23	25	27	26	27	24	20
		Thornyhead	22	21	22	20	25	28	25	25	18	19
BSAI	FIX	Northern	9	8	10	2	6	9	9	8	12	12
		Other	28	32	24	24	26	41	36	28	27	27
		Popa	6	2	6	3	6	10	10	7	9	14
		Rougheye	20	17	15	14	14	27	14	17	18	13
		Shortraker	19	16	19	20	24	30	22	22	18	20
	TWL	Northern	29	32	34	26	30	29	38	31	29	30
		Other	40	36	40	40	34	33	42	41	34	32
		Popa	42	42	42	40	40	38	43	41	39	38
		Rougheye	23	23	26	24	20	19	26	25	18	25
		Shortraker	19	23	29	27	23	21	31	26	18	23

Notes: These estimates include only vessels fishing federal TACs. Based on federal permit files.

Source: NMFS Alaska Region Blend estimates, Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

A.3. Expanded Economic Data Tables for Fishmeal

Table R2: Gross wholesale value of groundfish fishmeal products in the fisheries off Alaska by species, region and sector, 2010-2014, (million dollars).

		Gulf of Alaska	Bering Sea & Aleutian Islands	
	Year	Shoreside	At-sea	Shoreside
Pollock	2010	*	27.68	32.63
	2011	0.13	39.29	43.09
	2012	*	40.04	38.75
	2013	*	40.67	52.22
	2014	*	49.14	46.98
Pacific cod	2010	0.07	0.66	1.21
	2011	0.02	0.90	1.50
	2012	0.00	0.44	0.39
	2013	*	0.82	1.55
	2014	0.09	0.68	3.62
Flatfish	2010	0.15	3.08	1.27
	2011	0.04	3.02	1.10
	2012	*	2.14	0.69
	2013	*	3.93	1.05
	2014	*	2.18	0.58
Other	2010	0.00	0.18	0.16
	2011	0.00	0.20	0.07
	2012	*	0.17	0.26
	2013	*	0.22	0.08
	2014	*	0.23	0.23

Notes: Fishmeal in this table are provided as preliminary for the Sept. draft. The reported data use federal shoreside and at-sea production reports, which may exclude some primary fishmeal production. Because of these tables may under report fishmeal production and value. Efforts are currently under way to reconcile these data with the landing report which will be complete when this report is finalized in November. Species in "Other" include sablefish, atka mackerel, rockfish, skate, squid, octopus, shark, and sculpin. These estimates are for catch from both federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: At-sea and shoreside production reports and commercial operators annual report. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R3: Wholesale production of groundfish fishmeal products in the fisheries off Alaska by species, region and sector, 2010-2014, (1,000 metric tons product weight).

		Gulf of Alaska	Bering Sea & Aleutian Islands	
	Year	Shoreside	At-sea	Shoreside
Pollock	2010	*	14.64	23.67
	2011	0.11	22.58	30.23
	2012	*	21.08	31.44
	2013	*	20.98	32.89
	2014	*	23.25	33.60
Pacific cod	2010	0.05	0.40	0.85
	2011	0.01	0.58	0.96
	2012	0.00	0.48	1.04
	2013	*	0.47	1.02
	2014	0.14	0.49	2.49
Flatfish	2010	0.12	1.48	0.98
	2011	0.02	1.66	0.68
	2012	*	1.23	0.84
	2013	*	1.38	0.37
	2014	*	1.08	0.28
Other	2010	0.00	0.14	0.13
	2011	0.00	0.14	0.08
	2012	*	0.11	0.33
	2013	*	0.13	0.06
	2014	*	0.15	0.19

Notes: Fishmeal in this table are provided as preliminary for the Sept. draft. The reported data use federal shoreside and at-sea production reports, which may exclude some primary fishmeal production. Because of these tables may under report fishmeal production and value. Efforts are currently under way to reconcile these data with the landing report which will be complete when this report is finalized in November. Species in "Other" include sablefish, atka mackerel, rockfish, skate, squid, octopus, shark, and sculpin. These estimates are for catch from both federal and state of Alaska fisheries. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: At-sea and shoreside production reports and commercial operators annual report. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R4: Wholesale price per pound of groundfish fishmeal products in the fisheries off Alaska by species, region and sector, 2010-2014, (dollars).

		Gulf of Alaska	Bering Sea & Aleutian Islands	
	Year	Shoreside	At-sea	Shoreside
Pollock	2010	*	0.86	0.63
	2011	0.53	0.79	0.65
	2012	*	0.86	0.56
	2013	*	0.88	0.72
	2014	*	0.96	0.63
Pacific cod	2010	0.65	0.75	0.65
	2011	0.71	0.70	0.71
	2012	0.77	0.42	0.17
	2013	*	0.79	0.69
	2014	0.29	0.63	0.66
Flatfish	2010	0.56	0.94	0.59
	2011	0.74	0.83	0.74
	2012	*	0.79	0.37
	2013	*	1.29	1.30
	2014	*	0.92	0.92
Other	2010	0.68	0.56	0.57
	2011	0.62	0.65	0.39
	2012	*	0.69	0.36
	2013	*	0.79	0.61
	2014	*	0.69	0.54

Notes: Fishmeal in this table are provided as preliminary for the Sept. draft. The reported data use federal shoreside and at-sea production reports, which may exclude some primary fishmeal production. Because of these tables may under report fishmeal production and value. Efforts are currently under way to reconcile these data with the landing report which will be complete when this report is finalized in November. Species in “Other” include sablefish, atka mackerel, rockfish, skate, squid, octopus, shark, and sculpin. These estimates are for catch from both federal and state of Alaska fisheries. Prices based on confidential data have been excluded. “*” indicates a confidential value; “-” indicates no applicable data or value.

Source: At-sea and shoreside production reports and Commercial Operators Annual Reports (COAR) (compiled and provided by the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

A.4. Supplementary Data Tables

Table E.1: Global cature production and value of whitefish (cods, hakes, haddocks) 2009 - 2013 (1,000 metric tons product weight and million dollars)

Data	2009	2010	2011	2012	2013
Production	6952	7436	7412	7699	8156
Value	6036	7125	8308	7526	-

Notes: Production and Value include capture and aquaculture.

Source: FAO. 2015. Fishery and Aquaculture Statistics. Global capture production 1950-2013 (FishStatJ). Yearbook of Fishery Statistics Summary tables, Appendix II - World fishery production: estimated value by groups of species (2006-2012); ftp://ftp.fao.org/FI/STAT/summary/appIIybc.pdf

Table E.2: Quantities and value of groundfish exports originating from Alaska and Washington by species (group), destination country, and product type 2011 - 2015 (through June 2015) (1,000 metric tons product weight and million dollars).

			2011		2012		2013		2014		2015	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alaska Pollock	Japan	Frozen	0.19	$ 0.44	0.23	$ 0.42	1.75	$ 4.97	3.5	$ 6.13	0.31	$ 0.62
		Fillet Frozen	0.31	$ 0.75	0.14	$ 0.32	0.9	$ 2.81	0.28	$ 0.66	0.47	$ 1.28
		Surimi	53.97	$ 115.33	67.6	$ 159.7	56.23	$ 115.84	71.89	$ 156.83	37.08	$ 85.21
		Roe Frozen	8.03	$ 56.24	7.62	$ 46.83	6.54	$ 42.54	11.21	$ 67.72	10.35	$ 71.49
		Meat Frozen	-	$ -	-	$ -	-	$ -	0.61	$ 3.25	0.18	$ 1
	China	Frozen	25.02	$ 63.22	24.15	$ 53.91	43.38	$ 89.34	48.31	$ 102.69	23.35	$ 49.34
		Fillet Frozen	11.31	$ 27.43	8.87	$ 22.38	5.06	$ 11.8	5.2	$ 13.41	2.21	$ 5.65
		Surimi	3.08	$ 6.73	1.43	$ 3.07	3.3	$ 6.61	3.07	$ 6.85	1.8	$ 4.68
		Roe Frozen	0.31	$ 1.72	0.55	$ 4.55	0.9	$ 6.19	0.75	$ 5.05	0.5	$ 3.83
		Meat Frozen	-	$ -	-	$ -	0.09	$ 0.17	0.32	$ 1.13	0.05	$ 0.22
	South Korea	Frozen	1.85	$ 3.66	0.86	$ 1.71	2.59	$ 4.72	6.1	$ 11.01	6.16	$ 10.59
		Fillet Frozen	3.37	$ 7.08	1.6	$ 4	0.85	$ 1.73	0.84	$ 2.06	0.64	$ 1.26
		Surimi	41.54	$ 120.49	44.95	$ 144.18	61.41	$ 156.44	56.85	$ 143.61	23.63	$ 60.08
		Roe Frozen	9.2	$ 100.42	7.56	$ 64.94	7.41	$ 64.55	9.79	$ 79.91	8.6	$ 70.36
		Meat Frozen	-	$ -	0.95	$ 1.76	0.04	$ 0.1	0.24	$ 0.51	0.08	$ 0.23
	Germany	Frozen	3.94	$ 14.72	23.77	$ 74.58	4.44	$ 12.35	2.43	$ 7.13	0.14	$ 0.49
		Fillet Frozen	52.54	$ 169	37.35	$ 119.99	66.9	$ 200.35	81.38	$ 237.67	27.34	$ 75.83
		Surimi	6.15	$ 11.34	8.52	$ 18.69	10.41	$ 20.89	5.61	$ 11.28	2.28	$ 4.33
		Roe Frozen	-	$ -	0.02	$ 0.1	-	$ -	-	$ -	-	$ -
		Meat Frozen	-	$ -	0.27	$ 0.53	0.33	$ 0.81	2.99	$ 6.67	0.48	$ 1.2

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Table E.2: Continued

		Product	2011 Quantity	2011 Value	2012 Quantity	2012 Value	2013 Quantity	2013 Value	2014 Quantity	2014 Value	2015 Quantity	2015 Value
Alaska Pollock	Nether-lands	Frozen	0.02	$ 0.04	1.54	$ 4.08	0.81	$ 1.75	1.53	$ 3.21	0.64	$ 1.86
		Fillet Frozen	31.54	$ 100.69	21.57	$ 67.41	25.38	$ 75.49	24.69	$ 71.53	8.76	$ 26.51
		Surimi	4.42	$ 11.29	4.47	$ 13.76	2.35	$ 6.11	2.67	$ 6.5	0.94	$ 2.34
		Roe Frozen	0	$ 0.06	-	$ -	-	$ -	-	$ -	0	$ 0.01
		Meat Frozen	-	$ -	0	$ 0.01	0.14	$ 0.27	0.21	$ 0.47	-	$ -
	Other	Frozen	7.99	$ 20.43	11.24	$ 27.26	10.74	$ 26.04	7.82	$ 18.85	0.72	$ 1.59
		Fillet Frozen	14.32	$ 41.43	9.95	$ 29.43	14.23	$ 41.37	18.05	$ 51.16	5.65	$ 14.14
		Surimi	23.47	$ 49.19	23.97	$ 55.3	25.74	$ 53.7	20.61	$ 45.09	6.38	$ 14.61
		Roe Frozen	-	$ -	0.15	$ 1.45	0.11	$ 0.96	0.01	$ 0.11	-	$ -
		Meat Frozen	-	$ -	3.47	$ 12.47	3.29	$ 7.85	4.57	$ 11.59	2.29	$ 4.93
Sablefish	Japan	Frozen	8.53	$ 67	6.39	$ 68.18	5.79	$ 60.93	4.32	$ 50.92	2.22	$ 23.63
		Fresh	0.9	$ 8.19	0.92	$ 8.9	0.5	$ 5.6	0.15	$ 1.75	0.1	$ 1.32
	China	Frozen	0.9	$ 6.93	0.67	$ 6.3	0.53	$ 6.89	0.47	$ 7.42	0.24	$ 4.32
		Fresh	0.39	$ 3.27	0.47	$ 4.28	0.27	$ 3.16	0.1	$ 0.8	0.05	$ 0.53
	South Korea	Frozen	0.08	$ 0.53	0.14	$ 1.09	0.04	$ 0.46	0.04	$ 0.57	0.04	$ 0.55
		Fresh	-	$ -	0.02	$ 0.1	0.01	$ 0.17	-	$ -	-	$ -
	Germany	Frozen	0.03	$ 0.23	0.03	$ 0.26	0.01	$ 0.19	0.01	$ 0.18	0.02	$ 0.34
		Fresh	-	$ -	-	$ -	-	$ -	0	$ 0.03	-	$ -
	Nether-lands	Frozen	0.02	$ 0.25	0.01	$ 0.08	0.05	$ 0.48	0.07	$ 0.83	0.04	$ 0.54
		Fresh	0.03	$ 0.26	-	$ -	0.02	$ 0.03	-	$ -	-	$ -
	Other	Frozen	1.15	$ 9.07	0.87	$ 8.67	0.85	$ 11.54	0.65	$ 10.11	0.37	$ 5.92
		Fresh	0.26	$ 1.56	0.15	$ 1.25	0.08	$ 0.87	0.13	$ 1.25	0.04	$ 0.33

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Table E.2: Continued

			2011		2012		2013		2014		2015	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Cod NSPF	Japan	Frozen	12.46	$ 41.9	14.62	$ 50.43	10.75	$ 33.94	16.29	$ 47.42	5.46	$ 16.8
		Fillet Frozen	3.91	$ 16.07	0.47	$ 1.43	0.06	$ 0.18	0.05	$ 0.16	0.05	$ 0.11
		Fresh	0.97	$ 2.75	0.17	$ 0.53	0.16	$ 0.55	0.05	$ 0.17	-	$ -
		Salted | Dried	-	$ -	0.01	$ 0.02	0.13	$ 0.32	-	$ -	0.07	$ 0.18
		Minced Frozen	0.02	$ 0.05	0.06	$ 0.13	0.02	$ 0.05	0.08	$ 0.12	-	$ -
	China	Frozen	30.28	$ 97.06	40.37	$ 125.39	46.77	$ 136.19	55.16	$ 154.06	39.56	$ 112.03
		Fillet Frozen	1.52	$ 5.79	4.24	$ 13.2	0.98	$ 3.87	0.76	$ 3.04	1.46	$ 4.12
		Fresh	10.65	$ 30.89	4.71	$ 14.15	0.19	$ 0.53	0.03	$ 0.08	0.02	$ 0.07
		Salted | Dried	0.53	$ 1.49	1.57	$ 4.03	2.52	$ 6.03	1.33	$ 3.29	0.72	$ 1.9
		Minced Frozen	0.06	$ 0.14	0.1	$ 0.18	0.02	$ 0.06	-	$ -	-	$ -
	South Korea	Frozen	4.35	$ 13.1	4.61	$ 13.7	7.69	$ 21.38	5.33	$ 12.22	6.85	$ 17.17
		Fillet Frozen	1.19	$ 3.29	0.05	$ 0.11	-	$ -	0.07	$ 0.14	0.04	$ 0.1
		Fresh	1.41	$ 4.12	0.85	$ 2.46	-	$ -	0.05	$ 0.08	0.02	$ 0.05
		Salted | Dried	-	$ -	0.94	$ 2.73	0.28	$ 0.68	0.04	$ 0.08	1.97	$ 5.5
		Minced Frozen	0.18	$ 0.34	0.04	$ 0.07	-	$ -	-	$ -	0.02	$ 0.07
	Germany	Frozen	3.55	$ 12.73	3.04	$ 11.01	2.85	$ 9.04	2.89	$ 10.19	1.4	$ 4.51
		Fillet Frozen	0.14	$ 0.54	0.05	$ 0.18	0.03	$ 0.07	-	$ -	0.01	$ 0.04

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Table E.2: Continued

			2011		2012		2013		2014		2015	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Cod NSPF	Nether-lands	Frozen	7.43	$ 25.72	6.15	$ 19.93	5.01	$ 16.15	6.21	$ 20.96	3.05	$ 9.35
		Fillet Frozen	0.02	$ 0.06	0.1	$ 0.37	0.22	$ 0.81	0.22	$ 0.65	0.02	$ 0.09
		Fresh	0.21	$ 0.37	0.02	$ 0.04	-	$ -	-	$ -	-	$ -
	Other	Frozen	20.6	$ 77.26	18.73	$ 66.2	16.49	$ 51.74	11.53	$ 37.27	8.73	$ 26.29
		Fillet Frozen	2.95	$ 15.08	4.84	$ 20.9	1.23	$ 6.86	1.04	$ 5.34	0.89	$ 3.92
		Fresh	0.22	$ 0.52	0.08	$ 0.31	0.23	$ 0.79	0.17	$ 0.58	0.2	$ 0.61
		Salted | Dried	0.18	$ 0.34	0.39	$ 1.17	0.51	$ 1.45	2.44	$ 6.58	0.59	$ 1.75
		Minced Frozen	0.08	$ 0.17	-	$ -	0.04	$ 0.11	-	$ -	0.05	$ 0.1
Yellowfin Sole	Japan	Frozen	-	$ -	0.32	$ 0.4	0.03	$ 0.04	0.02	$ 0.03	0.01	$ 0.01
	China	Frozen	23.27	$ 25.78	33.82	$ 45.26	62.54	$ 88.88	62.09	$ 86.25	26.95	$ 35.81
	South Korea	Frozen	10.18	$ 12.47	10.58	$ 13.09	9.38	$ 12.77	10.02	$ 12.26	6.01	$ 7.39
	Other	Frozen	0.1	$ 0.13	0.53	$ 0.81	-	$ -	0.01	$ 0.01	-	$ -
Flatfish NSPF	Japan	Frozen	6.2	$ 9.95	2.44	$ 3.92	3.95	$ 7.54	5.27	$ 9.81	1.75	$ 3.06
		Fillet Frozen	-	$ -	0.01	$ 0.03	0	$ 0.01	0	$ 0.02	-	$ -
		Fresh	0.94	$ 1.46	0.36	$ 0.58	-	$ -	0	$ 0.01	-	$ -
		Fillet Fresh	-	$ -	0	$ 0.01	-	$ -	-	$ -	-	$ -
	China	Frozen	22.29	$ 35.37	16.47	$ 28.1	34.56	$ 57.74	38.4	$ 64.56	21.89	$ 33.71
		Fillet Frozen	-	$ -	0.03	$ 0.12	0.21	$ 0.85	0.04	$ 0.21	0.06	$ 0.29
		Fresh	6.06	$ 10.03	4.07	$ 6.38	-	$ -	0.01	$ 0.07	0.02	$ 0.04

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Table E.2: Continued

			2011		2012		2013		2014		2015	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Flatfish NSPF	South Korea	Frozen	3.22	$ 4.58	4.03	$ 5.85	1.48	$ 2.35	0.96	$ 1.58	2.64	$ 4.46
		Fillet Frozen	-	$ -	0.06	$ 0.24	0.26	$ 0.97	0.22	$ 0.65	-	$ -
		Fresh	0.02	$ 0.11	0.22	$ 0.34	0.01	$ 0.08	0.02	$ 0.05	-	$ -
	Nether-lands	Frozen	-	$ -	-	$ -	0	$ 0.01	-	$ -	-	$ -
	Other	Frozen	6.37	$ 7.72	0.76	$ 0.97	0.75	$ 1.24	0.68	$ 1.47	0.09	$ 0.18
		Fillet Frozen	-	$ -	0.02	$ 0.15	0.03	$ 0.13	0.05	$ 0.27	0	$ 0
		Fresh	0	$ 0.03	0.03	$ 0.09	0.09	$ 0.24	0.02	$ 0.12	0	$ 0.01
		Fillet Fresh	-	$ -	0.17	$ 1.39	0.15	$ 1.25	0.07	$ 0.55	0.03	$ 0.25
Pac. Ocean Perch	Japan	Frozen	1.55	$ 2.17	3.23	$ 7.91	9.33	$ 33.63	6.86	$ 24.54	2.76	$ 10.35
	China	Frozen	8.08	$ 15.76	8.14	$ 24.55	8.98	$ 27.64	15.57	$ 51.41	2.46	$ 8.12
	South Korea	Frozen	0.74	$ 1.21	1.41	$ 4.06	1.4	$ 4.44	0.92	$ 2.7	0.5	$ 1.22
	Other	Frozen	0.26	$ 0.6	-	$ -	0.1	$ 0.17	0.05	$ 0.13	0	$ 0
Atka Mackerel	Japan	Frozen	12.18	$ 16.63	11.45	$ 24.7	7.79	$ 21.69	12.63	$ 35.07	10.19	$ 28.28
	China	Frozen	6.83	$ 9.26	5.86	$ 11.2	2.5	$ 6.95	3.74	$ 10.4	2.8	$ 7.79
	South Korea	Frozen	2.68	$ 3.78	2.42	$ 3.92	2.24	$ 5.83	2.81	$ 7.18	0.34	$ 1.01
	Other	Frozen	-	$ -	0.29	$ 0.5	0.15	$ 0.2	0.33	$ 0.5	0.02	$ 0.03

Notes: Totals for China include Taipei and Hong Kong. Totals for ”FLATFISH NSPF” include species ”TURBOT GREENLAND”, ”PLAICE” and ”SOLE ROCK”

Source: NOAA Fisheries, Fisheries Statistics Division, Foreign Trade Division of the U.S. Census Bureau, http://www.st.nmfs.noaa.gov/commercial-fisheries/foreign-trade/index.

Table E.3: Monthly Employment of Seafood Processing Workers in Alaska, 2010 - 2015.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2010	7100	8300	8600	7500	6600	11600	18900	16200	11100	6200	5000	3100	9200
2011	7300	9000	9400	8100	7200	13100	20400	18300	13400	7600	5600	3200	10200
2012	7700	9800	10300	8900	8200	13600	19500	16800	11400	7700	5700	3700	10300
2013	7600	9400	9600	9200	8300	13200	20400	17400	13100	8900	6600	4000	10600
2014	8700	10000	10000	10200	8200	14000	20900	17000	11500	6300	4600	3100	10400
2015	7400	8500	8600	8500	7000	12700	20300	-	-	-	-	-	-

Notes: Series code: 32311700.

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section, http://live.laborstats.alaska.gov/ces/ces.cfm?at=01&a=000000&adj=0.

Table E.4: Monthly Employment of Seafood Harvesting Workers in Alaska, 2008 - 2012.

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All Species	2008	2738	3138	4511	4445	5572	17022	20447	13634	8226	4202	2708	602
	2009	2527	2817	3126	4874	5693	17609	20076	13687	7148	4593	2388	507
	2010	2668	3060	4005	5255	5685	18878	23128	15287	7759	4992	2887	850
	2011	2898	3214	4010	4723	5610	20101	23813	15574	7916	5721	2303	849
	2012	2923	3409	4609	5402	6163	19237	24761	16191	6988	5453	2274	853
Groundfish	2008	2034	2135	2348	1714	1514	1736	1647	1817	2182	1494	805	90
	2009	1834	1811	1728	1746	1686	1592	1383	1596	1738	1420	567	111
	2010	1448	1690	1773	1716	1660	1436	1214	1518	1929	1230	589	196
	2011	1571	1767	2108	1935	1663	1622	1341	1586	2321	1938	628	465
	2012	1774	2052	2626	2099	1954	1924	1580	1735	2230	1878	765	437
Halibut	2008	3	0	1066	1260	1859	2284	1866	2345	1865	1004	590	0
	2009	0	0	372	1274	1802	1955	1501	2033	1727	1385	514	0
	2010	0	0	1002	1355	1895	1963	1735	2147	1685	1280	480	0
	2011	0	0	774	1134	1929	2066	1595	1820	1553	1162	374	0
	2012	0	0	614	969	1694	1936	1530	1941	1464	1241	297	0
Salmon	2008	126	145	286	500	1603	12383	16308	8924	4014	306	148	126
	2009	72	157	182	449	1353	13452	16611	9565	3420	370	171	163
	2010	155	296	358	635	1629	14938	19608	11153	3945	479	259	193
	2011	193	225	381	607	1640	15882	20344	11869	3894	704	265	174
	2012	104	220	404	635	1575	14467	21130	12066	3103	528	266	121

Notes: See original data source for details.

Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section, http://labor.alaska.gov/research/seafood/seafoodstatewide.htm

B. RESEARCH AND DATA COLLECTION PROJECT SUMMARIES AND UPDATES 2015 GROUNDFISH SAFE REPORT

Markets and Trade

Developing Better Understanding of Fisheries Markets

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Despite collecting a relatively broad set of information regarding the catch, products produced, and the prices received at both the ex-vessel and first-wholesale levels, our understanding of fishery and product markets and the factors driving those markets in the North Pacific is relatively incomplete. The primary goal of this project is to improve our understanding and characterization of the status and trends of seafood markets for a broad range of products and species. During the past year AFSC economists have met with a number of seafood industry members along the supply chain, from fish harvesters to those who process the final products available at local retailer stores and restaurants. This project will be a culmination of the information obtained regarding seafood markets and sources of information industry relies upon for some of their business decisions. We will be working with a contractor to develop a new document, similar in style and presentation to the *Alaska Fishing Fleet Profiles* (`http://www.akfin.org/alaska-fishing-fleet-profiles-2010/`) as an example of the level of professional appearance, accessibility and ease of interpretation we hope for in the report. It will include figures, tables, and text illustrating the current and historical status of seafood markets relevant to the North Pacific. The scope of the analysis will include global, international, regional, and domestic wholesale markets to the extent they are relevant for a given product. To the extent practicable for a given product, the analysis will address product value (revenues), quantities, prices, market share, supply chain, import/export markets, major participants in the markets, product demand, end-use, current/recent issues (e.g., certification), current/recent news, and future prospects. A summary of the market profiles will be included in *Status Report for the Groundfish Fisheries Off Alaska, 2014*. A standalone dossier titled *Alaska Fisheries Wholesale Market Profiles* contains the complete detailed set of market profiles.

Alaska Groundfish Wholesale Price Projections

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For a significant portion of the year there is a temporal lag in officially reported first-wholesale prices. This is lag occurs because the prices are derived from the Commercial Operators Annual Report which is not available until after data processing and validation of the data, in August of each year. The result is a data lag that grows to roughly a year and a half (e..g. prior to August 2015 the most recent available official prices were from 2014). To provide information on the current state of fisheries markets, nowcasting is used to estimate 2014 first-wholesale prices from corresponding export prices which are available in near real time. Nowcasting provided fairly accurate predictions and displayed rather modest prediction error with most of the confidence bounds within 5-10% of the price. In addition, time series models are used to project first-wholesale prices for 2016 - 2019. Resampling methods are used estimate a prediction density of potential future prices. Confidence bounds are calculated from the prediction density to give the probability that the prices will fall within a certain range. Prediction densities also provide information on the expected volatility of prices. As prices are projected past the current year the confidence bounds grow reflecting increasing uncertainty further out in the future. The results of this project will be presented in the *Status Report for the Groundfish Fisheries Off Alaska, 2014*. A technical report, Fissel (2015), details the methods used for creating the price projections.

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Economic Indices for the North Pacific Groundfish Fisheries: Calculation and Visualization.

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Fisheries markets are complex; goods have many attributes such as the species, product form, and the gear with which it was caught. The price that fisheries goods command and the products they compete against are both functions of these various attributes. For example, whitefish products of one species may compete with whitefish products of another species. Additionally, markets influence a processing company's decision to convert their available catch into different product types. During any given year it is determining whether to produce fillets or surimi, or perhaps to adjusting gear types to suit markets and consumer preferences. This myriad of market influences can make it difficult to disentangle the relative influence of different factors in monitoring aggregate performance in Alaska fisheries. This research employs a method that takes an aggregate index (e.g. wholesale-value index) and decomposes it into subindices (e.g. a pollock wholesale-value index and a Pacific cod wholesale-value index). These indices provide management with a broad perspective on aggregate performance while simultaneously characterizing and simplifying significant amounts of information across multiple market dimensions. A series of graphs were designed and organized to display the indices and supporting statistics. Market analysis based on these indices has been published as a section in the Economic Status of the Groundfish Fisheries Off Alaska since 2010. A technical report, Fissel (2014), details the methods used for creating the indices.

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Data Collection and Synthesis

The Utility of Daily Fishing Logbook Data towards Fisheries Management in Alaska

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Mandatory daily fishing logbooks provide a potentially valuable source of at-sea catch and effort information in Alaska. However, their utility to fishery scientists and managers is limited since logbooks are neither verified for accuracy nor digitized to make them readily available. This study explores the current logbook system and its reporting requirements and analyzes a unique dataset of digitized logbook data from catcher vessels participating in the 2005 Gulf of Alaska (GOA) trawl fishery to determine the utility of these data to fishery scientists and managers.

We compare the uniqueness or redundancy of information reported on logbooks with information gathered from observers and fish tickets. We find there is a large amount of non-duplicated data recorded on the logbooks, particularly for unobserved trips. However, some of this information, especially data on fishing discards, is of insufficient quality to be useful to any user of the logbook data. Based on our comparisons we suggest that there could be an improvement in the utility of the logbook data to fishery managers and scientists if the data were made electronic either through an extension of the eLogbook program or by digitizing the paper logbook forms. Both approaches will enable greater accuracy and spatial coverage for catch location, discard location, and effort of vessels that are not fully observed, which is the most valuable aspect of the logbook data from a research perspective. We do not consider here whether other forms of electronic monitoring, such as vessel monitoring systems (VMS) or video monitoring, would be a better source of some of these data. During 2014, revisions were made to our draft manuscript that will be published as a NOAA Tech Memo during 2015.

Economic Data Reporting in Groundfish Catch Share Programs

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The 2006 reauthorization of the Magnuson-Stevens Fishery Management and Conservation Act (MSA) includes heightened requirements for the analysis of socioeconomic impacts and the collection of economic and social data. These changes eliminate the previous restrictions on collecting economic data, clarify and expand the economic and social information that is required, and make explicit that NOAA Fisheries has both the authority and responsibility to collect the economic and social information necessary to meet requirements of the MSA. Beginning in 2005 with the BSAI Crab Rationalization (CR) Program, NMFS has implemented detailed annual mandatory economic data reporting requirements for selected catch share fisheries in Alaska, under the guidance of the NPFMC, and overseen by AFSC economists. In 2008, the Amendment 80 (A80) Non-AFA Catcher-Processor Economic Data Report (EDR) program was implemented concurrent with the A80 program, and in 2012 the Amendment 91 (A91) EDR collection went into effect for vessels and quota share holding entities in the American Fisheries Act (AFA) pollock fishery. In advance of rationalization or new bycatch management measures in the Gulf of Alaska (GOA) trawl groundfish fishery currently in development by the NPFMC, EDR data collection will begin in 2016 to gather baseline data on costs, earnings, and employment for vessels and processors participating in GOA groundfish fisheries.

Amendment 91 EDR

The A91 EDR program was developed by the NPFMC with the specific objective of assessing the effectiveness of Chinook salmon prohibited species catch (PSC) avoidance incentive measures implemented under A91, including sector-level Incentive Plan Agreements (IPAs), prohibited species catch (PSC) hard caps, and the performance standard. The data are intended to support this assessment over seasonal variation in salmon PSC incidence and with respect to how timing, location, and other aspects of pollock fishing and salmon PSC occur. The EDR is a mandatory reporting requirement for all entities participating in the AFA pollock trawl fishery, including vessel masters and businesses that operate one or more AFA-permitted vessels active in fishing or processing BSAI pollock, CDQ groups receiving allocations of BSAI pollock, and representatives of sector entities receiving allocations of Chinook salmon PSC from NMFS. The EDR is comprised of three separate survey forms: the Chinook salmon PSC Allocation Compensated Transfer Report (CTR), the Vessel Fuel Survey, and the Vessel Master Survey. In addition to the EDR program, the data collection measures developed by the Council also specified modification of the Daily Fishing Logbook (DFL) for BSAI pollock trawl CVs and CPs to add a ”checkbox” to the tow-level logbook record to indicate relocation of vessels to alternate fishing grounds for the purpose of Chinook PSC avoidance.

AFSC economists presented a report to the NPFMC in February, 2014 on the first year of A91 EDR data collection (conducted in 2013 for 2012 calendar year operations) and preliminary analysis of the data. The goal of the report was to identify potential problems in the design or implementation of the data collections and opportunities for improvements that could make more efficient use of reporting burden and may ultimately produce data that would be more effective for informing Council decision making.

Notable findings in the report were that the Vessel Fuel Survey and Vessel Master Survey have been successfully implemented to collect data from all active AFA vessels and have yielded substantial new information that will be useful for analysis of Amendment 91. Quantitative fuel use and cost data have been used in statistical analyses of fishing behavior, and qualitative information reported by vessel masters regarding observed fishing and PSC conditions during A and B pollock seasons and perceptions regarding management measures and bycatch avoidance incentives has been useful to analysts for interpretation of related fishery data. The Council is currently considering action to revise Amendment 91 and these data will be utilized in that analysis in 2015. Additional qualitative data analysis of vessel master survey data is planned following the finalization of 2013 calendar year data. No compensated transfers (i.e., arms-length market transactions) of Chinook PSC have been reported to date (for 2012 or 2013), however, and it remains uncertain whether an in-season market for Chinook PSC as envisioned by the CTR survey will arise in the instance of high-Chinook PSC incidence or if the CTR survey as designed will be effective in capturing the nature of trades. The logbook checkbox has not effectively produced usable information on vessel movements to date. While it can be improved with greater communication and compliance, it is unlikely to be informative regarding all types of location-choice decisions that are motivated by PSC avoidance as designed, or to be fully effective without more uniform deployment of electronic logbook reporting and data capture. The Council did not initiate any review of alternatives for revising the EDR program pending collection and analysis of at least one additional year of data, and the report on the A91 EDR program will be updated for presentation to the Council in February, 2015.

GOA Trawl and Amendment 80 EDR

During 2014, AFSC economists collaborated with NPFMC and Alaska Region staff and industry members to develop draft data collection instruments and a preliminary rule following NPFMC recommendations for implementing EDR data collection in the GOA trawl groundfish fishery. New EDR forms for GOA groundfish trawl catcher vessels and processors were developed, evaluated, and revised in workshop meetings and individual interviews with members of industry, and modifications to the existing A80 Trawl CP EDR form have been made to accommodate Council recommendations to extend the A80 data collection to incorporate A80 CPs GOA activity and capture data from non-A80 CPs in the GOA. The draft data collection forms and proposed rule were reviewed and approved by the Council at their April, 2014 meeting, and the proposed rule was published August 11, 2014 (`http://alaskafisheries.noaa.gov/prules/79fr46758.pdf`79 FR 46758; see `http://alaskafisheries.noaa.gov/sustainablefisheries/trawl/edr.htm` for more information). The final rule is expected to be published by the end of 2014, authorizing mandatory data collection to begin with reporting of 2015 calendar year data (to be submitted in 2016). In preparation for this, AFSC will continue working with industry to test and refine the draft EDR forms to ensure data to be collected will meet appropriate data quality standards, including modifications to reduce the reporting burden in the A80 EDR program and improve the utility of data collected from CP vessels in non-AFA groundfish fisheries in the BSAI as well as in the GOA.

Recreational Fisheries and Non-Market Valuation

Alaska Recreational Charter Boat Operator Research

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To assess the effect of current or potential regulatory restrictions on Alaska charter boat fishing operator behavior and welfare, it is necessary to obtain a better general understanding of the charter vessel industry. Some information useful for this purpose is already collected from existing sources, such as from the Alaska Department of Fish and Game (ADFG) charter logbook program. However, information on vessel and crew characteristics, services offered to clients, and costs and earnings information are generally not available from existing data sources and thus must be collected directly from the industry through voluntary surveys. In order to address the identified data gaps, AFSC researchers conducted a survey of Alaska charter business owners in 2012, 2013, and 2014.

The survey instrument collects annual costs and earnings information about charter businesses and the general business characteristics of Alaska charter boat operations. Some specific information collected includes equipment and supplies purchased by charter businesses, services offered to clients and associated sales revenues, and crew employment and pay.

Initial scoping and design of the survey was based on consultation with NMFS Alaska Region, ADFG, North Pacific Fishery Management Council, and International Pacific Halibut Commission staff members regarding analytical needs and associated data gaps, and experience with collecting data from the target population. To refine the survey questions, AFSC researchers conducted focus groups with charter business owners in Homer and Seward in September 2011 and conducted numerous interviews in 2012 with additional Alaska charter business owners. In addition, the study was endorsed by the Alaska Charter Association, the Deep Creek Charterboat Association, the Southeast Alaska Guides Organization, and Homer Charter Association.

Following OMB approval under the Paperwork Reduction Act, the survey was fielded with the help of the Pacific States Marine Fisheries Commission during the spring of 2012 to collect data for the 2011 season, during the spring of 2013 to collect data for the 2012 season, and during the spring of 2014 to collect data for 2013. After data validation, the data were summarized and analyzed. Due to the high rates of unit and item non-response, data imputation and sample weighting methods were used to adjust the data to be more representative of the population. The specific methods used were described in Lew, Himes-Cornell, and Lee (2015). This process led to population-level estimates being generated and compiled into a report (Lew et al. 2015). An additional analysis is currently underway to determine fishing community-level estimates, and other analyses are planned, including a regional economic analysis using IMPLAN data and the employment, cost, and earnings data from the survey that can be used to examine the contribution or impacts of the charter boat sector on the regional economy. In addition, efforts are underway to conduct the survey again in 2016.

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Cook Inlet Beluga Whale Economic Valuation Survey

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The purpose of this project is to develop, test, and implement a survey that collects data to understand the public's preferences for protecting the Cook Inlet beluga whale (CIBW), a distinct population segment (stock) of beluga whale that resides solely in the Cook Inlet, Alaska. It is the smallest of the five U.S. beluga whale stocks. In October 2008, the CIBW was listed as an endangered species (73 FR 62919). It is believed that the population has declined from as many as 1,300 to about 312 animals (seehttp://www.fakr.noaa.gov/protectedresources/whales/beluga/management.htm#esa for more details). The public benefits associated with protection actions for the Cook Inlet beluga whale are substantially the result of the non-consumptive value people attribute to such protection. This includes active use values associated with being able to view beluga whales and passive use, or "existence," values unrelated to direct human use. No empirical estimates of these values for Cook Inlet beluga whales are currently available, but this information is needed for decision makers to more fully understand the trade-offs involved in evaluating population recovery planning alternatives and to complement other information available about the costs, benefits, and impacts of alternative plans (including public input).

Considerable effort was invested in developing and testing the survey instrument. Qualitative pretesting of survey materials is generally recognized as a key step in developing any high quality survey (e.g., Dillman, Smyth, Christian [2009]). Pretesting survey materials using focus groups and cognitive interviews is important for improving questions, information, and graphics presented in the survey instruments so they can be better understood and more consistently interpreted by respondents to maximize the likelihood of eliciting the desired information accurately. During 2009 and 2010, focus groups and cognitive interviews were undertaken to evaluate and refine the survey materials of a stated preference survey of the public's preferences for CIBW recovery. As a result of the input received from these qualitative testing activities, the survey materials were revised and then integrated into a Paperwork Reduction Act (PRA) clearance request package that was prepared and submitted to the Office of Management and Budget (OMB) for the pilot survey implementation, which precedes implementing the full survey. The pilot survey was administered during 2011. PRA clearance for the full survey implementation was obtained in spring 2013, and the full survey was fielded in late 2013. The data were cleaned and validated before delivery at the end of the year. Several models have been developed to analyze the data and preliminary estimates of willingness to pay generated. A paper summarizing these results is in preparation.

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Demand for Saltwater Sport Fishing Trips in Alaska

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The primary goal of this study is to estimate the demand for, and economic value of, saltwater sport fishing trips in Alaska using data collected from an economic survey of Alaska anglers. The survey instrument collects basic trip information on fishing trips taken during 2006 by both resident and non-resident anglers and uses a stated preference choice experiment framework to identify anglers' preferences for fish size, catch, and harvest regulations related to halibut, king (Chinook) salmon and silver (Coho) salmon. The survey also includes questions that provide detailed information on time and money constraints and characteristics of the most recent fishing trip, including detailed trip expenditures. Details on the survey implementation and data collected are provided in Lew, Lee, and Larson (2010).

Together, these data were used to estimate the demand for Alaska saltwater sport fishing and to understand how attributes such as fish size and number caught and harvest regulations affect participation rates and the value of fishing experiences. Several papers describing models that estimate the net economic value of saltwater sport fishing trips by Southeast Alaska anglers using these data were completed. The first paper (Lew and Larson, 2011) describes a model of fishing behavior that accounts for two decisions, participation and site choice, which is estimated using a repeated discrete choice modeling approach. The paper presents the results from estimating this model and the economic values suggested by the model results with a primary emphasis on Chinook and Coho salmon trip values. The second paper (Larson and Larson, 2013) analyzes the role of targeting behavior and the use of different sources of harvest rate information on saltwater sportfishing demand in Southeast Alaska. The third paper (Larson and Lew, 2014) is primarily methodological, as it assesses different ways of estimating the opportunity cost of travel time in the recreational fishing demand model. In the latter two papers, economic values for saltwater species are presented, but the emphases of the papers are on addressing other issues.

During 2010 and early 2011, the 2007 survey was updated and qualitatively tested with resident and non-resident anglers. The new survey aimed to collect much of the same information collected by the 2007 survey, but also collected additional information needed to facilitate the data's application in a wider range of models and for a wider range of policies. During 2012, the updated survey was fielded following OMB clearance. The data are currently being analyzed, and similar models to those described above will be applied to the data to estimate economic values of saltwater sport fishing in the near future.

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Estimating Economic Values for Saltwater Sport Fishing in Alaska Using Stated Preference Data

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Knowing how anglers value their fishing opportunities is a fundamental building block of sound marine policy, especially for stocks for which there is conflict over allocation between different uses (e.g., allocation between recreational and commercial uses). This study reports on the results from an analysis of stated preference choice experiment data related to how recreational saltwater anglers value their catches and the regulations governing Pacific halibut *Hippoglossus stenolepis*, Chinook salmon *Oncorhynchus tshawytscha*, and coho salmon *O. kisutch* off the coast of Alaska.

The data used in the analysis are from a national mail survey conducted during 2007 of people who purchased sport fishing licenses in Alaska in 2006. The survey was developed with input collected through several focus groups and cognitive interviews with Alaska anglers, as well as from fishery managers. Each survey included several stated preference choice experiment questions, which ask respondents to choose between not fishing and two hypothetical fishing trip options that differ in the species targeted, length of the trip, fishing location, trip cost, and catch-related characteristics (including the expected catch and harvest restrictions). Responses to these questions are analyzed using random utility maximization-based econometric models. The model results are then used to estimate the economic value, or willingness to pay, non-resident and Alaska resident anglers place on saltwater boat fishing trips in Alaska and assess their response to changes in characteristics of fishing trips.

The results show that Alaska resident anglers had mean trip values ranging from $246 to $444, while non-residents had much higher values ($2,007 to $2,639), likely reflecting that their trips are both less common and considerably more expensive to take. Non-residents generally had significant positive values for increases in number of fish caught, bag limit, and fish size, while Alaska residents valued size and bag limit changes but not catch increases. The economic values are also discussed in the context of allocation issues, particularly as they relate to the sport fishing and commercial fishing sectors for Pacific halibut. A comparison of the marginal value estimates of Pacific halibut in the two sectors suggests that the current allocation is not economically efficient, as the marginal value in the sport sector is higher than in the directed halibut fishery in the commercial sector. Importantly, the results are not able to provide an estimate of how much allocation in each sector would result in the most efficient allocation, which requires additional data and analysis to fully estimate the supply and demand for Pacific halibut in each sector. The results from this study have been published in the *North American Journal of Fisheries Management*.

Since the data support a model specification that differentiates between values for fish that are caught and kept, caught and released (due to a bag limit restriction), and only potentially caught (fish in excess of the number caught but within the bag limit), additional work has been conducted to derive the value of these types of fishing trips. The estimated models indicate these different catch variables are important and anglers view them distinctly, generally valuing the fish they keep the highest and those they are required to release, or potentially catch, less. The marginal values anglers place on catch and release fish and potential fish were generally positive. And as a result, among resident anglers at least, this contributed to mean trip values for salmon catch-and-release fishing trips being larger than trips where the anglers catch their limits, suggesting that trips where anglers do not catch their limits are valuable. Alaska residents were willing to pay more for catch and keep halibut trips. Importantly, however, the mean trip values associated with catch-and-release only trips and trips where anglers harvested fish were not statistically different in any comparison. In addition, as illustrated above, differentiating between different types of fishing and estimating separate values for each type can influence the calculations of the marginal value of a fish often desired in policy evaluation. The paper (Lew and Larson 2014) summarizing these results have been published in *Fisheries Research*.

In addition, analyses are proceeding using data from the Alaska saltwater sport fishing survey conducted during 2012 that collected information on fishing behavior and preferences from people who purchased sport fishing licenses in Alaska in 2011. The stated preference choice experiment questions in that survey capture angler preferences for regulatory tools that were not in place when the previous survey was conducted (e.g., maximum size limits on Pacific halibut). Some results from the analysis of these data were presented at the 2013 North American Association of Fisheries Economists Biennial Forum and at the NMFS Recreational Fisheries Data and Model Needs Workshop, and were published in *Marine Policy* (Lew and Larson 2015). Additional analyses are ongoing.

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Geospatial Aspects of Non-Market Values for Threatened and Endangered Marine Species Protection

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An issue that arises in applying non-market values in policy settings is defining the extent of the economic jurisdiction – the area that includes all people who hold values – for a good or service. In this research, we estimate non-market values for recovering several threatened and endangered marine species in the U.S. and assess the geospatial distribution across the U.S. In Wallmo and Lew (2015), we compare estimates for households in the nine Census regions, as well as for the entire nation. We statistically compare species values between the regional samples to help determine the extent of and variation in the economic jurisdiction for endangered species recovery.

In related work, we more closely examine spatial distribution of individual willingness to pay values using tools from geographical analysis (Johnston et al. *In Press*). The paper demonstrates a suite of analytic methods that may be used to characterize otherwise undetectable spatial heterogeneity in stated preference willingness to pay (WTP). We emphasize flexible methods applicable to large scale analysis with diffuse policy impacts and uncertainty regarding the appropriate scales over which spatial patterns should be evaluated. Illustrated methods include spatial interpolation and multi-scale analysis of hot/cold spots using local indicators of spatial association. An application to threatened and endangered marine species illustrates the empirical findings that emerge. Relevant findings include previously unobserved, large scale clustering of non-use WTP estimates that appears at multiple scales of analysis.

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Models of Fishermen Behavior, Management and Economic Performance

Hidden Flexibility: Institutions, Incentives, and the Hidden Margins of Selectivity in Fishing

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In 2008, participants in the non-pollock "Amendment 80" groundfish trawl fisheries were given exclusive harvesting quota privileges through their participation in cooperatives to a share of their primary target species – ending the previous common property system for all but a small number of vessels that opted out of the program.

The degree to which selectivity in fisheries is malleable to changes in incentive structures is critical for policy design. We examine data for the Amendment 80 fishery before and after a transition from management under common-pool quotas to a fishery cooperative and note a substantial shift in post-cooperative catch from bycatch and toward valuable target species. We examine the margins used to affect catch composition, finding that large and fine-scale spatial decision making and avoidance of night fishing were critical. We argue that the poor incentives for selectivity in many systems may obscure significant flexibility in multispecies production technologies. This manuscript is forthcoming at *Land Economics*.

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Abbott, J., A. Haynie, and M. Reimer. 2014. "Targeting Ability Under Rights-Based Management: The Amendment 80 Bering Sea/Aleutian Islands Groundfish Fishery." In press at *Land Economics*.

The Economic Impacts of Technological Change in North Pacific Fisheries

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Technological advancements have had a significant impact on fishing fleets and their behavior. Technology has expanded both the range of fish stocks we are able to target and the efficiency with which we capture, process, and bring products to market. Technology induced changes in the feasibility and efficiency of fishing can impact the composition and behavior the fishing fleet. Fissel and Gilbert (2014) provide a formal bioeconomic model with technological change showing that marked technology advances can explain over-capitalization as a natural fleet behavior for profit maximizing fishermen when total catch and effort are unconstrained and the technological advancements are known. Extending this analysis to North Pacific fisheries requires research on the theory of technological change in TAC-based and catch share management regimes as well as statistical methods for identifying unknown technological events as this data hasn't been historically collected. Fissel, Gilbert and LaRiviere (2013) extends the theory of technological change to by considering the incentive to adopt new technologies under in an open-access resource setting, finding that low stock levels in particular increase adoption incentives. This ongoing project develops the theory and methods necessary to analyze technological change in North Pacific fisheries through two in-progress manuscripts. Fissel (2013) adapts statistical methods for identifying marked changes in financial times series to the fisheries context using both simulation and empirics to show and validate the methods. North Pacific fisheries are considered with these methods as a case where technological change is unknown. This manuscript is expected to be completed in 2015. Future research on this project will use the results from these papers to analyze the impact of technological advancement in North Pacific fisheries with particular attention toward the impact of on-board computers.

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FishSET: a Spatial Economics Toolbox to better Incorporate Fisher Behavior into Fisheries Management

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Since the 1980s, fisheries economists have modeled the factors that influence fishers’ spatial and participation choices in order to understand the trade-offs of fishing in different locations. This knowledge can improve predictions of how fishers will respond to area closures, changes in market conditions, or to management actions such as the implementation of catch share programs.

NOAA Fisheries and partners are developing the Spatial Economics Toolbox for Fisheries (FishSET). The aim of FishSET is to join the best scientific data and tools to evaluate the trade-offs that are central to fisheries management. FishSET will improve the information available for NOAA Fisheries’ core initiatives such as coastal and marine spatial planning and integrated ecosystem assessments and allow research from this well-developed field of fisheries economics to be incorporated directly into the fisheries management process.

One element of the project is the development of best practices and tools to improve data organization. A second core component is the development of estimation routines that enable comparisons of state-of-the-art fisher location choice models. FishSET enables new models to be more easily and robustly tested and applied when the advances lead to improved predictions of fisher behavior. Pilot projects that utilize FishSET are in different stages of development in different regions in the United States, which will ensure that the data challenges that confront modelers in different regions are confronted at the onset of the project. Implementing projects in different regions will also provide insight into how economic and fisheries data requirements for effective management may vary across different types of fisheries. In Alaska, FishSET is currently being utilized in pilot projects involving the Amendment 80 and AFA pollock fisheries, but in the future models will be developed for many additional fishing fleets.

Evaluating the Effectiveness of Rolling Hotspot Closures for Salmon Bycatch Reduction in the Bering Sea Pollock Fishery

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Bycatch is commonly noted as a primary problem of fisheries management and has been a recurrent management concern in the North Pacific. Bycatch levels of chum and Chinook salmon rose substantially beginning early in the last decade, with chum bycatch peaking in 2005 and Chinook bycatch reaching a record high in 2007 before bycatch of both species declined. Prior to 2011, in the Bering Sea pollock fishery, Chinook and chum salmon bycatch reduction measures consisted principally of area closures, although a Chinook salmon bycatch hard cap with individual bycatch allocations went into effect beginning 2011 which would close the fishery if the cap were reached.

Since the mid-1990s, area closures aimed at bycatch reduction have consisted of both large long-term Salmon Savings Area closures and short-term rolling hotspot (RHS) closures. Significant areas of the pollock fishing grounds have been closed at some point in all years between 1995 and 2011. Currently, the North Pacific Fishery Management Council (NPFMC) is considering several measures to further reduce Chinook and chum bycatch, including evaluating means to improve industry-imposed RHS closures. In this paper, we quantify the reduction in bycatch following the implementation of actual RHS closures. We also briefly discuss the hard cap and incentive plan agreements (IPAs) that were put in place in 2011 to reduce Chinook salmon bycatch. This work is part of on-going NPFMC consideration of salmon bycatch reduction measures and will also be submitted as a manuscript to a scientific journal.

Assessing the Economic Impacts of 2011 Steller Sea Lion Protective Measures in the Aleutian Islands

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One of the primary challenges to fisheries management in Alaska continues to be protecting the endangered Western stock of Steller sea lions. For more than 20 years, regulations have restricted fishing effort in the Aleutian Islands, Bering Sea, and Gulf of Alaska. In 2011, additional measures were implemented that further restricted fishing in the Aleutians because of concern that fishing there is harming the SSL population. This research is an assessment of the costs the recent 2011 protection measures in the Aleutians generated in affected fisheries. The project is underway and will be completed in early 2015 and a manuscript will be submitted to a scientific journal.

Because regulations have been sequentially implemented over more than two decades, the reference point is not the native state of the fishery, but rather the years prior to 2011. In 2008 Amendment 80 (A80) created cooperatives that granted catch shares to vessels based on individual catch history. Comparing this fishery in the period after the implementation of A80 and before the 2011 SSL measures, with the period since the implementation of the 2011 measures is likely to give the best assessment of impacts on this fishery. Spatial data will be utilized for earlier periods to inform analysts of the value of fishing in different areas that were closed by earlier actions.

For several reasons, the impacts on A80 vessels are expected to be most comprehensively calculable relative to other fishing fleets. First, economic data reports (EDR) and 100-percent observer coverage are available for the fishery since 2008. Second, considerable spatial analysis of the A80 fishery has been conducted in previous research (Abbott, Haynie, and Reimer 2014). For the Pacific cod catcher/processor non-trawl, and catcher vessel trawl and non-trawl fisheries, less groundwork has been conducted in analyzing their spatial behavior in the Aleutian Islands. Therefore a hybrid approach will be employed, in which different types of models will be utilized for the different fisheries.

Using a variety of statistical and econometric techniques, fishing behavior, production, and revenue will be examined for the years prior to, and following, the implementation of the SSL protective measures. The actual alternative fishing actions of the vessels affected by the SSL actions will be carefully assessed so that a net cost rather than gross impact of the management action is estimated. Additionally, the amount of effort that is re-allocated to the Bering Sea and Gulf of Alaska as a result of the 2011 actions will be estimated. This information will provide insight into whether this shift in effort is likely to have adversely impacted the vessels that have historically fished primarily or only in the Bering Sea. For the other fisheries in this study, we will examine and summarize the pre- and post-2011 fishing actions of the different fleets. The changes in effort, spatial behavior, and species mix will be summarized.

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Climate Change and Location Choice in the Pacific Cod Longline Fishery

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Pacific cod is an economically important groundfish that is targeted by trawl, pot, and longline gear in waters off Alaska. An important sector of the fishery is the “freezer longliner” segment of the Bering Sea which in 2008 accounted for $220 million of the Pacific cod first wholesale value of $435 million. These vessels are catcher/processors, meaning that fish caught are processed and frozen in a factory onboard the ship.

A dramatic shift in the timing and location of winter season fishing has occurred in the fishery since 2000. This shift is related to the extent of seasonal sea ice, as well as the timing of its descent and retreat. The presence of winter ice cover restricts access to a portion of the fishing grounds. Sea ice also affects relative spatial catch per unit effort by causing a cold pool (water less than 2ÂřC that persists into the summer) that Pacific cod avoid. The cold pool is larger in years characterized by a large and persistent sea ice extent. Finally, climate conditions and sea ice may have lagged effects on harvesters’ revenue through their effect on recruitment, survival, total biomass, and the distribution of size and age classes. Different sizes of cod are processed into products destined for district markets. The availability and location of different size classes of cod, as well as the demand for these products, affects expected revenue and harvesters’ decisions about where to fish.

Understanding the relationship between fishing location and climate variables is essential in predicting the effects of future warming on the Pacific cod fishery. Seasonal sea ice is projected to decrease by 40% by 2050, which will have implications for the location and timing of fishing in the Bering Sea Pacific cod longline fishery. Our research indicates that warmer years have resulted in lower catch rates and greater travel costs, a pattern which we anticipate will continue in future warmer years. Work is on-going on a manuscript that will be submitted to a scientific journal upon completion.

Using Vessel Monitoring System Data to Estimate Spatial Effort in Bering Sea Fisheries for Unobserved Trips

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A primary challenge of marine resource management is monitoring where and when fishing occurs. This is important for both the protection and efficient harvest of targeted fisheries. Vessel monitoring system (VMS) technology records the time, location, bearing, and speed for vessels. VMS equipment has been employed on vessels in many fisheries around the world and VMS data has been used in enforcement, but a limited amount of work has been done utilizing VMS data to improve estimates of fishing activity. This paper utilizes VMS and an unusually large volume of government observer-reported data from the United States Eastern Bering Sea pollock fishery to predict the times and locations at which fishing occurs on trips without observers onboard. We employ a variety of techniques and specifications to improve model performance and out-of-sample prediction and find a generalized additive model that includes speed and change in bearing to be the best formulation for predicting fishing. We assess spatial correlation in the residuals of the chosen model, but find no correlation after taking into account other VMS predictors. We compare fishing effort to predictions for vessels with full observer coverage for 2003-2010 and compare predicted and observer-reported activity for observed trips. In this project, we have worked to address challenges that result from missing observations in the VMS data, which occur frequently and present modeling complications. We conclude with a discussion of policy considerations. Results of this work will be published in a scientific journal. We are also working with the NMFS Alaska Regional Office to attempt to improve the Region's spatial effort database and we will extend the model to other fisheries.

Using Vessel Monitoring System (VMS) Data to Identify and Characterize Trips made by Bering Sea Fishing Vessels

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Catch per unit effort (CPUE) is among the most common metrics for describing commercial fisheries. However, CPUE is a relatively fish-centric unit that fails to convey the actual effort expended by fishers to capture their prey. By resolving characteristics of entire fishing trips, in addition to their CPUE, a broader picture of fishers' actual effort can be exposed. Furthermore, in the case of unobserved fishing, trip start and end times may be required in order to estimate CPUE from effort models and landings data. In this project, we utilize vessel monitoring system (VMS) data to reconstruct individual trips made by catcher vessels in the Eastern Bering Sea fishery for walleye pollock (Gadus chalcogrammus) from 2003 – 2013. Our algorithm implements a series of speed, spatial and temporal filters to determine when vessels leave and return to port. We then employ another set of spatial filters and a probabilistic model to characterize vessel trips as fishing versus non-fishing. Once trips are identified and characterized, we summarize the durations of trips and the distances traveled -- metrics that can be subsequently used to characterize changes in fleet behaviors over time. This approach establishes a baseline of trip behaviors and will provide an improved understanding of how fisheries are impacted by management actions, changing economics, and environmental change.

Models with Interactions Across Species

Optimal Multi-species Harvesting in Ecologically and Economically Interdependent Fisheries

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Single-species management of multi-species fisheries ignores ecological interactions in addition to important economic interactions to the detriment of the health of the ecosystem, the stocks of fish species, and fishery profits. This study uses a model to maximize the net present value from a multispecies groundfish fishery in the Bering Sea where species interact ecologically in the ecosystem, and economically through vessels' multi-product harvesting technology, switching gear types, and interactions in output markets. Numerical optimization techniques are used to determine the optimal harvest quota of each species over time. This study highlights the need to incorporate both ecological and economic interactions that occur between species in an ecosystem.

This study uses the arrowtooth flounder, Pacific cod, and walleye pollock fisheries in the Bering Sea/Aleutian Islands region off Alaska as a case study and finds the net present value of the three-species fishery is over $20.7 billion dollars in the multispecies model, over $5 billion dollars more than the net present value of the single species model. This is a function of the interdependence among species that affects other species growth. Because arrowtooth negatively impacts the growth of cod and pollock, substantially increasing the harvest of arrowtooth to decrease its stock is optimal in the multispecies model as it leads to increased growth and therefore greater potential harvests of cod and pollock. The single species model does not incorporate the feedback among species, and therefore assumes each species is unaffected by the stock rise or collapse of the others. The vessels in this fishery are also shown to exhibit cost anti-complementarities among species, which implies that harvesting multiple species jointly is more costly than catching them independently. As approaches for ecosystem-based fisheries management are developed, the results demonstrate the importance of focusing not only on the economically valuable species interact, but also on some non-harvested species, as they can affect the productivity and availability of higher value species. A manuscript describing this project is forthcoming in *Environmental and Resource Economics*.

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Optimal Multispecies Harvesting in the Presence of a Nuisance Species

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The need for ecosystem based fisheries management is well recognized, but substantial obstacles remain in implementing these approaches given our current understanding of the biological complexities of the ecosystem and the economic complexities surrounding resource use. This study develops a multispecies bioeconomic model that incorporates ecological and economic interactions to estimate the optimal catch and stock size for each species in the presence of a nuisance species. The nuisance species lowers the value of the fishery by negatively affecting the growth of the other species in the ecosystem, and has little harvest value of its own. This study empirically estimates multispecies surplus production growth functions for each species and uses these parameters to explore the impact of a nuisance species on the management of this ecosystem. Multiproduct cost functions are estimated for each gear type in addition to a count data model to predict the optimal number of trips each vessel takes. These functions are used, along with the estimated stock dynamics equations, to determine the optimal multispecies quotas and subsidy on the harvest of the nuisance species to maximize the total value of this three species fishery.

This study uses the arrowtooth flounder, Pacific cod, and walleye pollock fisheries in the Bering Sea/Aleutian Islands region off Alaska as a case study and finds the net present value of the fishery is decreased from $20.7 billion to $8.5 billion dollars by ignoring arrowtooth's role as a nuisance species on the growth of Pacific cod and walleye pollock. The optimal subsidy on the harvest of arrowtooth summed over all years is $35 million dollars, which increases the net present value by $273 million dollars, after accounting for the subsidy. As arrowtooth flounder is a low value species and has a large negative impact on the growth of cod and pollock, it is optimal to substantially increase the harvesting of arrowtooth, lowering its population which results in increased growth and harvesting in the two profitable fisheries. Ignoring the role of the nuisance species results in a substantially less productive and lower value fishery than if all three species are managed optimally. This study highlights the role of both biological and technological interactions in multispecies or ecosystem approaches for management, as well as the importance of incorporating the impacts non-harvested species can have on the optimal harvesting policies in an ecosystem. During 2014, a manuscript was completed and is currently under review at a scientific journal.

Regional Economic Modeling

Collecting Borough and Census Area Level Data for Regional Economic Modeling of Alaska Fisheries

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Most regional economic models developed for North Pacific fisheries are designed to depict either the whole state (i.e., Alaska) or an administrative region (e.g., the Southeast region). While these models are designed to calculate the impacts of fishery management actions on relatively large regions, they may not as accurately represent impacts on smaller, fishing-dependent areas such as boroughs, census areas or “fishing communities”. Therefore, results from these large models may be less useful for fishery managers, policy makers and other parties interested in illustrating impacts on specific communities, especially ones with very unique economic structures. No existing study has yet developed models designed to estimate impacts on individual fishing-dependent communities in Alaska. Under this project we will begin to collect and estimate the type of data needed to develop regional economic models at the borough and census area (BCA) level. The three regions of interest for characterizing Alaska communities economically dependent on fishery resources (i.e., the Southwest, Gulf Coast, and Southeast regions) contain a total of 20 BCAs. In this project, we begin this data collection and modeling effort by collecting data and assembling regional economic models for each of the seven BCAs comprising the Southwest region.

The information needed to develop BCA-level models includes (i) IMPLAN data; (ii) landings data by port or community; (iii) data on expenditures by harvesters and fish processors; and (iv) indicators of linkages among harvesters, processors and local input suppliers. IMPLAN provides the local-level regional economic data needed as the foundation for BCA-level models. However the fishery sector data in IMPLAN is generally not considered reliable. Therefore we will replace the fishery sector in IMPLAN with data from more reliable sources including data collected via surveys. For revenue totals we will use data on ex-vessel and first-wholesale values available from existing sources (CFEC, AKFIN). The data to be collected through surveys include expenditure and employment data for harvesting vessels and seafood processors in each BCA. There are three stages that we will follow to implement this project. In the first stage, we will conduct informal interviews with processors and local businesses. In the second stage, we will administer a mail-out survey of fish harvesting vessels. In the final stage, we will develop BCA-level regional economic models.

To obtain these data it is necessary to collect information from a sample using mailout or other survey instruments and to estimate the population parameters (e.g., total labor expenditures for harvesting and processing sectors) using statistical procedures. Economists are inclined to use simple random sampling (SRS) or stratified sampling methods. However if the distribution of activity within harvesting or processing sectors is very skewed or dominated by a small number of participants, an SRS would be likely to cover only a small portion of total activity and therefore be biased or misleading. Consequently to avoid bias in estimates of these population parameters, it is necessary to use an unequal probability sampling (UPS)[see Brewer and Hanif 1983, Rosén 1997, Seung 2010] in which the selection probability of each sampling unit is proportional to its relative output level (e.g., share of total fishery ex-vessel or ex-processor values). UPS methods will be used to (i) determine the sample size for fish harvesting and processing sector; and (ii) estimate population parameters of the variables of interest (e.g., employment, labor earnings, and cost of intermediate inputs such as fuel). In determining sample sizes, we will use ex-vessel revenues and ex-processor revenues as proxy indicators of economic activity. These values are available from existing data sources (CFEC, AKFIN).

Survey recipients will be given a list of percentage ranges they spend on different categories of inputs to review. Respondents will be asked to indicate how closely these percentages reflect their input expenditure patterns and whether the expenditures were made in the local economy or elsewhere. The percentages they will be shown will be based on data collected in previous studies that estimated regional economic information for the state of Alaska and the Southeast region (e.g., The Research Group 2007).

These data combined with the basic regional economic structure for each BCA from IMPLAN will be used to develop regional economic models such as social accounting matrix (SAM) and/or computable general equilibrium (CGE) models for each of the fishing-dependent BCAs in the Southwest region. The models will be able to calculate BCA-level impacts of fishery management issues. With information collected on the location of input purchases, we will also be able to estimate impacts transmitted to the remainder of Alaska and to West Coast states. The resulting models will provide more accurate and targeted measures of impacts for fishery managers, policy makers and other parties interested in understanding the effects of fishery policies and natural resource disasters on fishing dependent communities in Alaska.

So far, we have hired three contractors who will conduct the informal interviews of processors and local businesses, completed UPS sampling using 2013 data, developed and pretested the survey instruments, published the federal register, and completed, and submitted paperwork reduction act (PRA) packet. Administering the key informant interviews (Stage 1), survey of fishing vessels (Stage 2), and developing regional economic models (Stage 3) will follow.

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Estimating the Economic Impact of Non-resident Anglers' Saltwater Sportfishing Harvest Restrictions in Alaska: a Multi-regional CGE Analysis

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Most previous studies of economic impacts related to recreational fishing use a single-region economic impact model, such as social accounting matrix (SAM) model or computable general equilibrium model (CGE). However, the limitation of the single-region model is that it fails to capture the economic impacts occurring outside of the region where the initial policy shock is given. In this study, we use a multi-regional CGE (MRCGE) model to calculate the multi-regional economic impacts of various harvest limits imposed on several important recreational fishing species in Alaska waters targeted by non-resident Alaska anglers. In so doing, we use a stated preference model of saltwater sportfishing participation to estimate changes in participation arising from changes in harvest limits for Pacific halibut (*Hippoglossus stenoleptis*), chinook salmon (*Oncorhynchus tshawytscha*), and coho salmon (*Oncorhynchus kisutch*). We then use a MRCGE model to calculate the economic impacts of these bag limit changes that occur in Alaska, West Coast, and the Rest of the US. Preliminary results indicate that the economic impacts occurring in the three regions depend on the assumption regarding how the changes in non-resident anglers' spending from changes in the bag limits are spent in the three regions.

Socioeconomic, Cultural and Community Analyses

The Regional and Community Size Distribution of Fishing Revenues in the North Pacific

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The North Pacific fisheries generate close to $2 billion in first wholesale revenues annually. However, the analysis supporting management plans focuses on describing the flow of these monies through each fishery (e.g., NOAA AFSC 2013), rather than across the individual cities and states in which harvesters live and spend their fishing returns. In the last two decades North Pacific fisheries have undergone a series of management changes aimed at ensuring healthy and sustainable profits for those participating in harvesting and processing, and healthy fish stocks. The formation of effective cooperatives and rationalization programs that have been designed by harvesters and processors support an economically successful industry. However, a variety of narratives have emerged about the distributional effects of these management changes, and in particular their effects on the participation of people in coastal communities in the North Pacific.

Previous work has adopted a variety of perspectives to establish the effects of a changing fishing industry in the North Pacific. Carothers (2008) focuses on individual communities in the Aleutian islands and argues that shifts in the processing industry, away from small canneries in strongly place-identified communities, are exacerbated by rationalization that monetizes historical fishing access and draws fishing activity out of small communities when fishermen fall under duress. Carothers et al. (2010) adopts a state-wide perspective on a single fishery, and finds that small fishing communities as a category were more likely to divest of halibut IFQ in the years immediately following the creation of the program. Sethi et al. (2014) propose a suite of rapid assessment community-level indicators that integrate across fisheries, and identify that Alaskan communities are affected by trends of reduced fishery participation and dependence, by fewer fishermen who participate in fewer fisheries and growth in other of the economy during 1980-2010. However, they also observe that this effect is primarily distributional, as total fishing revenues within communities are stable and increasing.

This study contributes by providing a regional overview of the benefits from North Pacific fishing, looking beyond the changes in any particular community or any particular fishery. It seeks to describe the regions to which revenues from North Pacific fisheries are accruing, whether that distribution has changed significantly over the last decade, and how any changes might be caused or affected by management. This is important because managers or stakeholders may have preferences over the distribution of benefits within their jurisdiction, and while the movement of fishing activity out of communities is frequently the focus of academic and policy research, research focusing on single communities often does not follow where those benefits go. Of particular interest is whether movement of North Pacific fishery revenues is dominated by movement within coastal Alaska, or primarily shifts away from coastal communities to other regions outside of Alaska.

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Social Baseline of the Gulf of Alaska Groundfish Trawl Fishery: Results of the 2014 Social Survey

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The North Pacific Fishery Management Council (NPFMC) is considering the implementation of a new bycatch management program for the Gulf of Alaska (GOA) groundfish trawl fishery. Any change in how the fishery is managed will likely affect the people and communities participating in the fishery. In anticipation of such changes, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) Alaska Fisheries Science Center developed and implemented a survey to collect baseline information about the social dimensions of the fishery. Data were collected before program implementation in order to provide a baseline description of the industry as well as allow for analysis of changes the bycatch management program may bring for individuals and communities once implemented. A similar data collection is planned to occur every two to three years in order to capture social changes in the fishery. Having a detailed baseline description will allow for a greater understanding of the social impacts the program may have on the individuals and communities affected by the new management program. When combined with data to be collected in planned post-program implementation follow-up surveys, this information will inform changes in the social characteristics over time and assist in a more comprehensive program evaluation and more informed consideration of potential post-implementation modifications of the program, if needed.

A survey instrument was developed to gather data on the social dimensions of the fishery. The survey was available in-person with field researchers in Kodiak, Seattle, King Cove, and Sand Point or for participants to take online, over the phone, or. The data collection was intended to collect information from active participants in the fishery about their demographics, individual participation in commercial fishing and/or processing, connections with others in the fishery, and opinions on the current status of bycatch management, as well as specifics related to the fishing practices of vessel owners, skippers and crew and specific information related to how processing plants operate and the processing workers who are employed in them. Additionally, the survey asked for opinions on a range of elements that may or may not be included in the final bycatch management program to assess different participant's preferences for various management options, which may change over time as well. We conducted the survey with participants in the GOA groundfish trawl fishery, including vessel owners, vessel operators, crew aboard groundfish vessels, catcher/processor owners, catcher/processor crew, shoreside and inshore floating processors, tender owners and operators, and other individuals who are stakeholders in the trawl fishery including any businesses that are directly tied to the groundfish trawl industry through the supply of commercial items to include, but not limited to gear suppliers, fuel suppliers, and equipment suppliers.

Overall, approximately 50% (n = 1,569) of people directly involved in the GOA groundfish trawl fishery participated in the survey. This included 77% (n = 23) of processing managers, 72% (n = 1,269) of processing workers, 57% (n = 47) of catcher-vessel owners, 28% of CV skippers (n=25), 37% of CV crewmembers (n=77), and 47% (n = 95) of support service businesses were surveyed. From a geographic perspective, 85% (n = 1,242) of those people directly involved in the fishery in Kodiak were surveyed. Additionally, 6% (n = 66) of the estimated number of people in the Seattle MSA directly involved in the fishery were surveyed; however, larger than estimated populations of

CV owners, CV skippers, CV crew, and processor employees were found to be located outside of the Seattle MSA region during fieldwork which offsets the Seattle MSA's relatively low response rate.

Through a non-response bias analysis, we found that vessels from which an owner responded, a skipper responded, a crew member responded, where both an owner and a crew member responded (no skipper), where both a skipper and crew member responded (no owner), and where an owner, skipper, and crew member responded have a statistically significantly (at the 0.05 level) higher amount of landings than those vessels that did not respond. The only two groups that were not statistically significantly different were vessels from which only the owner or only a crew member responded. This suggests that those respondents who participated in our survey effort are more active in the GOA trawl fishery than those vessels that did not respond. The same six groups that had a statistically significantly higher amount of GOA trawl landings also had a statistically significantly higher amount of GOA trawl revenue than vessels that did not respond. However, in addition to these six, the vessels where only a crew member responded are also found to have statistically significantly (at the 0.05 level) higher GOA trawl revenue than those vessels that did not respond at all. This again suggests that those respondents who participated in our survey effort are likely to be more active in the GOA trawl fishery than those that did not respond.

The results of the survey highlight the differences in the people, sectors, and communities engaged in the fishery. For example, an average, CV owners were found to be 57.2 years old while skippers were 49.2 and crew were 37.8 years old on average. Additionally, participants reported that a significant amount of their spouses or partners participate in the fishing industry in some way. This suggests that the effects of management changes may extend beyond direct fishery participants. There is a wide range of number of years respondents have been participating in commercial fishing or processing. CV owners started working on average at 16 years old and have 39.8 years of experience. CV skippers started working at 17.8 years old and have 30 years of experience. CV crew started working at 18.5 years old and have 18.4 years of experience. Additionally, the majority of respondents only have one job and are therefore very tied to fishing.

Social networks show how connected vessels are with support services both within the region they are based and outside the region. Depending on the number of boats that are able to stay in the fishery once the new management program goes into effect, the support service businesses could either be dramatically or minimally affected. Respondents also participate in a wide variety of other fisheries – namely CGOA rockfish, BSAI pollock, salmon. A good number of respondents also participate in West Coast fisheries. The majority of vessels have a mutual agreement or longstanding relationship with a processor to buy their catch. And only a third indicated that they shop around for the best price. Two thirds of the processing plant managers attempt to sell their product to the best market. Over half have longstanding relationships with buyers or formal agreements with a wholesaler. As for the processing workers, half of those surveyed work 10-12 months of the year. Another 30% reported that they work 7 to 9 months of the year. The processing workers in Alaska that were surveyed generally indicated that they are permanent residents, although many are from other countries and tend to send remittances back to those countries or to family members living in other U.S. states.

The current survey effort serves as a baseline for the social characteristics of the GOA groundfish trawl fishery. This survey serves as one of the first of its kind in terms of providing a social baseline in advance of a specific change in Alaskan fisheries management. The intention is that the data provided here will assist the NPFMC in its development the new bycatch management program in the GOA groundfish trawl fishery and in its assessment of the impacts of the program on fishing communities and sectors that have historically participated in the fishery. If final NPFMC action and NOAA Fisheries implementation of the new bycatch management program are delayed beyond the beginning of 2017, we will undertake a second baseline survey of participants in the fishery in order to ensure that a baseline is available for the most current status of participation. In addition, in order to measure social changes among the fishery's participants, we will seek additional funding to undertake a follow up survey will be conducted two years after implementation of the program.

A NOAA Tech Memo summarizing the project and results is expected to be released in late summer 2015.

Perceptions of Measures to Affect Active Participation, Lease Rates and Crew Compensation in the Bering Sea/Aleutian Islands Crab Fisheries

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In 2010 the North Pacific Fishery Management Council (NPFMC) completed a 5-year review of the Bering Sea and Aleutian Islands (BSAI) Crab Rationalization Program. The review highlighted a suite of social concerns that have emerged in the fishery since the management change. The central issues perceived by the NPFMC were that lease rates are being charged against crew pay, the difficulty for skippers and crew to purchase quota shares, and concerns about quota ownership by people or entities that do not have a financial stake in a vessel. The NPFMC initiated discussion and analyses on these issues and ultimately decided to encourage the crab fleet to address the issues through voluntary measures. The crab cooperatives developed measures to address the NPFMC's concerns, which were implemented in 2013. The measures include the Right of First Offer (ROFO) program, which gives skippers and crew an initial opportunity to purchase quota shares, and a voluntary lease rate cap for two of the eight crab fisheries. The National Marine Fisheries Service's Alaska Fisheries Science Center developed a study in 2014 to gather perspectives on the cooperative measures from fishery participants.

This study involved interviews with a diverse group of participants in the BSAI crab fisheries where their perceptions on measures to affect access to quota shares, active participation, and lease rates were discussed. A total of 220 individuals across 6 participant categories shared their perspectives. These individuals contributed to a response rate of 25.9% of the total population of participants in these fisheries; however, the overall response rate excluding crew was 45.1%, representing individuals from 87.2% of the active vessels in the BSAI crab fisheries in 2012.

Overall, the individuals that were interviewed spoke to many reasons why skippers and crewmembers are not, as a majority, purchasing quota shares. The reasons relate to the price of quota shares, the lack of availability of shares, a lack of knowledge to navigate the system, and misgivings about the time commitment to pay off an investment and remain committed to the fisheries. These perceptions and opinions are ultimately affecting the lack of use of the ROFO program. Several interviewees related the lack of availability back to the minimal active participation requirements of the program. A majority of participants stated that they perceive a need for more extensive active participation requirements in the fishery. Interviewees related this opinion back to their understanding of the risk sharing between those who own the quota and those who harvest the quota. The minimal active participation requirements in the program have allowed an extensive leasing culture in the fishery and the specific goals of the lease rate cap are not widely understood by interview participants.

There is considerable sentiment among those who were interviewed that compliance with the caps is at best less than complete. Given this, the free rider problem has the possibility of eroding the current level of compliance over time. In general, many interviewees held negative views of the leasing market and were distrusting of their fellow participants likelihood of long-term compliance with a voluntary measure.

This study is an important step forward in incorporating the views of participants in the BSAI crab fisheries into the management of those fisheries. It provides an important complement to the fisheries' economic data collection program and provides context for the quantitative data available on the operation of the fisheries. More importantly, it provides a voice to the people involved in the fishery and brings to light information about how those individuals understand and experience issues that have been a central discussion topic at the NPFMC over recent years. Specifically, the results of this study highlight underlying issues in the crab fisheries that seem to be driving the perceived issues with access to quota shares, lease rates, and active participation; issues that are not addressed by the current voluntary cooperative measures. Additionally, it suggests areas for future research that will ultimately better inform managers about how to more effectively address these social goals.

A NOAA Tech Memo summarizing the project and results is expected to be released in late summer 2015.

Community Snapshots Tool Available to Better Understand Alaska Fishing Communities

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Community profiles have been produced for fishing communities throughout the state of Alaska in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Act and provide a necessary component of the social impact assessment process for fisheries management actions. These profiles provide detailed information on elements of each fishing community, including location, demographics, history, infrastructure, governance, facilities, and involvement in state and federal fisheries targeting commercial, recreational and subsistence resources. A total of 196 communities from around Alaska were profiled as part of this effort.

However, these profiles are static and require manual updates as more recent data become available. In order to address this in a more effective way, social scientists in the AFSC Economic and Social Science Research Program have developed web-based community snapshots, which provide updated time series information on communities involved in fishing in the North Pacific. These snapshots take the pulse of Alaskan fishing communities using information about their fishing involvement and demographic characteristics. Each snapshot provides information on:

- What commercial species are landed and processed in the community;
- The number of crew licenses held by residents;
- The characteristics of fishing vessels based in the community;

- Processing capacity
- Participation in recreational fishing (including both charter businesses and individual anglers);
- Subsistence harvesting dependence;
- Demographic attributes of the community (including educational attainment, occupations by industry, unemployment, median household income, poverty, median age, sex by age, ethnicity and race, and language and marginalization);
- Social vulnerability indices (These indices represent social factors that can shape either an individual or community's ability to adapt to change. These factors exist within all communities regardless of the importance of fishing. The indices include: Poverty, Population Composition, Personal Disruption, and Housing Disruption.); and
- Fishing engagement and reliance indices (These indices portray the importance or level of dependence of commercial or recreational fishing to coastal communities. The indices include: Commercial Engagement, Commercial Reliance, Recreational Engagement and Recreational Reliance

This web-based snapshot tool will be updated annually as new data become available.

To access the *NEW* community snapshots; go to: `http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/communitysnapshots/main.php`

To access the community profiles; go to: `http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php`

Developing Comparable Socio-economic Indices of Fishing Community Vulnerability and Resilience for the Contiguous US and Alaska

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The ability to understand the vulnerability of fishing communities is critical to understanding how regulatory change will be absorbed into multifaceted communities that exist within a larger coastal economy. Creating social indices of vulnerability for fishing communities provides a pragmatic approach toward standardizing data and analysis to assess some of the long term effects of management actions. Over the past three years, social scientists working in NOAA Fisheries' Regional Offices and Science Centers have been engaged in the development of indices for evaluating aspects of fishing community vulnerability and resilience to be used in the assessment of the social impacts of proposed fishery management plans and actions (Colburn and Jepson, 2012; Himes-Cornell and Kasperski, 2015). These indices are standardized across geographies, and quantify conditions which contribute to, or detract from, the ability of a community to react positively towards change.

The Alaska Fisheries Science Center (AFSC) has developed indices for over 300 communities in Alaska. We compiled socio-economic and fisheries data from a number of sources to conduct an analysis using the same methodology used by Colburn and Jepson (2012) and Jepson and Colburn (2013). To the extent feasible, the same sources of data are being used in order to allow comparability between regions. However, comparisons indicated that resource, structural and infrastructural differences between the NE and SE and Alaska require modifications of each of the indices to make them strictly comparable. The analysis used for Alaska was modified to reflect these changes. The data are being analyzed using principal components factor analysis (PCFA), which allows us to separate out the most important socio-economic and fisheries related factors associated with community vulnerability and resilience in Alaska within a statistical framework.

These indices are intended to improve the analytical rigor of fisheries Social Impact Assessments, through adherence to National Standard 8 of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act, and Executive Order 12898 on Environmental Justice in components of Environmental Impact Statements. Given the often short time frame in which such analyses are conducted, an advantage to the approach taken to date by the Principal Investigators is that the majority of the data used to construct these indices are readily accessible secondary data and can be compiled quickly to create measures of social vulnerability and to update community profiles.

Although the indices are useful in providing an inexpensive, quick, and reliable way of assessing potential vulnerabilities, they often lack external reliability. Establishing validity on a community level is required to ensure indices are grounded in reality and not merely products of the data used to create them. However, achieving this requires an unrealistic amount of ethnographic fieldwork once time and budget constraints are considered. To address this, a rapid and streamlined groundtruthing methodology was developed to confirm external validity from a set of 13 sample communities selected based on shared characteristics and logistic feasibility. The goal of this research methodology is to confirm external validity of the well-being indices through measuring how well quantitative index constructs overlap with qualitative constructs developed from ethnographic fieldwork. Several inter-rater agreement tests, including a Cohen's Kappa and Spearman's rho, were used in assessing construct overlap by measuring how well ethnographic data is in agreement with the indices.

A K-means cluster analysis was used in determining community groupings based on similarities in the secondary data used in creating the indices. Once communities were grouped, 13 sample communities were selected based on the cluster characteristics, and logistical constraints. An iterative, mixed-methods grounded approach was used in developing protocols for ethnographic fieldwork. Key-informant categories were identified based on the index-derived constructs, and interview protocols were developed to target specific themes thought relevant to those constructs. Interviews were open-ended to allow for emergent constructs to present themselves during the interview process. Finally, to supplement interview data physical field assessments of community character, environment, and condition were conducted by researchers.

Once fieldwork was complete, summaries were drawn from researcher experiences and their interview interpretations, which will be used to create a qualitative ranking system. The next step for the groundtruthing exercise was to compare the qualitative fieldwork data to the quantitative indices. As a first step, a rapid assessment was done. This qualitative data was used to test the construct validity of the quantitative well-being indices. Specifically, this methodology used a test of convergent validity: in theory, the quantitative indices should be highly correlated with the qualitative measure. This comparison helps us understand how well the estimated well-being indices represent real-world conditions observed by researchers. For each quantitative component, a ranking of "high", "medium", or "low" was given according to the score created from the PCFA. Members of the research team provided subjective rankings for each component based on ethnographic data, and the two ranking schemes were tested for inter-rater agreement. First, a Cohen's Kappa was used to test for perfect matches of rankings, which is the more conservative of two tests. Second, Spearman's rho was calculated to provide a coefficient of "agreement", and omit instances where there was not a perfect match. Together, these tests provide a well-rounded picture of agreement between the qualitative and quantitative sets of ranks, and thus a general assessment of construct overlap. Study findings suggest that some index components exhibit a high degree of construct validity based on high correlations between the quantitative and qualitative measures, while other components will require refinement prior to their application in fisheries decision-making.

This index validation test affirms that it is not enough to simply create an index of community well-being, since that index requires place-specific meaning if it is to be used in explaining real-world phenomena or projecting community-based responses to SES-directed perturbations. Moreover, a detailed exploration of how qualitative constructs link broadly derived indices with more nuanced characteristics found in individual communities can assist in determining the usefulness of such indices as a management tool. The results and discussion presented in this paper set the stage for a detailed content analysis that can inform additional theoretical development and refinement of all stages of the index development methods, including selection of variables, PCFA, cluster analysis, and qualitative comparison. Further, the results provides substantial evidence for the importance of groundtruthing quantitative indices so they may be better calibrated to reflect the communities they seek to measure.

Groundtruthing the results using this type of methodology will facilitate use of the indices by the AFSC, NOAA's Alaska Regional Office, and the North Pacific Fishery Management Council staff to analyze the comparative vulnerability of fishing communities across Alaska to proposed fisheries management regulations, in accordance with NS8. This research will provide policymakers with an objective and data driven approach to support effective management of North Pacific fisheries.

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Himes-Cornell, A., and S. Kasperski. 2015. "Assessing climate change vulnerability in Alaska's fishing communities." *Fisheries Research* 162: 1-11.

Jepson, M. and L.L. Colburn. 2013. "Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U.S. Southeast and Northeast Regions." *NOAA Technical Memorandum* NMFS-F/SPO-129, April 2013.

Catch Shares Programs and Quota Markets

What Lessons Do Non-Fisheries Tradable Permit Programs Have for the Alaska Halibut Catch Sharing Plan?

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To address long-standing allocation conflicts between the Pacific halibut commercial fishing sector and recreational charter (for-hire) sector in Alaska, an Alaska halibut catch sharing plan (CSP) was implemented in 2014 that has a provision allowing the leasing of commercial individual fishing quota to recreational charter businesses. This one-way inter-sectoral trading allows for the charter sector to increase its share of the total allowable catch while compensating commercial fishermen. In this work, we examine the literature on non-fisheries tradable permit programs (TPPs) that have similarities to the Alaska halibut CSP program. Several successful TPPs are discussed, including ones from emissions trading programs, water quality trading programs, water markets, and transferable development rights programs. They are then evaluated in terms of their similarities and differences to the Alaska CSP program. Characteristics not part of the current CSP that other TPPs have used and that may increase the likelihood for the CSP to be effective in achieving its primary goals (if they are implemented) are identified, such as allowing more flexible transfers (e.g., internal transfers), intertemporal banking, cooperative structures, and multi-year leasing. The paper (Call and Lew 2015) has been published in *Marine Policy.*

Reference:

Call, I., and D.K. Lew. 2015. “Tradable permit programs: What are the lessons for the new Alaska Halibut Catch Sharing Plan?” *Marine Policy* 52: 125-137.

Understanding Charter Halibut Permit Holders’ Preferences, Attitudes, and Behavior Under the Alaska Halibut Catch Sharing Plan

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The Alaska charter boat sector has undergone significant change in recent years due, at least in part, to regulatory changes in the management of the Pacific halibut sport fishery. To control growth of the charter sector in the primary recreational charter boat fishing areas off Alaska, a limited entry program was implemented in 2011 (75 Federal Register 554). In addition, in the past several years, charter vessel operators in Southeast Alaska (International Pacific Halibut Commission [IPHC] Area 2C) and Southcentral Alaska (Area 3A) have been subject to harvest controls that impose both size and bag limits on the catch of Pacific halibut on guided fishing trips, with these limits being more restrictive than the regulations for non-guided trips (e.g., 78 Federal Register 16425). Most recently, a Halibut Catch Sharing Plan (CSP) was implemented during 2014 that formalizes the process (a) of allocating catch between the commercial and charter sector and (b) for evaluating changes to harvest restrictions (78 FR 75843). Importantly, the CSP allows leasing of commercial halibut individual fishing quota (IFQ) by eligible charter businesses. Leased halibut IFQ (called guided angler fish, or GAF) could then be used by charter businesses to relax harvest restrictions for their angler clients, since GAF fish would not be subject to the charter sector-specific size and bag limits that may be imposed—though the non-charter sector size and bag limit restrictions (currently two fish of any size per day) would still apply to charter anglers individually.

Under the initial rules for the IFQ leasing program, henceforth the GAF leasing program, several restrictions are placed on the use of GAF, including the following:

1. **Single-season use**. GAF must be used before the end of the season for which it is leased, with automatic returns if the GAF is unused by a certain date (15 days before the end of the commercial fishing season).

2. **No transfers.** GAF can't be transferred between CHP holders during the season.

The restrictions listed above are features that are sometimes relaxed in other IFQ (or, more generally, tradable permit) programs to increase flexibility for participants. Recent research has shown that the restrictions imposed on transfers within IFQ markets can have significant effects on economic efficiency and other goals (e.g., Kroetz et al. 2015).

To inform decision makers about the likely impacts of relaxing program features such as those above, as well as other programs that may be considered by the North Pacific Fishery Management Council (Council), AFSC developed and implemented a survey that collects data from eligible participants in the IFQ leasing market to determine their attitudes towards, and behavior in, the lease market and attitudes and preferences towards alternative programs. The survey was developed during 2013 and 2014 with input from staff from the Council, NMFS Alaska Region, and ADF&G, and was qualitatively pretested with members from the target population (Alaska charter halibut permit holders). It was implemented in 2015, and the data are currently being analyzed.

References:

Kroetz, K., J.N. Sanchirico, and D.K. Lew (2015). "Efficiency Costs of Social Objectives in Tradable Permit Programs." *Journal of the Association of Environmental and Resource Economists* 2(3): 339-366.

U.S. Catch Share Markets: A Review of Characteristics and Data Availability

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A growing number of U.S. fisheries are managed with catch share systems, which allocate exclusive shares of the total allowable catch from a fish stock to individuals, cooperatives, communities, or other entities. All of these catch share programs allow transferability of catch privileges in some form. Information on these transfers, particularly prices, can be valuable to fishery managers and to fishery participants and other stakeholders. We document the availability and quality of data on transfers of catch privileges in fourteen U.S. catch share programs, including programs in every U.S. region except the Pacific Islands. The catch share programs reviewed include several individual fishing quota (IFQ) programs as well as a number of programs that allocate catch privileges to selfâĂŘorganized cooperatives. We provide a short synopsis of each catch share program and quota market including a short description of the fishery, the management system, and the rules for transferring quota share(QS) and quota pounds (QP). Each synopsis also includes a description of the information collected on QS and QP transfers and an evaluation of the availability and quality of QS and QP price information and other useful information that can be derived from transfer data. We do not attempt to evaluate the efficiency of any of the catch share markets, nor provide inâĂŘdepth analysis of market data, but we do provide some evaluation of the potential to use catch share market data to provide useful information to stakeholders and managers. We make recommendations on how to improve the design of catch share systems and associated data collection systems to facilitate effective catch share markets, collection of catch share market data, and better use of information from catch share markets.

A manuscript describing this project has been published as a NOAA Tech Memo (Holland et al. 2014).

References:

Holland, D., E. Thunberg, J. Agar, S. Crosson, C. Demarest, S. Kasperski, L. Perruso, E. Steiner, J. Stephen, A. Strelcheck, and M. Travis. 2014. U.S. Catch Share Markets: A Review of Characteristics and Data Availability. U.S. Dept. of Commer., *NOAA Technical Memorandum* NMFS-F/SPO-145, 67 p.

Productivity Change in U.S. Catch Share Fisheries

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In fisheries, productivity refers to the relationship between the quantity of fish produced and the quantity of inputs used to harvest fish. We are concerned with "multi-factor" productivity since fish are caught using multiple inputs such as capital (e.g. fishing vessels), crew, fuel, ice, bait, etc. A change in multi-factor productivity (MFP) measures changes in outputs and inputs between two time periods. MFP may improve either by harvesting more fish with the same amount of inputs or by harvesting the same amount of fish using fewer inputs. By ending the "race to fish" catch share programs may be expected to lead to improved productivity through the ability to better plan harvesting activities to change the mix of outputs and/or make better use of capital and other inputs. Productivity gains may also be obtained through the transfer of quota from less to more efficient vessels.

Annual MFP was estimated for a total of 20 catch share programs or sub-components of catch share programs using the Lowe index. Of the 20 programs, 13 included pre-catch share baseline conditions. In 10 of 13 cases, MFP improved during the first three years after program implementation. These productivity gains were maintained in all six catch share programs that have been in existence since at least 2007, and MFP continued to substantially improve in five of six longer-term programs after the first three years of program implementation.

Ideally MFP would be estimated using full information on inputs including capital, labor, energy, materials, and services. In 11 of the 20 fisheries evaluated in this report available data were limited to capital and labor. Analysis of the 9 programs that included energy and the 5 programs that also included materials found that energy made a larger contribution to estimated MFP as compared to capital and labor alone or to specifications including only capital, labor, and materials. This suggests that new data collection or new methods to estimate fuel use may be a priority in improving estimation of MFP in future studies.

The biomass index plays an important role in characterizing changes in MFP in catch share programs, as biomass changes may affect the catchability of fish and thus harvesting productivity. However, obtaining biomass data was a time consuming process, and in some cases, required a stock-by-stock evaluation of the reliability of the biomass information that was available. In most instances, biomass adjusted and biomass unadjusted measures of MFP were consistent in terms of productivity change relative to baseline conditions although, unadjusted MFP underestimates productivity change when biomass is declining and overestimates productivity change when biomass is increasing. The magnitude of the difference between unadjusted and adjusted MFP increases with the magnitude of the biomass trend. If the biomass trend is sufficiently large, then biomass unadjusted MFP may provide a false impression of change in MFP. This means that obtaining reliable biomass data will be important in any future updates to MFP in catch share fisheries conducted by NMFS.

A manuscript describing this project will soon be published as a NOAA Tech Memo.

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Walden, J., J. Agar, R. Felthoven, A. Harley, S. Kasperski, J. Lee, T. Lee, A. Mamula, J. Stephen, A. Strelcheck, and E. Thunberg. 2014. Productivity Change in U.S. Catch Shares Fisheries. U.S. Dept. of Commer., *NOAA Technical Memorandum* NMFS-F/SPO-XXX, XXX p. (Forthcoming)

C. AFSC ECONOMIC AND SOCIAL SCIENCES RESEARCH PROGRAM PUBLICATIONS FOR FULL-TIME STAFF (NAMES IN BOLD), 2014-2015

2015

Abbott, J., **A. Haynie,** and M. Reimer. 2015. "Hidden Flexibility: Institutions, Incentives and the Margins of Selectivity in Fishing." *Land Economics* 91 (1): 169–195.

The degree to which selectivity in fisheries is malleable to changes in incentive structures is critical for policy design. We examine data for a multispecies trawl fishery before and after a transition from management under common-pool quotas to a fishery cooperative and note a substantial shift in post-coop catch from bycatch and toward valuable target species. We examine the margins used to affect catch composition, finding that large and fine-scale spatial decision making and avoidance of night fishing were critical. We argue that the poor incentives for selectivity in many systems may obscure significant flexibility in multispecies production technologies.

Breslow, S., D. Holland, P. Levin, K. Norman, M. Poe, C. Thomson, R. Barnea, P. Dalton, N. Dolsak, C. Greene, K. Hoelting, **S. Kasperski**, R. Kosaka, D. Ladd, A. Mamula , S. Miller, B. Sojka, C. Speir, S. Steinbeck, and N. Tolimieri. 2014. "Human Dimensions of the CCIEA". In: Levin, P.S., Wells, B.K., and M.B. Sheer, (Eds.), California Current Integrated Ecosystem Assessment: Phase III Report 2013. Available from `http://www.noaa.gov/iea/Assets/iea/california/Report/pdf/10.Human%20Dimensions_2013.pdf`.

A conceptual model of the California Current Large Marine Ecosystem (CCLME) socioecological system highlights the "social" within the socio-ecological system and demonstrates that any particular management strategy can affect human wellbeing through at least two major pathways: through alterations in environmental conditions, which in turn affect human wellbeing, and through direct effects on human wellbeing. In addition to broad conceptualizations of the coast-wide system in both natural and social terms, and discussions of relevant social science approaches and frameworks, we include 5 major indicator efforts within the CCLME. These indicators cover levels of human coastal community vulnerability, vessel- and port-level fisheries diversification trends and effects, "personal use" of fisheries as a preliminary proxy for possible subsistence practices among commercial operators, the relationship between water supply and agricultural production in Central California, and a survey of marine-oriented recreational expenditures.

Call, I., and **D. Lew.** 2015. "Tradable Permit Programs: What are the Lessons for the New Alaska Halibut Catch Sharing Plan?" *Marine Policy* 52: 125-137.

To address long-standing allocation conflicts between the Pacific halibut commercial fishing sector and recreational charter (for-hire) sector in Alaska, an Alaska halibut catch sharing plan (CSP) is being implemented in 2014 that has a provision allowing the leasing of commercial individual fishing quota to recreational charter businesses. This one-way inter-sectoral trading allows for the charter sector to increase its share of the total allowable catch while compensating commercial fishermen. This type of catch shares program is novel in fisheries. In this paper, the literature on non-fisheries tradable permit programs (TPPs) that have similarities to the Alaska halibut CSP program is examined. Several successful TPPs are discussed, including ones from emissions trading programs, water quality trading programs, water markets, and transferable development rights programs. They are then evaluated in terms of their similarities and differences to the Alaska CSP program. Characteristics not part of the current CSP that other TPPs have used and that may increase the likelihood for the CSP to be effective in achieving its primary goals (if they are implemented) are identified, such as allowing more flexible transfers (e.g., internal transfers), intertemporal banking, cooperative structures, and multi-year leasing.

Fissel, B., **R. Felthoven**, **S. Kasperski**, and C. O'Donnell. "Decomposing Productivity and Efficiency Changes in the Alaska Head and Gut Factory Trawl Fleet". In Press at *Marine Policy.*

Fishing fleets are subject to numerous factors that affect economic performance, making identification and attribution of such impacts difficult. This paper separately identifies the effects of changing input and output prices, fishery management, and quota allocations on total factor productivity using a Lowe Index. Indices account for technical change and decompose efficiency estimates into its technical, environmental, and scale-mix components. This results in measures that reflect shifts in the production frontier, and movements by vessels toward and around the frontier, to capture economies of scale and mix after a policy shift to a catch share program that includes fishing cooperatives and a limited access fishery. The difference between cooperative and limited access vessels is exploited to compare the changes in economic performance between the groups after the introduction of the shift to catch shares and cooperative management, which allowed the vessels to improve the timing and coordination across multi-species fisheries and to decrease incidental catch of quota-limited bycatch species that had closed the target fisheries prematurely in the past. Results indicate that total factor productivity increased significantly after the move to a catch share program, largely due to increases in technical change that shifted out the production frontier of the fishery.

Garber-Yonts, B., and J. Lee. 2015. *Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea/Aleutian Islands: Economic Status of the BSAI King And Tanner Crab Fisheries Off Alaska, 2014.* NOAA Fisheries, Alaska Fisheries Science Center, Seattle, WA. January, 2015. 224 p.

This report presents information on economic activity in commercial crab fisheries currently managed under the Federal Fishery Management Plan (FMP) for Bering Sea and Aleutian and Islands King and Tanner Crab (BSAI crab), with attention to the subset of fisheries included in the Crab Rationalization (CR) Program. Statistics on harvesting and processing activity; effort; revenue; labor employment and compensation; operational costs; and quota ownership, usage and disposition among participants in the fisheries are provided. Additionally, this report provides a summary of BSAI crab-related research being undertaken by the Economic and Social Sciences Research (ESSR) program at the Alaska Fisheries Science Center (AFSC).

Fissel, B. 2015. "Methods for the Alaska Groundfish First-Wholesale Price Projections." *NOAA Technical Memorandum* NMFS-AFSC-305, 39 p. U.S. Department of Commerce.

For a significant portion of the year there is a temporal lag in officially reported first-wholesale prices. This is lag occurs because the prices are derived from the Commercial Operators Annual Report which is not available until after data processing and validation of the data, in August of each year. The result is a data lag that grows to roughly a year and a half (e.g. prior to August 2015 the most recent available official prices were from 2013). To provide information on the current state of fisheries markets, now-casting is used to estimate 2014 first-wholesale prices from corresponding export prices which are available at a shorter time lag. Now-casting provided fairly accurate predictions and displayed rather modest prediction error with most of the confidence bounds within 5-10% of the price. In addition, time series models are used to project first-wholesale prices for 2015-2018. Resampling methods are used estimate a prediction density of potential future prices. Confidence bounds are calculated from the prediction density to give the probability that the prices will fall within a certain range. Prediction densities also provide information on the expected volatility of prices. As prices are projected past the current year the confidence bounds grow reflecting increasing uncertainty further out in the future. An empirical example to projecting the prices of pollock goods illustrates the methods. The full results of this research are published in the Status Report for the Groundfish Fisheries Off Alaska, 2015.

Himes-Cornell, A. and K. Hoelting. 2015. " Resilience strategies in the face of short- and long-term change: out-migration and fisheries regulation in Alaskan fishing communities." *Ecology and Society* 20(2): 9.

Historically, communities persisted in remote, isolated areas of Alaska in large part because of the abundance of marine and terrestrial resources, as well as the ability of local people to opportunistically access those resources as they became available. Species switching and the ability to shift effort away from fisheries during poor years allowed local residents to diversify their livelihoods in the face of uncertainties and ecological change. The advent of modern fisheries management, which views Alaskan fisheries as the property of all citizens of the United States, has fundamentally altered the relationship of place-based communities to fishery resources. Local access to fisheries has been particularly affected by the development of transferable fishing privileges, making it possible for fishing rights to leave place-based communities through the choices of individual community members to sell or to move away. When fishing communities in Alaska lose active fishing businesses, over time the loss of various types of community capital will follow, including human, social, cultural, technical, and financial capital. In some cases, communities are able to adapt or transform through diversification of their local economies. In other cases, no alternatives to a fishery-based economy are accessible. We have used resilience theory to explore drivers of change affecting Alaskan fishing communities. Emphasis was placed on two primary change drivers, the regulatory environment and rural out-migration, as well as their interconnections and their impacts on individuals, communities, and the larger social-ecological system. We summarized several government programs that have been implemented to support the continued participation of communities in Alaskan fisheries. In addition, we reviewed informal and private-sector efforts to generate resilience strategies that can facilitate new entry into fisheries or retain fishing businesses and fishing rights within communities, as well as respond to increasing uncertainty related to the global market and climate changes.

Himes-Cornell, A., and K. Kent. 2014. "Involving fishing communities in data collection: a summary and description of the Alaska Community Survey, 2011." U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-284, 171 p.

A review of existing fisheries data collected by the State of Alaska and the National Marine Fisheries Service (NMFS) shows that many Alaskan communities are highly engaged in commercial, recreational, and subsistence fisheries. These resources are frequently affected by fisheries management decisions and anthropogenic effects on resource distribution and abundance that can either threaten or enhance community well-being. However, much of the existing economic data about Alaskan fisheries is collected and organized around specific units of analysis such as counties (boroughs), fishing firms, vessels, sectors, and gear groups that are often difficult to aggregate or disaggregate for analysis at the individual community or regional level. In addition, some relevant community-level economic data have not been collected historically. As a result, the North Pacific Fishery Management Council (NPFMC), the Alaska Fisheries Science Center (AFSC), and community stakeholder organizations identified the ongoing collection of community level socio-economic information, specifically related to commercial fisheries, as a priority. To address this need, the AFSC Economic and Social Sciences Research Program (ESSRP) began implementing the Alaska Community Survey – a voluntary data collection program to improve the socio-economic data available for consideration in North Pacific fisheries management using the community as the unit of reporting and analysis. ESSRP social scientists partnered with community-based organizations and individuals from fishing communities around Alaska to determine the detailed community level information to be collected and made available for the socio-economic impact assessment of communities involved in North Pacific fisheries (initially focused on Alaska communities for feasibility reasons). An additional goal was to ensure that community level socio-economic and demographic data are collected at comparable levels of spatial and thematic resolution to commercial fisheries data. Such data will facilitate analysis of the impacts of proposed changes in commercial fisheries management, both within and across North Pacific communities involved and engaged in various types of fishing. These data will also help ESSRP scientists and NPFMC staff to better understand Alaskan communities' social and economic ties to the fishing industry and facilitate the analysis of potential impacts of catch share programs and coastal and marine spatial planning efforts. This survey was designed to gather information about Alaskan fishing communities and to help determine each community's capacity to support fishing activities. The types of data collected through the survey address recommendations from community representatives that participated in our community meetings. This report gives an overview of the survey, results from the second year of implementation in 2012 (collecting data for the 2011 calendar year), and addresses the potential for this and other methods of engaging communities to better inform fisheries management in isolated areas of Alaska.

Himes-Cornell, A. and **S. Kasperski**. 2015. "Assessing climate change vulnerability in Alaska's fishing communities." *Fisheries Research* 162 (2015): 1-11.

Communities in Alaska are experiencing impacts of unexpected climate-related changes and unprecedented environmental conditions on the harvests of marine and terrestrial resources. Residents of rural Alaska are already reporting heretofore unseen changes in the geographic distribution and abundance of fish and marine mammals, increases in the frequency and ferocity of storm surges in the Bering Sea, changes in the distribution and thickness of sea ice, and increases in river and coastal erosion. When combined with ongoing social and economic change, climate, weather, and changes in the biophysical system interact in a complex web of feedbacks and interactions that make life in rural Alaska extremely challenging. The purpose of this study is to develop a framework of indicators to assess the vulnerability, resilience and adaptability of Alaskan communities to climate change. The framework developed here can also be applied more generally through indicators that assess community vulnerability and resiliency to sea level rise, drought, storm intensity, and other likely impacts of climate change. These indicators can help inform how best to allocate resources for climate change adaptation.

Himes-Cornell, A., **S. Kasperski**, K. Kent, C. Maguire, M. Downs, S. Weidlich, and S. Russell (2015). "Social Baseline of the Gulf of Alaska Groundfish Trawl Fishery: Results of the 2014 Social Survey." U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-303, 98 p. plus Appendices.

The North Pacific Fishery Management Council is considering the implementation of a new bycatch management program for the Gulf of Alaska groundfish trawl fishery. Any change in how the fishery is managed will likely affect the people and communities participating in the fishery. In anticipation of such changes, NOAA Fisheries' Alaska Fisheries Science Center developed a survey to collect baseline information about the social dimensions of the fishery. Data were collected before program implementation in order to provide a baseline description of the industry as well as allow for analysis of changes the bycatch management program may bring for individuals and communities once implemented. Having a detailed baseline description will allow for a greater understanding of the social impacts the program may have on the individuals and communities affected by the new management program. When combined with data to be collected in planned post-program implementation follow-up surveys, this information will inform changes in the social characteristics over time and assist in a more comprehensive program evaluation and more informed consideration of potential post-implementation modifications of the program, if needed. Additionally, the survey asked for opinions on a range of elements that may or may not be included in the final bycatch management program to assess different participant's preferences for various management options, which may change over time as well. We conducted the survey with participants in the Gulf of Alaska groundfish trawl fishery, including vessel owners, vessel operators, crew aboard groundfish vessels, catcher/processor owners, catcher/processor crew, shoreside and inshore floating processors, tender owners and operators, and other individuals who are stakeholders in the trawl fishery including any businesses that are directly tied to the groundfish trawl industry through the supply of commercial items to include, but not limited to gear suppliers, fuel suppliers, and equipment suppliers. The results of the survey highlight the differences in the people, sectors, and communities engaged in the fishery. Data from the survey demonstrate how different individuals and sectors depend on the Gulf of Alaska groundfish trawl fishery to sustain their businesses and families and how they may be interconnected with one another.

Holland, D.S., and **S. Kasperski**. 2014. "Fishery Income Diversification and Risk for Fishermen and Fishing Communities of the US West Coast and Alaska – Updated to 2012", Appendix HD1, Appendix to: *Human Dimensions of the CCIEA*, in: Levin, P.S., Wells, B.K., and M.B. Sheer (Eds.). California Current Integrated Ecosystem Assessment: Phase III Report 2013. Available from`http://www.noaa.gov/iea/Assets/iea/california/Report/pdf/11.Human%20dimensions%20Appendix_2013.pdf`.

Catches and prices from many fisheries exhibit high interannual variability, leading to variability in the income derived by fishery participants. The economic risk posed by this variability might be mitigated in some cases if individuals participate in several different fisheries, particularly if revenues from those fisheries are uncorrelated or vary asynchronously. We work with a large dataset that includes annual landings and revenues between 1981 and 2012 by species, port and vessel from all commercial fisheries in the US EEZ off the West Coast and Alaska. We present the vessel-level analysis based on 28,151 vessels with average fishing while the port level analysis includes 166 ports with average fishing revenues over $100,000 and includes 79 ports along the West Coast and 87 ports in Alaska. The large dataset enables us to identify trends in diversification and relationships between diversification and variation in revenues, despite the relationship being very noisy. We also consider a number of subsets of the larger fleet categorized by average revenues, length and whether they had landings in West Coast states (i.e., excluding vessels with revenue only from Alaska). The current fleet of vessels on the US West Coast and in Alaska (those that fished in 2012) is less diverse than at nearly any point in the past 30 years, except that they are slightly more diverse than they were in 2011. For smaller vessels diversification has generally been declining (i.e., HHI has been increasing) since 1981. For larger vessels, diversification increased through the early 1990s but has mostly declined since. The ability of fishermen to diversify may be limited (or facilitated) by management approaches and regulatory actions. This should be a consideration when evaluating management actions, though in some cases management actions that reduce diversification are needed to remove excess capacity and promote efficiency. It is not clear that ports could or should increase diversification to reduce variation in landed value, but it does appear that high levels of diversification can reduce variation in landed value. High variation in overall landed value for several ports is associated with dependence on fisheries that have high variation in revenues. This variation could be socially disruptive, but this may be somewhat unavoidable if those ports want to continue to attract the landings from valuable fisheries like crab that have highly volatile annual landings.

Holland, D.S., E. Thunberg, J. Agar, S. Crosson, C. Demerest, **S. Kasperski**, L. Perruso, E. Steiner, J. Stephen, A. Strelcheck, and M. Travis. 2014. "U.S. Catch Share Markets: A Review of Characteristics and Data Availability".U.S. Dept. of Commer., NOAA Technical Memorandum NMFS-F/SPO-145, 67 p.

A growing number of U.S. fisheries are managed with catch share systems, which allocate exclusive shares of the total allowable catch from a fish stock to individuals, cooperatives, communities, or other entities. All of these catch share programs allow transferability of catch privileges in some form. Information on these transfers, particularly prices, can be valuable to fishery managers and to fishery participants and other stakeholders. We document the availability and quality of data on transfers of catch privileges in fourteen U.S. catch share programs, including programs in every U.S. region except the Pacific Islands. The catch share programs reviewed include several individual fishing quota (IFQ) programs as well as a number of programs that allocate catch privileges to self-organized cooperatives. We provide a short synopsis of each catch share program and quota market including a short description of the fishery, the management system, and the rules for transferring quota share(QS) and quota pounds (QP). Each synopsis also includes a description of the information collected on QS and QP transfers and an evaluation of the availability and quality of QS and QP price information and other useful information that can be derived from transfer data. We do not attempt to evaluate the efficiency of any of the catch share markets, nor provide in-depth analysis of market data, but we do provide some evaluation of the potential to use catch share market data to provide useful information to stakeholders and managers. We make recommendations on how to improve the design of catch share systems and associated data collection systems to facilitate effective catch share markets, collection of catch share market data, and better use of information from catch share markets.

Johnston, R., D. Jarvis, K. Wallmo, and **D. Lew**. 2015. "Characterizing Large Scale Spatial Pattern in Nonuse Willingness to Pay: An Application to Threatened and Endangered Marine Species." In press at *Land Economics.*

This paper demonstrates methods that may be combined to characterize otherwise undetectable spatial heterogeneity in stated preference willingness to pay (WTP) estimates that may occur at multiple geospatial scales. These include methods applicable to large-scale analysis with diffuse policy impacts and uncertainty regarding the appropriate scales over which spatial patterns should be evaluated. Illustrated methods include spatial interpolation and multi-scale analysis of hot/cold spots using local indicators of spatial association. An application to threatened and endangered marine species illustrates the empirical findings which emerge. Findings include large scale clustering of nonuse WTP estimates at multiple scales of analysis.

Kasperski, S. 2015. "Optimal Multi-species Harvesting in Ecologically and Economically Interdependent Fisheries." *Environmental and Resource Economics* 61(4): 517-557.

Single-species management of multi-species fisheries ignores ecological interactions in addition to important economic interactions to the detriment of the health of the ecosystem, the stocks of fish species, and fishery profits. This study maximizes the net present value from a multi-species fishery where species interact ecologically in the ecosystem, and economically through vessels' multi-product harvesting technology, switching gear types, and interactions in output markets. Numerical optimization techniques are used to determine the optimal harvest quota of each species over time. This study highlights the need to incorporate both ecological and economic interactions that occur between species in an ecosystem.

Kroetz, K., J. Sanchirico, and **D. Lew**. 2015. "Efficiency Costs of Social Objectives in Tradable Permit Programs." *Journal of the Association of Environmental and Resource Economists* 2(3): 339-366.

Objectives of tradable permit programs are often broader than internalizing an externality and improving economic efficiency. Often programs are designed to accommodate community, cultural, and other non- efficiency goals through restrictions on trading. However, restrictions can decrease economic efficiency gains. We use a policy experiment from the Alaska halibut and sablefish tradable permit program, which includes both restricted and unrestricted permits, to develop one of the few empirical measurements of the costs of meeting non-efficiency goals. We estimate that restrictions are reducing resource rent in the halibut and sablefish fisheries by 25% and 10%, respectively.

Lew, D., **A. Himes-Cornell**, and **J. Lee**. 2015. "Weighting and Data Imputation for Missing Data in Fisheries Economic and Social Survey." *Marine Resource Economics* 30(2): 219-230.

Surveys of fishery participants are often voluntary and, as a result, commonly have missing data associated with them. The two primary causes of missing data that generate concern are unit non-response and item non-response. Unit non-response occurs when a potential respondent does not complete and return a survey, resulting in a missing respondent. Item non-response occurs in returned surveys when an individual question is unanswered. Both may lead to issues with extrapolating results to the population. We explain how to adjust data to estimate population parameters from surveys using two of the principal approaches available for addressing missing data, weighting and data imputation, and illustrate the effects they have on estimates of costs and earnings in the Alaska charter boat sector using data from a recent survey. The results suggest that ignoring missing data will lead to markedly different results than those estimated when controlling for the missing data.

Lew, D., and D. Larson. 2015. "Stated Preferences for Size and Bag Limits of Alaska Charter Boat Anglers." *Marine Policy* 61: 66-76.

Over the last several years, significant regulatory changes related to Pacific halibut *Hippoglossus stenolepis* have occurred in the for-hire recreational charter boat fishing sector in Alaska. In addition to limited entry restrictions and adoption of a catch sharing plan that provides a formal means of determining allocation between the commercial and charter boat fishing sectors, more restrictive harvest regulations were placed on anglers fishing from charter boats. This article provides insights into how the value anglers place on charter boat fishing is affected by these regulations, principally bag and size limits. Such information is helpful in assessing the trade-offs in economic benefits associated with different regulatory tools used to manage angler harvest levels. Stated preference choice experiment data from a 2012 survey are analyzed using a panel rank-ordered mixed logit model to estimate the economic value, or willingness to pay (WTP), non-resident anglers place on saltwater charter boat fishing trips in Alaska and to assess how changes in characteristics of fishing trips, particularly harvest restrictions related to Pacific halibut, affect this value. The model specification accounts for a wide array of size and bag limit restrictions that have been recently implemented or are under consideration by Pacific halibut fishery managers. The results indicate that very strict harvest restrictions have the effect of driving WTP to zero, while allowing at least one (potentially) large fish to be caught is valuable to anglers. The results also suggest that WTP for fishing trips with bag limits that allow two or more fish to be harvested with no size restrictions on the first fish harvested are not statistically different from the value for trips for larger bag limits or for the case where all the fish in the limit can be any size. This suggests that fishery managers can restrict the size of the second fish in a two-fish bag limit and still maintain economic values for fishing trips.

Lew, D., G. Sampson, **A. Himes-Cornell, J. Lee**, and **B. Garber-Yonts**. 2015. "Costs, Earnings, and Employment in the Alaska Saltwater Sport Fishing Charter Sector, 2011-2013." U.S. Dept of Commerce, NOAA Technical Memorandum NMFS-AFSC-2738, 134 p.

This report describes the development, design, testing, and implementation of the Alaska Saltwater Sport Fishing Charter Business Survey, a survey that collects baseline economic information from the saltwater sport fishing charter businesses in Alaska. The survey was administered for three consecutive years (2011-2013) to collect annual costs, earnings, and employment information of sport fishing charter businesses. Descriptive statistics of the samples of item respondents are presented, as well as population-level estimates of key variables that are adjusted for missing data using sample weighting and data imputation methods. The adjusted population-level results suggest that in 2011 the Alaska saltwater sport fishing charter sector as a whole operated at a loss, but in 2012 and 2013, as the population of charter businesses shrank, the sector yielded an overall profit. The analysis examines sector-level trends and is a first attempt to provide a basic understanding of the economic conditions in the charter sector leading up to the implementation of the Alaska halibut catch sharing plan (CSP) implemented in 2014. The 3-year period leading up to the CSP implementation saw slight changes in employment and spending patterns by the charter businesses that remained in the fishery. This includes a shift to decreasing the amount spent on charter trip expenses and cash investments in vehicles, machinery, equipment, buildings and real estate. At the same time, average revenues increased. To better understand the effects of management changes on costs, earnings, and employment, business-level models should be developed.

Lipton, D., **D. Lew**, K. Wallmo, P. Wiley, and A. Dvarskas. 2014. "The Evolution of Non-Market Valuation of U.S. Coastal and Marine Resources." *Journal of Ocean and Coastal Economics* Vol. 2014, Article 6.

At the federal level, particularly within the National Oceanic and Atmospheric Administration (NOAA), regulatory and programmatic needs have driven the continued development and application of non-market valuation approaches to marine and coastal resources. The evolution of these valuation approaches not only entails adopting the recommendations of the 1993 NOAA blue ribbon panel on contingent valuation, but also an expansion of stated preference approaches with increased use of stated preference choice experiments. Revealed preference approaches have also advanced with more sophisticated random utility models. We provide an overview of this evolution in the areas of natural resources damage assessment, protected resources, recreational fisheries, and coastal management. With the broad adoption of an ecosystem services approach to marine and coastal resource management, the demand for valuation of ecosystem services has grown and will continue to provide the impetus for more studies similar to those presented. Similar to what occurred initially as a result of the blue ribbon study, greater adoption of valuation estimates, particularly for non-use value, may be facilitated by guidance and standards from a high-level or highly respected authority.

Pienaar, E., **D. Lew**, and K. Wallmo. 2015. "The Importance of Survey Content: Testing for the Context Dependency of the New Ecological Paradigm Scale." *Social Science Research* 51: 338-349.

Using a regression-based analysis of a survey of U.S. households, we demonstrate that both environmental concern, as measured by the New Ecological Paradigm (NEP) Scale, and facets of environmental concern, as measured by three NEP factors, are influenced by survey context. Survey respondents were presented with detailed information about two to four threatened and endangered marine species in the United States, including the Endangered Species Act listing status of the species and threats to the survival of the species. All else being equal, measures of environmental concern are influenced by both which species were included in the survey and by the concern expressed about these species. As such, measures of environmental concern are found to be context dependent since they are correlated with the species included in each survey. We also demonstrate that NEP-based measures of environmental concern are affected by socio-demographic variables, opinions about government spending, and environmental knowledge. Given the wide, multi-disciplinary use of the NEP Scale, it is important for researchers to recognize that NEP-based measures of environmental concern may be sensitive to information included in surveys.

Rose, K.A., J. Fiechter, E. N. Curchitser, K. Hedstrom, M. Bernal, S.Creekmore, **A. Haynie**, S. Ito, S. Lluch-Cota, B. A. Megrey, C. A. Edwards, D. Checkley, T. Koslow, S. McClatchie, F. Werner, A. MacCall, V. Agostini. 2015. "Demonstration of a Fully-Coupled End-to-End Model for Small Pelagic Fish Using Sardine and Anchovy in the California Current." *Progress in Oceanography,* Available online 4 February 2015, ISSN 0079-6611, `http://dx.doi.org/10.1016/j.pocean.2015.01.012.`

We describe and document an end-to-end model of anchovy and sardine population dynamics in the California Current. The end-to-end model was 3-dimensional, time-varying, and multispecies, and consisted of four coupled submodels: hydrodynamics, Eulerian nitrogen-phytoplankton-zooplankton (NP_2Z_3), an individual-based full life cycle anchovy and sardine submodel, and an agent-based fishing fleet submodel. A predator roughly mimicking albacore was included as individuals that consumed anchovy and sardine. All submodels were coded within the ROMS software, and used the same resolution spatial grid and were all solved simultaneously to allow for possible feedbacks among the submodels. We used a super-individual approach and solved the coupled models on a distributed memory parallel computer, both of which created challenging but resolvable bookkeeping challenges. The anchovy and sardine growth, mortality, reproduction, and movement, and the fishing fleet submodel, were each calibrated using simplified grids before being inserted into the full end-to-end model. An historical simulation of 1959-2008 was performed, and the latter 40 years analyzed. There was good agreement between simulated and observed spatial maps of surface chlorophyll concentrations and for vertical profiles of temperature, nitrate, and chlorophyll. SSH and SST for the historical simulation showed strong horizontal gradients and multi-year scale temporal oscillations related to various climate indices (PDO, NPGO), and both showed responses to the 1997-1998 El Nino. Total phytoplankton was lower during strong El Nino events and higher for the strong 1999 La Nina event. The three zooplankton groups generally corresponded to the spatial and temporal variation in total phytoplankton. Simulated biomasses of anchovy and sardine were within the historical range of observed biomasses but predicted biomasses showed much less inter-annual variation. Anomalies of annual biomasses of anchovy and sardine showed a switch from anchovy to sardine dominance in the mid-1990s, which agreed with observed values. Simulated averaged weights- and lengths-at-age did not vary much across decades, and movement patterns showed anchovy located close to the coast while sardine were more dispersed and farther offshore. Albacore predation on anchovy and sardine was concentrated near the coast in two pockets near the Monterey Bay area and equatorward of Cape Mendocino. Predation mortality from fishing boats was concentrated where sardine age-1 and older individuals were located close to one of the five ports. We demonstrated that it is feasible to perform multi-decadal simulations of a fully-coupled end-to-end model, and that this can be done for a model that follows individual fish and boats on the same 3-dimensional grid as the hydrodynamics. Our focus here was on proof of principle and our results showed that we solved the major technical, bookkeeping, and computational issues. We discuss the next steps to increase computational speed and to include important biological differences between anchovy and sardine.

Seung, C., M. Dalton, A. Punt, D. Poljak, and R. Foy. 2015. "Economic Impacts of Changes in an Alaska Crab Fishery from Ocean Acidification." In press at *Climate Change Economics*.

We use a dynamic computable general equilibrium (CGE) model for Alaska, linked to a bioeconomic model of the Bristol Bay red king crab (BBRKC) fishery, to analyze the regional economic effects of a future with impacts of ocean acidification (OA) on fishery yields and income. We compare the CGE model outcomes computed with yield projections based on two different assumptions about the form of OA effects in the bioeconomic model, which represent linear and nonlinear effects on the survival of juvenile red king crab, to a baseline without OA effects. Results demonstrate considerable uncertainty in future projections of yields and economic effects, and show that outcomes including regional economic impacts, welfare changes, and temporal changes in quota share lease rates for BBRKC are sensitive to the linear versus nonlinear form taken in the yield projections, and to changes in the world price for BBRKC.

Seung, C. 2015. "Untangling Economic Impacts for Alaska Fisheries: A Structural Path Analysis" *Marine Resource Economics* 30(3): 331-347.

Fishery managers are often provided with economic impact multipliers calculated using input-output (IO) or social accounting matrix (SAM) models. However, these multipliers measure total economic impacts and do not provide the fishery managers with the details underlying how and along what paths these total economic impacts are generated and transmitted throughout a regional economy. This article uses a structural path analysis (SPA) to illustrate how an initial shock to a fishery sector generates impacts through various paths in a regional economy and to what extent these impacts are amplified while passing through the various paths. The SPA analysis is conducted within a SAM framework for the fisheries of the Southeast region of Alaska.

Thunberg, E., J. Agar, S. Crosson, **B. Garber-Yonts**, A. Harley, D. Kitts, T. Lee, C. Lian, C. Liese, M. Pan, L. Perusso, G. Silva, D. Squires, E. Steiner, and S. Stohs. "A Snapshot of 2014 NOAA Fisheries Commercial Fishery Cost Data Collection." NOAA Technical Memorandum NMFS-F/SPO-154, August 2015.

Increased institutional support within NOAA Fisheries for systematic cost data collection program has expanded the number of active, ongoing data collections from 5 in 2002 to 19 in 2014. Each of these programs has been tailored to suit regional Council requirements and/or through add-ons to take advantage of other region-specific fishery dependent or independent data collection programs. As a result, there are important differences among regions in how cost data are collected, and although these data collection programs and economic analyses that derive from these data may be documented at the regional level, a summary of cost data collection programs across regions has not been previously prepared. This report provides a historical perspective of the development of NOAA Fisheries cost data collection over time, a comparison of metadata descriptions for current and planned cost data collections as of 2014, and more detailed narratives for each of the 19 data collection programs, including background information, description of the survey population, and a summary of data collection methods other pertinent information about program design and implementation. All survey forms referenced in the report are included as appendices.

Thunberg, E., J. Walden, J. Agar, **R. Felthoven**, A. Harley, **S. Kasperski**, **J. Lee**, T. Lee, A. Mamula, J. Stephen, and A. Strelcheck. "Measuring Changes in Multi-Factor Productivity in U.S. Catch Share Fisheries". In Press at *Marine Policy.*

By ending the "race to fish" catch share programs may be expected to lead to improved productivity at the fishery level by retiring redundant capital and by allowing fishing firms to become more technically efficient in their harvesting activities by, among other things, changing the composition of inputs and outputs. Yet, there have been relatively few empirical studies of productivity changes in catch share fisheries and no comprehensive treatment of a cross-section of programs using a common measure of productivity change. In this study we provide estimates of multi-factor productivity change for 20 catch share fisheries in the U.S. using a Lowe index. With few exceptions, productivity increased relative to baseline conditions during the first three years of catch share program implementation. For five of six of the most established catch share programs, these initial productivity gains have been maintained or have continued to improve.

Walden, J., **B. Fissel**, D. Squires, and N. Vestergaard. "Productivity Changes in Commercial Fisheries: An Introduction to the special issue". In Press at *Marine Policy.*

Productivity is a key economic indicator and measures the relationship between inputs used to produce a product, and the amount of product produced. Productivity change measures how productivity has changed through time. In traditional land based industries, these two economic metrics have been extensively measured and studied. Until recently, this has not been true for commercial fishing fleets. This article provides an overview of productivity as an economic performance metric, and highlights specific studies of productivity change in commercial fisheries during the past 50 years. It concludes with an introduction to the articles contained in this special edition.

Walden, J., J. Agar, **R. Felthoven**, A. Harley, **S. Kasperski**, A. Mamula, **J. Lee**, T. Lee, J. Stephen, A. Strelcheck, and E.Thunberg. 2014. "Productivity Change in U.S. Catch Share Fisheries." U.S. Dept. of Commer., NOAA Technical Memorandum NMFS-F/SPO-146, p.137.

NOAA Fisheries Office of Science and Technology has initiated a national program including development and reporting of indicators of performance for catch share fisheries. The first national report of catch share program performance was published in 2013. That report included an initial set of performance indicators that were readily available with existing data while noting that additional indicators of performance were being developed, one of which was productivity change. In this report productivity change in most US catch share fisheries, including sub-components for some programs, was estimated using a Lowe index. The Lowe index is an aggregate index that avoids computational problems associated with changes in fleet size over time. The Lowe index is computationally easy to construct, less data demanding than most alternative productivity measures, and could be applied in a consistent manner for all selected U.S. catch share programs. Where biomass data were available the Lowe Index was adjusted for biomass change. Annual MFP was estimated for a total of 20 catch share programs or sub-components of catch share programs using the Lowe index. Of the 20 programs, 13 included pre-catch share baseline conditions. In 10 of 13 cases, MFP improved during the first three years after program implementation. These productivity gains were maintained in all six catch share programs that have been in existence since at least 2007, and MFP continued to substantially improve in five of six longer-term programs after the first three years of program implementation. Ideally MFP would be estimated using full information on inputs including capital, labor, energy, materials, and services. In 11 of the 20 fisheries evaluated in this report available data were limited to capital and labor. Analysis of the 9 programs that included energy and the 5 programs that also included materials found that energy made a larger contribution to estimated MFP as compared to capital and labor alone or to specifications including only capital, labor, and materials. This suggests that new data collection or new methods to estimate fuel use may be a priority in improving estimation of MFP in future studies.

Wallmo, K., and **D. Lew**. 2015. "Public Preferences for Endangered Species Recovery: An Examination of Geospatial Scale and Non-Market Values." *Frontiers in Marine Science* 2:55.

Non-market valuation allows society to express their preferences for goods and services whose economic value is not reflected in traditional markets. One issue that arises in applying non-market values in policy settings is defining the extent of the economic jurisdiction – the area that includes all people who hold values – for a good or service. In this paper we estimate non-market values for recovering eight threatened and endangered marine species in the US for two geographically embedded samples: households on the west coast of the US and households throughout the nation. We statistically compare species values between the two samples to help determine the extent of and variation in the economic jurisdiction for endangered species recovery. Our findings offer support to the tenet that the summation of non-market values across the country is appropriate when evaluating alternative policies for endangered species recovery.

2014

Clay, T., and **A. Himes-Cornell**. 2014. "Bringing Social Science into US National Climate Policy." *Anthropology News*, April 2014.

The third in a series of congressionally mandated National Climate Assessments (NCAs) will be published in 2014 (NCA 2013). Scientists from multiple federal agencies and universities participated in drafting regional and topical Technical Input Documents (TIDs) that will be used in the drafting of the final high level NCA. This is the first NCA to include social and economic impacts of climate change on marine resources. In addition, for the first time a set of indicators of climate change (including social and economic indicators) is being developed to facilitate all future NCAs. In this essay, the authors discuss the results of "Section 4: Impacts of Climate Change on Human Uses of the Ocean" of the *Oceans and Marine Resources in a Changing Climate TID*, as well as the Community Social Vulnerability Indicators (CSVIs) created by NOAA Fisheries' social scientists and slated to be in use nationally by 2015 as one of the new NCA indicators.

Felthoven, R., J. Lee, and K. Schnier. 2014. "Cooperative Formation and Peer Effects in Fisheries." *Marine Resource Economics* 29(2): 133-156.

The economic benefits that arise following the transition to a rights-based fishery management regime accrue on both the extensive margin, through consolidation, and the intensive margin, through more efficient use of productive inputs. This research explores the changes in fleet composition, economic performance and coordination that occurred following the introduction of the Bering Sea

Crab Rationalization program in the federally managed crab fisheries off Alaska. On the extensive margin we estimate the relative efficiency of the vessels available to each fishing cooperative in order to look for potential arbitrage opportunities when selecting which vessels will fish the cooperative's quota allocation. On the intensive margin we investigate the role of peer effects in facilitating the flow of information within the cooperative. The results of our econometric analysis support two hypotheses within the red king and snow crab fisheries: (1) the cooperatives which formed appear to have exploited the inter-cooperative efficiency arbitrage opportunities, and (2) an increase in landings by a fellow cooperative member tends to increase one's own landings, a positive peer effect.

Fissel, B. 2014. "Economic Indices for the North Pacific Groundfish Fisheries: Calculation and Visualization." *NOAA Technical Memorandum* NMFS-AFSC-279, 59 p. U.S. Department of Commerce.

This technical report details the methods used to create indices for monitoring economic performance in the Alaskan North Pacific Groundfish Fisheries published in the annual Economic Status of the Groundfish Fisheries Off Alaska report. The intuition and interpretation of the indices used is discussed informally followed by a review of the formal literature on the technical properties of indices and the methods for their construction. A decomposition of the Fisher index is derived which relates subindices to a larger aggregate index. The derivations are extended to chained indices over time. A case study of the Gulf of Alaska shoreside groundfish fishery is used to show how the indices and supporting statistics can be graphically displayed to characterize significant amounts of data across different dimensions of economic markets efficiently.

Haynie, A. "Estimating the Value of a Fishing Right: An Analysis of Changing Usage and Value in the Western Alaska Community Development Quota (CDQ) Program." 2014. *Fisheries Science* 80 (2): 181-191.

An important element in the U.S. management of fisheries in the North Pacific is the existence of Community Development Quotas (CDQs) which grant community cor- porations the right to fish in many fisheries off the coast of Alaska. The eastern Bering Sea pollock fishery is the largest of these fisheries, with 10 % of the quota allocated to CDQs. The CDQ program evolved from a partial catch share pro- gram that existed from 1992 to 1999 within a limited-entry fishery to a full catch share program with separate spatial rights. In this paper I examine the temporal and spatial uses of CDQ rights and how these uses have changed since the implementation of catch shares throughout the fishery. I also discuss the dispersion of CDQ royalties since the program's inception and examine the prices of CDQ fishing rights from 1992 to 2005 when data on quota value were reported to the government. I compare quota prices to information about walleye pollock fishing and examine the evolving use of CDQ rights. The use of the CDQ right has changed from extending the season to enabling fishing in otherwise closed areas during the season. The number of vessels fishing with CDQ rights has declined substantially, with all pollock CDQ fishing now done by at-sea processors.

Himes-Cornell, A., K. Hoelting, C. Maguire, L. Munger-Little, **J. Lee**, J. Fisk, **R. Felthoven** and P. Little**.** 2013. "Community Profiles of North Pacific Fisheries: Alaska" 2nd edition. U.S. Dep. Commer., *NOAA Tech. Memo.* NMFS-AFSC-259 (Volumes 1-12).

This document profiles 196 fishing communities in Alaska with information on social, economic and fisheries characteristics. Various federal statutes, including the Magnuson-Stevens Fishery Conservation and Management Act and the National Environmental Policy Act, among others, require agencies to examine the social and economic impacts of policies and regulations. These profiles serve as a consolidated source of baseline information for assessing community impacts in Alaska. Each community profile is given in a narrative format that includes six sections: *People and Place, Natural Resources and Environment, Current Economy, Governance, Infrastructure,* and *Involvement in North Pacific Fisheries*. *People and Place* includes information on location, demographics (including age and gender structure of the population, racial and ethnic makeup), education, housing, and local history. *Natural Resources and Environment* includes presents a description of the natural resources in the vicinity of the community, as well as specific information on local parks and preserves, resource exploration opportunities (e.g., mining and fishing), natural hazards and nearby environmental contamination sites. *Current Economy* analyzes the principal contributions to the local economy, including the distribution of occupations and industries that employ residents, as well as unemployment and poverty statistics. *Governance* lays out information regarding city classification, taxation, Native organizations, proximity to fisheries management and immigration offices, and municipal revenue and fisheries-related grants received by the community. *Infrastructure* covers connectivity and transportation, facilities (water, waste, electricity, schools, police, and public accommodations), medical services, and educational opportunities. *Involvement in North Pacific Fisheries* details community activities in commercial fishing (processing, permit holdings, and aid receipts), recreational fishing, and subsistence fishing. To define communities, we relied on Census place-level geographies where possible, grouping communities only when constrained by fisheries data, yielding 188 individual profiles. Regional characteristics and issues are briefly described in regional introductions.

Himes-Cornell, A., K. Kent. 2014. “Involving Fishing Communities in Data Collection: A Summary and Description of the Alaska Community Survey, 2010.” U.S. Dep. Commer., *NOAA Tech. Memo.* NMFS-AFSC-280, 170 p.

A review of existing fisheries data collected by the State of Alaska and the National Marine Fisheries Service (NMFS) shows that many Alaskan communities are highly engaged in commercial, recreational, and subsistence fisheries. These resources are frequently affected by fisheries management decisions and anthropogenic effects on resource distribution and abundance that can either threaten or enhance community well-being. However, much of the existing economic data about Alaskan fisheries is collected and organized around units of analysis such as counties (boroughs), fishing firms, vessels, sectors, and gear groups that is often difficult to aggregate or disaggregate for analysis at the individual community or regional level. In addition, some relevant community level economic data have not been collected historically. As a result, the North Pacific Fishery Management Council (NPFMC), the Alaska Fisheries Science Center (AFSC), and community stakeholder organizations identified the ongoing

collection of community level socio-economic information, specifically related to commercial fisheries, as a priority. To address this need, the AFSC Economic and Social Sciences Research Program (ESSRP) began implementing the Alaska Community Survey – a voluntary data collection program to improve the socio-economic data available for consideration in North Pacific fisheries management using the community as the unit of reporting and analysis. ESSRP social scientists partnered with community-based organizations and individuals from fishing communities around Alaska to ensure that detailed community level information is collected and made available for the socio-economic impact assessment of communities involved in North Pacific fisheries (initially focused on Alaska communities for feasibility reasons). An additional goal was to ensure that community level socio-economic and demographic data are collected at comparable levels of spatial and thematic resolution to commercial fisheries data. Such data will facilitate analysis of the impacts of proposed changes in commercial fisheries management, both within and across North Pacific communities involved and engaged in various types of fishing. These data will also help scientists and NPFMC staff to better understand Alaskan communities' social and economic ties to the fishing industry and facilitate the analysis of potential impacts of catch share programs and coastal and marine spatial planning efforts. This survey was designed to gather information about Alaskan fishing communities and to help determine each community's capacity to support fishing activities. The types of data collected from communities include recommendations from community representatives that participated in our community meetings. The survey was intended to collect information that is currently lacking about individual community involvement in fishing. This report gives an overview of the survey, results from the first year of implementation in 2011, and addresses the potential for this and other methods of engaging communities to better inform fisheries management in isolated areas of Alaska.

Himes-Cornell, A. and **S. Kasperski**. 2014. "Using Indicators to Assess the Vulnerability and Resiliency of Alaskan Communities to Climate Change." In Press at *Fisheries Research.*

Communities in Alaska are experiencing impacts of unexpected climate-related changes and unprecedented environmental conditions on the harvests of marine and terrestrial resources. Residents of rural Alaska are already reporting heretofore unseen changes in the geographic distribution and abundance of fish and marine mammals, increases in the frequency and ferocity of storm surges in the Bering Sea, changes in the distribution and thickness of sea ice, and increases in river and coastal erosion. When combined with ongoing social and economic change, climate, weather, and changes in the biophysical system interact in a complex web of feedbacks and interactions that make life in rural Alaska extremely challenging. The purpose of this study is to develop a framework of indicators to assess the vulnerability, resilience and adaptability of Alaskan communities to climate change. The framework developed here can also be applied more generally through indicators that assess community vulnerability and resiliency to sea level rise, drought, storm intensity, and other likely impacts of climate change. These indicators can help inform how best to allocate resources for climate change adaptation.

Kasperski, S., A. Himes-Cornell. 2014. "Indicators of Fishing Engagement and Reliance of Alaskan Fishing Communities." *AFSC Quarterly Report* Feature article (January-February-March 2014) 7 p.

With the growing emphasis on ecosystem-based management by resource managers, there is an expanding need for measures of social well-being and sustainability for fishing communities. Because primary data collection is time-consuming and costly, use of secondary data is a practical alternative that can provide substantial cost savings in developing these measures. Researchers with the Alaska Fisheries Science Center's (AFSC) Economic and Social Sciences Research program have used secondary data in the development of fisheries engagement and reliance indicators to measure Alaskan fishing community involvement in a variety of aspects of fishing. In their study, they consider three categories of fisheries involvement: commercial processing, commercial harvesting, and recreational fishing. They then create numerical indices of engagement and reliance for each category of fisheries involvement for each community included in the study. These indices can be used to assess which communities may be most affected by changes in fisheries management in Alaska. Through their project they have developed a novel way for fisheries managers to look at the potential community impacts associated with fisheries management changes. The approach represents a quantitative method for incorporating multiple data sources across commercial processing, commercial harvesting, and recreational fishing involvement into measurable concepts of fishing engagement and reliance at the community level.

Larson, D., and **D. Lew**. 2014. "The Opportunity Cost of Travel Time as a Noisy Wage Fraction." *American Journal of Agricultural Economics* 96(2): 420-437.

Few issues are more important to welfare estimation with recreation demand models than the specification of the opportunity cost of travel time (*oct*). While the *oct* is sometimes estimated, it is more commonly predetermined by the researcher as a specific fraction of the recreationist's wage. Recognizing that information limitations can preclude more general approaches, we show that the joint recreation travel-labor supply model leads to, under relatively modest assumptions, a specification of the *oct* as a wage fraction with noise, which is straightforward to implement as part of random parameters-based recreation demand models. We then evaluate the welfare consequences of using the two approaches commonly seen in the literature, which are special cases of the noisy wage fraction specification. Our results suggest that the more critical restriction to relax in *oct* specifications is the absence of noise in the *oct*, rather than the specific level of the wage fraction.

Lew, D., and D. Larson. 2014. "Is a Fish in Hand Worth Two in the Sea? Evidence from a Stated Preference Study." *Fisheries Research* 157: 124-135.

The value anglers place on their fishing opportunities is critical information for fully informing marine policy within an economic efficiency framework, especially for stocks where there is conflict over allocation between different sectors. In this paper, we use stated preference choice experiment data from a 2007 survey to estimate the value recreational sport anglers place on their catches of Pacific halibut (*Hippoglossus stenolepis*), Chinook salmon (*Oncorhynchus tshawytscha*), and coho salmon (*O. kisutch*) off the coast of Southeast and Southcentral Alaska, the primary regions for saltwater sport fishing in the state. In contrast to past stated preference studies that value fishing, our data supports a specification that differentiates between values for fish that are caught and kept, caught and released (due to a bag limit restriction), and potential catch (fish in excess of the number caught but within the bag limit). The results indicate that for single-day marine private boat fishing trips where one species is caught with catches less than or equal to the allowable bag (or take) limit, Southeast Alaska residents had mean values ranging from $258 to $315 (U.S. dollars), depending upon whether the fish was kept or released. Single-day private boat fishing trips in Southcentral Alaska were valued between $324 and $384 by Alaska residents. Among Alaska residents, mean values for charter fishing trips in Southcentral Alaska were between $268 and $329. Non-residents had much higher total values for the same fishing experiences, likely due to the fact that the trips are both less common and considerably more expensive to participate in given the travel costs to Alaska. Mean trip values ranged from $2,088 to $2,691 for charter fishing in Southeast Alaska and $2,215 to $2,801 in Southcentral Alaska. Non-resident and Alaska resident anglers generally had statistically-significant positive values for increases in number of fish caught and kept, potential catch, and fish size.

Lew, D. and **C. Seung.** 2014. "On the Statistical Significance of Regional Economic Impacts from Changes in Recreational Fishing Harvest Limits in Southern Alaska." *Marine Resource Economics* 29(3): 241-257.

Confidence intervals for regional economic impacts resulting from six changes in saltwater sportfishing harvest limits are calculated using a stated preference model of sportfishing participation and a social accounting matrix (SAM) for Southern Alaska. Two types of input variation are considered: sample variation in sportfishing-related expenditures and stochastic variation from parameters in the recreation participation model. For five of six policy scenarios, the 95% confidence intervals contain zero, suggesting bag limit reductions are not statistically different from zero. Differences in estimated impacts between scenarios are assessed with the method of convolutions, showing there are only statistical differences between estimated economic impacts when sampling variation alone is accounted for, but none when stochastic variation is considered. This suggests that in some cases decision makers should look beyond a simple comparison of point estimates of economic impacts as a basis for choosing a preferred alternative due to a lack of statistical differences in the results from regional economic impact models.

Meiyappan, P., **M. Dalton**, B.C. O'Neill, and A.K. Jain. 2014. "Spatial modeling of agricultural land use change at global scale." *Ecological Modelling* 291: 152-174.

Long-term modeling of agricultural land use is central in global scale assessments of climate change, food security, biodiversity, and climate adaptation and mitigation policies. We present a global-scale dynamic land use allocation model and show that it can reproduce the broad spatial features of the past 100 years of evolution of cropland and pastureland patterns. The modeling approach integrates economic theory, observed land use history, and data on both socioeconomic and biophysical determinants of land use change, and estimates relationships using long-term historical data, thereby making it suitable for long-term projections. The underlying economic motivation is maximization of expected profits by hypothesized landowners within each grid cell. The model predicts fractional land use for cropland and pastureland within each grid cell based on socioeconomic and biophysical driving factors that change with time. The model explicitly incorporates the following key features: (1) land use competition, (2) spatial heterogeneity in the nature of driving factors across geographic regions, (3) spatial heterogeneity in the relative importance of driving factors and previous land use patterns in determining land use allocation, and (4) spatial and temporal autocorrelation in land use patterns. We show that land use allocation approaches based solely on previous land use history (but disregarding the impact of driving factors), or those accounting for both land use history and driving factors by mechanistically fitting models for the spatial processes of land use change do not reproduce well long-term historical land use patterns. With an example application to the terrestrial carbon cycle, we show that such inaccuracies in land use allocation can translate into significant implications for global environmental assessments. The modeling approach and its evaluation provide an example that can be useful to the land use, Integrated Assessment, and the Earth system modeling communities.

Norman, K., D. Holland, and **S. Kasperski**. 2013. Resilient and Economically Viable Coastal Communities, In: Levin, P.S., Wells, B.K., and M.B. Sheer, (Eds.), "California Current Integrated Ecosystem Assessment: Phase II Report." Available from `http://www.noaa.gov/iea/CCIEA-Report/index.html`.

In this chapter, we focus on the status and trends of coastal communities that are dependent on the natural resources of the California Current and identify a set of proposed indices. Each index is a composite of 3 to 5 metrics and, considered together, the indices focus on the degree to which coastal communities rely on marine resources and are socioeconomically vulnerable. The integrated ecosystem assessment focuses on status and trends in focal species and focal components. In much the same way, a focus on those coastal communities most directly linked to the ecosystem via fishing provides a first step in index selection. While coastal communities are linked to the California Current large marine ecosystem (CCLME) in numerous ways, in the context of the IEA we will initially focus on the communities linked to the CCLME via fishing. Once the communities most reliant on commercial fisheries are identified, statistical analyses of subsequent indices can assess these communities in terms of their socioeconomic vulnerability. Our indices of socioeconomic vulnerability include a Population Composition Index, Poverty Index, Personal Disruptions Index and a Fishery Income Diversification Indicator. The Fishery Income Diversification Indicator presents a final single indicator, rather than an index, and is measured at both the vessel level and community level. This indicator measures how many species a vessel catches or are landed in a community, which is important as catches and prices from many fisheries exhibit high inter-annual variability leading to high variability in fishermen's income and incoming community revenues. We examine all vessels fishing off the West Coast over the last 30 years and found that variability of annual revenue can be reduced by diversifying fishing activities across multiple fisheries or regions. There has been a moderate decline in average diversification since the mid 1990s or earlier for most vessels groupings as less diversified vessels have been more likely to exit the fishery, vessels that remain in the fishery have become less diversified, and newer entrants have generally been less diversified than earlier entrants.

Package-Ward, C. and **A. Himes-Cornell**. 2014. "Utilizing oral histories to understand the social networks of Oregon fishermen in Alaska." *Human Organization* v. 73(3).

Many commercial fishermen from the Newport, Oregon area began fishing in Alaska during the historical fishing boom times of the 1960s to 1980s. Since then, they have continued to be involved in fishing in Alaska. Many of these individuals began fishing in Alaska because of their connections, opportunity, adventure, and money. Drawing on oral histories, this study examines the ways in which this network of fishermen allowed them to become established in a new region. The article explores how connections through this social network draw parallels with traditional ethnic enclaves and facilitate their capacity to adapt to declining resources in one region through transferring fishing effort to another.

Peterson, M.J., F. Mueter, K. Criddle, **A. C. Haynie**. 2014. "Costs incurred by Alaskan sablefish, Pacific halibut and Greenland turbot longliners due to killer whale depredation." *PLoS ONE* 9(2): e88906. doi:10.1371/journal.pone.0088906

Killer whale (*Orcinus orca*) depredation (whales stealing or damaging fish caught on fishing gear) adversely impacts demersal longline fisheries for sablefish (Anoplopoma fimbria), Pacific halibut (Hippoglossus stenolepis) and Greenland turbot (Reinhardtius hippoglossoides) in the Bering Sea, Aleutian Islands and Western Gulf of Alaska. These interactions increase direct costs and opportunity costs associated with catching fish and reduce the profitability of longline fishing in western Alaska. This study synthesizes National Marine Fisheries Service observer data, National Marine Fisheries Service sablefish longline survey and fishermen-collected depredation data to: 1) estimate the frequency of killer whale depredation on longline fisheries in Alaska; 2) estimate depredation-related catch per unit effort reductions; and 3) assess direct costs and opportunity costs incurred by longliners in western Alaska as a result of killer whale interactions. The percentage of commercial fishery sets affected by killer whales was highest in the Bering Sea fisheries for: sablefish (21.4%), Greenland turbot (9.9%), and Pacific halibut (6.9%). Average catch per unit effort reductions on depredated sets ranged from 35.1–69.3% for the observed longline fleet in all three management areas from 1998–2012 ($p<0.001$). To compensate for depredation, fishermen set additional gear to catch the same amount of fish, and this increased fuel costs by an additional 82% per depredated set (average $433 additional fuel per depredated set). In a separate analysis with six longline vessels in 2011and 2012, killer whale depredation avoidance measures resulted in an average additional cost of $494 per depredated vessel-day for fuel and crew food. Opportunity costs of time lost by fishermen averaged $522 per additional vessel-day on the grounds. This assessment of killer whale depredation costs represents the most extensive economic evaluation of this issue in Alaska to date and will help longline fishermen and managers consider the costs and benefits of depredation avoidance and alternative policy solutions.

Punt, A.E., D. Poljak, **M. Dalton**, and R.F. Foy. 2014. "Evaluating the impact of ocean acidification on fishery yields and profits: The example of red king crab in Bristol Bay." *Ecological Modelling* 285: 39-53.

A stage-structured pre-recruit model was developed to capture hypotheses regarding the impact of ocean acidification on the survival of pre-recruit crab. The model was parameterized using life history and survival data for red king crab (*Paralithodes camtschaticus*) derived from experiments conducted at the National Marine Fisheries Service Kodiak laboratory. A parameterized pre-recruit model was linked to a post-recruit population dynamics model for adult male red king crab in Bristol Bay, Alaska that included commercial fishery harvest. This coupled population dynamics model was integrated with a bioeconomic model of commercial fishing sector profits to forecast how the impacts of ocean acidification on the survival of pre-recruit red king crab will affect yields and profits for the Bristol Bay red king crab fishery for a scenario that includes future ocean pH levels predictions. Expected yields and profits were projected to decline over the next 50–100 years in this scenario given reductions in pre-recruit survival due to decreasing ocean pH levels over time. The target fishing mortality used to provide management advice based on the current harvest policy for Bristol Bay red king crab also declined over time in response to declining survival rates. However, the impacts of ocean acidification due to reduced pre-recruit survival on yield and profits are likely to be limited for the next 10–20 years, and its effects will likely be masked by natural variation in pre-recruit survival. This analysis is an initial step toward a fully integrated understanding of the impact of ocean acidification on fishery yields and profits, and could be used to focus future research efforts.

Seung, C., E. Waters, and J. Leonard. 2014. "Economic Impacts of Alaska Fisheries: A Multi-regional Computable General Equilibrium (MRCGE) Analysis." *Review of Urban and Regional Development Studies* 26(3): 155-173.

Previous studies of economic impacts of fisheries used single-region models. Single-region models are limited in that they fail to capture the spread and feedback effects between economic regions. To overcome this limitation, this study uses a multiregional computable general equilibrium (MRCGE) model of three U.S. economic regions – Alaska (AK), the West Coast (WC), and the rest of U.S. (RUS). The model is applied to fisheries off Alaska, which are characterized by a large leakage of factor income to, and large imports of goods and services from, the other two regions. We examine the economic impacts of changes in (i) the volume of fish caught off Alaska; (ii) the demand for Alaska seafood by both the U.S. and the rest of the world; and (iii) currency exchange rates. We also examine the sensitivity of model results to key trade parameter values. We find evidence for both spread and feedback effects, and we discuss the direction, magnitude, and implications of the findings for each of the three regions.

Seung, C. 2014. "Estimating effects of exogenous output changes: An application of multi-regional social accounting matrix (MRSAM) method to natural resource management." *Regional Science Policy and Practice* 6(2): 177-193.

Previous studies use single-region Leontief demand-driven economic impact models or mixed endogenous-exogenous models to calculate the economic impacts of an exogenous change in resource-based industry's output. Using a multiregional social accounting matrix (MRSAM) model, this study overcomes the limitations of the previous studies by specifying as initial shocks the exogenous changes in the directly impacted industry's output and the forward-linked industry's output and by running the model with regional purchase coefficients for the outputs set to zero. The model is used to calculate the multiregional impacts of a hypothetical reduction in Alaska pollock total allowable catch.

Torres, M. and **R. Felthoven**. 2014. "Productivity Growth and Product Choice in Catch Share Fisheries: the Case of the Alaska Pollock." *Marine Policy* 50, Part A: 280-289. DOI: 10.1016/j.marpol.2014.07.008

Many fisheries worldwide have exhibited marked decreases in profitability and fish stocks during the last few decades as a result of overfishing. However, more conservative, science- and incentive-based management approaches have been practiced in the US federally managed fisheries off Alaska since the mid-1990's. The Bering Sea pollock fishery is one such fishery and remains one of the world's largest in both value and volume of landings. In 1998, with the implementation of the American Fisheries Act (AFA) this fishery was converted from a limited access fishery to a rationalized fishery in which fishing quota were allocated to cooperatives which could transfer quotas, facilitate fleet consolidation, and maximize efficiency. The changes in efficiency and productivity growth arising from the change in management regime have been the subject of several studies, with a few focusing on the large vessels that both catch and process fish onboard (catcher-processors). This study modifies existing approaches to account for the unique decision making process characterizing catcher-processor's production technologies. The focus is on sequential decisions regarding what products to produce and the factors that influence productivity once those decisions are made, using a multiproduct revenue function. The estimation procedure is based on a latent variable econometric model and departs from and advances previous studies since it deals with the mixed distribution nature of the data, a novel application to fisheries production modeling. The resulting productivity growth estimates are consistent with increasing productivity growth since rationalization of the fishery, even in light of large decreases in the pollock stock. These findings suggest that rationalizing fishery incentives can help foster improvements in economic productivity even during periods of diminished biological productivity.

Waters, E., **C. Seung**, M. Hartley, and **M. Dalton**. 2014. "Measuring the Multiregional Economic Contribution of an Alaska Fishing Fleet with Linkages to International Markets" *Marine Policy* 50, Part A: 238-248.

The Alaska head and gut (H&G) fishing fleet, a major component of the Bering Sea Aleutian Islands region (BSAI) groundfish fisheries, was recently rationalized under Amendment 80 (A80) to the BSAI groundfish fishery management plan. Economic impacts from H&G sector activities occur not only in Alaska but also extend to other U.S. regions via economic linkages with economic agents in those regions. Using a multiregional social accounting matrix (MRSAM) model of three U.S. regions (Alaska, West Coast, and rest of USA), the multiregional contribution of the H&G industry is estimated, and multiregional impacts of selected shifts in H&G sector production are evaluated in terms of changes in output, employment and income. Results indicate that the A80 H&G fleet vessels are important participants in Alaska fisheries, that more than half of the impacts from the H&G fleet on total output and about 80% of the impacts on household income accrue outside Alaska, and that the H&G fleet is relatively insensitive to variations in world prices of its primary products.