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, 2013

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/2014/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`

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1. EXECUTIVE SUMMARY

The commercial groundfish fishery off Alaska catch totaled 2.2 million tons (t) in 2013 (this total includes catch in federal and state waters). This amount was up 2.3% from 2012, and was roughly four times larger than the combined catch of Alaska's other commercial domestic species (Fig. 1 and Table 1). Despite the increased groundfish catch in 2013, the 4:1 ratio to other species was less than typical because of the substantial 65% increase in Pacific salmon catch (Table 1A). The groundfish fishery off Alaska is an important segment of the U.S. fishing industry. In 2012 it accounted for 48% of the weight of total U.S. domestic landings (Fisheries of the United States, 2012)

Catches of commercial groundfish across all species generally increased slightly or remained stable in 2013. The contributions of the major groundfish species or species groups to the total catch are depicted in Fig. 2. Alaska pollock is the dominant species off Alaska and in 2013 accounted for 63% of groundfish with catch of 1.4 million t, an increase of 4.6% from 2012 (Table 1). Pollock is caught primarily with trawl gear and 93% of the catch comes out of the Bering Sea and Aleutian Islands (BSAI) (Table 2). Catch for the aggregate flatfish, and rockfish species complexes similarly increased in 2013. However Pacific cod catch, which accounted for 15% of the total in 2013, did decrease slightly (3%) to 319 thousand t. This decrease came from both hook and line (including longline and jigs) and pot gear types (Table 1). Sablefish catch also decreased slightly. Atka mackerel catch declined precipitously, falling by 50% to 24 thousand t in 2013 as a result of reduction in the total allowable catch (TAC).

The real ex-vessel value (2013 USD) of the catch of commercial fisheries for all species decreased from $2.2 billion in 2012 to $1.9 billion in 2013 (Fig. 4 and Table 16) (totals include catch in federal and state waters as well as the imputed value of catch processed at sea).[1] The groundfish fisheries had a total ex-vessel value of $878 million in 2013 which accounted for the largest share (46%) of the ex-vessel value of all commercial fisheries off Alaska in 2013, below its ten-year average share of 50% (Table 17). This drop in share can, again, be largely attributed to the abnormally large 2013 catch of Pacific salmon, whose share of the total Alaska ex-vessel value increased 10% to $680 million. The ex-vessel value of other commercial fisheries (shellfish, herring, and Pacific halibut) decreased in 2013 as well. Average prices for groundfish, Pacific salmon and Pacific halibut also fell in 2013 (calculated from Tables 1, 1A and 16). Alaska accounted for 22% of the ex-vessel value of total U.S. domestic landings (Fisheries of the United States, 2012).

The decrease in aggregate ex-vessel value in 2013 occurred broadly across nearly all species and gear types within Alaska's FMP groundfish fisheries (Table 19).[2] Alaska pollock, the dominant commercial species off Alaska, lost $41 million (8.3%) in ex-vessel value (gross revenue) between 2012 and 2013. However, the largest loss came from Pacific cod with a $69 million (29%) drop in value. Sablefish, flatfish, rockfish, and Atka mackerel experienced similar reductions in ex-vessel value between 2012 and 2013. The decrease in ex-vessel value in 2013 was driven by prices, which fell by proportionally similar margins (Table 18) (total catch increased slightly). While the decreases in 2013 are marked, they come after multiple consecutive years of increasing ex-vessel value. Between 2009-2013 total ex-vessel value grew by 7.9% (Table 19). With the exception of Atka mackerel and

[1] Th data required to estimate 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.

[2] An FMP fishery is one that is managed under a Federal Managment Plan.

sablefish the 2013 ex-vessel value for each species is on par with levels observed around 2010 and 2011. While sablefish catches did not change significantly in 2013, the ex-vessel price has dropped after being high for an extended period. The low ex-vessel value for Atka mackerel is the result of a precipitous 50% drop in catch in 2013 (Table 1).

Alaska's FMP fisheries can be broadly divided in to 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 2013, catcher vessels accounted for 48% of the ex-vessel value of the groundfish landings compared to 44% 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 wholesale value to exclude the value added by at-sea processing.

The gross value of the 2013 groundfish catch after primary processing (first wholesale) was $2.17 billion (F.O.B. Alaska) (Table 31), a decrease of 15% from 2012. This roughly matched the first wholesale value of Alaska's non-groundfish fisheries which totaled $2.38 billion (Table 30). Most of the non-groundfish product value comes from Pacific salmon whose value rose by 35% in 2013 as a result of the substantial increase in catch. The first wholesale value of halibut, which comes mostly from the Gulf of Alaska, has declined by 52% since 2008, the result of steady reduction in the TAC.

As with the ex-vessel market many species saw a drop in first wholesale value (Table 30). Prices were clearly a contributing factor as both at-sea and shoreside aggregate prices across products fell for pollock, Pacific cod, sablefish, as well as the flatfish aggregate (Table 26). Pollock roe and surimi made up 37% of total pollock first wholesale value, and between 2012 and 2013 prices for both fell by 23% and 29%, respectively (Tables 25 and 29). Pollock fillet prices also fell, however, increases in production resulted in a net gain in first wholesale value. Pacific cod is primarily produced into the 'head and gut' product form (particularly at-sea), for which 2013 prices fell $0.34 to $1. Pacific cod fillets are largely produced by the shoreside sector where both price and value increased by 1.7% and 19%, respectively. Most other species are primarily produced into a single product form which is typically 'head and gut'. Since 2009 aggregate prices have been rising, so the broad decrease across most species in 2013 and products marks a reversal of this trend.

A significant portion of the products produced from the commercial fisheries off Alaska are exported. Since 2004 exports of pollock originating from the state of Washington and Alaska have risen from 288 thousand t to 355 thousand t and value has risen from $743 million to $956 million (Table E.2). Pollock fillet and surimi accounted for 72.5% of the export value. Germany and South Korea were the primary markets from which export value came with $234 million and $228 million, respectively, while the export value of products going to China totaled $114 million in 2013 (Table E.2). Globally, pollock, Pacific cod and sablefish from Alaska accounted for 10% of the worlds 6.5 million t whitefish production in 2012 (Tables 25 and E.1). Alaska's first wholesale value from these three species was $2.1 billion relative to the world's total whitefish product value of $7.6 billion. Since 2009 Alaska's share of production in the whitefish market has increased from 8.5% to 10.4%, while relative 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 vessel. The data indicate that in 2013, the crew weeks totaled 99,683 with the majority of them (96,737) occurring in the BSAI groundfish fishery (Table 50). In 2013, the maximum monthly employment (16,246) occurred in

March. Relative to 2012, annual crew weeks declined in 2013 by 5.6%, which comes after a decline of 10% from 2011. Statewide average monthly employment in fish processing (of any species) was 10,600 in 2013, up slightly from previous years (Table E.3). Statewide average monthly employment in groundfish harvesting increased by 154 from 2011 to 1,252 in 2012 (the most recent data currently available) (Table E.4). Groundfish comprised 15% of the total fish harvesting employment in Alaska while halibut made up 12%.

1.1. Response to Comments from the Scientific and Statistical Committee (SSC)

Comments by the SSC are italicized.

The SSC received a presentation of the 2014 Economic Groundfish SAFE document from Ron Felthoven and Ben Fissel (NMFS-AFSC). There was no public testimony.

It is encouraging to see continued progress on extending and improving the Economic SAFE. The SSC appreciates the effort, demonstrated in this draft, to elevate the Economic SAFE to a level nearer to par with the Biological SAFE documents. The improvements seen in the past two to three years exhibit the AFSC's renewed commitment of staff and resources proportionate to the importance of these data in the Council's decision-making process.

There are numerous improved elements in this draft. The effective presentation of data and improved supporting text make the SAFE a valuable reference document in support of the Council's management process. The effort to enhance the informational content of the SAFE by supplementing the statistical data with indices, to identify and highlight apparent trends over a series of seasons is a good contribution. One noteworthy improvement is the enhanced utilization of accurate and consistent terminology. Nevertheless, improvement in accessibility through the use of accurate terminology understandable to the target audience is needed. Thorough proof-reading and editing are strongly recommended.

We appreciate your comments and continue to strive towards improved accessibility of this report. To this end, the terminology in the text is being revised and reviewed to be accurate. The editorial comments made by SSC members have been incorporated into this report.

The uneven treatment of material in the SAFE is likely a product of multiple contributing authors. Selection of a single editor, responsible for checking consistency and relevancy of commentary, could potentially solve this problem and would further strengthen the document. Additionally the SSC requests that the authors explicitly identify the species included in the "other" species category. The SSC further recommends that the authors elaborate on the interpretation of some of the descriptive statistics presented throughout the 2013 Economic Groundfish SAFE document. For instance, Section 6 of the document references multiple figures containing the percentage of quota harvested by all groundfish catch share programs, with little interpretation as to why quota was not fully utilized. If the goal of the Economic Groundfish SAFE is to summarize the status of the groundfish fisheries, the authors should be careful to interpret some of the trends presented in the document, especially to highlight some of the challenges that North Pacific groundfish programs currently face.

As the Economic Groundfish SAFE document evolves over time to include additional informational content, it is important that the document remains accessible and informative to an audience that is looking for an overview of the current status of the North Pacific groundfish fisheries. To this end, the SSC recommends that the authors include summary information that highlights some of the *recent trends in the North Pacific groundfish fisheries and some of the challenges that groundfish programs currently face. The accessibility of the document would be greatly enhanced by opening with an Executive Summary and Economic Report card, similar to the compilation of summary information and Ecosystem Indices that appears at the beginning of the Ecosystem Considerations Chapter of the Groundfish SAFE.*

A list of the species included in the "Other" category for each table has been included in Section 2.1.8. The interpretation of trends and challenges is inherently subjective and the authors recognize the need to approach interpretation with caution to avoid speculation. We will continue to make efforts to include information on current trends and challenges. To this end, additional content has been added to the report in recent years such as the section on economic indices (as noted in these SSC comments). This year, Sections 1 and 2 of this report have been revised to help the reader identify critical changes in 2013. Section 1 is an executive summary that highlights critical information from 2013. Section 2 was previously an overview in which descriptions of the tables were mixed with information from 2013 status of the fisheries. Section 2 is now a description of the tables, information on how the data was constructed and caveats in interpreting and understanding the data. By disentangling information on the current status of the fishery from the description of the data we hope that the audience can more easily access information on 2013 trends and changes highlighted by the authors.

In response to the standing request for additional suggestions for information that could be integrated into the SAFE, the SSC recommends that the authors consider the following for inclusion in future versions:

- *Use standard long-term forecasts of global economic conditions-like those used for business and investment forecasting-to project changes in the seafood consumer, supply or processing markets globally. For example, how big might the change in pollock demand in China be due to rising incomes? Might offshore processing become more expensive as a result of rising wages, and shifting locations? What will be the effect of long-term overfishing of flatfish in West Africa on the market for Alaska flatfish products?*

  Supplementary data tables have been added to provide the reader with perspective on the fisheries off Alaska in relation to other nations and the world. We hope to expand the information on global economic conditions as they relate to the fisheries off Alaska in future versions of this report.

- *Use standard short-term forecasts of global economic conditions to foresee changes in global market conditions that will affect prices.*

  The final version of this report will contain a section with price now-casts and probabilistic projections characterizing the range of prices for wholesale products. Future versions of this report will improve upon these forecasts by testing, and where warranted, incorporating external data into the forecast models.

- *Include retrospective information on where, broadly, Alaska fisheries benefits accrue, though tracking the communities in which their participants live. In particular, are harvesters, their crew, and the processing workers from Alaska, the Pacific Northwest, the U.S., or foreign countries?*

  Supplementary data tables have been included that provide information on fish harvesting and seafood processing employment in Alaska. Section 7, "Community Participation in North

Pacific Groundfish Fisheries" was added to last year's report and will be updated as community level information becomes available. The distribution of Alaska fishing revenues is a topic currently being analyzed by ESSRP researchers, which we hope to include in future versions of this report.

The SSC commends the authors on their efforts to identify users of the SAFE, how this diverse audience uses it, and what they would like to see in the future. The SAFE cannot be all things to all people, but understanding its value to various groups can determine the content and organization for future iterations. The SSC would like to see the addition of links to relevant publications and technical memos, especially on community research. In addition, the authors are encouraged to explore ways to improve the quality of the graphs and tables in the document and in the PowerPoint presentations to the Council. Larger fonts, more efficient figures with legends that can be read from the back of a large room, and a careful selection of representative figures rather than all of the graphs available will make for more powerful presentations. This Groundfish Economic SAFE represents a good advancement in documenting economic performance in these fisheries and the SSC requests an annual update of the Economic SAFE documents at future February SSC meetings.

Thank you for the comments and feedback provided by the SSC. This information helps us improve the quality and content in the document and is appreciated by the authors. We look forward to presenting the Economic SAFE documents at future meetings.

Alaska Fisheries Science Center,
Economic and Social Sciences Research Program

1.2. Economic Summary of the Alaska commercial groundfish fisheries

These following summaries were prepared for the Groundfish Plan Team Meeting (Nov. 2014). The information below are excerpts from the introductions in the BSAI and GOA Groundfish Plan Team reports.

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 $2,150.5 million in 2012 to $1,924.2 million in 2013. The first wholesale value of 2013 groundfish catch was $2,169.9 million. The 2013 total groundfish catch increased by 2.3% while the total first-wholesale value decreased by 14.6% relative to 2012.

In terms of ex-vessel value, the groundfish fisheries accounted for the largest share (45.7%) of the ex-vessel value of all commercial fisheries off Alaska, while the Pacific salmon (*Oncorhynchus spp.*) fishery was second with $679.5 million or 35.3% of the total Alaska ex-vessel value. The value of the shellfish fishery amounted to $238.4 million or 12.4% of the total for Alaska and exceeded the value of Pacific halibut (*Hippoglossus stenolepis*) with $111.5 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 2009 through 2013, 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 2012-13 in the BSAI

The following brief analysis summarizes the overall changes that occurred between 2012-13 in the quantity produced and revenue generated from BSAI groundfish. According to data reported in the 2014 Economic SAFE report, the ex-vessel value of BSAI groundfish dropped from $814.0 million in 2012 to $690.9 million in 2013 (Figure 1.1), and first-wholesale revenues from the processing and production of groundfish in the BSAI fell from $2,168.7 million in 2012 to $1,840.9 million in 2013, a decrease of 15.1% (Figure 1.2).

The total quantity of groundfish products from the BSAI increased from 802.7 thousand metric tons in 2012 to 818.2 thousand metric tons in 2013, a difference of 15.5 thousand metric tons. These changes in the BSAI account for part of the change in first-wholesale revenues from Alaska groundfish fisheries overall which decreased by $372.8 million, a relative difference of -14.7% in 2013 compared to 2012 levels.

By species group, a negative price effect of $226.8 million for pollock was the largest change in first-wholesale revenues from the BSAI for 2012-13 (Figure 1.3). This enormous price effect was partially offset by a positive quantity effect of $82.6 million for pollock. A negative price effect of $88.8 million for cod was also important. By product group, a positive quantity effect occurred for fillets, and negative price effects were concentrated in the surimi and whole head & gut categories in the BSAI first-wholesale revenue decomposition for 2012-13.

In summary, first-wholesale revenues from the BSAI groundfish fisheries decreased by $327.8 million from 2012-13. A major driver was an enormous negative price effect for pollock concentrated in the surimi and whole head & gut product groups. In comparison, first-wholesale revenues decreased by $44.9 million from 2012-13 in the GOA, due to a strong negative quantity effect for cod, and negative price effects for rockfish and sablefish.

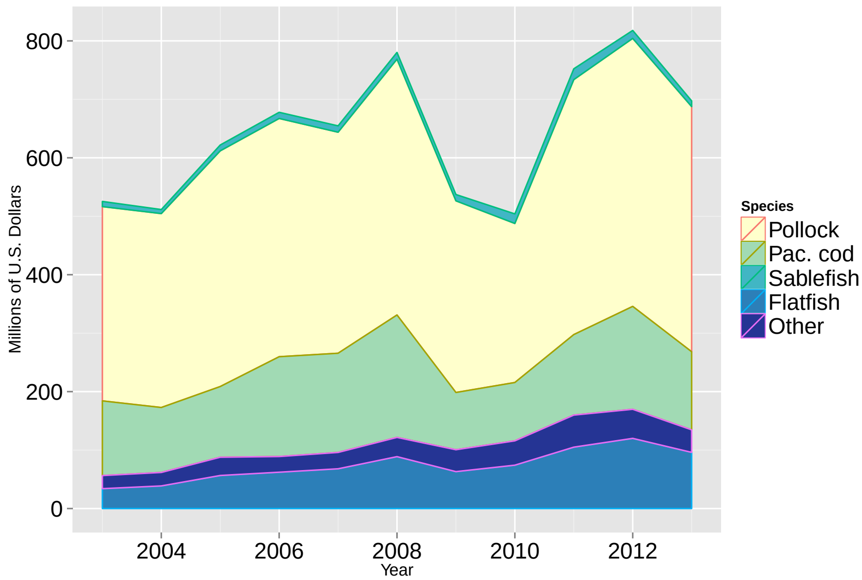

Figure 1.1: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries in the BSAI area by species, 2003-2013 (base year = 2013).

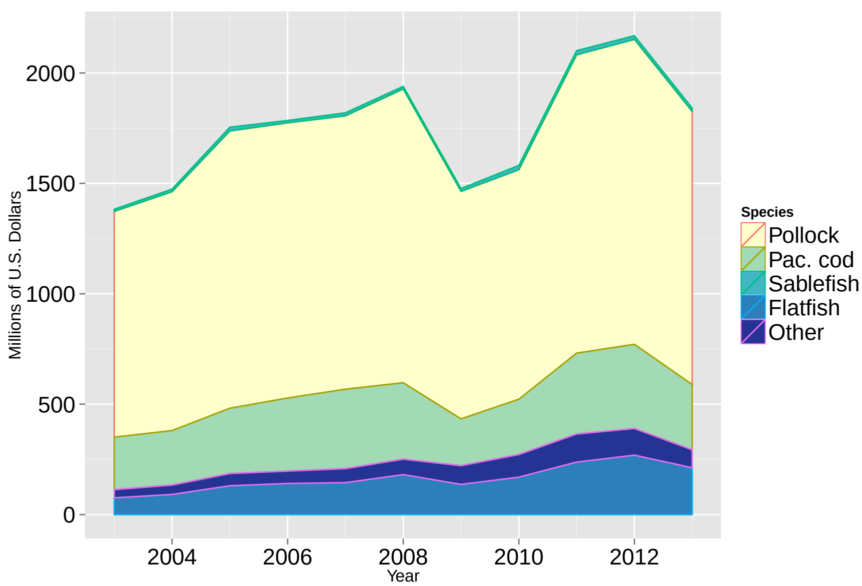

Figure 1.2: Real gross product value of the groundfish catch in the BSAI area by species, 2003-2013 (base year = 2013).

Decomposition of the change in first-wholesale revenues from 2012-13 in the GOA

The following brief analysis summarizes the overall changes that occurred between 2012-13 in the quantity produced and revenue generated from GOA groundfish. According to data reported in the 2014 Economic SAFE report, the ex-vessel value of GOA groundfish dropped from $242.5 million in 2012 to $180.5 million in 2013 (Figure 1.4), and first-wholesale revenues from the processing and

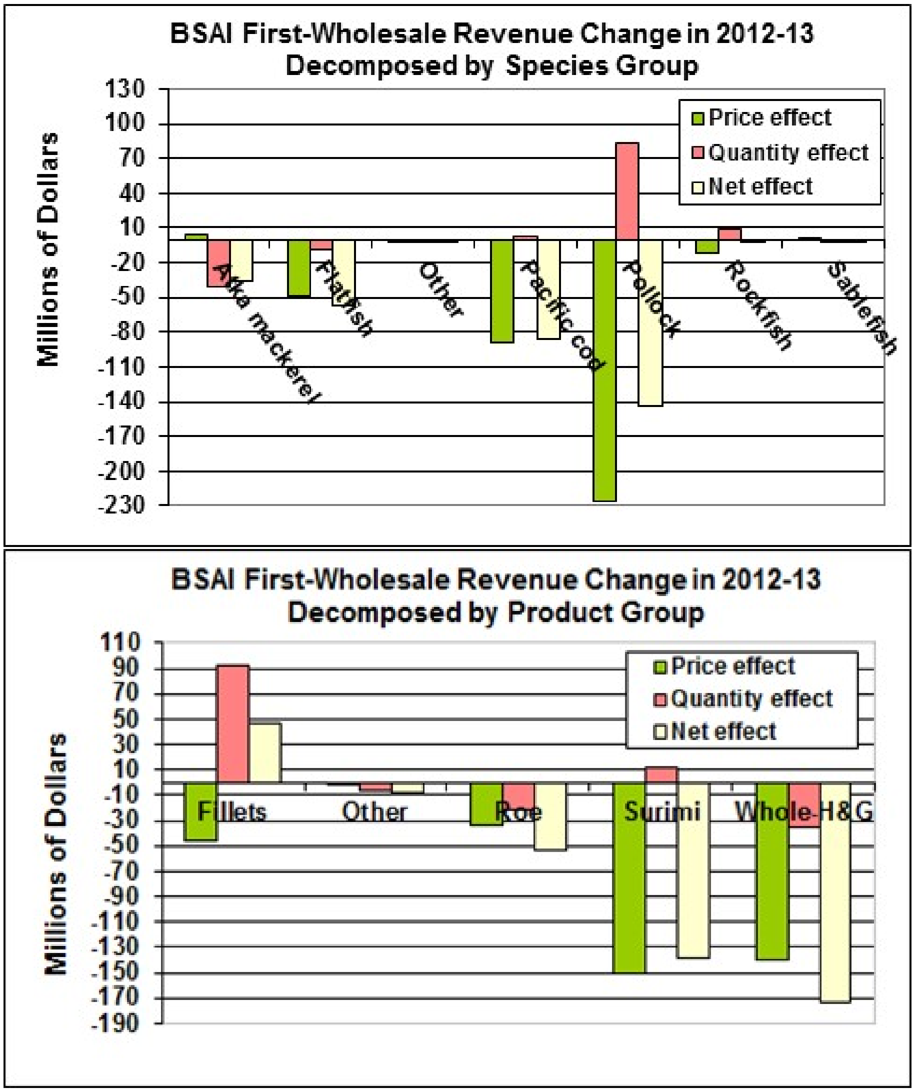

Figure 1.3: Decomposition of the change in first-wholesale revenues from 2012-13 in the BSAI area. **Notes:** The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the 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).

production of groundfish in the Gulf of Alaska (GOA) fell from $373.9 million in 2012 to $328.9 million in 2013, a decrease of 12.0% (Figure 1.5). At the same time, the total quantity of groundfish products from the GOA decreased from 106.8 thousand metric tons to 99.3 thousand metric tons, a difference of 7.4 thousand metric tons. These changes in the GOA account for part of the change in first-wholesale revenues from Alaska groundfish fisheries overall which decreased by $372.8 million, a relative difference of -14.7%, in 2013 compared to 2012 levels.

By species group, a negative quantity effect of $19.6 million for cod was the largest change in first-wholesale revenues from the GOA for 2012-13 (Figure 1.6). Negative price effects of $16.6 million for sablefish and $11.4 million for rockfish were also important. By product group, negative price and quantity effects were concentrated in the whole head & gut category in the GOA first-wholesale revenue decomposition for 2012-13.

In summary, first-wholesale revenues from the GOA groundfish fisheries decreased by $44.9 million from 2012-13. The major drivers of this decrease were a strong negative quantity effect for cod and negative price effects for sablefish and rockfish concentrated in the whole head & gut product group. In comparison, first-wholesale revenues decreased by $327.8 million from 2012-13 in the BSAI due to an enormous negative price effect for pollock.

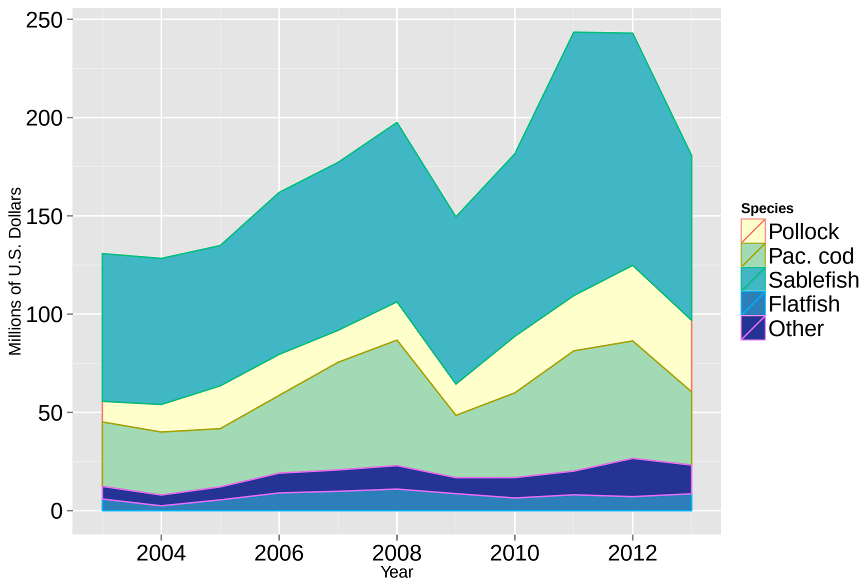

Figure 1.4: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries in the GOA area by species, 2003-2013 (base year = 2013).

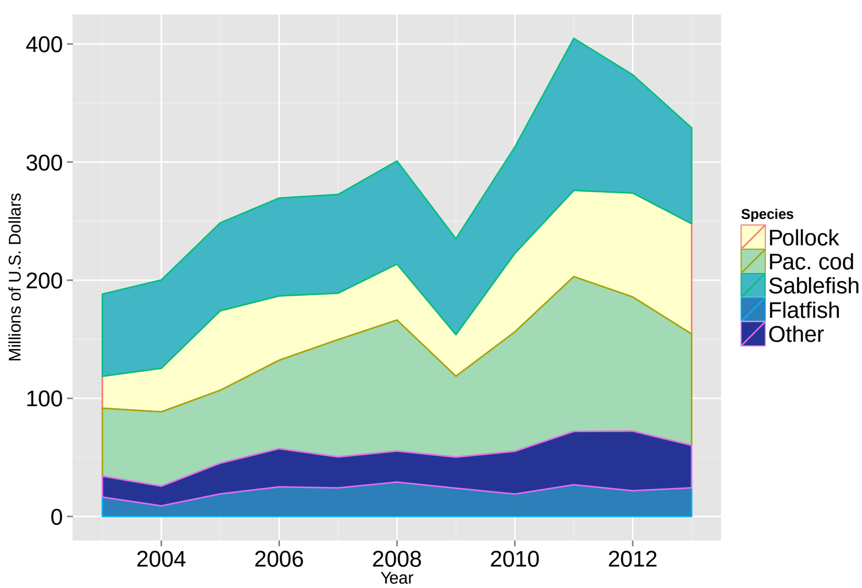

Figure 1.5: Real gross product value of the groundfish catch in the GOA area by species, 2003-2013 (base year = 2013).

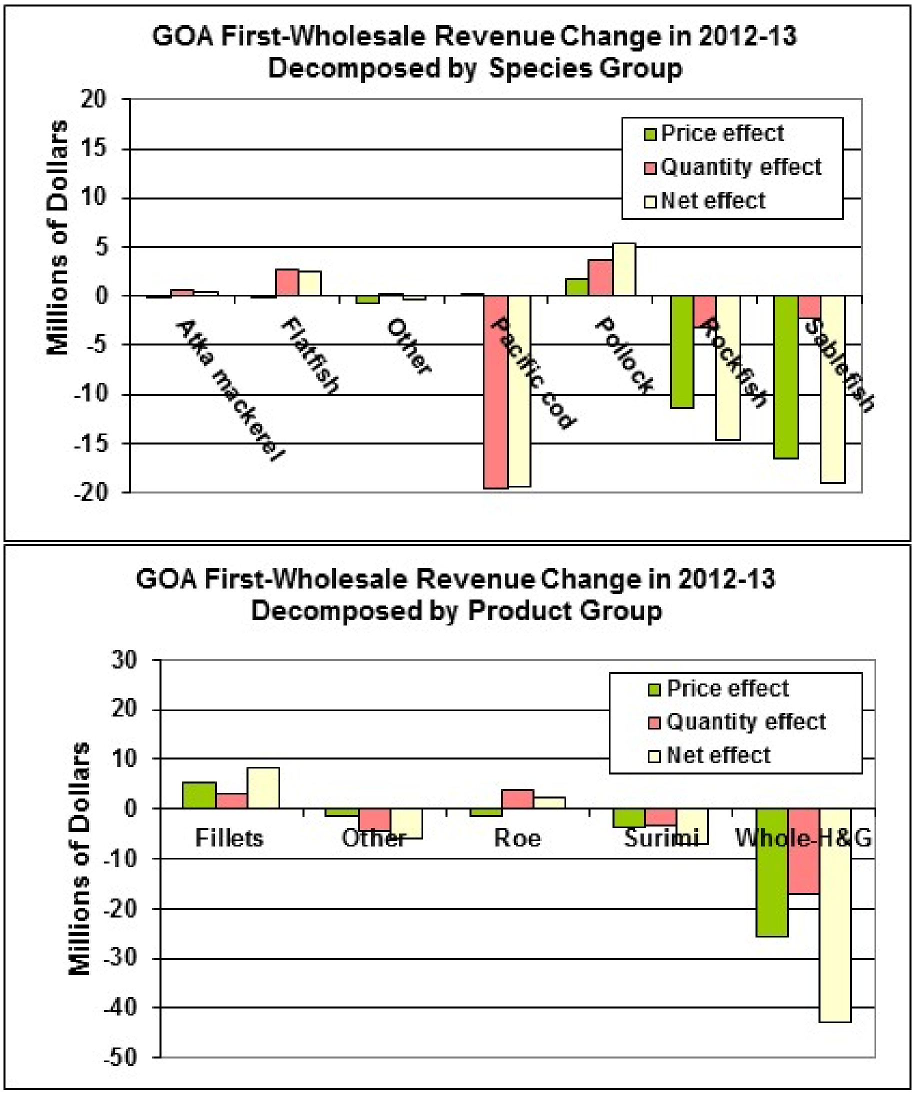

Figure 1.6: Decomposition of the change in first-wholesale revenues from 2012-13 in the GOA area. **Notes:** The first decomposition is by the species groups used in the Economic SAFE report, and the second decomposition is by product group. The price effect refers to the change in revenues due to the 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, 2013

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), the size and level of activity of the groundfish fleet, and the weight 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 are for the fishing industry activities that are reflected in Weekly/Daily Production Reports, Observer Reports, fish tickets, and the Commercial Operator's Annual Reports. All catch data reported for 1991-2002 are based on the blend estimates of total catch, which were used by the NMFS Alaska Regional Office (AKR) to monitor groundfish and PSC quotas in those years. Catch data for 2003-2013 come from the AKR's catch-accounting system (CAS), which replaces the "blend" as the primary tool for monitoring groundfish and PSC quotas. The data descriptions, qualifications, and limitations noted in the overview of the fisheries, market reports 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.* 2013) and is intended to serve as a reference document for those involved in making decisions with respect to conservation, management, and use of GOA and BSAI fishery resources.

The footnotes for each table in this document indicate if the estimates provided in that table are only for the fisheries with catch that is counted against a federal Total Allowable Catch (TAC) quota (i.e., managed under a federal FMP) or if they also include other Alaska groundfish fisheries. The reader should keep in mind that 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 outside the 3-mile limit (in the U.S. Exclusive Economic Zone, or EEZ) and catch occurring inside the 3-mile limit (Alaska state waters). The state of Alaska maintains authority over some rockfish fisheries in the EEZ of the GOA, for example, and federal FMPs often manage catch from inside state waters in addition to catch from the EEZ. 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 the price, revenue or other measure associated with a unit of catch) as being part of a federal FMP or otherwise. For Catch-Accounting System data from the NMFS Alaska Regional Office (AKR), for example, distinguishing between the two categories is relatively easy, but the distinction is approximate for Alaska Department of Fish & Game (ADF&G) fish ticket data and essentially impossible for Commercial Operator's Annual Report (COAR) data. Finally, even for catch that can be positively identified as being part of a federal TAC, it is not always possible to identify what portion of that catch might have come from inside Alaska state waters and what portion came from the federal EEZ. Because of these multiple layers of ambiguity, there may be tables in which the reader should not construe phrases such as "groundfish fisheries off Alaska" or "Alaska groundfish", as used in this report, 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 mean 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. Again, refer to the notes for each table for a description of what is included in the estimates provided in that table.

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

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 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 2010, Fell and Haynie 2012, Torres and Felthoven 2014). A new section on catch share metrics provides a consistent set of metrics to evaluate the North Pacific catch share programs in various dimensions.

There is considerable uncertainty concerning the future conditions of stocks, the resulting quotas, and future 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.

2.1. Description of the Economic Data Tables

2.1.1 Catch Data

Trawl, hook and line (including longline and jigs), and pot gear account for virtually all the catch in the BSAI and GOA groundfish fisheries. There are catcher vessels and catcher/processor vessels within each of these three gear groups. Table 2 presents catch data by area, gear, vessel type, and species. The catch data in Table 2 and the catch, PSC, and vessel information in the tables of the rest of this report are for the BSAI and GOA FMP fisheries unless otherwise indicated.

Target fisheries are defined by area, gear and target species. The target designations are used to estimate PSC, apportion PSC allowances by fishery, and monitor those allowances. The target fishery designations can also be used to provide estimates of catch and PSC data by fishery. The “blend” catch data are assigned to a target fishery by processor, week, area, and gear. The catch-accounting system (CAS), which replaced the blend as the primary source of catch data in 2003, assigns the target at the trip level rather than weekly, except for the small fraction of total catch (0-4% in different years) that comes from NMFS Weekly/Daily Production Reports (WPR). CDQ fishing activity is recorded separately from non-CDQ fishing. Generally, the species or species group that accounts for the largest proportion of the retained catch of the TAC species is considered the target species. One exception to the dominant retained-catch rule is that the target for the pelagic pollock fishery is assigned if 95% or more of the total catch is pollock. Tables 3 and 4 provide estimates of total catch by species, area, gear, and target fishery for the GOA and the BSAI, respectively. Beginning in 2011, Kamchatka flounder was broken out from other flatfish target species categories (in the BSAI only). 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.

Residents of Alaska and of other states, particularly Washington and Oregon, are active participants in the BSAI and GOA groundfish fisheries. Catch data by residency of vessel owners are presented in Table 5. These data were extracted from the NMFS blend and catch accounting system catch databases and from the State of Alaska groundfish fish ticket database and vessel-registration file, which includes the stated residency of each vessel owner. For the domestic groundfish fishery as a whole, 83% of the 2013 catch volume was made by vessels with owners who indicated that they were not residents of Alaska. The catches of the two vessel-residence groups were much closer to being equal in the GOA. Note that in 2010 we changed the method by which we produced Table 5. Since the Alaska Region's CAS data (unlike the earlier Blend data) now include catcher-vessel IDs for all processing sectors, and information on vessel-owner residency is readily available from both NMFS and the state of Alaska, we can obtain direct estimates of groundfish catch by owner residence. Previously, we had estimated the amount of catch by residency for the shoreside sector by prorating CAS estimates based on the fraction of catch by residency obtained from shoreside fish-ticket data, which have always included catcher-vessel IDs.

2.1.2 Groundfish Discards and Discard Rates

The discards of groundfish in the groundfish fishery have received increased attention in recent years by NMFS, the Council, Congress, and the public at large. Table 6 presents the catch-accounting system estimates of discarded groundfish catch and discard rates by gear, area, and species for years 2009-2013. The discard rate is the percent of total catch that is discarded. These are the best available estimates of discards and are used for several management purposes. However, they should be viewed as "noisy" estimates. The groundfish TACs are established and monitored in terms of total catch, which is both retained catch and discarded catch. The catch-composition sampling methods used by at-sea observers provide the basis for NMFS to make good estimates of total catch by species, not the disposition of that catch. Observers on vessels sample randomly chosen catches for species composition. For each sampled haul, they also make a visual approximation of the weight of the non-prohibited species in their samples that are being retained by the vessel. This is expressed as the percent of that species that is retained. Approximating this percentage is difficult because discards can occur in a variety of ways such as 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 discards. For the most common species (e.g. pollock and cod) retention requirement help to mitigate this error and approximations are likely to be fairly accurate. Because the discard estimates are derived by expanding these approximations from sampled hauls to the remainder of the catch they should be considered noisy for the purposes of analysis.

Tables 7, 8, 9 and 10, respectively, provide estimates of discarded catch and discard rates by species, area, gear, and target fishery. Within each area or gear type, there are substantial differences in discard rates among target fisheries. Similarly, within a target fishery, there are often substantial differences in discard rates by species. Typically, in each target fishery the discard rates are very high except for the target species. The regulatory exceptions to the prohibition on pollock and Pacific cod discards explain, in part, why there are still high discard rates for these two species in some fisheries.

2.1.3 Prohibited-Species Catch

The catch of Pacific halibut, king and tanner crab (*Chionoecetes*, *Lithodes* and *Paralithodes spp.*), Pacific salmon (*Oncorhynchus spp.*), and Pacific herring (*Clupea pallasi*) in Alaska groundfish fisheries has been a central management issue for roughly thirty years. 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 the catch of these "prohibited species" for 2009-2013 are summarized by area and gear in Table 11. More detailed estimates of prohibited species catch (PSC) and of PSC rates for 2012 and 2013 are in Tables 12-15. The estimates for halibut are in terms of PSC mortality because the PSC limits for halibut are set and monitored using estimated discard mortality rates. The estimates for the other prohibited species are of total PSC; this is in part due to the lack of well-established discard mortality rates for these species. The discard mortality rates probably approach 100% for salmon and herring in the groundfish fishery as a whole; the discard mortality rates for crab, however, may be lower.

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).

2.1.4 Ex-Vessel Prices and Value

Table 18 contains the estimated ex-vessel prices that were used with estimates of retained catch to calculate ex-vessel values (gross revenues). The estimates of ex-vessel value by area, gear, type of vessel, and species are in Table 19. Notice that the estimates of ex-vessel prices and value for trawl-caught GOA rockfish in this year's report are no longer based on fractions of processed-product prices and value as in the past (refer to the footnote to Table 18). Since 2000 at least 20% of all rockfish retained landings in Alaska were caught by trawl gear in the GOA and delivered to shoreside processors; this means that we have adequate data on these shoreside landings to estimate ex-vessel prices (and thus values) directly.

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 vessel owners, area, and species. For the BSAI and GOA combined, 77.9% of the 2013 ex-vessel value was accounted for by vessels with owners who indicated that they were not residents of Alaska. Note that, as with Table 5, we have revised the method for producing Table 22 to use information on catcher-vessel IDs in catch-accounting system data to better determine the residency of participants in the fisheries.

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] The data in both tables, which include both state and federally managed groundfish, are reported by processor group, which is a classification of shoreside processors based primarily on their geographical locations. The processor groups are described in the footnotes to the tables.

This 2014 version of the Economic Status Report presents an additional set of tables in an appendix: Tables 16.B-24.B. 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 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.

2.1.5 First Wholesale Production, Prices and Value

Estimates of first wholesale weight and value (gross revenue) of the processed products made with BSAI and GOA groundfish catch 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 product value per round metric ton of retained catch (first wholesale prices) are reported in Table 27.

Table 30 reports estimates of the weight and first wholesale value of processed products from catch in the non-groundfish commercial fisheries of Alaska, which enables comparison with the groundfish first wholesale value estimates reported in Table 25. We present Table 30 to provide a further means, besides the ex-vessel value estimates reported in Table 16, of comparing the groundfish and non-groundfish fisheries.

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

Gross product value (F.O.B. Alaska) data, through primary processing, are summarized by category of processor and by area in Table 31, and by catcher/processor category, size class and area in Table 32. Table 33 reports gross product value per vessel, categorized in the same way as Table 32. Tables 34 and 35 present 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 broken down by processor group. The processor groups are the same as in Tables 23 and 24 and no distinction is made between groundfish catch from the state and federally managed groundfish fisheries.

2.1.6 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). Historically, the SBA defined small business entities in the finfish fishing and shellfish fishing industries as entities that had combined annual receipts of no greater than $4 million across all revenue sources. In June 2013, the SBA revised the small entity size standard for the finfish fishing industry (NAICS code 114111) from $4 million to $19 million; the small entity size standard for shellfish fishing (NAICS code 114112) was adjusted to $5 million.

Reporting in Tables 36 - 39b, which presents counts and average revenues of entities meeting small and large entity thresholds, has been revised in the current version of this report to reflect the 2013 adjustments to the SBA small entity size standards and additional interpretive guidance provided by staff of the NMFS Alaska Regional Office. To determine whether an entity is subject to the finfish or shellfish standard, we use a "preponderance of gross receipts" rule: the standard applied to an entity corresponds to the fishing activity from which it 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 current reporting of 2013 data, which draws on more complete accounting of groundfish bycatch in directed halibut fisheries, we include vessels targeting halibut among the entities reported in Tables 36 - 39b. Due to these changes from pre-2013 reporting methods, Tables 36 - 39b now show data only for 2013 and forward.

Though we do not have all the information necessary to determine if a vessel is independently owned and operated and has gross earnings in excess of the relevant small entity size threshold, it is possible to identify vessels that clearly are not small entities by using estimates of revenue from catch or processing of Alaska groundfish and other species.

Estimates of both the numbers of fishing vessels that clearly are not small entities and the numbers of fishing vessels that may be 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) for the vessels in Tables 36 and 37a, respectively, are presented in Tables 38 and 39a. Data on ex-vessel revenue from federal West Coast fisheries, including the imputed ex-vessel value of the at-sea whiting fishery, have been incorporated into estimates of vessel revenue in all tables. These tables treat vessels as proxies for entities, in that revenue and entity size are determined for each vessel individually without regard to affiliation.

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.

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

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 information on the BSAI and GOA groundfish vessels by type of vessel, vessel size class, catch amount classes, and residency of vessel owners is in Tables 41-46. In particular, Table 43 gives detailed estimates of the numbers of smaller (less than 60 feet) hook-and-line catcher vessels.

Estimates of the number of vessels by month, gear, and area are in Table 47. Table 48 provides estimates of the number of catcher vessel weeks by size class, area, gear, and target fishery. Table 49 contains similar information for catcher/processor vessels.

Weekly/Daily Production Reports include employment data for at-sea processors but not inshore processors. These employment data measure 'crew weeks' and are summarized in Table 50 by month and area. Crew weeks are defined as the number of crew aboard each vessel in a week summed over the entire year.

2.1.8 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
- 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).

2.1.9 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 Producer Price Index (PPI) for unprocessed and packaged fish was to deflate the ex-vessel and first wholesale value estimates reported in Tables 16 and 30, respectively. The PPIs are available from the Bureau of Labor Statistics at: `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 2013 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.

2.2. 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.

2.3. Citations

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2.4. Acknowledgements

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

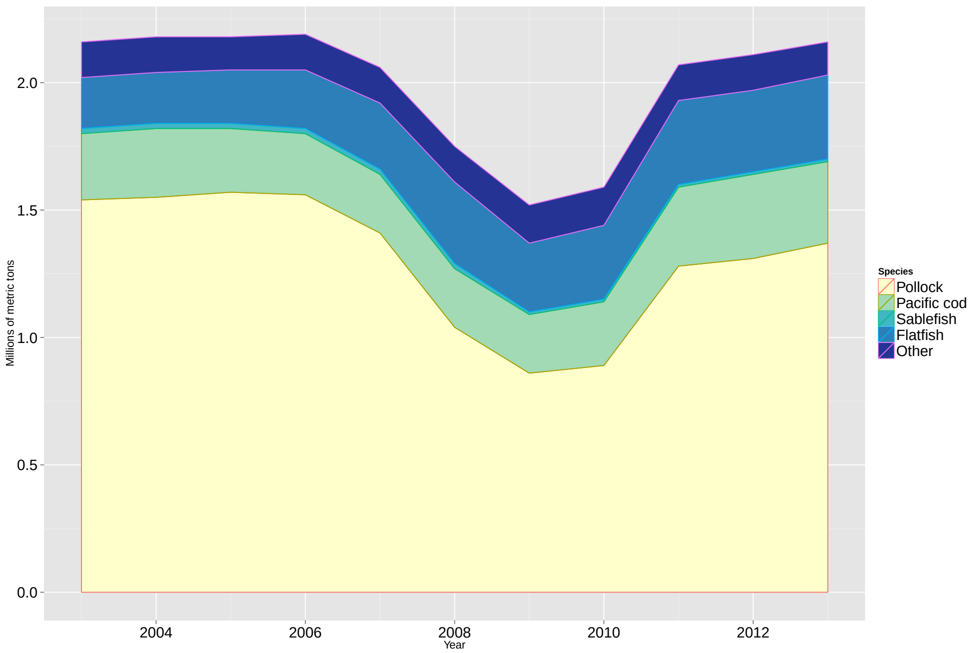

Figure 1: Groundfish catch in the commercial fisheries off Alaska by species, 2003-2013

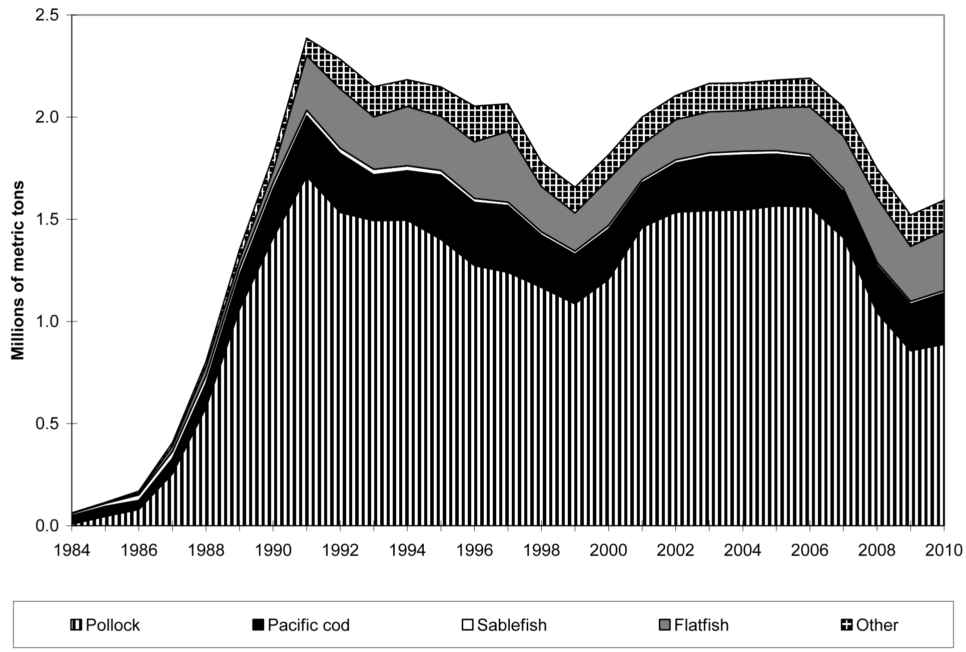

Figure 2: Groundfish catch in the domestic commercial fisheries off Alaska by species, (1984-2010)
Notes: Catch for 2011 and onward are displayed in Figure 1.

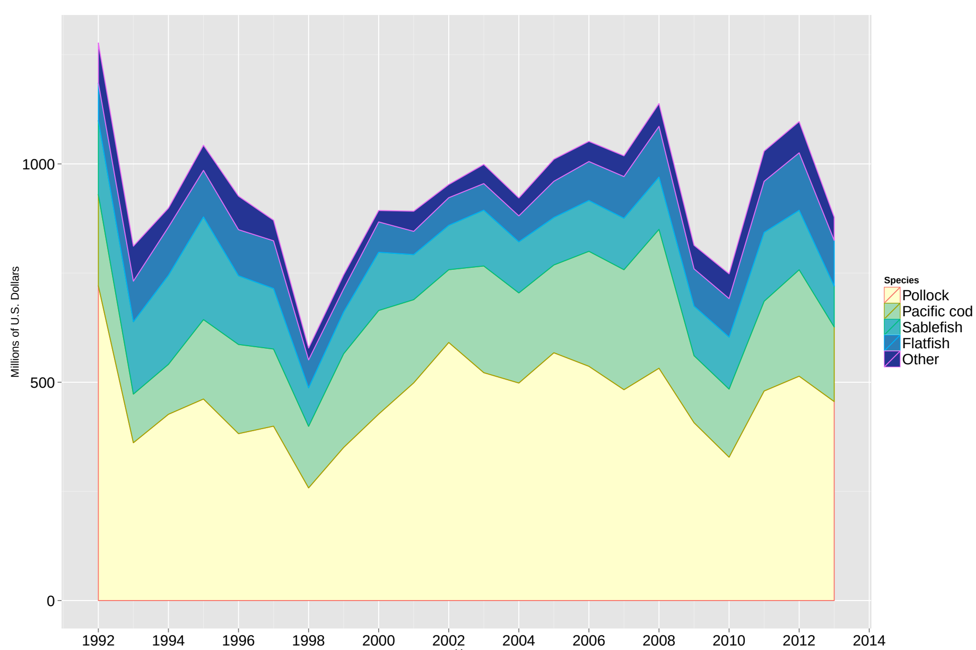

Figure 3: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries off Alaska by species, 1992-2013 (base year = 2013)

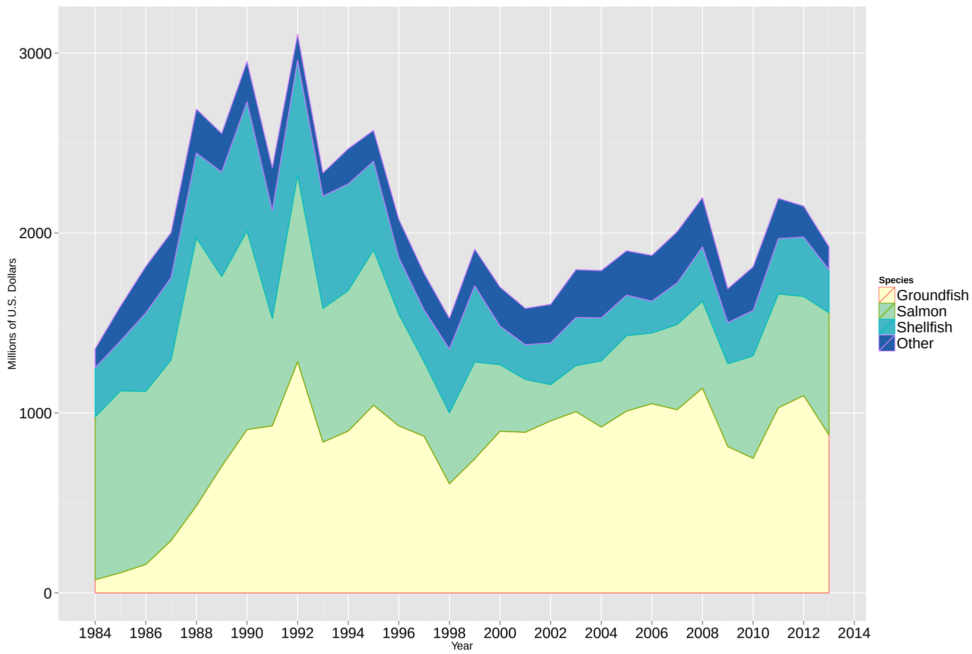

Figure 4: Real ex-vessel value of the domestic fish and shellfish catch off Alaska by species group, 1984-2013 (base year = 2013)

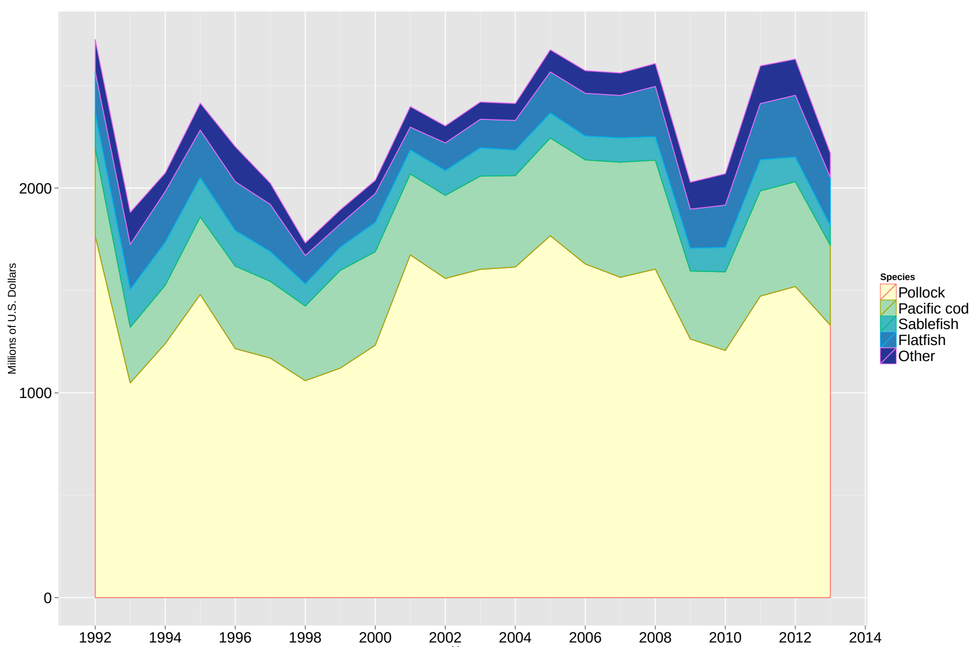

Figure 5: Real gross product value of the groundfish catch off Alaska by species, 1992-2013 (base year = 2013)

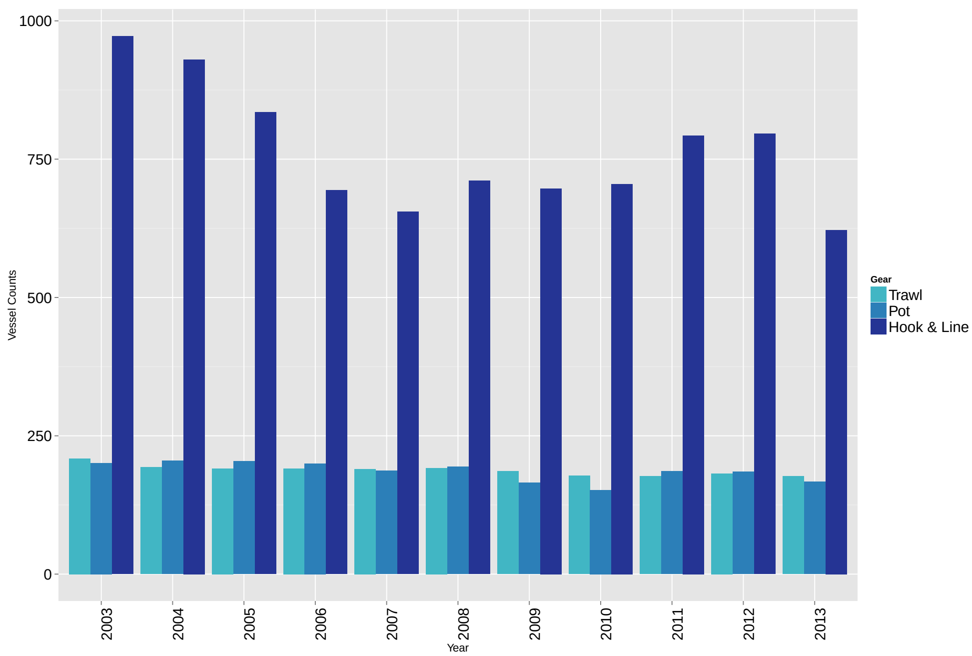

Figure 6: Number of vessels in the domestic fishery off Alaska by gear type, 2003-2013

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, 2004-2013 (1,000 metric tons, round weight).

	Year	Pollock	Sablefish	Pacific Cod	Flatfish	Rockfish	Atka Mackerel	Total
Gulf of Alaska	2004	63.8	16.8	56.6	23.4	22.3	0.8	188.5
	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	23.5	1.5	192.4
	2008	52.6	13.7	59.0	45.7	23.1	2.1	202.8
	2009	44.2	12.0	53.2	42.3	22.8	2.2	185.7
	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
Bering Sea & Aleutian Islands	2004	1,481.7	2.0	212.6	174.7	17.7	60.6	1,979.8
	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	2.3	174.5	216.2	23.6	58.7	1,860.4
	2008	991.9	2.0	171.3	270.0	21.7	58.1	1,546.0
	2009	812.5	2.0	175.8	226.3	19.5	72.8	1,337.1
	2010	811.7	1.8	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	1,817.9
	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
All Alaska	2004	1,545.6	18.8	269.2	198.1	40.0	61.4	2,168.3
	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	47.1	60.2	2,052.8
	2008	1,044.5	15.8	230.3	315.7	44.8	60.2	1,748.7
	2009	856.8	14.1	229.0	268.6	42.3	75.0	1,522.8
	2010	888.4	12.8	250.2	291.0	49.0	71.1	1,593.4
	2011	1,281.8	13.7	305.4	327.0	51.3	53.4	2,069.5
	2012	1,310.2	14.6	328.9	320.9	55.5	49.0	2,116.9
	2013	1,370.1	14.5	318.9	331.1	59.9	24.5	2,164.7

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

Source: National Marine Fisheries Service, Office of Science and Technology, Fisheries Statistics Division, Fisheries of the United States (housed at the Alaska Fisheries Information Network (AKFIN)).

Table 1A: Catch of species other than groundfish in the domestic commercial fisheries, 1999-2013 (1,000 metric tons).

Year	Crab	Other Shellfish	Salmon	Halibut	Herring	Total
1999	93.5	4.1	363.6	34.4	38.7	534.3
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

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

Source: National Marine Fisheries Service, Office of Science and Technology, Fisheries Statistics Division, Fisheries of the United States (housed at the Alaska Fisheries Information Network (AKFIN)).

Table 2: Groundfish catch off Alaska by area, vessel type, gear and species, 2009-2013 (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	2009	9	1	10	1	1	1	10	2	11
		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
	Pacific Cod	2009	9	6	14	1	101	102	9	107	116
		2010	9	8	17	1	89	90	9	97	107
		2011	9	8	17	1	118	119	10	126	136
		2012	11	5	15	1	131	132	11	136	147
		2013	10	3	13	2	125	127	12	128	140
	Flatfish	2009	0	0	0	0	4	4	0	4	4
		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
	Rockfish	2009	1	0	1	0	0	0	1	1	2
		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
	All Groundfish	2009	23	7	31	1	125	126	25	132	157
		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	33	160	193

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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
Pot	Pacific Cod	2009	12	*	12	11	4	14	23	4	26
		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
Trawl	Pollock	2009	41	2	43	435	373	808	476	375	850
		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
	Sablefish	2009	0	0	1	0	0	0	0	1	1
		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
	Pacific Cod	2009	12	2	14	29	27	57	42	29	71
		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
	Flatfish	2009	27	15	42	9	212	221	36	227	263
		2010	22	11	33	4	244	249	27	255	282
		2011	23	17	39	7	272	278	30	288	318
		2012	16	11	27	6	272	277	22	282	305
		2013	20	12	31	4	275	279	24	287	311

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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
Trawl	Rockfish	2009	8	14	21	0	18	18	8	31	39
		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
	Atka Mackerel	2009	0	2	2	0	69	69	0	72	72
		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
	All Groundfish	2009	91	35	127	476	710	1,187	567	746	1,313
		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	853	1,018	1,872
All Gear	All Groundfish	2009	127	43	169	489	839	1,328	616	882	1,498
		2010	170	41	211	477	868	1,345	648	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	908	1,157	2,066
		2013	191	34	225	736	1,151	1,888	927	1,186	2,113

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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch Accounting System estimates (housed at 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, 2012-2013 (1,000 metric tons, round weight).

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2012	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	-	-	-	-	*
		Sablefish	0	10.3	0	0.2	0	-	0	0	1.0	-	12.1
		Pacific Cod	0.2	0	14.9	0	0	-	*	0	0	*	16.8
		Rockfish	-	-	0	-	-	-	-	-	0.1	-	0.1
		All Targets	0.2	11.1	15.2	0.2	0	-	0	0	1.4	*	30.5
	Pot	Sablefish	-	-	*	-	-	-	-	-	-	-	*
		Pacific Cod	0	0	21.2	0	*	-	0	0	0	0	21.8
		All Targets	0	0	21.2	0	*	-	0	0	0	0	21.8
	Trawl	Pollock, Bottom	13.4	0	0.9	0.8	0.1	0	0	0.1	0.1	*	15.7
		Pollock, Pelagic	83.6	0	0.3	0.5	0	0	*	0	0.3	0	84.8
		Sablefish	0	0.2	*	0	*	0	0	0	0.1	-	0.3
		Pacific Cod	1.5	0	16.2	0.8	0.2	0.1	0	0.8	0.1	0	20.2
		Arrowtooth	1.0	0.2	0.9	14.3	0.9	1.2	0.1	0.4	1.1	*	21.2
		Flathead Sole	*	*	*	*	*	*	*	*	*	-	*
		Rex Sole	0.2	*	0.1	1.0	0.2	0.7	*	0.1	0.1	*	2.6
		Flatfish, Shallow	0.7	0	1.0	1.2	0.2	0	0	2.3	0	*	6.0
		Rockfish	0.6	0.5	0.4	0.8	0	0.1	0.1	0.1	24.0	1.2	27.7
		All Targets	100.9	0.8	20.0	19.4	1.7	2.1	0.2	3.7	25.7	1.2	178.5

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Table 3: Continued

		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	*	13.4
		Rockfish	-	*	0	-	-	-	-	-	0.2	-	0.2
		All Targets	0.1	11.1	13.5	0.5	0	0	0	0	2.1	0	34.3
	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	*	16.7
		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	1.4	0.1	1.0	14.2	0.9	1.3	0	0.3	0.9	0	21.6
		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
	All Gear	All Targets	93.0	11.9	51.6	21.1	2.6	3.7	0.2	4.4	24.7	1.2	225.2

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 Catch-accounting system estimates (housed at 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, 2012-2013, (1,000 metric tons, round weight).

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	*	1.0	0	0	0	-	-	-	0	0.1	*	1.3
		Pacific Cod	4.8	0	131.6	1.0	0.1	0.3	0	1.0	0.1	0.1	0	159.0
		Kamchatka Flounder	-	*	-	-	*	*	-	-	-	*	-	*
		Turbot	0	0	0.1	0.3	0.2	0	-	-	0	0.1	-	3.0
		Rockfish	-	*	*	*	*	*	-	-	*	*	-	*
		All Targets	4.8	1.2	131.8	1.3	0.3	0.3	0	1.0	0.1	0.3	0	163.6
	Pot	Sablefish	*	*	*	*	*	*	-	-	*	*	-	*
		Pacific Cod	0	-	28.7	0	0	0	0	0	0	0	0	29.0
		All Targets	0	*	28.7	0	0	0	0	0	0	0	0	29.0
	Trawl	Pollock, Bottom	107.3	*	3.9	0.3	0	1.6	3.9	0.9	0.2	0.5	0.2	119.8
		Pollock, Pelagic	1,069.4	*	6.2	0.5	0	2.3	2.9	0.6	0.3	0.3	0.1	1,084.4
		Pacific Cod	3.6	*	43.7	0.2	0	0.2	1.4	0.8	0.3	0.1	0.4	51.3
		Arrowtooth	0.7	0.1	0.2	15.6	2.1	0.6	0	0	0.3	0.3	0.1	21.3
		Kamchatka Flounder	0.1	0.1	0	1.6	5.9	*	0	0	0	0.2	0.5	10.0
		Flathead Sole	0.9	*	0.4	0.4	0.1	3.3	0.6	0.1	0.2	0.1	-	6.2
		Rock Sole	6.7	-	9.7	0.1	0	0.8	58.0	9.4	2.8	0	*	89.1
		Yellowfin	10.6	-	17.8	1.0	0.1	2.0	8.5	126.9	14.0	0	-	184.7
		Other Flatfish	0.2	*	0.2	0.1	0	0.1	0	0.6	1.0	0.1	*	2.2
		Rockfish	0.7	0	0.2	0.5	0.2	0	0	0	0.1	18.5	1.1	21.7
		Atka Mackerel	0.4	0	1.1	0.8	0.6	0	0.1	0	0	5.9	41.4	51.3
		All Targets	1,200.7	0.2	83.4	21.0	9.1	10.9	75.5	139.2	19.2	26.0	43.8	1,642.2

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Table 4: Continued

		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	74.2	*	3.0	0.7	0.1	1.5	4.4	1.5	0.2	0.2	0.1	86.8
		Pollock, Pelagic	1,155.8	*	6.0	0.4	0	1.6	2.0	0.5	0.1	0.4	0	1,168.0
		Sablefish	*	*	-	*	*	*	-	-	*	*	-	*
		Pacific Cod	4.0	0	43.0	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	14.9
		Rock Sole	7.4	-	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	7.5	135.6	15.1	0	0	210.2
		Other Flatfish	0.4	*	0.5	0.1	0	0	0	1.2	2.1	*	-	4.5
		Rockfish	1.3	0	0.6	1.0	1.1	0.1	0.1	0	0.1	25.2	2.7	32.6
		Atka Mackerel	0.5	0	0.8	0.6	0.6	0	0	*	0	5.1	18.4	26.6
		All Targets	1,267.2	0.2	86.9	19.7	7.6	16.7	59.3	151.4	23.7	32.4	21.5	1,698.1
	All Gear	All Targets	1,272.4	1.2	243.8	20.3	7.7	17.1	59.4	153.1	23.7	32.8	21.5	1,887.7

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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2009-2013, (1,000 metric tons, round weight).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2009	20	23	125	687	145	710
	2010	36	39	136	676	172	715
	2011	33	47	181	1,019	214	1,066
	2012	41	61	172	1,034	213	1,095
	2013	33	60	189	1,085	222	1,145
Sablefish	2009	6	5	1	1	7	6
	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
Pacific Cod	2009	24	16	35	139	60	154
	2010	35	24	37	131	72	155
	2011	41	22	46	174	87	196
	2012	37	19	51	195	88	214
	2013	31	22	53	193	83	214
Flatfish	2009	14	28	59	168	73	196
	2010	13	25	67	187	79	212
	2011	10	31	23	263	33	294
	2012	7	23	5	287	11	309
	2013	8	26	17	280	25	306
Rockfish	2009	6	17	1	19	7	35
	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
Atka Mackerel	2009	0	2	0	73	0	75
	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
All Groundfish	2009	77	93	226	1,109	303	1,202
	2010	101	116	245	1,105	346	1,221
	2011	98	129	257	1,561	354	1,690
	2012	100	134	233	1,619	333	1,753
	2013	91	138	265	1,645	356	1,783

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.

Source: NMFS Alaska Region Catch Accounting System estimates, fish tickets, CFEC vessel data (housed at 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, 2009-2013, (1,000 metric tons, round weight).

		Year	Fixed Total Discards	Fixed Discard Rate	Trawl Total Discards	Trawl Discard Rate	All Gear Total Discards	All Gear Discard Rate
Gulf of Alaska	Pollock	2009	0	5 %	2.5	6 %	2.6	6 %
		2010	0.2	45 %	1.0	1 %	1.1	1 %
		2011	0	21 %	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 %
	Sablefish	2009	0.8	7 %	0.1	9 %	0.8	7 %
		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 %
	Pacific Cod	2009	1.0	3 %	3.0	21 %	3.9	7 %
		2010	0.5	1 %	2.4	11 %	2.9	4 %
		2011	1.4	2 %	0.7	4 %	2.1	2 %
		2012	0.3	0 %	0.7	3 %	1.0	1 %
		2013	2.3	5 %	2.3	11 %	4.6	7 %
	Flatfish	2009	0.3	91 %	12.5	30 %	12.8	30 %
		2010	0.3	92 %	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	0.6	97 %	5.8	17 %	6.3	19 %
	Rockfish	2009	0.3	22 %	1.6	8 %	1.9	8 %
		2010	0.5	31 %	1.3	6 %	1.8	7 %
		2011	0.3	26 %	1.6	7 %	1.9	8 %
		2012	0.5	29 %	1.6	6 %	2.0	7 %
		2013	1.1	48 %	1.8	8 %	2.9	12 %
	Atka Mackerel	2009	0	100 %	0.9	41 %	0.9	42 %
		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 %
	All Groundfish	2009	6.5	11 %	21.9	17 %	28.4	15 %
		2010	4.1	6 %	17.6	11 %	21.7	9 %
		2011	5.3	6 %	13.5	8 %	18.8	8 %
		2012	3.2	4 %	11.6	6 %	14.8	6 %
		2013	12.5	14 %	14.3	8 %	26.8	10 %

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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	2009	0.6	13 %	5.8	1 %	6.4	1 %
		2010	0.8	20 %	3.1	0 %	3.9	0 %
		2011	0.9	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 %
	Sablefish	2009	0	1 %	0	4 %	0	1 %
		2010	0	3 %	0	3 %	0	3 %
		2011	0	1 %	0	4 %	0	1 %
		2012	0	1 %	0	1 %	0	1 %
		2013	0	3 %	0	1 %	0	2 %
	Pacific Cod	2009	1.6	1 %	0.6	1 %	2.3	1 %
		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 %
	Flatfish	2009	2.5	59 %	23.7	11 %	26.3	12 %
		2010	1.9	41 %	22.8	9 %	24.6	10 %
		2011	2.1	48 %	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 %
	Rockfish	2009	0.2	50 %	2.0	11 %	2.3	12 %
		2010	0.3	42 %	1.5	7 %	1.8	8 %
		2011	0.1	36 %	1.0	4 %	1.1	4 %
		2012	0.1	25 %	1.4	5 %	1.5	5 %
		2013	0.2	60 %	0.9	3 %	1.1	3 %
	Atka Mackerel	2009	0.1	85 %	2.9	4 %	2.9	4 %
		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 %
	All Groundfish	2009	15.8	11 %	45.1	4 %	60.9	5 %
		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	24.2	12 %	39.0	2 %	63.2	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	2009	0.6	13 %	8.3	1 %	8.9	1 %
		2010	1.0	22 %	4.0	0 %	5.0	1 %
		2011	0.9	16 %	6.0	0 %	6.9	1 %
		2012	0.5	11 %	6.9	1 %	7.4	1 %
		2013	0.7	13 %	7.3	1 %	7.9	1 %
	Sablefish	2009	0.8	6 %	0.1	8 %	0.9	6 %
		2010	0.4	4 %	0	5 %	0.5	4 %
		2011	0.5	4 %	0.2	15 %	0.6	5 %
		2012	0.3	2 %	0.1	6 %	0.3	2 %
		2013	0.8	6 %	0	5 %	0.8	6 %
	Pacific Cod	2009	2.6	2 %	3.6	5 %	6.2	3 %
		2010	2.0	1 %	3.8	5 %	5.8	2 %
		2011	3.3	2 %	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 %
	Flatfish	2009	2.8	62 %	36.2	14 %	39.0	15 %
		2010	2.2	44 %	33.0	12 %	35.2	12 %
		2011	2.4	50 %	30.0	9 %	32.4	10 %
		2012	2.9	52 %	24.6	8 %	27.4	9 %
		2013	3.5	82 %	28.3	9 %	31.8	10 %
	Rockfish	2009	0.5	29 %	3.7	9 %	4.2	10 %
		2010	0.7	34 %	2.8	6 %	3.6	7 %
		2011	0.4	28 %	2.6	5 %	3.1	6 %
		2012	0.5	28 %	3.0	6 %	3.5	6 %
		2013	1.4	50 %	2.6	5 %	4.0	7 %
	Atka Mackerel	2009	0.1	87 %	3.8	5 %	3.9	5 %
		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 %
	All Groundfish	2009	22.3	11 %	67.0	5 %	89.3	6 %
		2010	18.5	9 %	57.8	4 %	76.3	5 %
		2011	25.8	10 %	51.2	3 %	77.0	4 %
		2012	23.6	9 %	47.3	3 %	71.0	3 %
		2013	36.7	13 %	53.3	3 %	90.0	4 %

Notes: All groundfish and all gear may include additional categories. Although these are the best available estimates of discards and are used for several management purposes, these estimates are not necessarily accurate. The reasons for this are as follows: 1) they are wholly or partially derived from observer estimates; 2) discards occur at many different places on vessels; 3) observers record are an approximation of what they see; 4) the sampling methods used by at-sea observers provide the basis for NMFS to make good estimates of total catch by species, not the disposition of that catch. 5) catch is only partially observed by the Observer Program. There were substantial changes to the observer program in 2013 that could affect the comparability of 2013 to previous years.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013, (metric tons, round weight).

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Flat Shallow	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	2	263	18	182	0	2	-	1,484
		Pacific Cod	28	0	189	41	11	5	*	1,062
		Rockfish	-	-	0	-	-	*	-	0
		All Targets	30	267	215	227	11	8	*	2,770
	Pot	Sablefish	-	*	*	-	-	-	-	*
		Pacific Cod	10	0	70	16	*	1	11	405
		All Targets	10	0	70	16	*	1	11	405
	Trawl	Pollock, Bottom	56	0	3	91	1	0	*	198
		Pollock, Pelagic	367	0	2	12	3	0	0	687
		Sablefish	0	0	*	38	*	0	-	84
		Pacific Cod	672	0	17	277	41	119	2	1,381
		Arrowtooth	252	59	160	2,257	88	28	0	3,703
		Flathead Sole	86	0	26	674	7	1	-	836
		Rex Sole	108	1	9	623	5	2	*	967
		Flatfish, Shallow	372	0	463	877	7	59	*	2,053
		Rockfish	16	5	8	126	3	7	488	1,671
		All Targets	1,929	65	687	4,973	155	217	490	11,580

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Table 7: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Flat Shallow	Atka Mackerel	All Species
2013	Hook & Line	Sablefish	6	421	93	256	4	7	-	3,462
		Pacific Cod	25	73	237	116	15	9	*	1,952
		Rockfish	-	0	0	-	-	-	-	0
		All Targets	42	726	2,202	493	19	23	1	12,130
	Pot	Sablefish	-	0	*	-	-	-	-	0
		Pacific Cod	8	0	120	1	0	2	3	382
		All Targets	8	0	120	1	0	2	3	382
	Trawl	Pollock, Bottom	228	0	1	667	56	6	0	1,180
		Pollock, Pelagic	170	0	0	15	1	0	-	236
		Sablefish	2	0	0	95	0	0	0	170
		Pacific Cod	76	0	41	768	234	162	19	1,617
		Arrowtooth	634	9	261	986	3	5	4	2,536
		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	1,871
		All Targets	2,400	47	2,308	5,088	316	218	427	14,302
	All Gear	All Targets	2,450	773	4,630	5,582	334	243	430	26,814

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. Although these are the best available estimates of discards and are used for several management purposes, these estimates are not necessarily accurate. The reasons for this are as follows: 1) they are wholly or partially derived from observer estimates; 2) discards occur at many different places on vessels; 3) observers record only a rough approximation of what they see; and 4) the sampling methods used by at-sea observers provide NMFS the basis to make good estimates of total catch by species, not the disposition of that catch. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013, (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
2012	Hook & Line	Sablefish	*	2	1	14	30	-	-	12	-	6	13	*	123
		Pacific Cod	501	4	1,789	761	54	289	28	8	1,001	65	57	10	19,293
		Kamchatka Flounder	-	*	-	-	*	*	-	*	-	-	*	-	*
		Turbot	2	2	4	131	94	13	-	15	-	6	6	-	625
		Rockfish	-	*	*	*	*	*	-	*	-	*	*	-	*
		All Targets	503	13	1,795	909	193	302	28	47	1,001	78	77	10	20,128
	Pot	Sablefish	*	*	*	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	3	-	75	1	0	0	1	-	29	0	1	6	308
		All Targets	3	*	75	1	0	0	1	*	29	0	1	6	308
	Trawl	Pollock, Bottom	175	0	15	39	3	178	541	0	52	22	138	31	1,574
		Pollock, Pelagic	1,571	*	15	83	11	834	1,718	17	439	71	114	5	5,853
		Pacific Cod	1,636	*	150	210	8	141	938	1	28	114	60	33	3,882
		Arrowtooth	228	1	2	761	200	10	2	8	0	16	102	33	1,722
		Kamchatka Flounder	8	0	0	16	65	*	0	4	1	6	9	9	303
		Flathead Sole	117	*	2	78	9	12	4	1	2	12	16	-	340
		Rock Sole	270	-	243	56	13	128	1,369	0	356	1,938	1	*	5,931
		Yellowfin	909	-	437	454	60	132	473	4	3,131	3,773	1	-	12,773
		Other Flatfish	8	*	2	9	2	0	0	0	15	14	54	*	129
		Rockfish	19	1	20	145	47	5	3	2	1	4	313	288	1,037
		Atka Mackerel	16	1	8	60	17	0	17	7	0	3	572	929	2,226
		All Targets	4,958	3	894	1,911	435	1,442	5,067	44	4,025	5,973	1,379	1,327	35,770

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Table 8: Continued

		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	*	-	37	-	12	62	*	282
		Pacific Cod	611	2	3,087	472	42	371	33	3	1,422	11	106	23	21,843
		Turbot	*	1	*	6	51	5	*	13	*	*	4	-	132
		Rockfish	*	0	*	*	*	*	-	4	-	*	1	-	5
		All Targets	611	27	3,555	513	142	377	34	83	1,422	31	241	23	23,306
	Pot	Sablefish	*	*	*	*	*	-	-	*	-	*	*	-	*
		Pacific Cod	6	0	112	2	0	0	1	-	298	2	6	3	853
		All Targets	6	0	112	2	0	0	1	*	298	2	6	3	853
	Trawl	Pollock, Bottom	88	0	12	239	15	79	227	1	237	81	52	9	1,456
		Pollock, Pelagic	265	*	4	102	11	605	1,079	5	484	19	103	0	3,415
		Sablefish	*	*	-	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	1,158	0	303	264	14	121	304	2	349	512	16	2	3,671
		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	245	*	27	126	24	106	39	15	67	198	9	0	1,113
		Rock Sole	477	-	270	498	84	94	1,193	2	217	1,212	2	*	5,759
		Turbot	*	*	*	*	*	*	-	*	-	*	*	-	*
		Yellowfin	2,106	-	869	1,126	77	141	284	25	3,055	7,693	5	0	18,963
		Other Flatfish	2	*	2	11	1	6	2	0	32	104	*	-	234
		Rockfish	66	0	32	247	104	15	11	6	1	11	267	213	1,278
		Atka Mackerel	54	0	4	30	42	0	7	2	*	0	289	448	1,219
		All Targets	4,862	3	1,525	3,037	619	1,188	3,149	267	4,441	9,838	871	675	39,015
	All Gear	All Targets	5,479	29	5,193	3,552	761	1,565	3,183	350	6,161	9,871	1,118	702	63,174

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. Although these are the best available estimates of discards and are used for several management purposes, these estimates are not necessarily accurate. The reasons for this are discussed in the Notes for Table 7. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013 (percent).

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	99	2	42	88	100	-	99	100	38	-	11
		Pacific Cod	16	2	1	93	100	-	*	97	15	*	5
		Rockfish	-	-	0	-	-	-	-	*	0	-	0
		All Targets	17	2	1	89	100	-	99	98	28	*	7
	Pot	Sablefish	-	*	*	-	-	-	-	-	*	-	*
		Pacific Cod	58	100	0	100	*	-	100	98	100	86	1
		All Targets	58	100	0	100	*	-	100	98	100	86	1
	Trawl	Pollock, Bottom	0	0	0	11	1	4	1	0	29	*	1
		Pollock, Pelagic	0	1	1	3	5	2	13	0	79	98	1
		Sablefish	57	0	*	97	*	81	96	100	16	-	27
		Pacific Cod	45	1	0	36	21	20	3	15	37	95	7
		Arrowtooth	26	33	17	16	10	4	62	8	30	38	17
		Flathead Sole	47	0	19	83	2	0	83	0	23	-	41
		Rex Sole	46	15	5	62	2	0	100	2	47	*	33
		Flatfish, Shallow	53	0	45	67	3	6	0	3	4	*	33
		Rockfish	3	1	2	16	17	13	52	11	4	42	6
		All Targets	2	8	3	24	7	4	74	5	6	42	6

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Table 9: Continued

		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	-	20
		Pacific Cod	21	97	2	100	100	-	*	98	28	*	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	18	*	100	99	99	99	1
		All Targets	41	1	0	100	18	*	100	99	99	99	1
	Trawl	Pollock, Bottom	2	1	0	46	18	4	1	3	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	11	0	0	57	57	16	77	17	51	100	8
		Arrowtooth	46	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
	All Gear	All Targets	3	6	7	26	12	2	57	4	12	36	10

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. Although these are the best available estimates of discards and are used for several management purposes, these estimates are not necessarily accurate. The reasons for this are as follows: 1) they are wholly or partially derived from observer estimates; 2) discards occur at many different places on vessels; 3) observers record only a rough approximation of what they see; and 4) the sampling methods used by at-sea observers provide the basis for NMFS to make good estimates of total catch by species, not the disposition of that catch. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013 (percent).

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	*	0	13	74	97	-	-	25	-	100	11	*	9
		Pacific Cod	10	23	1	78	72	99	100	6	100	92	50	47	12
		Kamchatka Flounder	-	*	-	-	*	*	-	*	-	-	*	-	*
		Turbot	18	7	5	39	39	100	-	1	-	100	11	-	21
		Rockfish	-	*	*	*	*	*	-	*	-	*	*	-	*
		All Targets	10	1	1	69	54	99	100	2	100	94	25	47	12
	Pot	Sablefish	*	*	*	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	56	-	0	100	100	18	91	-	100	86	98	71	1
		All Targets	56	*	0	100	100	18	91	*	100	86	98	71	1
	Trawl	Pollock, Bottom	0	0	0	15	12	11	14	1	6	12	30	16	1
		Pollock, Pelagic	0	*	0	18	54	36	60	35	77	21	35	6	1
		Pacific Cod	45	*	0	89	87	58	69	85	4	44	54	8	7
		Arrowtooth	31	2	1	5	9	2	10	1	32	5	38	22	8
		Kamchatka Flounder	6	0	1	1	1	*	8	0	100	35	4	2	3
		Flathead Sole	13	*	0	19	12	0	1	3	3	7	13	-	5
		Rock Sole	4	-	2	56	74	17	2	100	4	69	5	*	7
		Yellowfin	8	-	2	46	49	6	5	69	2	25	89	-	7
		Other Flatfish	4	*	1	12	12	1	1	38	2	1	96	*	6
		Rockfish	3	3	7	30	20	18	13	10	90	3	2	20	4
		Atka Mackerel	4	3	1	7	3	4	17	3	63	14	9	2	4
		All Targets	0	1	1	9	5	13	7	2	3	30	5	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
2013	Hook & Line	Sablefish	*	1	97	81	86	*	-	59	-	100	41	*	21
		Pacific Cod	12	49	2	81	84	100	100	22	100	100	80	91	14
		Turbot	*	12	*	85	85	100	*	2	*	*	19	-	18
		Rockfish	*	0	*	*	*	*	-	89	-	*	11	-	28
		All Targets	12	3	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	36	21	5	5	18	16	46	21	13	2
		Pollock, Pelagic	0	*	0	27	49	37	54	30	89	22	24	15	0
		Sablefish	*	*	-	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	29	37	1	90	73	49	32	93	13	84	31	19	7
		Arrowtooth	18	2	1	3	9	3	4	24	30	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	6	-	3	73	78	5	3	89	3	26	4	*	8
		Turbot	*	*	*	*	*	*	-	*	-	*	*	-	*
		Yellowfin	10	-	4	56	52	3	4	71	2	47	29	100	8
		Other Flatfish	0	*	0	13	7	17	3	1	3	5	*	-	5
		Rockfish	5	1	5	22	9	27	15	11	23	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
	All Gear	All Targets	0	2	2	17	10	9	5	20	4	39	3	3	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. Although these are the best available estimates of discards and are used for several management purposes, these estimates are not necessarily accurate. The reasons for this are discussed in the Notes for Table 9. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2009-2013, (metric tons (t) or number in 1,000s).

Area	Gear	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	2009	-	-	-	0	-	0	1	0
		2010	-	-	-	0	-	-	2	0
		2011	-	-	-	0	-	0	6	-
		2012	-	-	-	0	-	0	3	0
		2013	-	-	0	1	0	0	1	-
	Pot	2009	5	-	-	-	-	-	17	-
		2010	24	-	-	-	-	-	140	-
		2011	38	-	-	-	-	-	12	-
		2012	34	-	-	-	-	-	93	-
		2013	10	-	-	-	-	-	98	-
	Trawl	2009	1,831	9	8	2	-	3	229	1
		2010	1,635	2	55	2	-	3	91	*
		2011	1,867	11	22	3	-	0	103	-
		2012	1,712	1	23	1	-	0	83	-
		2013	1,230	11	23	5	0	0	243	-
	All Gear	2009	1,836	9	8	2	-	3	247	1
		2010	1,659	2	55	2	-	3	233	0
		2011	1,906	11	22	3	-	0	121	-
		2012	1,746	1	23	1	-	0	179	0
		2013	1,240	11	23	6	0	0	342	-
Bering Sea & Aleutian Islands	Hook & Line	2009	629	0	0	0	4	15	21	55
		2010	572	-	0	0	2	2	11	35
		2011	552	*	0	0	3	2	14	38
		2012	613	*	0	0	4	2	16	30
		2013	521	0	*	0	6	1	17	18
	Pot	2009	2	-	-	-	3	191	513	553
		2010	5	-	-	-	2	163	358	764
		2011	7	-	-	-	18	211	298	144
		2012	5	-	-	-	7	17	101	16
		2013	4	-	-	-	99	0	226	14
	Trawl	2009	2,885	88	14	48	76	17	481	526
		2010	2,817	356	12	15	60	13	508	1,721
		2011	2,618	397	26	194	46	52	901	763
		2012	3,112	2,376	13	24	34	25	428	625
		2013	3,076	988	15	127	31	31	714	691
	All Gear	2009	3,515	88	14	48	83	223	1,015	1,134
		2010	3,394	356	12	15	63	178	877	2,520
		2011	3,176	397	26	195	67	265	1,213	945
		2012	3,730	2,376	13	24	45	44	544	671
		2013	3,601	988	15	127	136	32	957	723
All Alaska	All Gear	2009	5,352	97	23	50	83	226	1,262	1,135
		2010	5,053	358	67	17	63	181	1,109	2,520
		2011	5,082	407	48	198	67	265	1,333	945
		2012	5,476	2,377	35	25	45	44	723	671
		2013	4,841	999	38	133	136	32	1,299	723

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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013, (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)
2012	Hook & Line	Sablefish	-	-	-	0.3	-	0	-	-
		Pacific Cod	-	-	-	-	-	-	3.1	0.1
		All Targets	-	-	-	0.3	-	0	3.1	0.1
	Pot	Pacific Cod	34.1	-	-	-	-	-	93.2	-
	Trawl	Pollock, Bottom	50.5	0.1	6.7	0.1	-	-	0.4	-
		Pollock, Pelagic	6.9	1.2	12.1	0.2	-	-	0.4	-
		Sablefish	3.0	-	-	-	-	*	-	-
		Pacific Cod	527.3	*	0.5	*	-	-	5.6	-
		Arrowtooth	590.7	*	0.3	0.1	-	-	73.0	-
		Flathead Sole	123.2	-	*	-	-	-	*	-
		Rex Sole	78.1	-	1.0	*	-	-	-	-
		Flatfish, Shallow	258.6	-	0.2	0.2	-	-	3.8	-
		Rockfish	73.3	-	1.6	0.3	-	0.1	0.1	-
		Other Ground-fish	*	-	-	-	-	-	-	-
		All Targets	1,711.6	1.3	22.5	0.9	-	0.1	83.2	-

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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)
2013	Hook & Line	Sablefish	-	-	0	0.6	0	0.1	0.1	-
		Pacific Cod	-	-	-	-	0	0	1.0	-
		All Targets	-	-	0	0.6	0	0.1	1.1	-
	Pot	Pacific Cod	10.2	-	-	-	-	-	98.2	-
	Trawl	Pollock, Bottom	133.9	-	3.7	0.1	-	-	8.0	-
		Pollock, Pelagic	24.5	10.6	9.8	0.7	0	-	-	-
		Sablefish	8.4	-	-	*	-	-	-	-
		Pacific Cod	294.6	-	0.4	-	-	-	16.4	-
		Arrowtooth	349.9	-	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	74.8	-	2.3	2.0	-	0.1	0.1	-
		Atka Mackerel	*	-	*	-	-	-	-	-
		All Targets	1,229.9	10.7	23.3	5.4	0	0.1	243.1	-
	All Gear	All Targets	1,240.1	10.7	23.3	6.1	0	0.2	342.4	-

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 Individual Fishing Quota 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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013, (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)
2012	Hook & Line	Sablefish	-	-	-	-	0	0.5	-	-
		Pacific Cod	607.4	*	0	0.1	4.0	1.4	15.6	29.6
		Turbot	5.5	-	*	0.1	-	0	0	0
		Rockfish	*	-	-	-	-	-	-	*
		All Targets	612.9	*	0	0.3	4.0	1.9	15.6	29.6
	Pot	Sablefish	*	-	-	-	-	*	-	*
		Pacific Cod	4.4	-	-	-	7.3	-	100.6	16.1
		All Targets	5.4	-	-	-	7.3	16.9	100.6	16.1
	Trawl	Pollock, Bottom	105.4	186.0	1.5	2.3	0.3	-	4.4	3.3
		Pollock, Pelagic	280.3	2,166.6	9.9	20.1	*	-	1.0	2.8
		Pacific Cod	472.8	5.9	0.9	0	0.3	0.2	10.0	6.6
		Arrowtooth	425.5	0.1	*	*	*	5.1	1.8	3.0
		Kamchatka Flounder	97.2	-	-	-	*	6.2	*	-
		Flathead Sole	85.5	0.6	*	*	0.5	*	26.1	25.9
		Rock Sole	429.8	0.2	*	-	22.6	*	73.6	12.5
		Yellowfin	950.4	16.3	*	0.3	8.1	0.3	309.9	568.6
		Other Flatfish	10.9	*	-	-	*	*	1.0	2.2
		Rockfish	76.5	-	0.3	*	*	7.3	*	-
		Atka Mackerel	177.8	0	*	1.2	1.8	6.3	-	*
		All Targets	3,112.0	2,375.7	12.5	23.9	33.6	25.3	427.8	625.0

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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)
2013	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	*	-
		Sablefish	-	-	*	0	-	0.5	-	-
		Pacific Cod	519.8	0.1	-	0.2	5.8	0.6	16.5	17.9
		Turbot	1.3	-	-	*	-	-	-	*
		Rockfish	*	-	-	-	-	*	-	-
		All Targets	521.1	0.1	*	0.2	5.8	1.1	16.5	17.9
	Pot	Sablefish	*	-	-	-	-	*	*	*
		Pacific Cod	2.1	-	-	-	99.5	0	226.5	14.3
		All Targets	3.7	-	-	-	99.5	0	226.5	14.3
	Trawl	Pollock, Bottom	150.9	0	1.6	1.7	0.3	*	10.6	4.8
		Pollock, Pelagic	117.5	958.9	11.5	123.8	-	*	1.6	3.7
		Sablefish	*	-	-	-	-	-	-	-
		Pacific Cod	359.0	0.2	0.9	0.3	0.5	0	11.0	11.5
		Arrowtooth	247.6	0.2	-	-	*	9.7	4.0	9.0
		Kamchatka Flounder	39.4	-	-	-	*	2.9	-	-
		Flathead Sole	131.0	1.7	-	-	1.0	*	70.7	76.6
		Rock Sole	614.8	0.3	*	*	18.4	*	52.1	14.7
		Turbot	*	-	-	-	-	-	-	-
		Yellowfin	1,203.2	26.8	0.6	0.3	11.0	0.4	560.3	563.0
		Other Flatfish	22.8	-	-	-	-	*	3.1	7.3
		Rockfish	112.4	-	*	-	*	14.7	0.7	*
		Atka Mackerel	77.6	*	-	0.7	*	3.3	*	*
		All Targets	3,076.1	988.1	14.5	126.9	31.1	31.0	713.9	690.6
	All Gear	All Targets	3,600.9	988.2	14.5	127.1	136.4	32.1	956.9	722.8

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 Individual Fishing Quota 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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013, (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)
2012	Hook & Line	Sablefish	-	-	-	0.025	-	0.002	-	-
		Pacific Cod	-	-	-	-	-	-	0.183	0.006
		All Targets	-	-	-	0.011	-	0.001	0.105	0.003
	Pot	Pacific Cod	0.002	-	-	-	-	-	4.262	-
	Trawl	Pollock, Bottom	0.003	0	0.427	0.003	-	-	0.023	-
		Pollock, Pelagic	0	0	0.143	0.003	-	-	0.004	-
		Sablefish	0.010	-	-	-	-	*	-	-
		Pacific Cod	0.026	*	0.026	*	-	-	0.275	-
		Arrowtooth	0.028	*	0.015	0.005	-	-	3.445	-
		Flathead Sole	0.060	-	*	-	-	-	*	-
		Rex Sole	0.026	-	0.332	*	-	-	-	-
		Flatfish, Shallow	0.041	-	0.038	0.033	-	-	0.600	-
		Rockfish	0.003	-	0.058	0.011	-	0.004	0.003	-
		Other Ground-fish	*	-	-	-	-	-	-	-
		All Targets	0.009	0	0.124	0.005	-	0.001	0.459	-

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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)
2013	Hook & Line	Sablefish	-	-	0	0.044	0.002	0.008	0.006	-
		Pacific Cod	-	-	-	-	0.001	0.001	0.075	-
		All Targets	-	-	0	0.022	0.002	0.005	0.040	-
	Pot	Pacific Cod	0.001	-	-	-	-	-	5.614	-
	Trawl	Pollock, Bottom	0.008	-	0.222	0.004	-	-	0.477	-
		Pollock, Pelagic	0	0	0.128	0.009	0	-	-	-
		Sablefish	0.018	-	-	*	-	-	-	-
		Pacific Cod	0.015	-	0.019	-	-	-	0.812	-
		Arrowtooth	0.016	-	0.187	0.047	-	-	4.590	-
		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	-	0.096	0.083	-	0.004	0.003	-
		Atka Mackerel	*	-	*	-	-	-	-	-
		All Targets	0.007	0	0.132	0.031	0	0.001	1.374	-
	All Gear	All Targets	0.006	0	0.105	0.027	0	0.001	1.543	-

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 Individual Fishing Quota 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. “*” indicates a confidential value; “-” indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 2012-2013, (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)
2012	Hook & Line	Sablefish	-	-	-	-	0.005	0.352	-	-
		Pacific Cod	0.004	*	0	0.001	0.025	0.009	0.098	0.186
		Turbot	0.002	-	*	0.042	-	0.009	0.005	0.014
		Rockfish	*	-	-	-	-	-	-	*
		All Targets	0.004	*	0	0.002	0.024	0.012	0.095	0.181
	Pot	Sablefish	*	-	-	-	-	*	-	*
		Pacific Cod	0	-	-	-	0.253	-	3.469	0.556
		All Targets	0	-	-	-	0.249	0.572	3.406	0.545
	Trawl	Pollock, Bottom	0.001	0.002	0.012	0.019	0.003	-	0.037	0.028
		Pollock, Pelagic	0	0.002	0.009	0.019	*	-	0.001	0.003
		Pacific Cod	0.009	0	0.017	0	0.007	0.003	0.195	0.129
		Arrowtooth	0.020	0	*	*	*	0.239	0.086	0.142
		Kamchatka Flounder	0.010	-	-	-	*	0.616	*	-
		Flathead Sole	0.014	0	*	*	0.072	*	4.190	4.158
		Rock Sole	0.005	0	*	-	0.253	*	0.821	0.140
		Yellowfin	0.005	0	*	0.002	0.041	0.001	1.587	2.911
		Other Flatfish	0.005	*	-	-	*	*	0.451	0.982
		Rockfish	0.003	-	0.012	*	*	0.313	*	-
		Atka Mackerel	0.003	0	*	0.021	0.032	0.112	-	*
		All Targets	0.002	0.001	0.008	0.014	0.020	0.015	0.258	0.377

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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)
2013	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	*	-
		Sablefish	-	-	*	0.006	-	0.362	-	-
		Pacific Cod	0.003	0	-	0.001	0.038	0.004	0.107	0.115
		Turbot	0.002	-	-	*	-	-	-	*
		Rockfish	*	-	-	-	-	*	-	-
		All Targets	0.003	0	*	0.001	0.037	0.007	0.105	0.113
	Pot	Sablefish	*	-	-	-	-	*	*	*
		Pacific Cod	0	-	-	-	3.203	0.001	7.295	0.461
		All Targets	0	-	-	-	3.154	0.001	7.182	0.453
	Trawl	Pollock, Bottom	0.002	0	0.019	0.020	0.004	*	0.122	0.055
		Pollock, Pelagic	0	0.001	0.010	0.106	-	*	0.001	0.003
		Sablefish	*	-	-	-	-	-	-	-
		Pacific Cod	0.007	0	0.016	0.006	0.009	0.001	0.209	0.218
		Arrowtooth	0.012	0	-	-	*	0.467	0.190	0.432
		Kamchatka Flounder	0.008	-	-	-	*	0.560	-	-
		Flathead Sole	0.009	0	-	-	0.065	*	4.750	5.142
		Rock Sole	0.008	0	*	*	0.242	*	0.683	0.193
		Turbot	*	-	-	-	-	-	-	-
		Yellowfin	0.005	0	0.002	0.001	0.048	0.002	2.466	2.478
		Other Flatfish	0.005	-	-	-	-	*	0.672	1.592
		Rockfish	0.003	-	*	-	*	0.418	0.019	*
		Atka Mackerel	0.003	*	-	0.025	*	0.116	*	*
		All Targets	0.002	0.001	0.008	0.074	0.018	0.018	0.415	0.402
	All Gear	All Targets	0.002	0.001	0.008	0.067	0.071	0.017	0.501	0.379

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 Individual Fishing Quota 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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: NMFS Alaska Region Catch-accounting system estimates (housed at 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, 1984-2013; calculations based on COAR ($ millions, base year = 2013).

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
1984	272.8	904.8	53.8	51.7	73.6	1,356.7
1985	277.3	1,010.7	95.7	97.3	112.6	1,593.6
1986	435.6	961.9	91.4	166.9	158.5	1,814.3
1987	457.0	1,004.4	88.6	162.0	291.1	2,003.2
1988	471.0	1,489.3	112.0	132.2	484.2	2,688.7
1989	580.9	1,054.2	38.9	175.6	703.8	2,553.4
1990	717.2	1,104.2	48.5	175.5	907.9	2,953.2
1991	598.8	596.8	56.9	182.2	928.7	2,363.3
1992	638.2	1,037.0	51.4	91.4	1,285.4	3,103.5
1993	624.0	743.0	26.8	101.8	838.3	2,333.9
1994	591.7	781.7	39.8	156.0	899.5	2,468.7
1995	492.4	863.2	68.1	103.6	1,043.3	2,570.6
1996	314.0	620.9	80.3	133.0	928.3	2,076.4
1997	287.3	413.6	26.5	177.8	871.0	1,776.3
1998	354.9	393.9	17.5	152.7	606.9	1,525.9
1999	422.4	538.4	22.1	182.1	745.8	1,910.7
2000	214.0	370.1	14.4	202.3	898.5	1,699.3
2001	192.4	293.7	16.2	185.9	893.1	1,581.4
2002	231.4	202.0	14.1	200.4	956.1	1,604.1
2003	267.0	255.9	13.5	252.5	1,007.7	1,796.7
2004	238.8	367.5	20.2	243.1	922.5	1,792.0
2005	224.9	419.1	19.6	227.2	1,011.2	1,902.0
2006	176.8	393.1	12.4	241.6	1,052.2	1,876.1
2007	230.8	473.4	18.9	266.2	1,019.1	2,008.4
2008	302.2	482.9	29.9	243.9	1,139.0	2,197.9
2009	229.0	459.9	28.3	159.5	814.2	1,690.9
2010	252.0	569.1	24.1	218.8	748.7	1,812.7
2011	307.7	632.4	11.2	212.1	1,030.0	2,193.5
2012	329.8	550.9	22.4	149.7	1,097.7	2,150.5
2013	238.4	679.5	16.3	111.5	878.5	1,924.2

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2013 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 (housed at 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, 1984-2013; 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 %	21.0 %	0.7 %	12.9 %	56.1 %
2007	11.5 %	23.6 %	0.9 %	13.3 %	50.7 %
2008	13.7 %	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 %	51.0 %
2013	12.4 %	35.3 %	0.8 %	5.8 %	45.7 %

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 Reports, Commercial Operators Annual Reports (COAR), Fisheries of the United States. (housed at 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, 2009-2013; calculations based on COAR ($/lb, round weight).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska
	Year	Fixed	Trawl	Fixed	Trawl	All Gear
Pollock	2009	0.110	0.174	0.097	0.185	0.184
	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
Sablefish	2009	3.452	3.338	2.573	1.281	3.296
	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
Pacific Cod	2009	0.299	0.265	0.273	0.221	0.264
	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
Flatfish	2009	0.171	0.133	0.023	0.144	0.142
	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	0.161	0.159
Rockfish	2009	0.572	0.091	0.596	0.175	0.145
	2010	0.536	0.123	0.642	0.228	0.186
	2011	0.531	0.156	0.537	0.348	0.272
	2012	0.665	0.265	0.490	0.289	0.287
	2013	0.650	0.206	0.639	0.211	0.220
Atka Mackerel	2009	*	0.281	*	0.187	0.189
	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

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, Commercial Operators Annual Report (COAR), At-Sea Production Reports, (housed at 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,2009-2013; 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	2009	71.3	7.6	78.9	3.3	3.5	6.8	74.6	11.1	85.7
		2010	80.6	5.9	86.4	6.0	5.3	11.2	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	78.2	7.6	85.8
	Pacific Cod	2009	7.3	3.6	10.9	0.4	60.2	60.6	7.7	63.8	71.5
		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	84.2	95.0
		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	68.3	6.8	69.5	76.4
	Flatfish	2009	0	0	0	*	0.1	0.1	0	0.1	0.1
		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
	Rockfish	2009	1.2	0.1	1.4	0.1	0.3	0.3	1.3	0.4	1.7
		2010	1.2	0.1	1.3	0.1	0.5	0.5	1.2	0.6	1.8
		2011	1.0	0.1	1.1	0.1	0.2	0.2	1.1	0.3	1.3
		2012	1.5	0.2	1.6	0.1	0.2	0.3	1.5	0.4	1.9
		2013	1.6	0.1	1.7	0.1	0.2	0.2	1.7	0.3	2.0
	All Species	2009	80.4	11.4	91.8	3.8	66.3	70.1	84.2	77.7	161.8
		2010	90.0	11.1	101.2	6.5	65.3	71.8	96.6	76.4	172.9
		2011	128.1	15.6	143.7	8.2	89.7	97.9	136.3	105.3	241.6
		2012	120.2	10.8	131.0	6.2	100.4	106.6	126.4	111.2	237.6
		2013	83.1	6.7	89.9	4.2	78.1	82.3	87.3	84.8	172.2

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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
Pot	Pacific Cod	2009	14.3	*	14.3	6.5	2.9	9.4	20.8	2.9	23.6
		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
		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
Trawl	Pollock	2009	15.4	0.5	15.9	176.3	150.6	327.0	191.7	151.2	342.9
		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
		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
	Sablefish	2009	3.4	2.6	6.0	0	0.5	0.5	3.4	3.1	6.4
		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
		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
	Pacific Cod	2009	5.6	0.8	6.4	11.9	16.0	27.9	17.5	16.8	34.3
		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
		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
	Flatfish	2009	6.7	1.9	8.7	2.4	60.7	63.1	9.1	62.6	71.7
		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
		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	95.4	96.0	6.1	98.5	104.6

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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
Trawl	Rockfish	2009	1.5	2.5	4.0	0.2	6.4	6.6	1.7	8.8	10.5
		2010	2.5	3.6	6.1	0.1	10.6	10.7	2.6	14.3	16.9
		2011	2.9	4.0	6.9	0.1	20.5	20.6	3.1	24.5	27.5
		2012	6.2	7.9	14.1	0.2	16.6	16.8	6.4	24.5	30.9
		2013	4.3	5.1	9.4	0.1	15.5	15.6	4.4	20.6	25.1
	Atka Mackerel	2009	0	0.8	0.8	0	28.9	28.9	0	29.7	29.7
		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
	All Species	2009	33.6	9.4	42.9	190.9	263.2	454.1	224.5	272.6	497.1
		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	693.9
		2012	66.0	15.8	81.7	272.4	412.5	684.9	338.4	428.2	766.6
		2013	59.5	12.1	71.5	240.9	352.6	593.5	300.4	364.6	665.0
All Gear	Pollock	2009	15.4	0.5	15.9	176.3	151.5	327.8	191.8	152.0	343.8
		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	436.2	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
	Sablefish	2009	74.6	10.2	84.8	6.9	3.9	10.8	81.5	14.1	95.7
		2010	83.9	8.7	92.6	6.0	5.6	11.6	89.8	14.4	104.2
		2011	121.0	12.5	133.5	13.3	5.0	18.3	134.3	17.5	151.9
		2012	108.1	9.5	117.7	5.5	4.2	9.7	113.7	13.7	127.4
		2013	77.1	6.8	83.9	3.6	3.4	7.0	80.6	10.2	90.9

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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
All Gear	Pacific Cod	2009	27.1	4.5	31.6	18.9	79.0	97.9	46.0	83.5	129.5
		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	110.3	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
	Flatfish	2009	6.7	1.9	8.7	2.4	60.8	63.1	9.1	62.7	71.8
		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	95.5	96.1	6.1	98.6	104.7
	Rockfish	2009	2.7	2.6	5.3	0.2	6.6	6.9	3.0	9.2	12.2
		2010	3.7	3.7	7.4	0.1	11.1	11.2	3.8	14.8	18.6
		2011	3.9	4.1	8.0	0.2	20.6	20.8	4.1	24.7	28.9
		2012	7.7	8.1	15.8	0.3	16.8	17.1	8.0	24.9	32.8
		2013	5.9	5.2	11.2	0.2	15.7	15.9	6.1	20.9	27.0
	Atka Mackerel	2009	0	0.8	0.8	0	28.9	28.9	0	29.7	29.7
		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
	All Species	2009	128.4	20.8	149.2	204.9	332.3	537.2	333.3	353.1	686.3
		2010	160.1	21.2	181.3	172.5	326.8	499.3	332.6	348.0	680.6
		2011	214.3	28.5	242.8	280.0	472.1	752.1	494.3	500.6	994.9
		2012	215.9	26.6	242.5	297.3	516.7	814.0	513.2	543.3	1,056.5
		2013	161.8	18.8	180.5	260.2	430.7	690.9	421.9	449.5	871.4

Notes: Ex-vessel value is calculated using prices on Table 18. Please refer to Table 18 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, Commercial Operators Annual Report (COAR), At-Sea Production Reports (housed at 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, 2004-2013; 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	2004	60.8	23.0	0.1	3.8	8.3	1.8	64.6	31.2	2.0
	2005	55.1	25.3	0.3	3.9	11.5	1.9	59.1	36.7	2.2
	2006	65.4	32.7	0.2	6.4	14.2	3.8	71.7	47.0	4.1
	2007	74.7	33.4	0	5.5	16.0	2.5	80.3	49.4	2.5
	2008	85.8	35.3	0.3	9.1	16.7	3.6	94.9	52.1	3.9
	2009	68.3	26.7	*	5.1	7.3	1.6	73.4	34.0	1.6
	2010	79.9	31.1	*	7.7	11.6	3.2	87.5	42.7	3.2
	2011	117.3	45.7	*	11.8	15.1	3.9	129.2	60.9	3.9
	2012	108.6	41.7	*	14.4	10.8	3.6	123.0	52.5	3.6
	2013	75.5	26.7	*	11.0	7.8	3.2	86.6	34.5	3.2
Trawl	2004	4.4	23.7	-	*	78.7	84.9	4.4	102.4	84.9
	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	38.1	*	*	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	161.7	119.7
	2013	8.9	50.6	-	*	95.2	108.4	8.9	145.8	108.4
All Gear	2004	65.2	46.7	0.1	3.8	87.0	86.7	69.0	133.6	86.8
	2005	63.2	54.1	0.3	3.9	101.1	108.7	67.1	155.2	109.0
	2006	73.0	66.1	0.2	6.4	108.3	116.0	79.4	174.4	116.2
	2007	83.5	67.6	0	5.5	108.7	102.6	89.0	176.3	102.6
	2008	96.6	73.5	0.3	9.1	123.7	122.8	105.7	197.2	123.1
	2009	74.8	53.8	*	5.1	79.7	85.8	79.9	133.5	85.8
	2010	90.2	70.1	*	7.7	72.4	72.6	97.8	142.5	72.6
	2011	125.5	89.3	*	11.8	115.6	111.7	137.4	204.9	111.7
	2012	124.0	92.3	*	14.4	121.9	123.4	138.4	214.2	123.4
	2013	84.4	77.3	*	11.0	103.0	111.6	95.4	180.3	111.6

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 Reports; ADF&G COAR buying data (housed at 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, 2004-2013; calculations based on COAR ($ thousands).

	Year	Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	2004	62	177	31	70	110	102	65	194	103
	2005	61	212	60	60	180	128	64	243	148
	2006	65	262	57	98	226	321	70	315	340
	2007	72	301	9	76	275	209	75	350	211
	2008	79	337	74	117	274	359	86	395	353
	2009	67	276	*	73	155	200	71	286	178
	2010	77	327	*	113	242	358	83	371	323
	2011	106	497	*	165	270	490	116	520	436
	2012	98	509	*	225	234	404	110	495	363
	2013	82	361	*	140	165	354	91	352	354
Trawl	2004	193	439	-	*	1,049	3,144	177	1,067	3,144
	2005	299	566	-	*	1,262	4,106	299	1,287	4,106
	2006	295	695	-	*	1,306	4,313	295	1,355	4,313
	2007	324	743	-	*	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	1,247	2,568
	2011	340	969	-	*	1,456	3,993	340	1,757	3,993
	2012	642	1,076	-	*	1,710	4,276	642	1,972	4,276
	2013	341	1,150	-	*	1,465	4,016	341	1,778	4,016
All Gear	2004	66	267	31	62	588	1,927	69	543	1,888
	2005	70	336	60	56	754	2,651	72	666	2,658
	2006	72	408	57	94	808	3,053	77	755	3,059
	2007	80	445	9	70	842	2,699	83	787	2,700
	2008	88	510	59	110	951	3,231	95	917	3,155
	2009	73	396	*	67	705	2,452	77	674	2,384
	2010	86	527	*	106	658	2,016	92	750	1,961
	2011	113	672	*	162	925	3,192	122	1,051	3,104
	2012	111	733	*	209	1,098	3,334	123	1,158	3,246
	2013	91	673	*	136	920	3,101	99	1,019	3,101

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 Reports; ADF&G COAR buying data (housed at 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, 2009-2013; calculations based on COAR ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2009	7.5	8.4	50.5	277.3	58.0	285.8
	2010	13.9	14.9	45.5	226.6	59.3	241.5
	2011	12.0	16.2	66.0	370.2	77.9	386.4
	2012	15.8	22.6	65.4	393.1	81.2	415.8
	2013	13.4	23.0	62.2	357.1	75.6	380.2
Sablefish	2009	47.7	37.1	3.5	7.3	51.2	44.4
	2010	51.1	41.8	2.7	8.9	53.7	50.7
	2011	74.2	59.8	7.7	10.6	82.0	70.4
	2012	64.7	53.4	2.7	7.0	67.4	60.4
	2013	46.9	37.0	4.4	5.3	51.3	42.3
Pacific Cod	2009	21.7	9.9	20.4	77.5	42.0	87.5
	2010	29.1	14.0	23.2	76.6	52.3	90.6
	2011	43.6	17.5	30.6	107.1	74.1	124.6
	2012	43.6	16.1	37.8	138.2	81.4	154.4
	2013	25.3	11.9	28.0	101.8	53.3	113.7
Flatfish	2009	3.4	5.3	16.6	46.5	20.0	51.8
	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	5.0	91.1	7.0	97.7
Rockfish	2009	2.0	3.4	0.2	6.7	2.1	10.1
	2010	2.5	4.9	0.3	11.0	2.8	15.9
	2011	2.0	6.1	0.5	20.4	2.4	26.4
	2012	3.8	11.9	0.1	17.0	3.9	28.9
	2013	3.2	8.0	0.2	15.7	3.3	23.7
Atka Mackerel	2009	0	0.8	0	28.8	0.1	29.6
	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
All Groundfish	2009	83.5	65.6	91.4	445.8	174.9	511.5
	2010	100.6	81.0	92.2	407.1	192.8	488.1
	2011	135.4	107.9	113.7	638.4	249.1	746.3
	2012	131.2	111.7	108.0	706.0	239.2	817.8
	2013	92.0	88.7	101.2	592.4	193.2	681.1

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 Catch Accounting System, Commercial Operators Annual Report (COAR), ADFG fish tickets, At-Sea Production Reports (housed at 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, 2008-2013; calculations based on COAR ($ millions).

Region	2008	2009	2010	2011	2012	2013
Bering Sea Pollock	260.1	172.5	168.1	254.4	270.3	231.3
AK Peninsula/Aleutians	24.2	11.3	5.5	12.0	19.6	14.9
Kodiak	67.0	41.7	59.9	77.4	87.7	68.3
South Central	26.0	25.5	27.0	44.8	37.0	26.4
Southeastern	36.3	30.8	33.6	44.8	43.3	28.4
All Regions	413.6	281.8	294.2	433.5	457.8	369.2

Notes: Refer to the notes for Table 24.

Source: Refer to the source information for Table 24.

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, 2008-2013; calculations based on COAR (percent).

Region	2008	2009	2010	2011	2012	2013
Bering Sea Pollock	62.0	58.9	57.5	58.7	64.4	62.9
AK Peninsula/Aleutians	11.8	6.1	2.4	4.6	7.0	5.4
Kodiak	44.0	35.1	42.9	41.9	47.9	40.4
South Central	12.4	15.8	9.3	17.7	15.6	9.7
Southeastern	15.0	15.9	13.4	13.9	15.7	8.8
All Regions	33.6	29.5	24.5	29.8	32.8	26.3

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: ADFG Commercial Operators Annual Report, ADFG intent to process (housed at 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, 2009-2013, (1,000 metric tons product weight and million dollars).

		2009		2010		2011		2012		2013	
	Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pollock	Whole Fish	2.04	$ 2.3	1.24	$ 1.6	2.01	$ 3.2	2.19	$ 2.2	2.48	$ 2.8
	Head And Gut	57.27	$ 85.7	60.81	$ 97.0	59.60	$ 109.1	48.15	$ 71.2	62.26	$ 100.0
	Roe	18.49	$ 162.9	16.45	$ 98.0	19.29	$ 152.9	18.16	$ 169.2	16.12	$ 115.6
	Deep-Skin Fillets	41.28	$ 166.6	40.28	$ 158.5	46.19	$ 171.0	55.49	$ 206.5	51.59	$ 184.5
	Other Fillets	76.57	$ 295.0	71.17	$ 263.8	120.72	$ 399.1	96.96	$ 314.0	125.07	$ 373.4
	Surimi	87.12	$ 249.8	103.59	$ 357.2	148.07	$ 418.0	167.04	$ 523.6	170.26	$ 377.5
	Minced Fish	22.10	$ 42.2	21.59	$ 41.6	30.99	$ 50.8	31.59	$ 54.3	30.94	$ 46.0
	Fish Meal	34.90	$ 42.0	38.32	$ 60.3	52.92	$ 82.5	52.52	$ 78.8	53.87	$ 92.9
	Other Products	22.91	$ 18.7	26.25	$ 26.3	33.97	$ 37.3	38.79	$ 48.6	33.81	$ 36.2
	All Products	362.68	$ 1,065.1	379.72	$ 1,104.3	513.75	$ 1,424.0	510.89	$ 1,468.4	546.41	$ 1,329.0
Sablefish	Head And Gut	6.79	$ 87.0	6.70	$ 104.3	6.86	$ 138.3	7.52	$ 113.4	7.35	$ 93.6
	Other Products	0.68	$ 7.1	0.49	$ 5.2	0.81	$ 9.1	0.63	$ 3.4	0.49	$ 2.6
	All Products	7.47	$ 94.0	7.18	$ 109.5	7.67	$ 147.4	8.16	$ 116.8	7.84	$ 96.2

Continued on next page.

Table 25: Continued

		2009		2010		2011		2012		2013	
	Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pacific Cod	Whole Fish	4.58	$ 5.5	3.01	$ 2.9	2.47	$ 3.7	3.27	$ 4.8	3.64	$ 3.9
	Head And Gut	72.28	$ 186.7	80.32	$ 232.4	106.07	$ 348.6	119.61	$ 354.1	104.38	$ 232.6
	Salted/Split	0.02	$ 0.0	*	$ *	*	$ *	*	$ *	*	$ *
	Roe	2.98	$ 4.6	5.05	$ 6.6	3.17	$ 4.9	3.86	$ 7.1	4.38	$ 9.1
	Fillets	11.48	$ 67.1	14.80	$ 86.8	15.79	$ 106.2	15.84	$ 103.1	18.50	$ 122.2
	Other Products	8.96	$ 16.3	12.29	$ 22.6	15.06	$ 33.3	14.17	$ 25.3	14.59	$ 21.9
	All Products	100.29	$ 280.1	115.47	$ 351.3	142.56	$ 496.7	156.75	$ 494.4	145.49	$ 389.7
Flatfish	Whole Fish	19.25	$ 24.4	19.53	$ 21.7	21.54	$ 30.2	26.03	$ 39.1	15.71	$ 41.3
	Head And Gut	101.92	$ 123.1	120.16	$ 153.3	142.08	$ 222.5	142.22	$ 241.6	151.20	$ 186.4
	Kirimi	*	$ *	*	$ *	*	$ *	*	$ *	*	$ *
	Fillets	0.80	$ 4.7	0.25	$ 0.9	0.19	$ 0.8	0.19	$ 0.9	0.21	$ 0.8
	Fish Meal	-	$ -	-	$ -	0	$ 0	0	$ 0	0.01	$ 0.0
	Other Products	4.00	$ 6.4	4.31	$ 9.2	3.47	$ 8.1	3.12	$ 6.4	2.02	$ 5.9
	All Products	125.96	$ 158.7	144.24	$ 185.1	167.27	$ 261.7	171.57	$ 288.0	169.15	$ 234.4
Rockfish	Whole Fish	2.28	$ 4.3	3.44	$ 6.8	3.61	$ 8.5	3.24	$ 7.0	3.79	$ 7.5
	Head And Gut	16.14	$ 31.6	20.15	$ 50.4	22.32	$ 84.0	22.66	$ 72.6	24.98	$ 58.0
	Other Products	0.49	$ 2.4	0.54	$ 2.2	0.43	$ 2.4	0.69	$ 5.2	0.40	$ 2.4
	All Products	18.91	$ 38.4	24.14	$ 59.3	26.35	$ 94.9	26.59	$ 84.7	29.17	$ 67.8
Atka Mackerel	Whole Fish	3.66	$ 3.3	2.15	$ 1.7	5.33	$ 5.3	5.63	$ 7.9	2.91	$ 5.3
	Head And Gut	37.34	$ 64.3	37.84	$ 72.7	27.41	$ 69.6	24.51	$ 67.0	11.67	$ 34.1
	Other Products	0	$ 0	0	$ 0	0	$ 0	0.03	$ 0.0	0	$ 0
	All Products	41.01	$ 67.7	39.99	$ 74.4	32.74	$ 74.9	30.17	$ 74.8	14.57	$ 39.4
All Species	Total	658.91	$ 1,708.5	713.69	$ 1,890.4	893.19	$ 2,507.5	907.81	$ 2,538.7	916.01	$ 2,166.5

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: At-sea and shoreside production reports and commercial operators annual report. 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, 2009-2013, (dollars).

		2009		2010		2011		2012		2013	
	Product	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Pollock	Whole Fish	$ 0.82	$ 0.34	$ 0.44	$ 0.58	$ 0.66	$ 0.73	$ 0.53	$ 0.45	$ 0.40	$ 0.52
	Head And Gut	$ 0.51	$ 0.80	$ 0.74	$ 0.72	$ 0.92	$ 0.65	$ 0.73	$ 0.60	$ 0.71	$ 0.76
	Roe	$ 4.83	$ 3.15	$ 3.51	$ 2.00	$ 3.94	$ 3.07	$ 5.03	$ 3.38	$ 3.73	$ 2.74
	Deep-Skin Fillets	$ 1.98	$ 1.55	$ 1.89	$ 1.57	$ 1.75	$ 1.52	$ 1.70	$ 1.67	$ 1.71	$ 1.41
	Other Fillets	$ 1.70	$ 1.79	$ 1.64	$ 1.72	$ 1.46	$ 1.53	$ 1.42	$ 1.52	$ 1.29	$ 1.41
	Surimi	$ 1.37	$ 1.23	$ 1.75	$ 1.37	$ 1.41	$ 1.16	$ 1.61	$ 1.26	$ 1.08	$ 0.94
	Minced Fish	$ 0.85	$ 0.98	$ 0.87	$ 0.89	$ 0.76	$ 0.70	$ 0.79	$ 0.74	$ 0.68	$ 0.65
	Fish Meal	$ 0.67	$ 0.48	$ 0.86	$ 0.63	$ 0.79	$ 0.65	$ 0.86	$ 0.56	$ 0.88	$ 0.72
	Other Products	$ 0.47	$ 0.31	$ 0.58	$ 0.37	$ 0.60	$ 0.44	$ 0.67	$ 0.53	$ 0.59	$ 0.43
	All Products	$ 1.45	$ 1.22	$ 1.49	$ 1.16	$ 1.36	$ 1.15	$ 1.44	$ 1.17	$ 1.17	$ 1.04
Pacific Cod	Whole Fish	$ 0.54	$ 0.54	$ 0.41	$ 0.45	$ 0.49	$ 0.73	$ 0.57	$ 0.73	$ 0.50	$ 0.46
	Head And Gut	$ 1.21	$ 0.92	$ 1.40	$ 1.01	$ 1.56	$ 1.31	$ 1.41	$ 1.18	$ 1.10	$ 0.64
	Salted/Split	$ -	$ 1.19	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Roe	$ 0.64	$ 0.72	$ 0.58	$ 0.60	$ 0.76	$ 0.70	$ 0.81	$ 0.84	$ 0.77	$ 0.95
	Fillets	$ 2.90	$ 2.63	$ 2.41	$ 2.67	$ 2.43	$ 3.08	$ 1.51	$ 2.98	$ 1.07	$ 3.03
	Other Products	$ 0.82	$ 0.82	$ 1.03	$ 0.77	$ 1.26	$ 0.89	$ 0.91	$ 0.78	$ 0.53	$ 0.75
	All Products	$ 1.19	$ 1.43	$ 1.38	$ 1.38	$ 1.53	$ 1.65	$ 1.37	$ 1.51	$ 1.06	$ 1.48
Sablefish	Head And Gut	$ 5.40	$ 5.91	$ 6.40	$ 7.19	$ 7.83	$ 9.38	$ 5.31	$ 7.09	$ 5.19	$ 5.87
	Other Products	$ 1.27	$ 5.13	$ 1.94	$ 5.51	$ 1.20	$ 6.06	$ 1.29	$ 2.58	$ 0.82	$ 3.23
	All Products	$ 5.17	$ 5.83	$ 6.04	$ 7.08	$ 6.94	$ 9.04	$ 5.03	$ 6.74	$ 4.62	$ 5.74

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Table 26: Continued

	Product	2009 At-sea	2009 Shoreside	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside	2013 At-sea	2013 Shoreside
Deep-Water Flatfish (GOA)	Whole Fish	$ -	$ 0.47	$ -	$ 0.40	$ -	$ 0.42	$ *	$ *	$ -	$ 0.45
	Head And Gut	$ *	$ *	$ -	$ 0.53	$ -	$ 0.62	$ 0.90	$ 0.64	$ 0.52	$ 0.78
	Kirimi	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -	$ -
	Fillets	$ -	$ 2.03	$ -	$ 1.51	$ -	$ 2.01	$ -	$ *	$ -	$ 1.66
	Other Products	$ -	$ *	$ -	$ -	$ *	$ -	$ -	$ -	$ -	$ -
	All Products	$ *	$ 1.12	$ -	$ 0.63	$ *	$ 0.58	$ 0.90	$ 0.64	$ 0.52	$ 0.61
Shallow-Water Flatfish (GOA)	Whole Fish	$ *	$ 0.39	$ *	$ 0.51	$ *	$ 0.63	$ *	$ 0.63	$ -	$ 1.08
	Head And Gut	$ 0.51	$ 0.78	$ 0.63	$ 0.56	$ 0.64	$ 0.68	$ 0.77	$ 0.70	$ 0.46	$ 0.72
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ 2.72	$ -	$ 1.58	$ -	$ 2.06	$ -	$ 2.15	$ -	$ 1.62
	Other Products	$ -	$ *	$ -	$ 0.81	$ -	$ 0.14	$ -	$ *	$ -	$ *
	All Products	$ 0.51	$ 0.98	$ 0.63	$ 0.66	$ 0.64	$ 0.78	$ 0.77	$ 0.82	$ 0.46	$ 0.98
Arrowtooth	Whole Fish	$ *	$ 0.81	$ *	$ 0.41	$ -	$ 0.65	$ *	$ 0.47	$ *	$ 0.64
	Head And Gut	$ 0.47	$ 0.45	$ 0.47	$ 0.37	$ 0.69	$ 0.54	$ 0.81	$ 0.57	$ 0.54	$ 0.45
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ *	$ -	$ *	$ *	$ *	$ -	$ *	$ -	$ 1.74
	Other Products	$ 0.50	$ 0.37	$ 0.82	$ 0.71	$ 0.77	$ 0.85	$ 0.75	$ 0.46	$ 1.27	$ 1.40
	All Products	$ 0.47	$ 0.45	$ 0.47	$ 0.48	$ 0.70	$ 0.57	$ 0.81	$ 0.56	$ 0.55	$ 0.51
Kamchatka Flounder (BSAI)	Head And Gut	$ -	$ -	$ -	$ -	$ 0.70	$ -	$ 1.00	$ -	$ 0.55	$ -
	Fish Meal	$ -	$ -	$ -	$ -	$ 0.75	$ -	$ 0.66	$ *	$ 1.29	$ -
	All Products	$ -	$ -	$ -	$ -	$ 0.70	$ -	$ 1.00	$ *	$ 0.55	$ -

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Table 26: Continued

	Product	2009 At-sea	2009 Shoreside	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside	2013 At-sea	2013 Shoreside
Flathead Sole	Whole Fish	$ 0.40	$ 0.39	$ 0.46	$ 0.49	$ 0.59	$ 0.53	$ 0.76	$ 0.62	$ 1.38	$ 1.06
	Head And Gut	$ 0.61	$ 0.66	$ 0.70	$ 0.55	$ 0.89	$ 0.53	$ 0.93	$ 0.61	$ 1.07	$ 0.68
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ 2.45	$ -	$ 1.90	$ *	$ 2.15	$ *	$ 2.00	$ -	$ 1.56
	Other Products	$ 0.49	$ 0.37	$ 0.88	$ 0.56	$ 0.82	$ 0.73	$ 0.75	$ 0.37	$ 1.35	$ 1.30
	All Products	$ 0.60	$ 0.53	$ 0.69	$ 0.56	$ 0.89	$ 0.60	$ 0.91	$ 0.59	$ 1.09	$ 0.98
Rex Sole (GOA)	Whole Fish	$ 0.86	$ 0.90	$ 0.91	$ 0.91	$ 1.12	$ 1.02	$ 1.12	$ 1.12	$ 1.21	$ 0.94
	Head And Gut	$ *	$ *	$ *	$ *	$ *	$ *	$ *	$ *	$ 1.76	$ *
	Kirimi	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ *
	Fillets	$ -	$ *	$ -	$ *	$ -	$ 1.83	$ -	$ *	$ -	$ 1.31
	Other Products	$ -	$ *	$ -	$ *	$ -	$ 0.74	$ -	$ *	$ -	$ *
	All Products	$ 0.86	$ 0.90	$ 0.91	$ 0.91	$ 1.12	$ 1.03	$ 1.12	$ 1.12	$ 1.21	$ 0.94
Rock Sole (BSAI)	Whole Fish	$ 0.38	$ *	$ 0.35	$ 0.43	$ 0.53	$ *	$ 0.66	$ *	$ 0.50	$ *
	Head And Gut	$ 0.51	$ -	$ 0.56	$ -	$ 0.69	$ -	$ 0.80	$ -	$ 0.54	$ -
	Head And Gut With Roe	$ 0.89	$ -	$ 0.84	$ -	$ 1.05	$ -	$ 1.28	$ -	$ 0.85	$ -
	Fillets	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -	$ *	$ -
	Other Products	$ 0.51	$ 0.37	$ 0.87	$ 0.56	$ 0.84	$ 0.74	$ 0.71	$ 0.37	$ 1.26	$ 1.30
	All Products	$ 0.61	$ 0.37	$ 0.61	$ 0.55	$ 0.77	$ 0.74	$ 0.91	$ 0.37	$ 0.58	$ 1.30
Turbot (BSAI)	Whole Fish	$ *	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Head And Gut	$ 1.40	$ -	$ 1.80	$ -	$ 2.65	$ *	$ 2.09	$ -	$ 1.95	$ -
	Other Products	$ 1.50	$ 0.37	$ 1.60	$ 0.56	$ 1.90	$ 0.70	$ 1.59	$ 0.37	$ 1.56	$ 1.33
	All Products	$ 1.43	$ 0.37	$ 1.74	$ 0.56	$ 2.45	$ 0.68	$ 1.96	$ 0.37	$ 1.86	$ 1.33

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Table 26: Continued

		2009		2010		2011		2012		2013	
	Product	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Yellowfin (BSAI)	Whole Fish	$ 0.48	$ *	$ 0.41	$ -	$ 0.55	$ -	$ 0.63	$ *	$ 1.34	$ *
	Head And Gut	$ 0.50	$ -	$ 0.54	$ -	$ 0.65	$ -	$ 0.63	$ -	$ 0.51	$ -
	Kirimi	$ *	$ -	$ *	$ -	$ *	$ -	$ -	$ -	$ -	$ -
	Fillets	$ -	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -
	Other Products	$ 0.70	$ 0.37	$ 0.96	$ 0.96	$ 0.85	$ 0.85	$ 0.87	$ 0.88	$ 1.30	$ 1.30
	All Products	$ 0.50	$ 0.37	$ 0.52	$ 0.96	$ 0.63	$ 0.85	$ 0.63	$ 0.88	$ 0.58	$ 1.30
Flat Other (BSAI)	Whole Fish	$ 0.99	$ 0.70	$ 0.86	$ *	$ 1.05	$ 1.40	$ 0.81	$ *	$ 0.90	$ *
	Head And Gut	$ 0.44	$ -	$ 0.46	$ *	$ 0.51	$ *	$ 0.58	$ -	$ 0.49	$ -
	Fillets	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -	$ -	$ -
	Other Products	$ 0.63	$ 0.38	$ 0.97	$ 0.56	$ 0.84	$ 0.74	$ 0.87	$ 0.37	$ 1.26	$ 1.30
	All Products	$ 0.55	$ 0.53	$ 0.52	$ 0.56	$ 0.56	$ 1.34	$ 0.64	$ 0.37	$ 0.57	$ 1.30
Rockfish	Whole Fish	$ 1.10	$ 0.77	$ 1.26	$ 0.74	$ 1.49	$ 0.94	$ 0.96	$ 0.98	$ 1.19	$ 0.84
	Head And Gut	$ 0.85	$ 1.14	$ 1.11	$ 1.32	$ 1.70	$ 1.74	$ 1.40	$ 1.75	$ 1.02	$ 1.32
	Other Products	$ 1.07	$ 2.27	$ 1.09	$ 1.83	$ 1.24	$ 2.76	$ 1.17	$ 3.48	$ 1.12	$ 2.85
	All Products	$ 0.86	$ 1.13	$ 1.11	$ 1.11	$ 1.69	$ 1.42	$ 1.38	$ 1.67	$ 1.03	$ 1.16
Atka Mackerel	Whole Fish	$ 0.41	$ *	$ 0.37	$ *	$ 0.45	$ 0.54	$ 0.63	$ 0.70	$ 0.83	$ *
	Head And Gut	$ 0.78	$ -	$ 0.87	$ -	$ 1.15	$ *	$ 1.24	$ -	$ 1.33	$ -
	Other Products	$ 0.45	$ 0.16	$ 0.56	$ 0.56	$ 0.64	$ 0.47	$ 0.71	$ 0.36	$ 1.12	$ 1.09
	All Products	$ 0.75	$ 0.16	$ 0.84	$ 0.56	$ 1.04	$ 0.54	$ 1.13	$ 0.66	$ 1.23	$ 1.09

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: At-sea and shoreside production reports and Commercial Operators Annual Reports (COAR) (housed at 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, 2009-2013, (dollars).

		Bering Sea & Aleutian Islands					Gulf of Alaska				
	Species	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Motherships	Pollock	1,034	-	1,219	1,153	808	-	-	-	-	-
	Pacific Cod	666	-	404	965	538	-	-	-	-	-
Catcher processors	Pollock	1,330	1,321	1,190	1,206	1,037	614	661	882	659	682
	Sablefish	7,566	8,663	10,176	7,853	7,795	7,005	8,727	11,279	6,770	6,834
	Pacific Cod	1,246	1,494	1,687	1,501	1,181	1,289	1,424	1,622	1,479	1,064
	Flatfish	703	746	913	1,003	780	1,214	1,100	1,018	1,105	961
	Rockfish	960	1,307	1,967	1,572	1,172	963	1,300	2,059	1,568	1,103
	Atka Mackerel	949	1,131	1,484	1,584	1,681	1,090	1,135	1,694	1,855	2,076
	Other	278	456	453	624	484	729	688	1,098	1,245	1,920
Shoreside processors	Pollock	1,279	1,256	1,047	1,089	940	852	882	920	865	998
	Sablefish	5,652	11,953	11,259	9,153	9,912	7,288	8,566	11,319	8,246	6,738
	Pacific Cod	1,136	1,457	1,682	1,632	1,277	1,408	1,328	1,570	1,463	1,503
	Flatfish	239	541	815	741	1,102	695	557	678	799	831
	Rockfish	887	1,634	1,731	1,661	1,425	1,214	1,317	1,865	1,830	1,469
	Other	195	708	424	888	707	783	1,198	1,609	2,166	2,046

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: At-sea and shoreside production reports, commercial operators annual report (COAR), and NMFS Alaska Region catch accounting system estimates of retained catch (housed at 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, 2009-2013, (1,000 metric tons product weight).

		Bering Sea & Aleutian Islands					Gulf of Alaska				
	Product	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Pollock	Whole Fish	1.4	0.7	1.5	1.7	1.8	0.7	0.5	0.5	0.5	0.7
	Head And Gut	51.3	49.2	44.8	29.1	41.0	6.0	11.6	14.8	19.0	21.3
	Roe	17.9	15.3	18.0	16.5	13.9	0.6	1.1	1.3	1.7	2.2
	Deep-Skin Fillets	41.3	40.3	46.2	55.5	51.6	*	*	*	*	*
	Other Fillets	74.0	66.5	115.0	91.1	119.3	2.6	4.7	5.7	5.9	5.8
	Surimi	84.6	97.1	141.0	157.1	161.7	2.5	6.5	7.1	9.9	8.6
	Minced Fish	22.1	21.6	30.4	31.0	30.7	*	*	0.5	0.6	0.2
	Fish Meal	34.9	38.3	52.8	52.5	53.9	*	*	0.1	*	*
	Other Products	22.6	25.4	33.3	38.2	33.0	0.4	0.8	0.6	0.6	0.8
Sablefish	Head And Gut	1.0	1.2	1.0	1.2	1.1	5.8	5.5	5.9	6.3	6.2
	Other Products	0	0	0	0.1	0	0.6	0.4	0.8	0.6	0.5
Pacific Cod	Whole Fish	2.7	0.9	1.2	1.5	2.4	1.9	2.1	1.3	1.8	1.2
	Head And Gut	65.2	66.4	88.8	104.2	97.8	7.1	13.9	17.3	15.4	6.6
	Salted/Split	*	*	*	*	-	0	*	*	-	*
	Roe	2.2	3.9	1.8	2.4	2.8	0.7	1.2	1.3	1.5	1.6
	Fillets	4.7	5.6	6.6	6.8	8.8	6.7	9.2	9.2	9.1	9.7
	Other Products	5.0	7.0	9.0	7.9	10.0	3.9	5.2	6.0	6.3	4.6
Flatfish	Whole Fish	12.5	14.9	17.4	22.5	10.5	6.7	4.7	4.1	3.5	5.2
	Head And Gut	95.6	114.2	130.1	133.8	142.6	6.3	5.9	12.0	8.4	8.6
	Kirimi	*	*	*	-	-	*	*	*	*	*
	Fillets	-	-	*	*	*	0.8	0.2	0.2	0.2	0.2
	Fish Meal	-	-	0	0	0	-	-	-	-	-
	Other Products	4.0	3.4	3.1	3.1	2.0	*	0.9	0.3	0.1	0
Rockfish	Whole Fish	0.2	0.2	0.7	1.3	0.5	2.1	3.2	3.0	1.9	3.3
	Head And Gut	8.0	10.9	13.4	12.3	16.3	8.1	9.3	8.9	10.4	8.6
	Other Products	0	0	0	0.1	0	0.5	0.5	0.4	0.6	0.4
Atka Mackerel	Whole Fish	3.7	2.2	5.3	5.6	2.9	*	-	-	*	-
	Head And Gut	36.8	37.3	26.9	24.2	11.1	0.6	0.5	0.5	0.4	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: At-sea and shoreside production reports (housed at 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, 2009-2013, (1,000 metric tons product weight).

		At-sea					Shoreside				
	Product	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Pollock	Whole Fish	0.70	0.04	0.11	0.24	0.16	1.35	1.20	1.90	1.95	2.32
	Head And Gut	23.81	19.80	38.83	26.05	37.86	33.46	41.01	20.77	22.10	24.40
	Roe	9.30	7.64	11.66	9.30	8.37	9.20	8.81	7.63	8.86	7.75
	Deep-Skin Fillets	26.65	27.51	32.25	36.84	36.83	14.63	12.78	13.94	18.65	14.76
	Other Fillets	37.75	31.29	58.32	47.55	59.63	38.82	39.88	62.40	49.41	65.44
	Surimi	44.03	52.78	70.80	77.93	80.85	43.08	50.81	77.27	89.11	89.41
	Minced Fish	19.34	17.75	23.49	25.06	23.47	2.76	3.83	7.50	6.53	7.47
	Fish Meal	12.30	14.64	22.58	21.08	20.98	22.60	23.67	30.34	31.44	32.89
	Other Products	8.59	10.63	12.26	10.57	12.21	14.32	15.62	21.71	28.22	21.60
Sablefish	Head And Gut	1.27	1.03	1.03	1.08	1.05	5.52	5.67	5.83	6.44	6.30
	Other Products	0.07	0.09	0.16	0.08	0.16	0.61	0.40	0.65	0.55	0.33
Pacific Cod	Whole Fish	2.76	0.84	0.63	1.28	1.99	1.82	2.17	1.84	1.99	1.65
	Head And Gut	62.23	61.53	78.50	86.92	84.35	10.05	18.79	27.57	32.69	20.03
	Salted/Split	-	-	-	-	-	0.02	*	*	*	*
	Roe	0.89	0.57	0.46	0.62	0.38	2.09	4.48	2.71	3.24	3.99
	Fillets	0.96	0.85	0.71	0.32	0.28	10.52	13.95	15.08	15.52	18.21
	Other Products	2.04	3.02	4.62	3.11	4.32	6.92	9.26	10.44	11.06	10.27
Flatfish	Whole Fish	15.59	17.32	18.86	23.86	12.37	3.66	2.21	2.68	2.16	3.34
	Head And Gut	97.21	116.68	136.38	138.44	146.87	4.71	3.47	5.69	3.78	4.33
	Kirimi	*	*	*	-	-	*	*	*	*	*
	Fillets	-	-	*	*	*	0.80	0.25	0.19	0.19	0.21
	Fish Meal	-	-	0	0	0.01	-	-	-	*	-
	Other Products	2.30	2.45	2.46	2.23	1.61	1.69	1.86	1.01	0.89	0.41
Rockfish	Whole Fish	0.63	1.01	0.82	1.17	0.52	1.65	2.43	2.78	2.07	3.27
	Head And Gut	14.05	17.52	19.73	19.42	22.35	2.08	2.63	2.59	3.23	2.63
	Other Products	0.01	0.02	0.06	0.03	0.03	0.49	0.52	0.37	0.66	0.36
Atka Mackerel	Whole Fish	3.66	2.15	5.07	5.43	2.91	*	*	0.25	0.20	*
	Head And Gut	37.34	37.84	27.41	24.51	11.67	-	-	*	-	-
	Other Products	0	0	0	0	0	0	0	0	0.03	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: At-sea and shoreside production reports (housed at 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, 2009-2013, (1,000 metric tons product weight and $ millions.

		Bering Sea & Aleutian Islands		Gulf of Alaska		All Alaska	
	Species	Quantity	Value	Quantity	Value	Quantity	Value
2009	Salmon	58.1	$ 404.4	152.0	$ 780.3	210.1	$ 1,184.7
	Halibut	2.7	$ 28.8	16.1	$ 185.7	18.8	$ 214.5
	Herring	18.5	$ 27.6	17.1	$ 40.5	35.6	$ 68.1
	Crab	20.6	$ 252.5	5.2	$ 62.5	25.9	$ 315.0
	Other	*	$ *	1.4	$ 22.1	1.4	$ 22.1
	All Species	99.9	$ 713.3	191.9	$ 1,091.1	291.8	$ 1,804.4
2010	Salmon	63.3	$ 490.9	187.1	$ 988.5	250.4	$ 1,479.4
	Halibut	2.5	$ 47.3	13.5	$ 208.3	16.0	$ 255.6
	Herring	24.9	$ 29.1	22.2	$ 35.9	47.2	$ 65.0
	Crab	18.6	$ 258.0	4.2	$ 61.1	22.8	$ 319.1
	Other	0.2	$ 1.2	1.5	$ 27.7	1.8	$ 29.0
	All Species	109.5	$ 826.4	228.5	$ 1,321.6	338.0	$ 2,148.0
2011	Salmon	48.6	$ 414.5	198.7	$ 1,073.8	247.3	$ 1,488.3
	Halibut	2.8	$ 55.4	8.2	$ 145.6	11.0	$ 201.0
	Herring	20.4	$ 22.1	21.0	$ 22.8	41.4	$ 44.9
	Crab	19.5	$ 332.5	4.6	$ 77.4	24.1	$ 409.9
	Other	*	$ *	1.3	$ 23.5	1.3	$ 23.5
	All Species	91.3	$ 824.5	233.8	$ 1,343.1	325.1	$ 2,167.6
2012	Salmon	39.8	$ 334.1	168.3	$ 997.8	208.1	$ 1,331.9
	Halibut	2.0	$ 34.7	8.5	$ 133.5	10.5	$ 168.2
	Herring	16.2	$ 20.9	15.4	$ 30.3	31.6	$ 51.2
	Crab	29.0	$ 378.7	4.6	$ 69.7	33.6	$ 448.4
	Other	0	$ 0	1.7	$ 33.8	1.7	$ 34.5
	All Species	87.0	$ 769.1	198.6	$ 1,265.1	285.5	$ 2,034.2
2013	Salmon	34.6	$ 351.7	290.3	$ 1,451.2	325.0	$ 1,802.8
	Halibut	1.4	$ 15.1	7.5	$ 113.8	8.9	$ 128.9
	Herring	25.5	$ 25.0	11.6	$ 22.0	37.1	$ 46.9
	Crab	24.7	$ 326.0	3.0	$ 44.6	27.7	$ 370.6
	Other	0	$ 0	1.3	$ 25.5	1.3	$ 26.3
	All Species	86.3	$ 718.5	313.7	$ 1,657.1	400.0	$ 2,375.6

Notes: These estimates include production resulting from catch in both federal and state of Alaska fisheries. The data have been adjusted to 2013 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. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: ADF&G Commercial Operators Annual Report (housed at 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, 1992-2013, ($ 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	1,447.3	656.1	69.0	339.2	2,511.5
2012	1,469.3	699.4	51.5	322.4	2,542.7
2013	1,224.7	616.2	36.9	292.1	2,169.9

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

Source: At-sea and shoreside production reports and ADFG Commercial Operators Annual Reports (COAR) (housed at 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, 2009-2013, ($ millions).

		Bering Sea & Aleutian Islands			Gulf of Alaska	
	Year	125-165	<125	>165	<125	>=125
Fixed Gear	2009	75.4	40.7	37.7	8.7	7.1
	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	84.5	42.5	51.4	*	6.3
Fillet Trawl	2009	-	-	56.8	-	-
	2010	-	-	*	-	-
	2011	-	-	79.6	-	-
Head And Gut Trawl	2009	38.7	28.0	173.8	9.1	16.2
	2010	48.9	33.7	207.9	7.6	23.8
	2011	64.4	47.8	287.8	8.4	37.1
	2012	74.2	48.4	307.1	9.3	28.4
	2013	51.9	33.1	244.1	8.7	19.4
Surimi Trawl	2009	-	-	442.2	-	-
	2010	-	-	479.5	-	-
	2011	-	-	595.0	-	-
	2012	-	-	684.8	-	-
	2013	-	-	627.6	-	-
All Trawl	2009	38.7	28.0	672.8	9.1	16.2
	2010	48.9	33.7	687.4	7.6	23.8
	2011	64.4	47.8	962.4	8.4	37.1
	2012	74.2	48.4	992.0	9.3	28.4
	2013	51.9	33.1	871.7	8.7	19.4

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: At-sea processor reports, Commercial Operators Annual Reports (COAR), and NMFS permits (housed at 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 2009-2013, ($ millions).

		Bering Sea & Aleutian Islands			Gulf of Alaska	
	Year	125-165	<125	>165	<125	>=125
Fixed Gear	2009	4.2	3.1	3.4	0.9	0.5
	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
Fillet Trawl	2009	-	-	18.9	-	-
	2010	-	-	*	-	-
	2011	-	-	26.5	-	-
Head And Gut Trawl	2009	9.7	4.7	15.8	1.8	1.2
	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	13.0	11.0	18.8	2.9	1.8
Surimi Trawl	2009	-	-	36.9	-	-
	2010	-	-	36.9	-	-
	2011	-	-	49.6	-	-
	2012	-	-	48.9	-	-
	2013	-	-	44.8	-	-
All Trawl	2009	9.7	4.7	25.9	1.8	1.2
	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	13.0	11.0	32.3	2.9	1.8

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: At-sea processor reports, Commercial Operators Annual Reports (COAR), and NMFS permits. 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, 2009-2013, ($ millions).

Region	2009	2010	2011	2012	2013
Bering Sea Pollock	453.1	510.1	675.8	699.4	636.0
AK Peninsula/Aleutians	20.6	20.5	44.2	61.1	35.9
Kodiak	90.0	128.5	161.7	168.5	157.2
South Central	31.7	36.2	58.3	48.5	34.3
Southeastern	33.1	41.5	51.2	51.0	35.8
All Regions	628.5	736.9	991.1	1,028.6	899.2

Table 35: Groundfish gross product value as a percentage of all-species gross product value by shoreside processor group, 2009-2013, (percent).

Region	2009	2010	2011	2012	2013
Bering Sea Pollock	69.4	72.8	72.8	75.7	74.3
AK Peninsula/Aleutians	5.7	4.5	8.8	11.8	6.9
Kodiak	34.5	42.9	46.4	46.0	41.6
South Central	12.2	7.2	13.8	10.2	5.4
Southeastern	8.8	8.8	8.3	9.8	5.7
All Regions	32.9	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: ADFG Commercial Operators Annual Report, ADFG intent to process (housed at 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 $19 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	-	7	7	1	23	24	1	23	24
	All Gear	1	7	8	2	25	27	3	25	28

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel was below the $19 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: Commercial Operators Annual Report (COAR), ADFG intent-to-operate listings, CFEC fish tickets, at-sea production reports, NMFS permits. (housed at 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 $19 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	1,079	10	1,089	315	32	347	1,329	34	1,363
	Pot	120	-	120	58	2	60	160	2	162
	Trawl	69	7	76	101	11	112	141	12	153
	All Gear	1,198	17	1,215	462	45	507	1,549	48	1,597

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel was below the $19 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: Commercial Operators Annual Report (COAR), ADFG intent-to-operate listings, CFEC fish tickets, at-sea production reports, NMFS permits (housed at 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 $19 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	1,073	2	1,075	314	3	317	1,323	5	1,328
	Pot	116	-	116	32	1	33	132	1	133
	Trawl	32	1	33	18	-	18	41	1	42
	All Gear	1,153	3	1,156	353	4	357	1,418	7	1,425

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $19 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 $19 million confers large entity status on all member vessels. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, at-sea production reports, NMFS permits, ADFG intent-to-operate listings (housed at 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 $19 million ex-vessel value or product value of groundfish and other species, by area, vessel type, and gear, 2013, ($ 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	-	23.23	*	40.56	*	40.56

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: Commercial operators annual report (COAR), ADFG intent-to-operate listings, at-sea production reports, NMFS permits, (housed at 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 $19 million ex-vessel value or product value of groundfish and other species, by area, vessel type and gear, 2013, ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
	Hook & Line	0.36	6.98	0.29	6.84	0.31	6.56
2013	Pot	0.83	-	2.06	*	1.19	*
	Trawl	1.64	14.36	2.91	16.06	2.48	15.10

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: Commercial operators annual report (COAR), ADFG intent-to-operate listings, at-sea production reports, NMFS permits, (housed at 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 $19 million ex-vessel value or product value of groundfish and other species, by area, vessel type and gear, 2013, ($ 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	0.38	*	0.32	*	0.32	*
	Pot	0.96	-	1.25	*	0.99	*
	Trawl	2.80	*	3.56	-	2.66	*

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $19 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 $19 million confers large entity status on all member vessels. "*" indicates a confidential value; "-" indicates no applicable data or value.

Source: Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, at-sea production reports, NMFS permits, ADFG intent-to-operate listings (housed at 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, 2006-2013.

		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	2006	656	26,649	97	15,061	694	32,736
	2007	626	23,974	85	13,562	655	30,125
	2008	668	23,807	107	14,630	711	31,114
	2009	656	24,058	100	14,813	697	31,245
	2010	675	24,016	96	13,555	705	29,918
	2011	756	24,984	101	12,422	793	30,478
	2012	753	22,752	91	12,405	796	30,358
	2013	566	18,920	97	12,014	622	26,698
Pot	2006	147	9,014	75	9,015	200	15,700
	2007	138	8,303	73	8,435	187	14,898
	2008	149	8,650	72	8,326	194	14,590
	2009	126	7,078	55	6,397	165	12,151
	2010	116	6,777	54	6,715	152	11,744
	2011	146	7,919	58	7,060	186	13,219
	2012	146	7,763	57	6,852	185	13,113
	2013	128	7,080	62	7,062	167	12,317
Trawl	2006	93	13,807	144	52,031	191	55,730
	2007	88	12,285	152	52,928	190	55,901
	2008	88	13,353	149	52,795	192	56,221
	2009	90	14,061	146	47,839	186	51,167
	2010	85	13,728	138	48,952	178	52,329
	2011	85	13,691	141	49,821	177	52,794
	2012	87	13,940	146	50,589	182	53,680
	2013	83	12,212	136	49,468	177	52,812
All Gear	2006	839	45,870	303	74,786	1,013	99,044
	2007	808	41,476	304	74,499	984	97,515
	2008	857	42,660	314	74,620	1,036	97,683
	2009	820	42,072	290	68,090	984	90,345
	2010	826	41,360	280	68,342	980	90,196
	2011	919	42,735	291	68,349	1,075	91,537
	2012	924	40,761	282	68,575	1,089	92,200
	2013	732	35,083	290	68,178	916	88,317

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 estimates, Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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, 2009-2013.

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessels	Catcher Proces-sors	Total	Catcher Vessels	Catcher Proces-sors	Total	Catcher Vessels	Catcher Proces-sors	Total
Hook & Line	Sablefish	2009	290	13	303	22	10	32	301	18	319
		2010	300	9	309	19	10	29	308	14	322
		2011	295	9	304	24	9	33	309	13	322
		2012	292	7	299	25	5	30	306	10	316
		2013	269	7	276	18	6	24	278	11	289
	Pacific Cod	2009	229	17	246	19	38	57	240	39	279
		2010	231	19	250	16	36	52	237	39	276
		2011	324	15	339	20	31	51	332	35	367
		2012	320	9	329	13	32	45	327	35	362
		2013	181	5	186	18	29	47	196	30	226
	Flatfish	2009	-	-	-	-	9	9	-	9	9
		2010	-	-	-	-	12	12	-	12	12
		2011	-	-	-	-	8	8	-	8	8
		2012	-	-	-	-	7	7	-	7	7
		2013	-	-	-	-	4	4	-	4	4
	Rockfish	2009	142	-	142	-	2	2	142	2	144
		2010	144	-	144	-	3	3	144	3	147
		2011	149	-	149	1	-	1	149	-	149
		2012	173	-	173	-	2	2	173	2	175
		2013	140	-	140	1	3	4	141	3	144
	All Groundfish	2009	586	22	608	37	40	77	600	42	642
		2010	608	22	630	33	39	72	614	40	654
		2011	693	19	712	43	35	78	706	37	743
		2012	706	15	721	34	34	68	721	38	759
		2013	506	10	516	33	33	66	524	35	559

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Table 41: 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	2009	124	2	126	43	4	47	153	5	158
		2010	115	1	116	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
Trawl	Pollock	2009	62	1	63	90	33	123	131	33	164
		2010	63	-	63	90	30	120	134	30	164
		2011	62	3	65	87	30	117	130	30	160
		2012	67	1	68	91	32	123	136	32	168
		2013	64	3	67	88	32	120	133	33	166
	Sablefish	2009	16	1	17	-	1	1	16	2	18
		2010	13	1	14	-	-	-	13	1	14
		2011	13	-	13	-	-	-	13	-	13
		2012	12	-	12	-	-	-	12	-	12
		2013	16	-	16	-	2	2	16	2	18
	Pacific Cod	2009	59	4	63	54	16	70	103	17	120
		2010	52	1	53	48	16	64	90	17	107
		2011	52	1	53	50	16	66	86	16	102
		2012	61	3	64	61	18	79	102	18	120
		2013	54	1	55	54	18	72	95	18	113
	Flatfish	2009	33	6	39	1	29	30	34	30	64
		2010	28	6	34	-	29	29	28	30	58
		2011	31	6	37	4	29	33	34	30	64
		2012	32	5	37	4	30	34	36	31	67
		2013	31	5	36	7	27	34	38	28	66

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Table 41: 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
Trawl	Rockfish	2009	27	15	42	2	11	13	29	15	44
		2010	28	15	43	2	15	17	30	19	49
		2011	25	12	37	2	16	18	27	18	45
		2012	30	16	46	2	17	19	32	20	52
		2013	29	13	42	1	16	17	30	19	49
	Atka Mackerel	2009	-	-	-	1	12	13	1	12	13
		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
	All Groundfish	2009	72	18	90	110	36	146	149	37	186
		2010	68	17	85	103	35	138	142	36	178
		2011	68	17	85	105	36	141	140	37	177
		2012	70	17	87	110	36	146	145	37	182
		2013	69	14	83	102	34	136	142	35	177
All Gear	All Groundfish	2009	736	42	778	192	78	270	857	81	938
		2010	749	40	789	182	77	259	859	79	938
		2011	843	37	880	199	73	272	959	76	1,035
		2012	865	33	898	191	73	264	985	78	1,063
		2013	664	24	688	190	70	260	787	73	860

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 Catch Accounting System estimates, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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	570	64	-	46	14	-	587	68	-
		2010	593	60	-	43	14	-	602	63	-
		2011	676	61	-	52	14	-	691	65	-
		2012	685	53	-	44	11	1	700	56	1
		2013	509	47	-	54	10	-	539	48	-
	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	45	73	-	50	79	-	45	74	-
		2010	45	74	-	50	77	-	45	74	-
		2011	44	75	-	49	78	-	44	76	-
		2012	44	74	-	50	78	176	44	74	176
		2013	45	74	-	43	76	-	45	74	-
	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

		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
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	63	-	40	90	-	27	67	-
		2010	25	66	-	40	92	-	26	71	-
		2011	25	68	-	38	84	-	26	71	-
		2012	25	66	-	42	89	172	26	70	172
		2013	26	63	-	31	78	-	27	66	-
	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 Catch Accounting System, ADFG fish tickets, observer data, NMFS permits (housed at 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), 2009-2013(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	2009	19	10	70	72	117	87	66	129	64
		2010	18	11	75	75	114	103	65	132	60
		2011	34	17	95	90	127	109	73	131	61
		2012	26	19	93	93	138	112	74	130	53
		2013	15	7	64	55	109	84	64	111	47
	Bering Sea & Aleutian Islands	2009	1	-	3	3	5	5	7	22	14
		2010	1	-	3	4	3	5	6	21	14
		2011	1	-	5	5	4	7	7	23	14
		2012	-	-	3	6	4	5	6	20	12
		2013	6	9	6	3	1	4	6	19	10
	All Alaska	2009	19	10	72	73	118	90	70	135	68
		2010	18	11	75	76	115	104	66	137	63
		2011	35	17	96	92	127	110	75	139	65
		2012	26	19	94	96	140	112	76	137	57
		2013	21	16	67	56	109	85	65	120	48

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 Catch Accounting System, ADFG fish tickets, observer data, NMFS permits (housed at 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, 2009-2013.

			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	2009	12	5	5	-	-	16	15	9	-	-	18	15	9	-	-
		2010	14	4	4	-	-	17	14	8	-	-	18	14	8	-	-
		2011	12	3	4	-	-	17	12	6	-	-	19	12	6	-	-
		2012	11	2	2	-	-	16	12	7	-	-	20	12	7	-	-
		2013	4	4	2	-	-	15	11	7	-	-	17	11	7	-	-
	Pot	2009	1	1	-	-	-	2	1	1	-	-	2	2	1	-	-
		2010	-	-	1	-	-	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	-	-
	Trawl	2009	5	3	8	1	1	6	4	10	3	13	7	4	10	3	13
		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
Mean vessel length (feet)	Hook & Line	2009	106	147	175	-	-	112	146	179	-	-	109	147	177	-	-
		2010	103	152	177	-	-	108	147	177	-	-	106	148	177	-	-
		2011	99	150	177	-	-	109	147	176	-	-	105	148	176	-	-
		2012	97	144	177	-	-	110	147	176	-	-	105	147	177	-	-
		2013	91	153	177	-	-	114	146	178	-	-	109	148	178	-	-
	Pot	2009	104	165	-	-	-	106	165	166	-	-	105	165	166	-	-
		2010	-	-	166	-	-	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	-	-

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Table 44: Continued

		Year	Gulf of Alaska <125	Gulf of Alaska 125-165	Gulf of Alaska 166-235	Gulf of Alaska 236-260	Gulf of Alaska >260	Bering Sea & Aleutian Islands <125	Bering Sea & Aleutian Islands 125-165	Bering Sea & Aleutian Islands 166-235	Bering Sea & Aleutian Islands 236-260	Bering Sea & Aleutian Islands >260	All Alaska <125	All Alaska 125-165	All Alaska 166-235	All Alaska 236-260	All Alaska >260
Mean vessel length (feet)	Trawl	2009	106	144	209	238	295	111	148	204	245	308	109	146	206	243	307
		2010	107	144	204	238	295	112	148	204	245	305	110	146	204	243	305
		2011	107	146	204	238	295	114	148	204	245	305	111	147	204	243	305
		2012	111	150	204	238	295	114	148	204	245	305	112	148	204	243	305
		2013	113	146	201	238	-	118	148	204	245	305	115	147	202	243	305
Mean Registered net tons	Hook & Line	2009	128	266	607	-	-	134	296	574	-	-	132	289	586	-	-
		2010	132	282	629	-	-	133	309	493	-	-	133	303	538	-	-
		2011	118	331	629	-	-	128	321	549	-	-	124	323	581	-	-
		2012	117	346	652	-	-	126	321	504	-	-	122	325	537	-	-
		2013	109	312	652	-	-	133	338	582	-	-	128	331	598	-	-
	Pot	2009	111	135	-	-	-	105	793	192	-	-	107	464	192	-	-
		2010	-	-	192	-	-	159	464	192	-	-	159	464	192	-	-
		2011	-	135	-	-	-	123	464	192	-	-	123	354	192	-	-
		2012	-	135	-	-	-	123	464	192	-	-	123	354	192	-	-
		2013	-	-	-	-	-	-	464	192	-	-	-	464	192	-	-
	Trawl	2009	130	214	641	611	693	138	254	588	985	1,647	134	237	611	892	1,579
		2010	121	214	584	611	693	138	254	584	985	1,711	132	237	584	892	1,643
		2011	124	256	584	611	693	134	254	588	985	1,711	130	254	586	892	1,643
		2012	122	255	584	611	693	134	254	588	985	1,711	129	254	586	892	1,643
		2013	118	256	584	611	-	133	254	588	985	1,711	126	254	586	892	1,711

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 Catch Accounting System, NMFS permits (housed at 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, 2006-2013.

		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	2006	222	201	233	16	24	57	238	222	259
	2007	210	166	250	20	15	50	228	179	275
	2008	217	209	242	21	26	60	238	232	271
	2009	192	213	251	19	21	60	210	231	279
	2010	200	201	274	12	30	54	212	227	299
	2011	227	249	280	17	32	52	244	275	311
	2012	212	229	312	22	23	46	232	250	344
	2013	172	152	242	32	17	48	204	168	279
Pot	2006	24	17	106	3	14	58	27	31	145
	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	7	101	-	5	49	8	12	133
	2011	31	12	103	1	1	56	32	13	144
	2012	17	20	109	-	-	57	17	20	150
	2013	7	18	103	2	3	57	9	21	140
Trawl	2006	-	2	91	-	1	143	-	3	190
	2007	1	1	86	-	1	151	1	2	189
	2008	1	1	86	-	3	146	1	4	191
	2009	2	2	86	-	1	145	2	3	183
	2010	1	-	84	1	-	137	2	-	176
	2011	-	5	80	-	1	140	-	6	173
	2012	-	1	86	-	5	141	-	6	182
	2013	-	1	82	-	2	134	-	3	176
All Gear	2006	245	220	410	18	38	253	263	255	567
	2007	220	180	424	23	20	265	240	197	600
	2008	226	234	414	24	30	269	250	261	587
	2009	206	233	402	19	27	249	224	257	557
	2010	208	207	430	13	35	236	221	238	577
	2011	256	263	437	18	34	243	273	291	595
	2012	229	245	479	22	28	239	249	271	642
	2013	178	171	398	34	22	237	212	192	562

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 estimates, Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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,2009-2013.

			Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
		Year	Alaska	Other	Alaska	Other	Alaska	Other
Hook & Line	Pollock	2009	1	-	-	-	1	-
		2010	1	-	-	-	1	-
		2011	5	-	1	-	6	-
		2012	1	-	-	-	1	-
		2013	4	-	-	2	4	2
	Sablefish	2009	216	87	18	14	226	93
		2010	224	85	16	13	230	92
		2011	220	84	19	14	232	90
		2012	215	84	19	11	226	90
		2013	200	76	13	11	206	83
	Pacific Cod	2009	215	31	26	31	227	52
		2010	221	29	21	31	228	48
		2011	302	37	25	26	311	56
		2012	305	24	20	25	317	45
		2013	168	18	23	24	189	37
	Flatfish	2009	-	-	-	9	-	9
		2010	-	-	2	10	2	10
		2011	-	-	2	6	2	6
		2012	-	-	-	7	-	7
		2013	-	-	-	4	-	4
	Rockfish	2009	126	16	-	2	126	18
		2010	127	17	-	3	127	20
		2011	132	17	1	-	132	17
		2012	154	19	-	2	154	21
		2013	126	14	1	3	127	17
	All Groundfish	2009	526	130	53	47	546	151
		2010	547	128	50	46	555	150
		2011	620	136	60	41	636	157
		2012	628	125	50	41	649	147
		2013	460	106	57	40	493	129
Pot	Pacific Cod	2009	108	18	18	29	115	43
		2010	96	20	21	29	105	43
		2011	124	21	19	33	132	47
		2012	123	22	21	33	132	49
		2013	108	20	22	37	116	48
Trawl	Pollock	2009	27	36	14	109	34	130
		2010	30	33	14	106	38	126
		2011	26	39	9	108	30	130
		2012	27	41	8	115	30	138
		2013	26	41	9	111	30	136

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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	2009	8	9	1	-	9	9
		2010	5	9	-	-	5	9
		2011	6	7	-	-	6	7
		2012	5	7	-	-	5	7
		2013	5	11	-	2	5	13
	Pacific Cod	2009	30	33	8	62	36	84
		2010	25	28	5	59	28	79
		2011	19	34	8	58	21	81
		2012	26	38	9	70	28	92
		2013	26	29	6	66	27	86
	Flatfish	2009	17	22	7	23	23	41
		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
	Rockfish	2009	18	24	2	11	18	26
		2010	19	24	3	14	20	29
		2011	12	25	1	17	13	32
		2012	14	32	-	19	14	38
		2013	14	28	1	16	15	34
	Atka Mackerel	2009	-	-	1	12	1	12
		2010	-	1	-	9	-	10
		2011	-	1	-	14	-	14
		2012	-	-	-	14	-	14
		2013	-	2	-	13	-	14
	All Groundfish	2009	37	53	16	130	41	145
		2010	36	49	15	123	40	138
		2011	27	58	11	130	31	146
		2012	28	59	11	135	32	150
		2013	29	54	10	126	33	144
All Gear	All Groundfish	2009	631	189	86	204	659	325
		2010	642	184	85	195	664	316
		2011	717	202	88	203	741	334
		2012	731	193	77	205	760	329
		2013	564	168	90	200	609	307

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 Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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, 2009-2013.

Area	Vessel type	Gear	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	Catcher Vessels	Hook & Line	2009	103	78	100	233	328	186	148	166	194	145	44	12	634
Gulf of Alaska	Catcher Vessels	Hook & Line	2010	87	96	156	252	332	188	167	169	207	109	38	16	653
Gulf of Alaska	Catcher Vessels	Hook & Line	2011	90	104	204	351	237	193	149	137	211	168	42	61	737
Gulf of Alaska	Catcher Vessels	Hook & Line	2012	89	129	254	350	358	228	148	168	214	163	72	41	738
Gulf of Alaska	Catcher Vessels	Hook & Line	2013	61	91	175	266	256	223	118	143	128	132	75	40	556
Gulf of Alaska	Catcher Vessels	Pot	2009	71	79	70	56	1	-	-	-	21	27	12	3	124
Gulf of Alaska	Catcher Vessels	Pot	2010	69	93	61	23	2	1	-	-	45	27	2	2	115
Gulf of Alaska	Catcher Vessels	Pot	2011	72	109	81	-	1	-	-	1	56	53	4	25	145
Gulf of Alaska	Catcher Vessels	Pot	2012	64	91	132	1	1	-	-	-	42	41	27	19	145
Gulf of Alaska	Catcher Vessels	Pot	2013	75	73	102	23	-	-	-	-	14	16	13	12	128
Gulf of Alaska	Catcher Vessels	Trawl	2009	46	50	49	22	20	19	13	35	45	50	15	6	72
Gulf of Alaska	Catcher Vessels	Trawl	2010	52	59	48	38	27	18	15	37	53	50	14	3	68
Gulf of Alaska	Catcher Vessels	Trawl	2011	39	44	51	33	19	15	8	22	50	54	9	1	68
Gulf of Alaska	Catcher Vessels	Trawl	2012	33	58	54	35	20	17	13	23	59	57	23	6	70
Gulf of Alaska	Catcher Vessels	Trawl	2013	39	52	58	19	22	17	8	40	42	48	19	2	69
Gulf of Alaska	Catcher Vessels	All Gear	2009	218	204	209	307	349	205	161	201	258	214	71	21	778
Gulf of Alaska	Catcher Vessels	All Gear	2010	206	239	256	312	361	207	182	205	297	180	54	21	786
Gulf of Alaska	Catcher Vessels	All Gear	2011	199	254	320	382	257	208	157	159	315	273	55	87	882
Gulf of Alaska	Catcher Vessels	All Gear	2012	186	271	416	384	379	245	161	190	315	258	120	66	891
Gulf of Alaska	Catcher Vessels	All Gear	2013	173	212	324	306	278	240	126	183	184	195	107	54	708
Gulf of Alaska	Catcher Processors	Hook & Line	2009	2	14	4	8	10	1	3	4	2	5	4	-	22
Gulf of Alaska	Catcher Processors	Hook & Line	2010	3	17	5	3	5	3	2	3	11	6	-	-	22
Gulf of Alaska	Catcher Processors	Hook & Line	2011	10	8	2	5	4	2	2	2	6	5	2	3	19
Gulf of Alaska	Catcher Processors	Hook & Line	2012	7	4	4	7	5	3	2	1	2	4	2	1	15
Gulf of Alaska	Catcher Processors	Hook & Line	2013	1	2	4	4	4	6	4	2	1	-	2	1	10
Gulf of Alaska	Catcher Processors	Pot	2009	-	2	-	-	-	-	-	-	-	-	-	-	2
Gulf of Alaska	Catcher Processors	Pot	2010	-	-	-	-	-	-	-	-	-	1	-	-	1
Gulf of Alaska	Catcher Processors	Pot	2011	1	1	-	-	-	-	-	-	-	-	-	-	1
Gulf of Alaska	Catcher Processors	Pot	2012	1	-	-	-	-	-	-	-	-	-	-	-	1
Gulf of Alaska	Catcher Processors	Trawl	2009	-	2	1	5	2	-	17	4	3	3	1	1	18
Gulf of Alaska	Catcher Processors	Trawl	2010	-	1	4	5	2	-	16	1	1	2	2	2	17
Gulf of Alaska	Catcher Processors	Trawl	2011	-	1	3	6	1	4	14	3	2	3	2	-	17
Gulf of Alaska	Catcher Processors	Trawl	2012	2	1	-	5	1	1	17	6	1	2	1	1	17
Gulf of Alaska	Catcher Processors	Trawl	2013	-	1	3	3	2	4	13	3	1	2	4	2	14
Gulf of Alaska	Catcher Processors	All Gear	2009	2	18	5	13	12	1	20	8	5	8	5	1	42
Gulf of Alaska	Catcher Processors	All Gear	2010	3	18	9	8	7	3	18	4	12	9	2	2	40
Gulf of Alaska	Catcher Processors	All Gear	2011	11	10	5	11	5	6	16	5	8	8	4	3	37
Gulf of Alaska	Catcher Processors	All Gear	2012	10	5	4	12	6	4	19	7	3	6	3	2	33
Gulf of Alaska	Catcher Processors	All Gear	2013	1	3	7	7	6	10	17	5	2	2	6	3	24

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Table 47: Continued

Region	Sector	Gear	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Bering Sea & Aleutian Islands	Catcher Vessels	Hook & Line	2009	7	8	9	7	10	22	22	32	24	17	8	2	60
			2010	2	4	2	5	17	26	25	29	27	15	12	-	57
			2011	4	5	5	7	29	31	36	35	25	23	8	-	66
			2012	3	4	4	4	18	28	27	29	24	10	5	-	56
			2013	5	3	6	7	12	30	28	20	19	14	7	-	64
		Pot	2009	28	25	16	7	12	8	6	4	6	11	6	5	51
			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
		Trawl	2009	65	96	103	54	-	68	71	68	34	10	1	-	110
			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
		All Gear	2009	100	129	128	68	22	97	99	104	64	38	15	7	212
			2010	77	102	116	75	22	89	95	97	71	49	24	-	203
			2011	92	111	112	94	37	106	110	109	112	107	22	-	218
			2012	107	110	114	69	25	104	104	106	106	58	26	8	209
			2013	124	117	110	80	18	104	104	91	71	46	19	21	220
	Catcher Processors	Hook & Line	2009	37	37	14	9	5	8	15	35	36	35	34	32	40
			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	23	30	30	31	28	28	29	35
			2013	26	26	25	18	13	13	21	28	27	29	28	26	33
		Pot	2009	3	2	1	1	2	2	-	-	3	3	3	3	4
			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
		Trawl	2009	31	34	34	26	15	18	29	32	29	22	8	-	36
			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	34	28	30	33	20	14	4	36
			2013	28	31	32	25	19	33	28	32	31	24	13	6	34
		All Gear	2009	71	73	49	36	21	28	44	67	68	60	45	35	78
			2010	66	71	47	32	30	36	43	56	56	51	40	23	77
			2011	55	62	63	57	37	47	55	58	65	65	54	31	73
			2012	57	62	63	45	35	57	59	61	67	51	45	33	73
			2013	57	59	57	43	32	46	49	60	61	56	44	34	70

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Table 47: Continued

Region	Sector	Gear	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
All Alaska	Catcher Vessels	Hook & Line	2009	110	84	108	238	337	205	166	189	211	158	51	14	655
			2010	89	98	158	256	343	211	184	191	225	122	50	16	665
			2011	92	107	208	358	261	219	178	166	229	184	50	61	756
			2012	91	133	258	354	371	248	170	191	231	172	77	41	757
			2013	66	94	181	273	265	248	141	159	141	143	81	40	587
		Pot	2009	96	100	80	63	13	8	6	4	27	38	18	8	160
			2010	95	99	73	28	7	5	3	2	56	43	14	2	146
			2011	101	117	92	6	10	6	3	5	84	85	7	25	181
			2012	99	105	140	10	6	5	3	1	63	58	31	27	180
			2013	112	89	112	35	3	3	2	2	23	31	22	33	164
		Trawl	2009	111	145	140	75	20	80	84	102	77	60	16	6	149
			2010	99	135	134	97	27	72	79	99	86	64	14	3	142
			2011	92	124	134	110	20	77	78	90	106	105	20	1	140
			2012	99	140	138	87	22	83	86	98	114	85	39	6	145
			2013	117	136	136	77	25	82	80	97	81	61	23	2	142
		All Gear	2009	315	326	318	372	368	292	256	295	313	248	85	28	903
			2010	281	323	356	380	377	288	266	291	359	223	78	21	901
			2011	283	345	418	472	289	302	258	260	417	372	77	87	999
			2012	289	371	512	449	398	336	259	289	408	311	145	74	1,011
			2013	293	315	418	383	293	333	223	258	244	234	125	75	843
	Catcher Processors	Hook & Line	2009	38	38	16	14	12	9	18	37	38	37	36	32	42
			2010	38	38	17	8	12	10	16	27	32	31	26	20	40
			2011	29	31	30	26	17	17	25	28	34	33	28	25	37
			2012	27	29	31	29	18	25	31	31	33	31	30	30	39
			2013	27	27	28	20	16	19	23	29	28	29	29	27	35
		Pot	2009	3	4	1	1	2	2	-	-	3	3	3	3	5
			2010	2	3	2	3	3	3	-	2	4	3	2	1	6
			2011	5	2	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
		Trawl	2009	31	35	35	29	17	18	34	34	30	24	9	1	37
			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	35	34	33	33	21	15	5	37
			2013	28	32	33	27	20	34	30	33	32	25	14	7	35
		All Gear	2009	72	76	52	44	30	29	52	71	71	64	48	36	81
			2010	68	74	52	36	35	37	47	59	62	55	41	25	79
			2011	61	67	65	62	40	50	60	61	70	68	56	32	76
			2012	61	64	65	50	40	60	66	65	69	55	48	35	78
			2013	58	61	61	47	36	53	53	62	63	57	46	36	73

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 Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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, 2009-2013.

			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	2009	917	241	-	77	23	-	994	264	-
		2010	1,026	270	-	94	26	-	1,119	296	-
		2011	1,033	262	-	101	18	-	1,134	280	-
		2012	1,284	314	-	118	15	-	1,402	329	-
		2013	1,276	339	-	91	14	-	1,366	353	-
	Pacific Cod	2009	1,546	58	-	89	-	-	1,635	58	-
		2010	1,476	42	-	78	0	-	1,554	42	-
		2011	1,719	70	-	129	1	-	1,848	71	-
		2012	2,292	55	-	74	-	-	2,366	55	-
		2013	1,206	18	-	72	-	-	1,278	18	-
	Rockfish	2009	357	6	-	-	-	-	357	6	-
		2010	452	5	-	-	-	-	452	5	-
		2011	472	1	-	1	-	-	473	1	-
		2012	563	3	-	-	-	-	563	3	-
		2013	504	2	-	0	-	-	504	2	-
	All Groundfish	2009	2,839	305	-	166	23	-	3,006	328	-
		2010	2,972	318	-	172	26	-	3,144	344	-
		2011	3,232	333	-	231	19	-	3,463	352	-
		2012	4,143	372	-	192	15	-	4,335	387	-
		2013	2,999	359	-	163	14	-	3,162	373	-
Pot	Pacific Cod	2009	763	162	-	121	78	25	885	240	25
		2010	736	165	2	108	138	34	844	303	36
		2011	878	200	-	131	184	33	1,009	384	33
		2012	862	280	-	196	118	34	1,058	398	34
		2013	711	201	-	221	126	29	932	327	29

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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	Pollock	2009	98	162	-	-	845	495	98	1,007	495
		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	383	-	-	903	608	87	1,286	608
	Sablefish	2009	13	14	-	-	-	-	13	14	-
		2010	12	9	-	-	-	-	12	9	-
		2011	-	13	-	-	-	-	-	13	-
		2012	-	10	-	-	-	-	-	10	-
		2013	-	21	-	-	-	-	-	21	-
	Pacific Cod	2009	106	83	-	28	244	25	134	327	25
		2010	39	162	-	18	205	28	57	367	28
		2011	30	123	-	1	264	38	31	387	38
		2012	87	145	-	18	285	48	105	430	48
		2013	116	88	-	8	263	39	124	351	39
	Flatfish	2009	17	363	-	-	-	4	17	363	4
		2010	17	203	-	-	-	-	17	203	-
		2011	2	199	-	-	0	15	2	200	15
		2012	5	141	-	-	1	28	5	142	28
		2013	8	170	-	-	0	47	8	171	47
	Rockfish	2009	4	86	-	-	-	9	4	86	9
		2010	4	102	-	-	-	5	4	102	5
		2011	-	91	-	-	-	6	-	91	6
		2012	10	120	-	-	-	6	10	120	6
		2013	7	99	-	-	-	8	7	99	8

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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	2009	-	-	-	-	-	15	-	-	15
		2010	-	-	-	-	1	13	-	1	13
		2011	-	-	-	-	3	15	-	3	15
		2012	-	-	-	-	-	22	-	-	22
		2013	-	-	-	-	-	7	-	-	7
	All Groundfish	2009	238	711	-	28	1,089	548	266	1,800	548
		2010	276	809	-	19	962	529	295	1,771	529
		2011	207	733	-	1	1,325	728	208	2,058	728
		2012	300	814	-	18	1,232	747	318	2,046	747
		2013	218	762	-	8	1,166	710	226	1,928	710
All Gear	All Groundfish	2009	3,840	1,178	-	339	1,287	592	4,179	2,465	592
		2010	3,988	1,291	2	299	1,192	588	4,287	2,483	590
		2011	4,321	1,266	-	363	1,615	779	4,684	2,881	779
		2012	5,306	1,467	-	406	1,402	792	5,712	2,869	792
		2013	3,928	1,321	-	392	1,342	759	4,320	2,663	759

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 Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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, 2009-2013.

			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	2009	6	28	23	-	-	49	16	-	6	77	39	-
		2010	6	14	18	-	-	45	14	-	6	59	32	-
		2011	6	14	18	-	2	70	6	-	8	84	24	-
		2012	8	15	10	-	-	79	3	-	8	93	13	-
		2013	12	11	17	-	-	88	-	-	12	99	17	-
	Pacific Cod	2009	2	54	12	-	7	310	541	-	9	364	553	-
		2010	16	54	22	-	12	249	475	-	28	303	496	-
		2011	16	68	18	-	-	325	623	-	16	393	642	-
		2012	12	48	6	-	10	394	658	-	22	442	663	-
		2013	-	28	8	-	-	315	644	-	-	344	652	-
	Flatfish	2009	-	-	-	-	-	23	28	-	-	23	28	-
		2010	-	-	-	-	3	31	45	-	3	31	45	-
		2011	-	-	-	-	2	33	16	-	2	33	16	-
		2012	-	-	-	-	-	44	8	-	-	44	8	-
		2013	-	-	-	-	-	16	0	-	-	16	0	-
	Rockfish	2009	-	-	-	-	-	-	0	-	-	-	0	-
		2010	-	-	-	-	-	-	0	-	-	-	0	-
		2012	-	-	-	-	-	1	-	-	-	1	-	-
		2013	-	-	-	-	-	2	-	-	-	2	-	-
	All Groundfish	2009	8	82	35	-	7	382	587	-	15	464	622	-
		2010	22	67	40	-	15	326	533	-	37	393	573	-
		2011	22	82	36	-	4	428	646	-	26	510	682	-
		2012	20	63	16	-	10	518	669	-	30	581	685	-
		2013	12	39	25	-	-	422	644	-	12	461	669	-

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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	2009	-	4	2	-	-	32	37	-	-	36	39	-
		2010	-	-	0	-	-	66	25	-	-	66	25	-
		2011	-	-	3	-	-	15	30	-	-	15	33	-
		2012	-	-	0	-	-	23	38	-	-	23	38	-
		2013	-	-	-	-	-	-	54	-	-	-	54	-
Trawl	Pollock	2009	-	0	-	-	-	4	16	242	-	4	16	242
		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	-	0	0	-	-	3	15	311	-	3	15	311
	Sablefish	2009	-	-	0	-	-	-	0	-	-	-	0	-
		2010	-	-	0	-	-	-	-	-	-	-	0	-
		2013	-	-	-	-	-	0	0	-	-	0	0	-
	Pacific Cod	2009	-	6	0	-	-	6	9	6	-	12	9	6
		2010	-	0	-	-	-	5	7	8	-	5	7	8
		2011	-	-	1	-	-	3	4	1	-	3	5	1
		2012	-	4	0	-	-	6	3	5	-	10	3	5
		2013	-	-	0	-	-	4	11	5	-	4	11	5
	Flatfish	2009	-	57	9	-	-	159	333	49	-	216	342	49
		2010	-	49	9	-	-	148	357	51	-	198	366	51
		2011	-	50	17	-	-	144	407	52	-	194	423	52
		2012	-	39	10	-	-	125	404	69	-	164	414	69
		2013	-	49	12	-	-	105	400	84	-	154	411	84

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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
Trawl	Rockfish	2009	-	9	28	2	-	1	11	8	-	11	38	10
		2010	-	3	33	3	-	0	18	7	-	3	51	10
		2011	-	-	29	2	-	5	24	12	-	5	53	14
		2012	-	3	27	1	-	5	24	10	-	8	51	12
		2013	-	3	26	1	-	0	44	15	-	3	70	16
	Atka Mackerel	2009	-	-	-	-	-	1	76	33	-	1	76	33
		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	14	-	0	34	14
	All Groundfish	2009	-	73	37	2	-	171	445	339	-	244	482	341
		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	499	422	-	186	535	423
		2013	-	52	39	1	-	113	502	428	-	165	541	429
All Gear	All Groundfish	2009	8	158	74	2	7	586	1,069	339	15	744	1,143	341
		2010	22	120	83	3	15	549	1,025	335	37	669	1,108	338
		2011	22	131	86	2	4	603	1,187	504	26	734	1,273	506
		2012	20	110	53	1	10	695	1,205	422	30	805	1,258	423
		2013	12	92	64	1	-	534	1,200	428	12	626	1,264	429

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 Catch Accounting System, fish tickets, observer data, federal permit file, CFEC vessel data (housed at 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, 2009-2013.

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	2009	*	700	138	610	405	*	1,571	311	132	440	180	*	4,487
	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
Bering Sea & Aleutian Islands	2009	7,984	12,017	10,223	4,557	2,686	4,492	9,260	12,868	9,753	6,971	3,110	1,081	85,002
	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
All Alaska	2009	7,984	12,717	10,361	5,167	3,091	4,492	10,831	13,179	9,885	7,411	3,290	1,081	89,489
	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

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: Weekly Processor Reports (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table H51A: Commercial halibut catch (net landed weight) by FMP area, 2009-2013, (100s of metric tons).

Year	Gulf of Alaska	Bering Sea & Aleutian Islands	All Alaska
2009	175.00	30.48	205.48
2010	167.50	31.03	198.53
2011	116.48	32.52	149.00
2012	93.03	23.69	116.72
2013	86.33	17.52	103.84

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

Table H51B: Commercial halibut catch (net landed weight) by IPHC area, 2009-2013, (100s of metric tons).

Area	2009	2010	2011	2012	2013
2C	22.83	20.85	11.12	12.31	13.78
3A	98.27	96.35	67.95	55.40	51.64
3B	50.89	47.16	34.31	23.31	19.02
4A	11.29	10.33	10.39	7.02	5.47
4B	6.88	8.10	9.18	7.75	5.54
4CDE	15.32	15.75	16.04	10.94	8.39

Notes: 4CDE refers to Areas 4C, 4D and 4E.

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

Table H52: Commercial halibut catch (net landed weight) by vessel length and FMP, 2009-2013, (100s of metric tons).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Length	Net tons	Percent	Net tons	Percent	Net tons	Percent
2009	<20	0.14	0	0.29	0.01	0.42	0
	20-29	2.85	0.02	2.49	0.08	5.35	0.03
	30-39	22.28	0.13	3.07	0.10	25.35	0.12
	40-49	64.01	0.37	5.50	0.18	69.51	0.34
	50-59	52.73	0.30	10.82	0.35	63.54	0.31
	>=60	32.86	0.19	8.32	0.27	41.18	0.20
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	61.85	0.37	6.13	0.20	67.97	0.34
	50-59	51.21	0.31	9.43	0.30	60.64	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	40.73	0.35	6.04	0.19	46.77	0.31
	50-59	36.30	0.31	9.89	0.30	46.19	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	34.06	0.37	4.85	0.20	38.90	0.33
	50-59	28.10	0.30	7.85	0.33	35.96	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	31.30	0.36	2.83	0.16	34.14	0.33
	50-59	25.67	0.30	5.74	0.33	31.41	0.30
	>=60	14.44	0.17	4.26	0.24	18.70	0.18

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

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

Table H53: Non-halibut prohibited species catch on halibut target trips by PSC species and area, 2013

	Year	Other King Crab (Count)
Gulf of Alaska	2013	*
Bering Sea & Aleutian Islands	2013	764
All Alaska	2013	764

Source: AKRO PSC.

Table H54A: Halibut ex-vessel price and value by FMP area, 2009-2013, ($/lb net weight and millions, respectively).

	Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
Year	Value	Price	Value	Price	Value	Price
2009	118.76	3.078	17.44	2.596	136.20	3.007
2010	173.53	4.699	29.33	4.287	202.86	4.635
2011	162.89	6.343	43.60	6.082	206.49	6.286
2012	117.32	5.720	26.80	5.132	144.12	5.601
2013	95.40	5.013	16.66	4.315	112.06	4.895

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

Table H54B: Halibut ex-vessel price and value by IPHC area, 2009-2013, ($/lb net weight and millions, respectively).

		2009	2010	2011	2012	2013
2C	Value	15.520	21.680	15.710	16.240	15.410
	Price	3.084	4.717	6.404	5.983	5.072
3A	Value	67.500	100.320	94.800	70.080	57.970
	Price	3.116	4.723	6.328	5.738	5.092
3B	Value	33.940	48.370	47.970	28.620	20.200
	Price	3.025	4.652	6.341	5.569	4.817
4A	Value	6.730	10.380	14.810	8.230	5.320
	Price	2.705	4.561	6.470	5.321	4.408
4B	Value	4.070	7.570	12.230	8.600	5.140
	Price	2.681	4.238	6.038	5.035	4.208
4CDE	Value	8.450	14.540	20.970	12.350	8.020
	Price	2.501	4.187	5.932	5.122	4.339

Source:

Table 55: Halibut ex-vessel value and average value per vessel by FMP area and vessel length, 2009-2013, (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
2009	<20	0.09	3.50	0.17	3.10	0.27	3.24
	20-29	1.96	15.53	1.22	8.57	3.17	11.89
	30-39	15.01	44.67	1.59	37.03	16.60	44.99
	40-49	43.32	120.33	3.25	147.90	46.57	126.90
	50-59	35.94	247.85	6.23	222.43	42.17	283.00
	>=60	22.35	338.70	4.98	177.93	27.34	379.67
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	63.94	176.64	5.97	238.78	69.91	189.47
	50-59	53.11	366.27	9.08	378.18	62.19	417.36
	>=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	56.65	161.39	8.49	326.71	65.14	183.50
	50-59	51.14	355.14	13.55	501.77	64.69	431.26
	>=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	43.10	124.92	5.58	223.05	48.67	138.67
	50-59	35.49	248.18	8.98	332.56	44.47	298.44
	>=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	53.00	2.10	53.87	16.20	54.73
	40-49	34.55	109.32	2.63	146.19	37.18	115.46
	50-59	28.57	213.22	5.45	201.95	34.02	243.03
	>=60	16.08	334.97	4.18	199.28	20.26	382.33

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

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

Table 56: Halibut ex-vessel value, price per net lb and percent of statewide ex-vessel value and yearly port rank for top 10 Alaska ports by value, 2009-2013, (millions $ and $/lb).

	Port	2009	2010	2011	2012	2013
Rank	Homer	1	1	1	2	1
	Kodiak	2	2	2	1	2
	Seward	3	3	3	3	3
	Dutch Harbor	4	4	4	4	5
	Sitka	6	5	7	5	6
	Juneau	5	6	9	8	4
	St Paul Island	12	7	5	7	9
	Petersburg	7	9	10	6	7
	Sand Point	11	8	6	9	14
	Yakutat	8	10	12	10	8
Value	Homer	41.78	54.78	37.76	26.93	24.24
	Kodiak	22.48	30.63	36.24	27.59	16.60
	Seward	14.64	23.52	23.20	15.77	14.79
	Dutch Harbor	7.95	*	*	10.94	*
	Sitka	6.77	9.43	8.54	*	6.02
	Juneau	7.36	8.83	7.16	5.90	6.86
	St Paul Island	*	*	*	*	*
	Petersburg	5.06	7.61	6.19	6.36	5.56
	Sand Point	*	*	*	*	*
	Yakutat	*	*	*	*	*
Price	Homer	3.14	4.65	6.02	5.50	4.95
	Kodiak	3.05	4.84	6.49	5.64	4.88
	Seward	3.06	4.65	6.27	5.83	5.07
	Dutch Harbor	2.65	*	*	5.25	*
	Sitka	3.12	4.79	6.61	*	5.06
	Juneau	3.06	4.57	6.06	5.69	5.44
	St Paul Island	*	*	*	*	*
	Petersburg	3.08	4.73	6.46	6.07	5.18
	Sand Point	*	*	*	*	*
	Yakutat	*	*	*	*	*
Percent	Homer	0.31	0.27	0.18	0.19	0.22
	Kodiak	0.17	0.15	0.18	0.19	0.15
	Seward	0.11	0.12	0.11	0.11	0.13
	Dutch Harbor	0.06	*	*	0.08	*
	Sitka	0.05	0.05	0.04	*	0.05
	Juneau	0.05	0.04	0.03	0.04	0.06
	St Paul Island	*	*	*	*	*
	Petersburg	0.04	0.04	0.03	0.04	0.05
	Sand Point	*	*	*	*	*
	Yakutat	*	*	*	*	*

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

Table 57: Halibut first wholesale production volume, value and price by product, 2009-2013, (1000s of metric tons, millions $ and $/lb, respectively).

	Year	Quantity	Value	Price
Head and Gut	2009	14.86	136.46	4.17
	2010	12.21	158.17	5.88
	2011	7.71	127.39	7.49
	2012	6.70	105.24	7.12
	2013	6.53	90.94	6.31
Fillet	2009	2.44	38.95	7.24
	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
Other Products	2009	1.54	5.61	1.65
	2010	0.65	1.77	1.24
	2011	0.67	1.76	1.19
	2012	1.85	4.22	1.03
	2013	0.75	2.20	1.33
All Products	2009	18.84	181.02	4.36
	2010	15.97	234.17	6.65
	2011	10.99	194.48	8.03
	2012	10.49	162.65	7.03
	2013	8.94	128.92	6.54

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

Table 58: Halibut first wholesale value of shoreside processors and percentage share of statewide wholseale value by region, 2009-2013, (millions $).

	Year	Value	Percent
AK Peninsula/ Aleutians	2009	31.26	0.17
	2010	55.79	0.24
	2011	60.63	0.31
	2012	41.28	0.25
	2013	16.63	0.13
Kodiak	2009	30.85	0.17
	2010	42.19	0.18
	2011	44.50	0.23
	2012	33.75	0.21
	2013	22.94	0.18
Southcentral	2009	74.54	0.41
	2010	82.80	0.35
	2011	43.38	0.22
	2012	48.82	0.30
	2013	51.27	0.40
Southeast	2009	40.95	0.23
	2010	50.33	0.22
	2011	42.46	0.22
	2012	36.25	0.22
	2013	36.25	0.28
Southwest/ Other AK	2009	3.07	0.02
	2010	2.52	0.01
	2011	1.95	0.01
	2012	2.49	0.02
	2013	1.63	0.01

Notes: Includes halibut processed by shoreside processors only.

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

Table 59: Number of vessels and median length for vessels catching halibut, by FMP area and vessel length class, 2009-2013.

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Vessels	Median Length	Vessels	Median Length	Vessels	Median Length
<20	2009	27	18	55	18	82	18
	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
20-29	2009	126	26	142	24	267	24
	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
30-39	2009	336	34	43	32	369	34
	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
40-49	2009	360	45	22	47	367	45
	2010	362	45	25	48	369	45
	2011	351	45	26	48	355	45
	2012	345	45	25	48	351	45
	2013	316	45	18	49	322	45
50-59	2009	145	57	28	57	149	57
	2010	145	57	24	57	149	57
	2011	144	57	27	58	150	58
	2012	143	58	27	58	149	58
	2013	134	58	27	58	140	58
≥60	2009	66	71	28	72	72	73
	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

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

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

Table 60: Number of vessels catching halibut by FMP area and pounds caught, 2009-2013.

	Landings	2009	2010	2011	2012	2013
Gulf of Alaska	<1	110	121	158	142	112
	1-9	374	362	411	395	360
	10-24	209	221	175	191	189
	25-49	131	127	113	109	114
	50-74	61	61	51	64	58
	75-99	41	39	41	37	38
	100-199	103	101	73	40	30
	>=200	31	22	1	-	-
Bering Sea & Aleutian Islands	<1	126	106	118	126	141
	1-9	91	100	109	91	91
	10-24	29	28	36	30	27
	25-49	26	27	19	26	28
	50-74	16	19	21	20	20
	75-99	12	5	13	10	3
	100-199	15	17	18	11	4
	>=200	3	4	2	-	-
All Alaska	<1	234	221	274	267	250
	1-9	452	449	496	461	435
	10-24	219	226	191	205	198
	25-49	138	142	116	114	118
	50-74	64	57	50	62	60
	75-99	45	38	37	39	36
	100-199	101	104	107	74	58
	>=200	53	46	9	1	-

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

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

Table 61: Number of vessel catching halibut and the percentage of yearly halibut in area caught by FMP area and month, 2009-2013.

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Month	Vessels	Percent	Vessels	Percent	Vessels	Percent
2009	Mar-Apr	308	0.15	7	0.02	313	0.13
	May	420	0.20	14	0.02	429	0.17
	Jun	364	0.15	170	0.13	525	0.15
	Jul	284	0.12	212	0.24	486	0.13
	Aug	378	0.15	143	0.28	502	0.17
	Sep	376	0.10	75	0.20	432	0.12
	Oct	291	0.11	37	0.08	314	0.10
	Nov	121	0.03	16	0.03	133	0.03
2010	Mar-Apr	379	0.22	7	0.02	381	0.19
	May	410	0.18	22	0.06	425	0.16
	Jun	353	0.14	139	0.17	484	0.14
	Jul	283	0.11	213	0.23	487	0.13
	Aug	401	0.13	180	0.22	558	0.15
	Sep	343	0.11	69	0.18	394	0.12
	Oct	247	0.09	36	0.08	275	0.09
	Nov	100	0.02	20	0.04	116	0.02
2011	Mar-Apr	312	0.20	10	0.02	317	0.16
	May	394	0.19	39	0.14	420	0.18
	Jun	321	0.15	209	0.19	524	0.16
	Jul	242	0.10	243	0.21	474	0.13
	Aug	351	0.15	123	0.19	444	0.16
	Sep	314	0.11	73	0.12	366	0.11
	Oct	219	0.07	50	0.11	261	0.08
	Nov	81	0.02	13	0.02	92	0.02
2012	Mar-Apr	276	0.17	3	0.02	279	0.14
	May	332	0.15	22	0.09	348	0.14
	Jun	334	0.16	154	0.16	479	0.16
	Jul	223	0.10	210	0.24	422	0.13
	Aug	361	0.17	106	0.27	444	0.19
	Sep	279	0.10	68	0.16	336	0.12
	Oct	233	0.13	22	0.06	251	0.11
	Nov	68	0.01	7	0.01	75	0.01
2013	Mar-Apr	256	0.19	6	0.03	262	0.16
	May	304	0.20	17	0.11	317	0.18
	Jun	298	0.16	192	0.16	482	0.16
	Jul	197	0.09	226	0.28	413	0.12
	Aug	299	0.15	75	0.18	360	0.15
	Sep	283	0.12	62	0.13	331	0.12
	Oct	219	0.08	25	0.09	236	0.08
	Nov	79	0.02	10	0.02	87	0.02

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

Table 62: Total and median vessel days fishing halibut by area, 2009-2013.

Area	2009	2010	2011	2012	2013
Gulf of Alaska	19,510	19,774	16,156	14,817	14,621
Bering Sea & Aleutian Islands	4,911	5,680	6,397	5,110	4,339
All Alaska	24,117	25,170	22,163	19,746	18,742

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

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

Table 63: Crew days fishing halibut by month and area, 2009-2013.

	Year	Mar-Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Gulf of Alaska	2009	11,040	13,404	9,932	7,298	9,296	8,830	7,312	2,038
	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	1,330
	2012	8,304	9,431	8,200	5,796	8,707	6,495	6,243	814
	2013	8,546	10,247	7,787	4,859	7,344	6,535	5,928	1,300
Bering Sea & Aleutian Islands	2009	585	595	3,121	4,497	4,469	2,439	1,402	517
	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
All Alaska	2009	11,565	13,938	12,951	11,620	13,513	10,955	8,579	2,503
	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	1,920
	2012	8,759	10,822	11,483	10,938	13,130	9,133	7,271	1,026
	2013	9,109	11,207	10,817	10,011	9,626	8,616	7,029	1,460

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

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

5. ECONOMIC PERFORMANCE IN THE NORTH PACIFIC GROUNDFISH FISHERIES: AN INDEX-BASED APPROACH TO EXAMINING ECONOMIC CHANGES

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: $P_{2009}(2010) = \sum_{k=1}^{K} P^k_{2009}(2010) * w^k_{2009}(2010)$, where k runs over product types, $k \in \{\text{fillet}, \text{head \& gut}, \text{surimi}, \ldots\}$ and $w^k_{2009}(2010)$ is the value share of product k. Value and quantity indices, $V^i_{t-1}(t)$ and $Q^i_{t-1}(t)$, 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. Next year the base will be changed to 2010 so that recent periods are closer to the base year. Taking our GOA shoreside price index as an example, the 2008 chained price index is given by $I^P_{2006}(2008) = 100 * P_{2006}(2007) * P_{2007}(2008)$. The 2009 chained price index is obtained by multiplying the 2008 index by the two-period price increment between 2008 and 2009, $I^P_{2006}(2009) = 100 * I_{2006}(2008) * P_{2008}(2009)$, 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 $I^P_{2006}(2007) = 100 * I_{2006}(2006) * P_{2006}(2007) = 150$. 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 $I^P_{2006}(2008) = 100 * I_{2006}(2007) * P_{2007}(2008) = 75$. 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 $w^k_{t-1}(t)$ 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

[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 forthcoming NOAA Technical Memorandum (Fissel 2013) 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.

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, 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.

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

Wholesale value in the BSAI at-sea region fell 17% between 2012 and 2013. While significantly lower than the levels seen in 2011 and 2012 the value index, at 115 in 2013, remains above the levels seen prior to 2008 and above the average (109) (Figure 5.2). Value in this region is largely concentrated in pollock, which had a value share of 59% in 2013, an increase of 4% over last year, but slightly below its average (61%) over 2003-2013. As pollock's share of value increased, Pacific cod, flatfish and Atka mackerel value shares decreased slightly. This is a change from a trend that started in 2002 whereby other species (in particular flatfish) acquired an increasing share of the value within the region. Cod and flatfish's share of value both stood at 17%, down 1% from last year, while Atka mackerel's value dropped 2% to 3.1%. 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 2013. 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 fell to 16% dipping 3% in 2013. Fillets and deep-skin fillets retained a combined 25% of the region's total value share, up 4% from last year. Roe, a high priced product that is the focus of the A season catch, accounted for 18% of the value share a decade ago but has steadily declined in significance and currently accounts for 5.6% of total value.

Quantity indices track production of wholesale market goods over time. The aggregate quantity index shows that in 2013 total production in this sector in was basically unchanged from 2012. The pollock quantity index increased 7.3% in 2013 and the quantity index remains at a level comparable to the highs observed before 2008 (Figure 5.2). The increase in pollock production was not seen in most of the other species. Cod production remained basically unchanged, while the quantity indices for flatfish dropped a marginal 5.9%. 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 largest decrease in production was Atka mackerel whose quantity index fell 53% because of reductions in the TAC. The fillet quantity index (which is basically just pollock fillets) increased substantially (25%) in 2013 bringing it to its highest level over the last decade (Figure 5.3). The H&G quantity index remained flat as small increases in pollock and flatfish H&G were offset by declines in Atka mackerel. Roe (pollock) production decreased slightly in 2013 and is almost the lowest (with the exception of 2010) it has been over the last decade. Pollock surimi production has been steadily increasing since diving in 2008 and 2009 during the pollock TAC reductions. The surimi quantity index rose 3.7% in 2013 but remains slightly below pre-2008 levels. Production of meal and "other" products has also been increasing since 2009. Although production of whole fish is relatively small, it fell sharply in part because of Atka mackerel, but largely because of a decrease in flatfish going into this product type.

The largest changes over 2013 in this sector were in prices as shown by the 17% decrease in the aggregate price index. This somewhat large decline in prices reflects a year in which the prices of different species and products were generally down. The pollock price index fell 17% with the 26% decrease and 33% decrease in roe the surimi price indices, respectively (Figures 5.2 and 5.3). Fillets prices also fell, but to a lesser degree with a 9.3% decrease, while the deep-skin index remained flat between 2012 and 2013. Fillet prices (including deep-skin) 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. Roe prices, like production, are as low they've been over the last decade. Surimi prices peaked in 2008 and have been vacillating since and in 2013 the index was approximately at its 10 year average. The cod price index decreased a marked 22% to the lowest level over the last decade. The H&G price index, which is the (the primary product form for BSAI at-sea cod), also fell by a similar margin, 21%. The H&G price index is an amalgamation of price change from various species, but primarily cod and flatfish. The flatfish price index also fell 16% but remains near its 10 year average. Though it's only a small segment of the market price index the whole fish price index increased 72% partially because of the generally increase in Atka mackerel prices from constrained supply, though whole fish prices for some flatfish species increased substantially as well (Table 26).

Commensurate with the declining price index, the aggregate value index decreased 17% in 2013. The value across all species declined in 2013. Despite the rather large decrease in pollock prices the pollock value index only fell 11% in 2013 both as a result of the general increase in pollock production and, to a lesser extent, the increase in fillet production where prices declined less (Figure 5.2). Though not at its peak, the pollock value index remains above its ten year average. The product decomposition of aggregate value (Figure 5.3) shows that fillets increased 13% in 2013 while value for pollock other primary product forms surimi and roe decreased, 31% and 33%, respectively, largely as a result of falling price. Low cod prices drove the cod value index down 23%. While the cod price is at a low, quantities are at a high, leaving the value index at 110, lower than its average level (116), but still in the middle of the distribution of value over the last decade. The value index for flatfish fell 21% though it remains high relative to historical levels as production is strong and prices arre stable. The value from H&G products fell 20% 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 worse off in 2013 than in the two years preceding but remains economically healthy. The significant price shocks in 2013 cause dramatic year-over-year shifts in value throughout sector. In part the marked decrease in the value index is a regression from highs seen in 2011 and 2012. Value remains higher than it was prior to 2008 or throughout the low levels seen in 2009-2010 when conservation reductions in the TAC of key species resulted in low production quantities. In contrast, the value index change in 2013 was the result of market forces through prices. 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 through out much of the decade (with the exception of 2008-2010). With production quantities since 2011 at the highest they have been in the last decade, future growth in this sector seems unlikely to come from increased 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

Value in the BSAI shoreside wholesale market fell 12% in 2013 from its peak level in 2012. Value in this sector is highly concentrated in pollock, which in 2013 comprised 84% 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 46% of the value share (deep-skin fillets included), as is the production of surimi which accounted for 27% 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 2013 only 5.4% of this sector's value came from roe. The remainder of value across species is divided between cod at 14% and sablefish which brought in 1.6% 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. Relative to the at-sea sector, the 5.4% share of value from H&G products is small and shrank in 2013.

The aggregate quantity index increased 4.8% to 141 in 2013, its highest level since 2003. The quantity index for pollock, the most important species in the region, rose 5.5% (Figure 5.4) and was the primary source of positive production growth in the region. Much of pollock's additional production went into fillets, which (together with growth in cod fillet production) resulted in a 35% increase in the fillet quantity index, though deep-skin fillet production fell somewhat (Figure 5.5). While total pollock production increased, surimi production remained stable increasing a mere 2%. Shoreside roe production also decreased marginally in what appears to be a general downward trend starting in 2007. Similar shifts in the production mix are were also observed in the at-sea sector. Pollock production and its associated primary products were at a decadal high in 2013. The cod quantity index increased by 7.1% to a decadal high as cod production shifted out of H&G and into the higher valued products such as fillets. This shift and the declines in sablefish production, which is concentrated in this product type, pulled the H&G quantity index down by 20% in 2013.

Aggregate prices in the shoreside sector fell in 2013 as shown by the 16% decrease in the index. The aggregate change can largely be attributed to a 14% drop in the pollock price (Figure 5.4). The largest factor in the declining pollock price was the 26% drop in the surimi price index (Figure 5.5). Declining prices of pollock's other product types also contributed, though to a lesser extent; either because the price change was comparatively small, as with fillets (down 7.6%), or they are a small component of pollock's production mix (e.g., roe). Pollock prices were not as high in 2013 as they were 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 moderate long-term growth in fillet prices and surimi prices that are at a decadal average. The cod price index fell 27% the 2013 to its lowest level. This coincides with the 41% drop 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 large decrease in the price index resulted in a net 12% decrease in the aggregate value index leaving the value index at 118.841489640259, slightly above its average level (114.493927341125). The aggregate change is a reflection of value decreases in both pollock and cod, which were also the result of price changes. The pollock value index fell 9.8% and the cod 22% (Figure 5.4). As with prices, the value decrease from surimi had a significant impact in this sector. Fillets were the only major product type where the value index increased (7.6%) as quantities of this product increased (Figure 5.5). The H&G value index fell the most as production shifted away from this product type with declining prices.

While prices declined throughout the sector in 2013, shifts in the product mix helped to minimize the impact on value. For pollock, additional production went into fillets where the decline in price was smaller relative to other products, such as surimi. While H&G cod prices fell precipitously in both the BSAI at-sea and shoreside sector, shoreside cod production shifted into fillets, whereas the at-sea sector did not because production is almost exclusively H&G. Examining the indices over the past decade, the shoreside wholesale sector is performing at level that is on par with performance prior to 2008. Aggregate value is significantly above the level of the index a decade earlier in 2003 and 2004. Production, which had fallen in 2008-2010, has rebounded and has remained stable since 2011. Value changes over 2013 in the BSAI shoreside sector were largely the result of market changes in price. With continued stability in quantities, prices (in particular pollock prices) will continue to be the factor driving value changes in the BSAI shoreside sector. High concentration of the BSAI shoreside sector in pollock has left the sector highly exposed to changes in the TAC or prices of the product forms in which it is concentrated. 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 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 species or whitefish will adversely affect this sector. Generally, when pollock does well this sector does well.

BSAI Shoreside Ex-Vessel Market

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, as expected, largely reflects the wholesale distribution (Figure 5.6). 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. 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). This share increased 4% in 2013 as the value share from cod and sablefish decreased to 16% and 2.8%, 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 7.9% of the total value share. Hook-and-line gear, which primarily targets sablefish, accounted for 1.9% of value. The share of value across gear types has remained essentially constant.

The aggregate quantity index, which is an index of catch deliveries to shoreside processors, increased 2.6% to 152 in 2013. Quantity indices show that catches are still somewhat below their levels prior to 2007 (Figure 5.6). The pollock quantity index increased 4.5%. After consecutive years of catch growth since 2008, the cod deliveries stabilized in 2013. The sablefish index decreased 17% to its lowest level, though sablefish catch in this sector is small. The gear-type quantity indices show that delivered catch increased slightly for pot caught cod (Figure 5.7). The increased pollock catch resulted in a 3.2% increase in the trawl gear quantity index. Pot quantity index increased 1.3% as cod catches shifted slightly from hook-and-line.

The aggregate ex-vessel price index decreased 15% to 97 in 2013. The decrease was primarily the result of a drop in the pollock price index which fell 13% (Figure 5.6) which mirrored the corresponding drop in wholesale pollock price index. This suggests that change in the ex-vessel price was the result of wholesale price changes passing through to the ex-vessel price. The ex-vessel cod price index also fell 23% with its corresponding wholesale price. Similar price declines occurred across gear-type price indices (Figure 5.7). The price for trawl caught fish decreased 15% with the pollock price. Pot gear, which is concentrated largely in cod, saw a 22% decrease in its price index. Hook-and-line makes up a small share of the sector, but the ex-vessel price index dropped 19% 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 2013 is down 13%, going from 170 to 148. Because pollock is such a large share of the value the decrease in aggregate ex-vessel value was a result of the drop in pollock value. The pollock value index decreased 9.5% as the decline in price outweighed the increase in quantity. The aggregate impact of cod and sablefish is more muted due to their small share of the ex-vessel market. In 2013 the 23% drop in cod value index put additional the downward pressure on value. Also like pollock, the drop in cod value was the result of falling prices while quantities remained stable. Sablefish also contributed to the negative change in value with a 33% drop in value coming from both decreasing prices and quantities.

Examination of the ex-vessel value index over the last decade shows that there has been little if any growth over the last decade in value with no discernable trend. As the ex-vessel sector is intrinsically connected to the wholesale market, they suffer from the same lack of diversity in the portfolio of species they bring to market. The shoreside sector performs well economically when the market for pollock is strong and catches are stable. 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 is lower than it has been in the past two years, 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 their pass through 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

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 (Figure 5.8). It is also the only sector that does not rely substantively on pollock. Rockfish and flatfish had the largest share of value at 34% and 26% in 2013. Sablefish and cod were also significant species with 20% and 12% value shares, respectively. The 2013 decrease in value share for rockfish (-7.6%) and cod (-6.2%) went to largely to flatfish (5.5%) and sablefish (5.4%). While diversified in species, value from the product types in this region is concentrated in head-and-gut products (83%) with a small percentage going to whole fish (15%) (Figure 5.9). In 2009 value share began increasing H&G, a trend reverted back to its historical average 2013.

The aggregate quantity index decreased 9.7% to 82 in 2013, a level that is below its historical average (92.5) and just above the lows in 2004 and 2005. Quantity indices show that production fell for multiple species (Figure 5.8). Most notably, the rockfish quantity index fell 15%, and cod 38% while the sablefish index remained basically unchanged. The decrease of 14% in the H&G quantity index came largely from a decline in cod production (Figure 5.9). The only key species showing positive production growth was flatfish which rose 9.6%. Flatfish production growth in 2013 went into the whole fish product type (H&G flatfish production remained unchanged) resulting in a 43% increase in whole fish quantity index. Whole fish production hit a low in 2012 and increases in 2013 may indicate a reversion toward more typical production levels.

The shoreside sector also experienced a decrease in the aggregate price which fell 21% to 90 in 2013. This level is below the average and in the middle-lower part of the distribution of index values since 2003. Price indices decreased significantly for three of the four key species in this sector: flatfish, cod and rockfish (Figure 5.8). These three species combined account 72% of the value in this sector. The 31% decrease in the rockfish price index was particularly influential; coupled with the similarly sharp decrease in 2012 these declines erased the large increase in 2011 leaving rockfish prices on par with earlier levels. The cod price index also decreased by 24% leaving the index at its lowest level over the last decade. The flatfish price index decreased 17%. Similar price changes occurred in the BSAI at-sea sector. Sablefish is the only key species where the price index did not fall, instead remaining flat relative to 2012. The whole fish price index showed small positive price movement by increasing 3.9% which, relative to the substantial 23% decrease in H&G prices, could account for the increase in the flatfish production mix towards whole fish.

Decreasing value in rockfish, flatfish and cod contributed to the 28% drop in the aggregate value index (Figure 5.8). After consecutive and substantial decreases in 2012 and 2013 the value index (73) is below its average (90.3) and the lowest it has been since 2005. A variety of negative price and quantity shocks occurring in different species contributed to the decrease in value. Rockfish and cod were the two key species where value declined the most with 42% and 53% decreases in their value indices, respectively, as both price and quantities declined for these species. Flatfish value was also down as the decrease in prices outweighed increase in quantities.

In some cases (rockfish and sablefish) part of the drop in 2012 and 2013 could reflect a reversion of economic factors which had become untenably high after large price shock in 2011. Price and quantity indices are generally at or below their average level and without any key species producing growth in value this sector is not as economically healthy as it has been throughout much of the past 10 years. In general, variation in the price index has been driving much of the change in aggregate value. Aggregate quantities have been comparatively more stable for many of the key species. However, both price and quantity indices were low in 2013. Diversification across species should generally help to maintain fairly stable aggregate value, price and quantity indices, as negative shocks will not likely persist for a diverse set of species. Future growth in this sector could come from a variety of species.

5.5. Economic Performance of the GOA Shoreside Sector

GOA Shoreside Wholesale Market

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 2013 pollock had a value share of 32%, cod 31%, and sablefish 25%. Composition bar graphs show that cod and pollock output is distributed across a multiple of product forms (Figure 5.11). Fillets are an important product type with in this sector a 29% value share. This is particularly true for cod where fillets make up a little less than half of the production quantities. Sablefish in contrast is processed almost exclusively as H&G, and H&G pollock made up a larger relative share of production in this sector than in the BSAI. Because of this H&G products had the largest share of total value (45%). Surimi is also a significant product form for pollock with 7% of the total value. Similar to other sectors roe was significant a decade ago but now has only a 4.7% value share. This is the only sector for which the “other” product type is meaningful with a value share of 8.4%.[4] The remaining value comes from a variety of other product types.

The aggregate quantity index fell 4.6% in 2013. The decomposition of the index across species shows that the 18% decrease in the cod quantity index was the primary factor in the aggregate

[4]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.

decline (Figure 5.10). Sablefish, decreased as well (2%) though the decline was marginal. The pollock quantity index remained high and even increased 4%. Composition bar graphs show that the pollock production increases in 2013 went primarily into H&G product forms (Figure 5.11). This stands in contrast to the BSAI sector where pollock production increases went more towards fillets. Product quantity indices show that, in spite of this, H&G decreased by 11% as cod H&G decreased dramatically. The fillet quantity index increased 2.8% with small increases coming from both pollock and cod. In contrast, BSAI fillet production increased. Surimi production, an important product form for pollock, fell 13% but remains high after increasing year-over-year since 2009. While production in 2013 decreased it remains at strong relative to the last decade with peak levels in pollock and high levels of cod and rockfish production.

The aggregate price index fell 5% in 2013 for the second year in a row. Since 2011 the aggregate price index has fallen 15%. Because of the magnitude of the price change, and its importance in the region (25% value share), the 19% decrease in sablefish was the primary driver in the declining aggregate price index (Figure 5.10). While the decrease in the sablefish index since 2011 has been large, it came after the dramatic increase in the sablefish price over the last decade, and the current drop could be a reversion to a more tenable state. Changes in the price indices of the other key species, pollock and cod, were smaller. The cod price index increased 4.5% in contrast to the BSAI sector where cod prices declined significantly. The difference can, in part, be attributed to GOA shoreside sector's decrease in the share of H&G cod where prices fell sharply. The H&G price index decrease of 10% was most prominent in the sector (Figure 5.11). Fillets were the only product showing positive movement with a 7.1% change in the price index. Interestingly, the fillet price index was a source of negative price movement in the BSAI, though changes in the index for both sectors were small. The pollock price index was basically unchanged rising only slightly by 2%.

With decreases in both aggregate production and prices, aggregate value shrank by 9.4% in 2013. Pollock was the only key species in which value grew, with a 6.1% increase in the value index (Figure 5.10). However, the change was not sufficient to offset the decreases in the other key species' value. The cod value index fell 14% and sablefish fell 20%. The drop in the sablefish value index was a result of the decrease in its price index while the decrease in cod value was from production. Commensurate with its significance in the sector, the 20% decrease in the H&G value index was the most influential product component of the aggregate value change (Figure 5.11). Surimi also contributed to the decline with a 26% decrease in value. The fillet value index grew by 10% as a result of the price increase and marginal increase in production.

Looking at the GOA shoreside wholesale sector over a longer time horizon, we see that despite the drop over the past two years, aggregate value is still high relative to the rest of the decade. 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 across species, broad scale changes in "whitefish" markets could have large effects on this sector.

GOA Shoreside Ex-Vessel Market

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. 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 2013 value, than in the wholesale market, where it accounted for only 25% of 2013 value. Since the wholesale sector processes the same fish landed in the ex-vessel sector, the difference in relative value share between the wholesale and ex-vessel markets must come 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 has continued to shift towards pollock in 2013 bringing its value share to 22%, a trend that started in 2011 with the decline in the sablefish price. Hook-and-line gear accounts for the largest fraction of value (51%) largely because it is used in the harvest of sablefish. Trawl gear increased its share to 37% of the value with the shift towards pollock. Despite the distribution of value across gear types, trawl gear accounts for roughly two-thirds of the total quantity (weight) delivered to processors.

The aggregate quantity index decreased 6.5%. Reductions in catch were seen for each of the three key species as displayed by the quantity indices (Figure 5.12). While the pollock quantity index fell 8%, catches in the region are nearly as high as they have been in the last 10 years. Correspondingly, the trawl quantity index, which is largely made up of pollock catch, decreased 3.5% though it remains high (Figure 5.13). Cod is the only species caught by multiple gear types in substantial quantities with roughly half of the catch from pot gear, and hook-and-line and trawl, each making up about one quarter of the catch. In contrast to 2012, where pot gear bore a disproportionate share of declining cod catch, the 16% decrease in the cod quantity index over 2013 was distributed roughly proportionally across the gear groups. Pot gear is used almost exclusively in the harvest of cod and fell 16% in 2013. The combined effect of reduction in hook and line caught cod and the 2.5% decrease in the sablefish quantity index resulted in the hook-and-line quantity indicies falling 5.8%.

The aggregate ex-vessel price index, which peaked in 2011, fell 20% between 2012 and 2013 and 26% since 2011 (Figure 5.12) leaving the index at its lowest level since 2006. The most significant change in the species prices came from sablefish (down 27%) which fell in tandem with the wholesale sablefish price index. The change in the cod price index was also significant, decreasing 25%. In contrast, while the ex-vessel cod price decreased, the wholesale cod price index increased slightly. The ex-vessel pollock price index also fell slightly 2.8% in agreement with the corresponding change in the wholesale sector. 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 (which targets sablefish), fell 27% and the pot gear and trawl price indices fell 24% and 6.6%, respectively.

The aggregate value index decreased 29% in 2013 as aggregate quantity and price both fell. While the price change was marked, the comparatively more muted decline in the quantity index resulted in aggregate value that is at 2010 levels. Owing to its share of the total value in the sector, the 29% decrease in the sablefish value index had a large impact on aggregate value. The 37% decrease in the cod value index also contributed significantly the drop in aggregate value as both price and quantities indices fell. The pollock value index also decreased 5.5%, though only marginally. Flatfish were the only species where ex-vessel value increased in 2013 though this is a small component of the sector and the level of the value index is well below the levels seen around 2008. Though rockfish makes up a comparatively small share of the sector, the large increase in the rockfish value seen in 2012 was partially erased in 2013 as rockfish prices decreased. Because catch declined roughly proportionally across gear types, value changes were largely the result of changing prices which in turn were commensurate with the price changes across species. The hook-and-line gear index decreased sharply with sablefish and cod (31%) as did the value index for pot gear (37%). The value from trawl caught species decreased (9.9%).

Over the last decade the steady rise in the price index and low volatility in the quantity index have generally translated to an upward-trending value index. The 2013 decrease in aggregate value was largely driven by the broad decline in prices throughout the sector. The steep decline in aggregate value in 2009 was driven mainly by a reduction in cod catch together with a drop in price. Gear type value indices show that the aggregate gains in value (and loss in 2009) have been experienced by all gear types. While the declines in 2013 value were marked relative to the highs in 2012 and 2011 value remains strong relative to historical levels. A strength of this sector is that value is diversified across species which helps support the sector when negative shocks occur.

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5.6. Economic Indices of the Groundfish Fisheries off Alaska

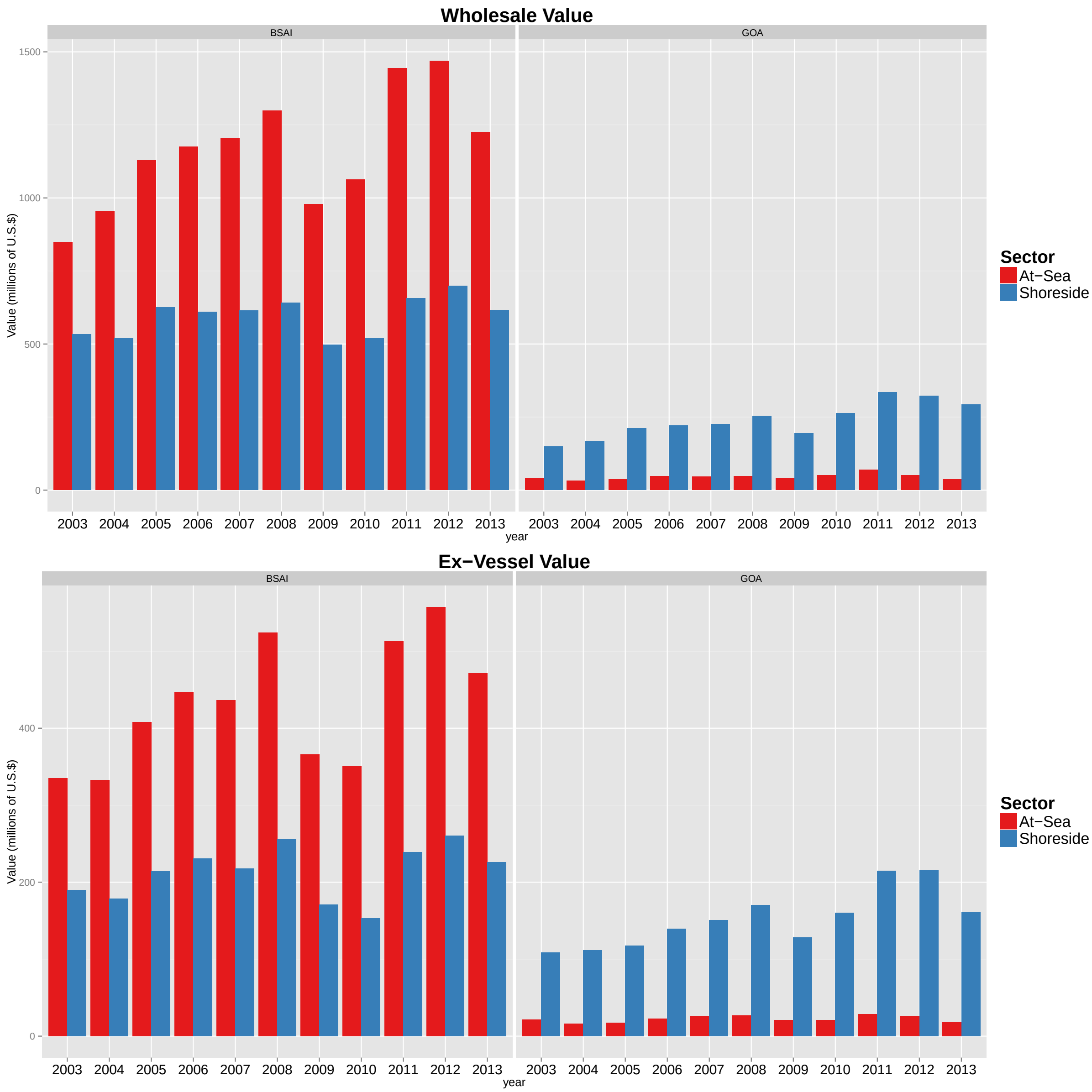

Figure 5.1: Wholesale and ex-vessel value by region and sector 2004-2013.
Source: NMFS Alaska Region's Catch-accounting system (CAS) and Weekly Production Report (WPR) estimates; Alaska Department of Fish and Game (ADF&G) Commercial Operator's Annual Report (COAR), National Marine Fisheries Service. P.O. Box 15700, Seattle, WA 98115-0070.

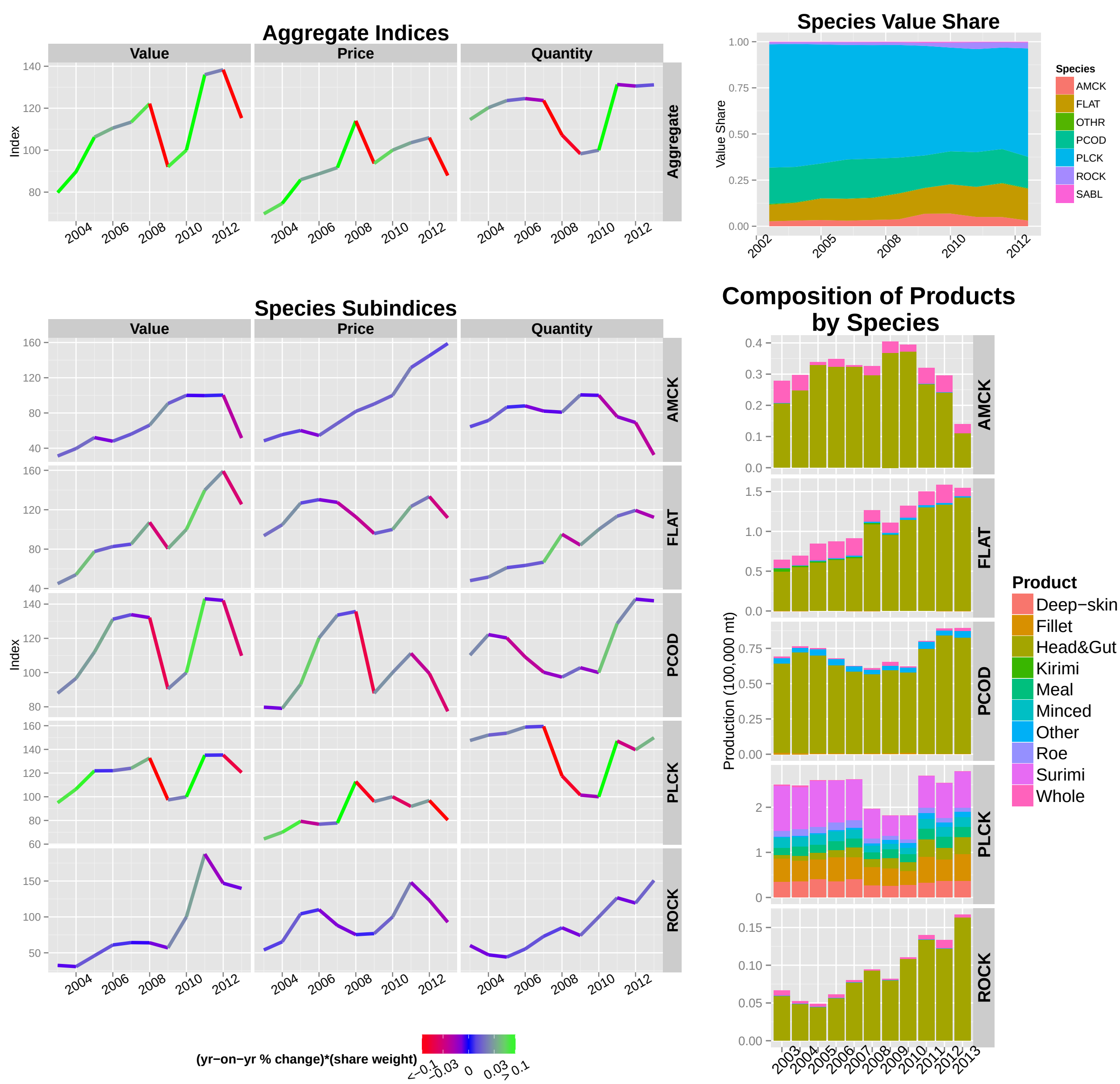

Figure 5.2: BSAI at-sea wholesale market: species decomposition 2004-2013 (Index 2010 = 100). **Notes:** Index values for 2008-2013, notes and source information for the indices are on Table 5.1. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

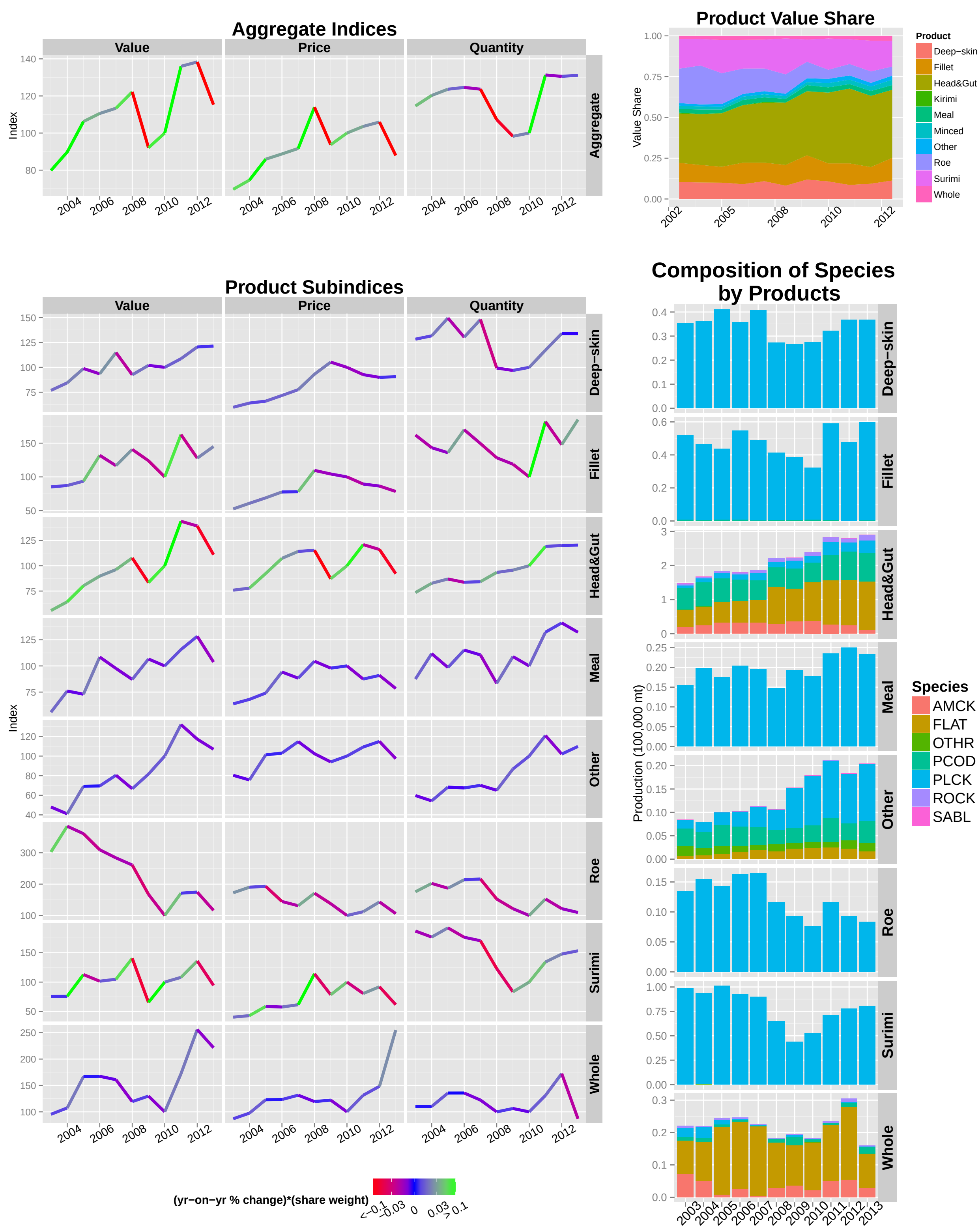

Figure 5.3: BSAI at-sea wholesale market indices: product decomposition 2004-2013 (Index 2010 = 100).

Notes: Index values for 2008-2013, 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.

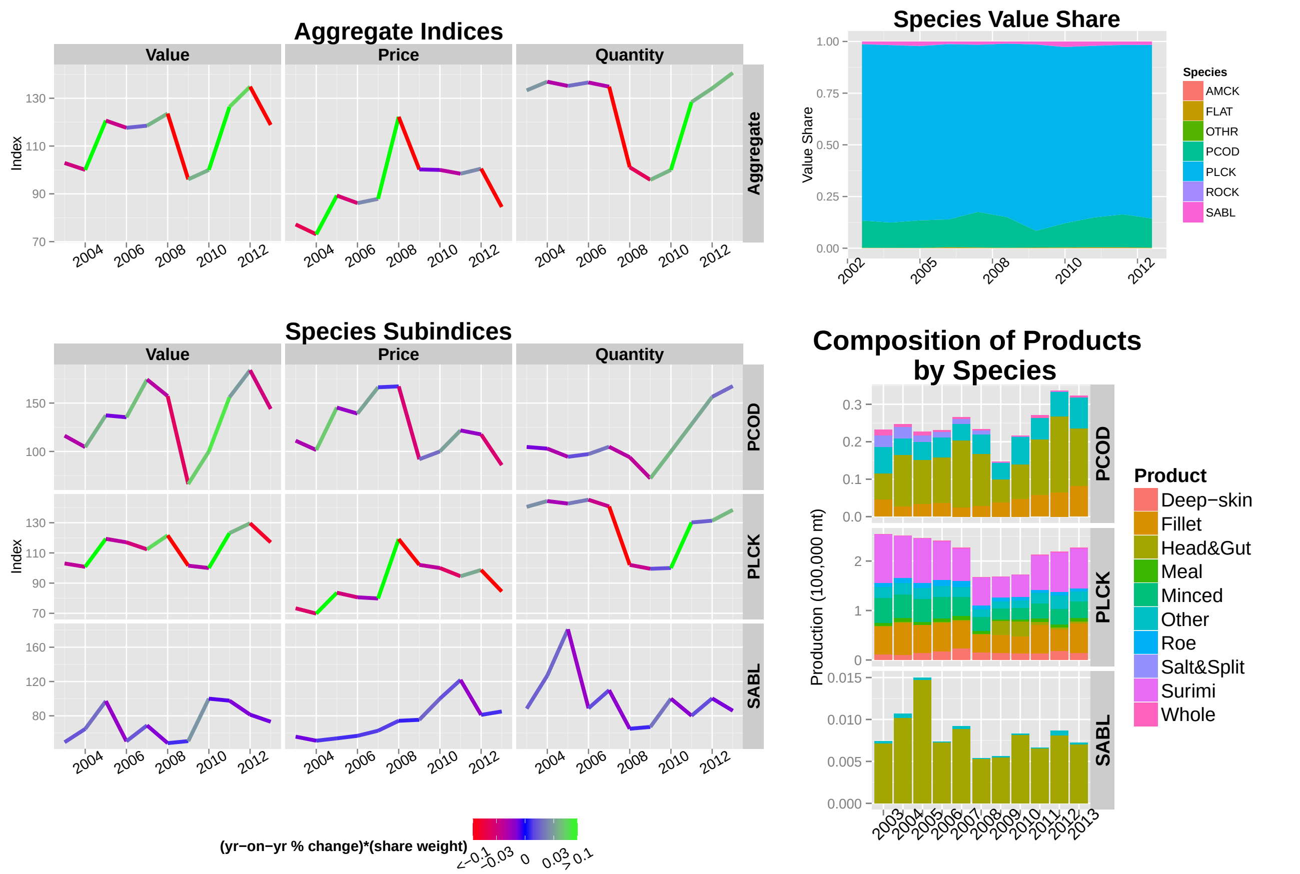

Figure 5.4: BSAI shoreside wholesale market: species decomposition 2004-2013 (Index 2010 = 100). **Notes:** Index values for 2008-2013, notes and source information for the indices are on Table 5.3. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

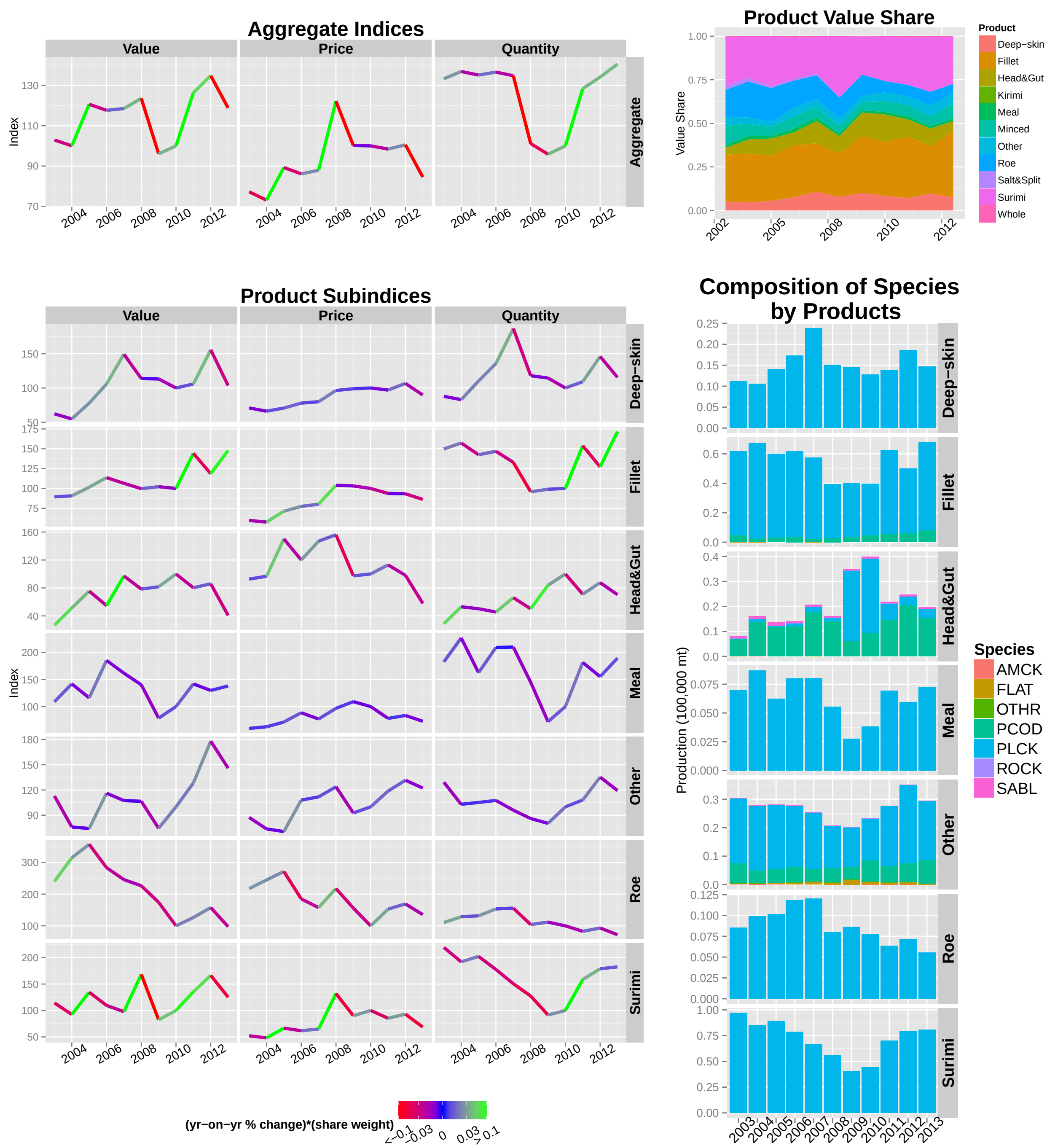

Figure 5.5: BSAI shoreside wholesale market: product decomposition 2004-2013 (Index 2010 = 100). **Notes:** Index values for 2008-2013, notes and source information for the indices are on Table 5.4. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

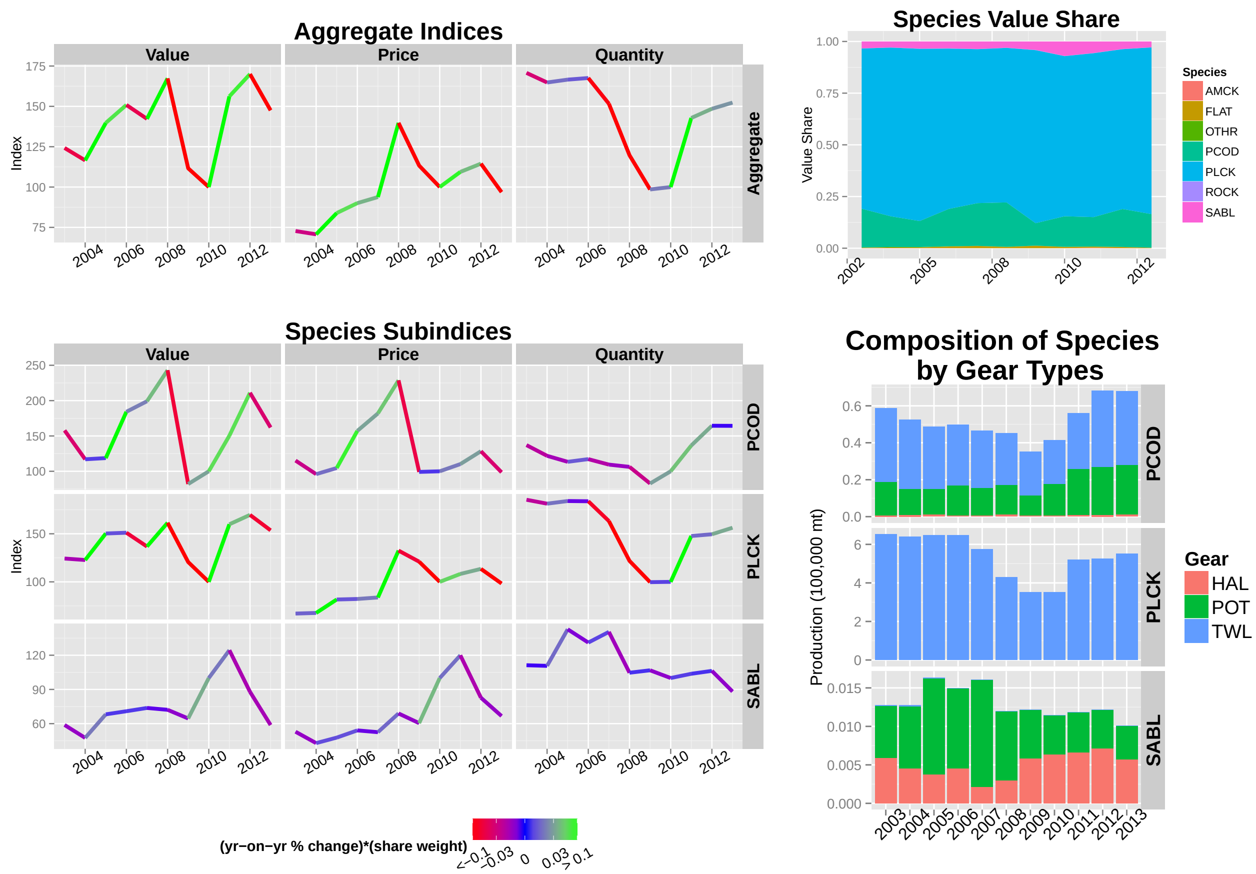

Figure 5.6: BSAI shoreside ex-vessel market: species decomposition 2004-2013 (Index 2010 = 100). **Notes:** Index values for 2008-2013, notes and source information for the indices are on Table 5.5. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

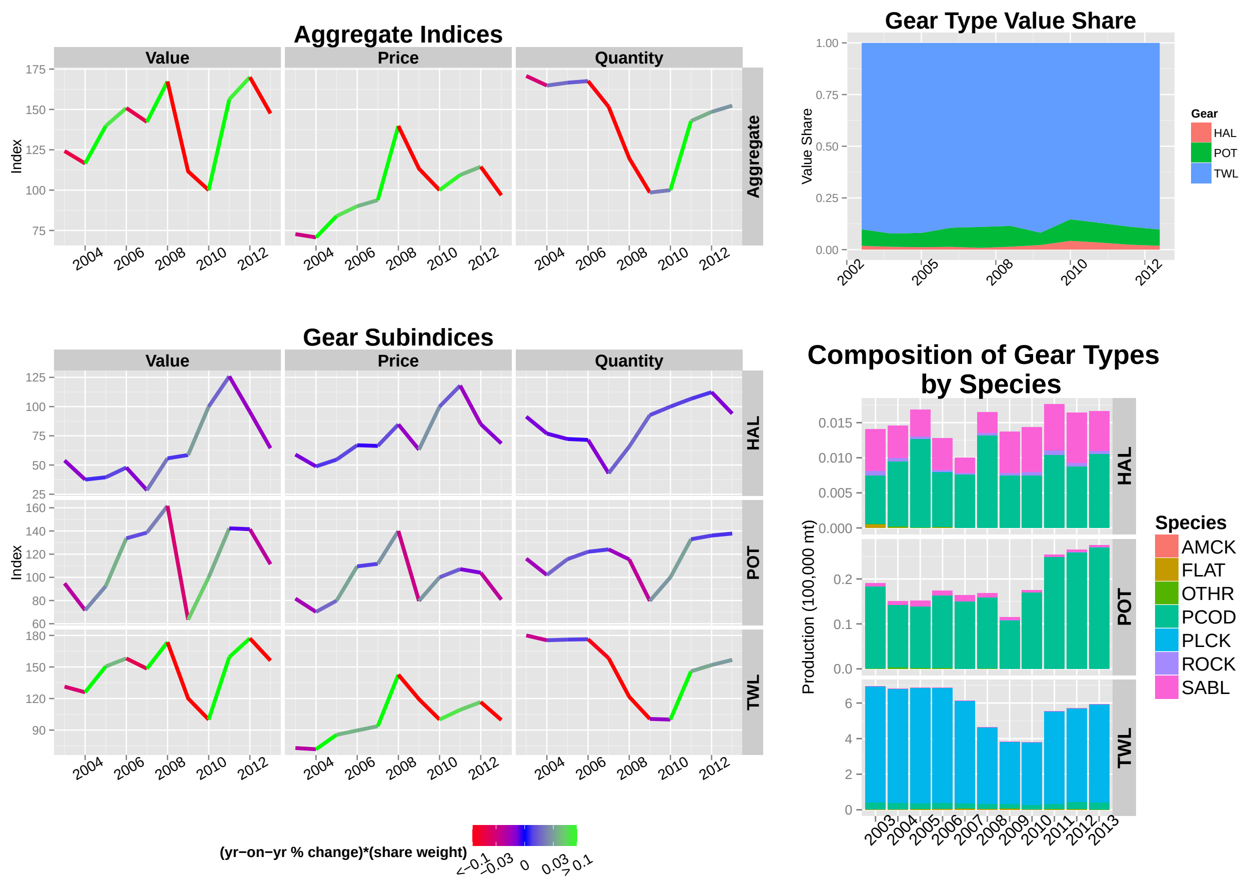

Figure 5.7: BSAI shoreside ex-vessel market: gear decomposition 2004-2013.

Notes: Index values for 2008-2013, 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.

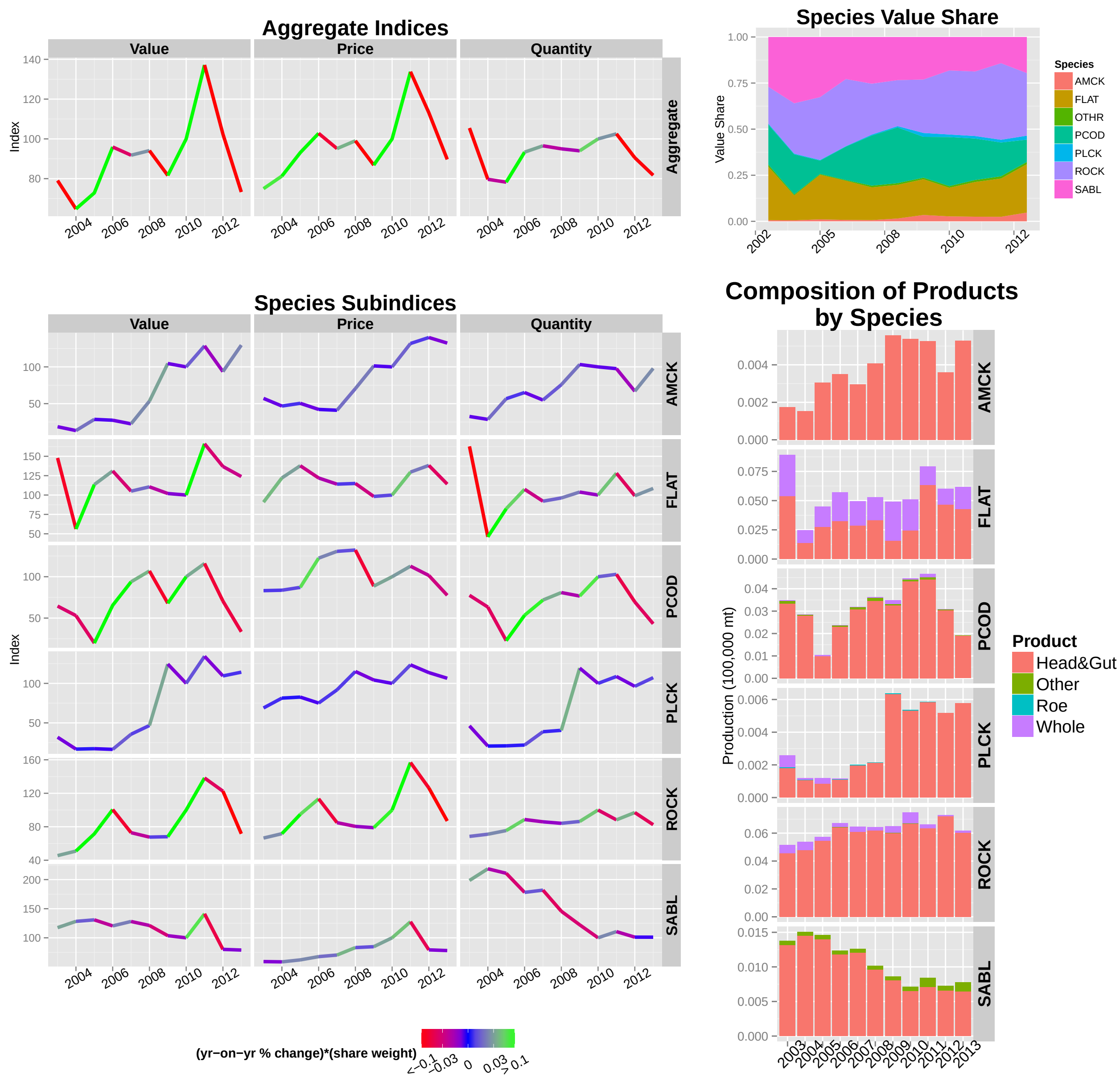

Figure 5.8: GOA at-sea wholesale market: species decomposition 2004-2013.
Notes: Index values for 2008-2013, notes and source information for the indices are on Table 5.7. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

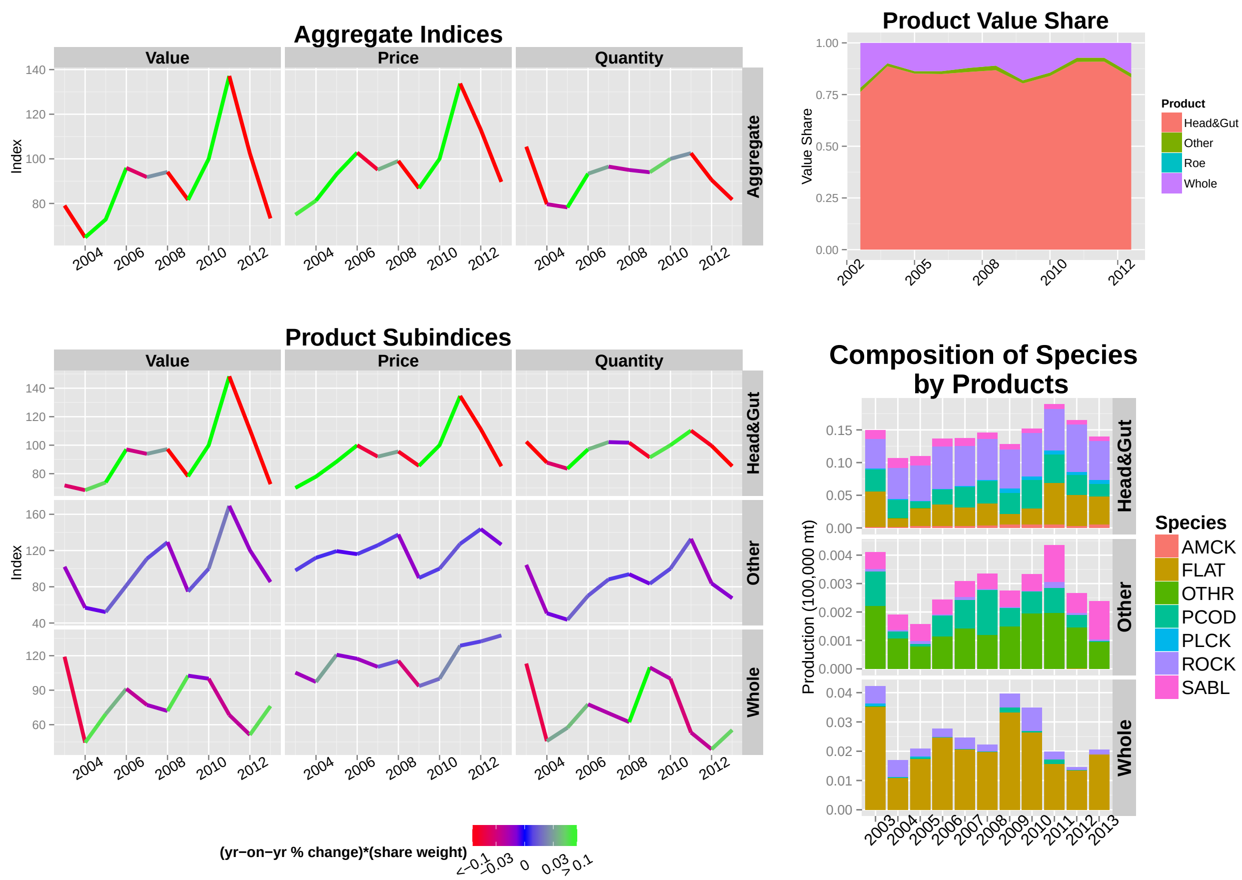

Figure 5.9: GOA at-sea wholesale market: product decomposition 2004-2013.
Notes: Index values for 2008-2013, notes and source information for the indices are on Table 5.8. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

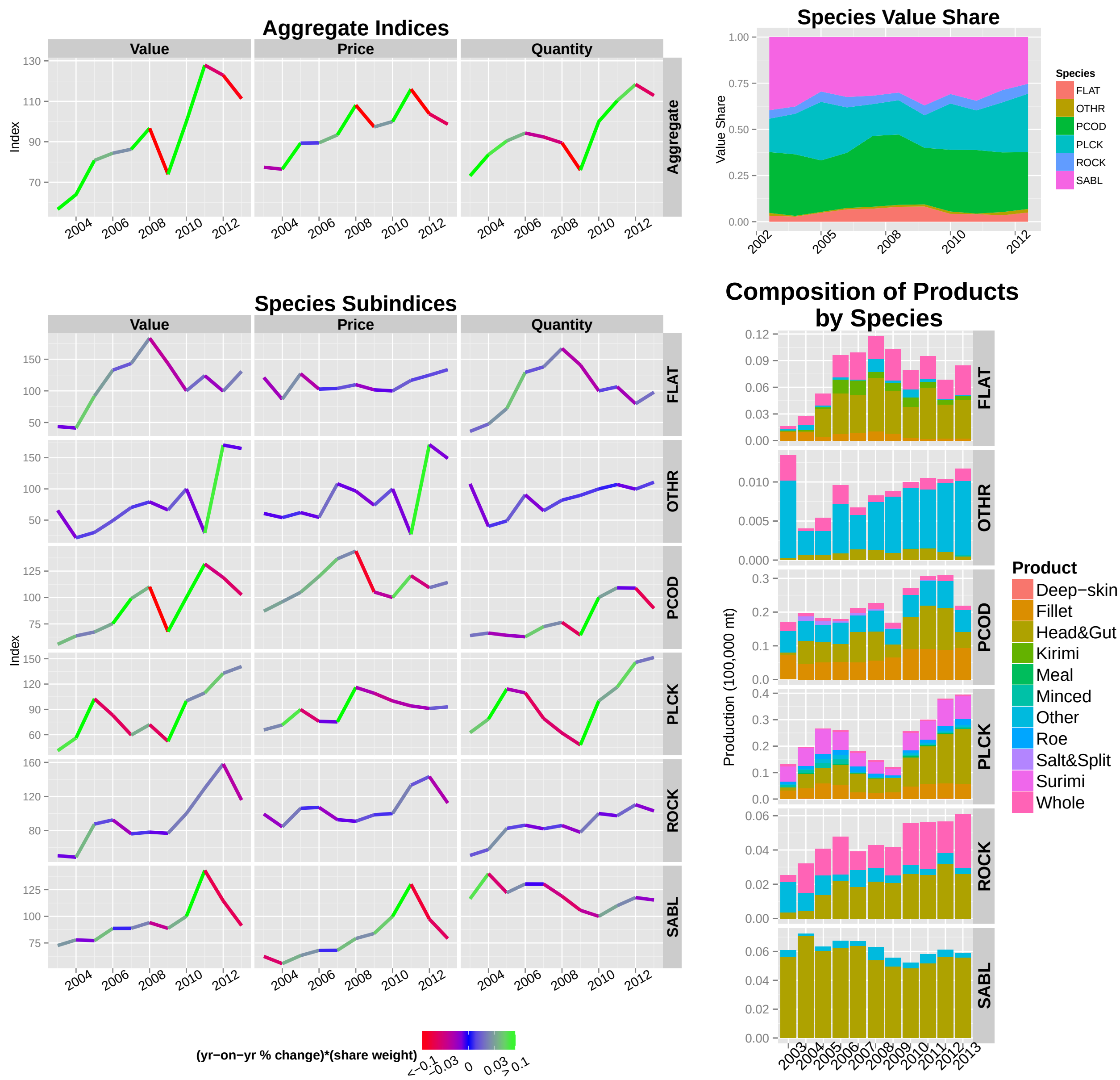

Figure 5.10: GOA shoreside wholesale market: species decomposition 2004-2013.

Notes: Index values for 2008-2013, 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.

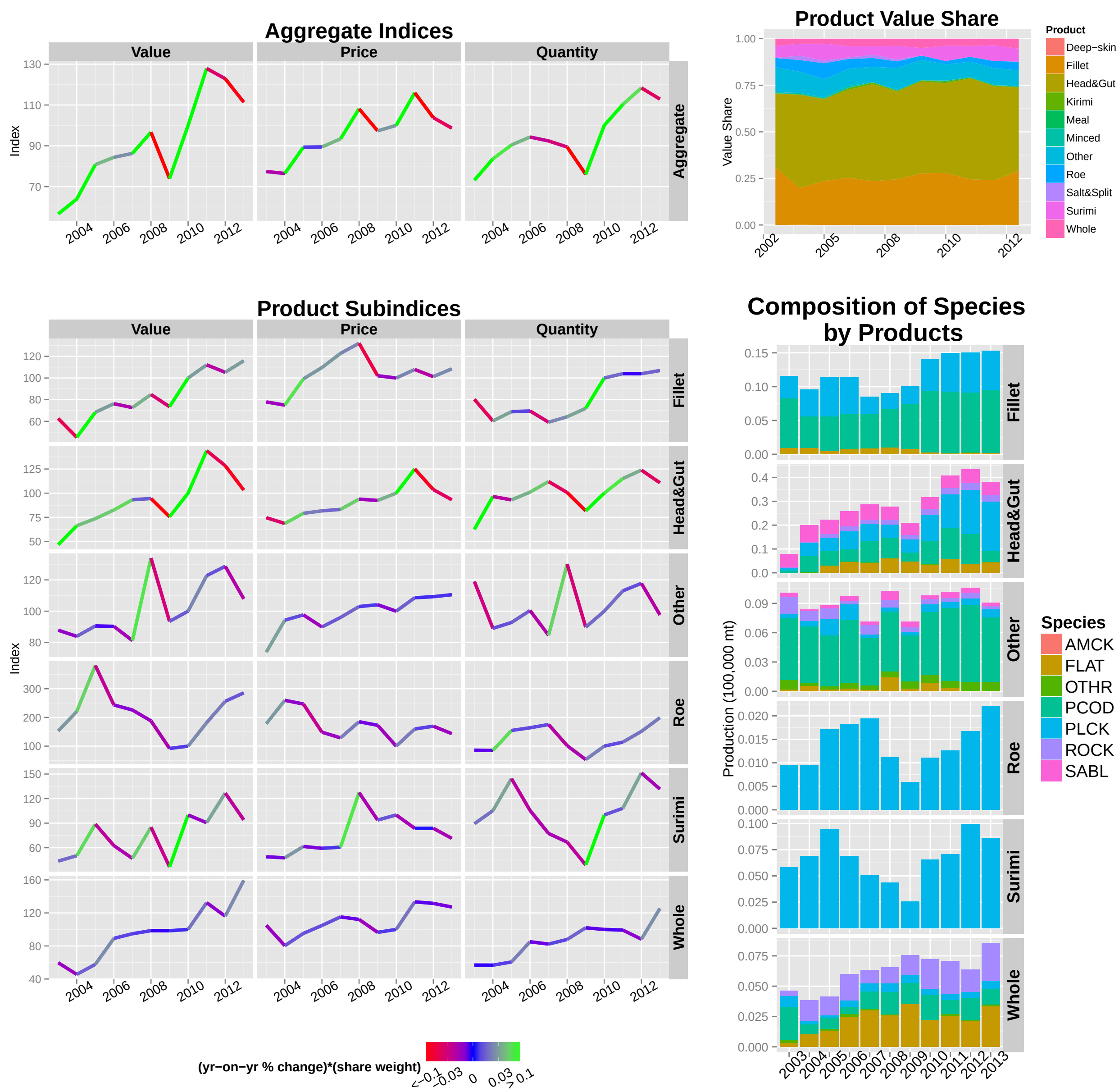

Figure 5.11: GOA shoreside wholesale market: product decomposition 2004-2013.
Notes: Index values for 2008-2013, notes and source information for the indices are on Table 5.10. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

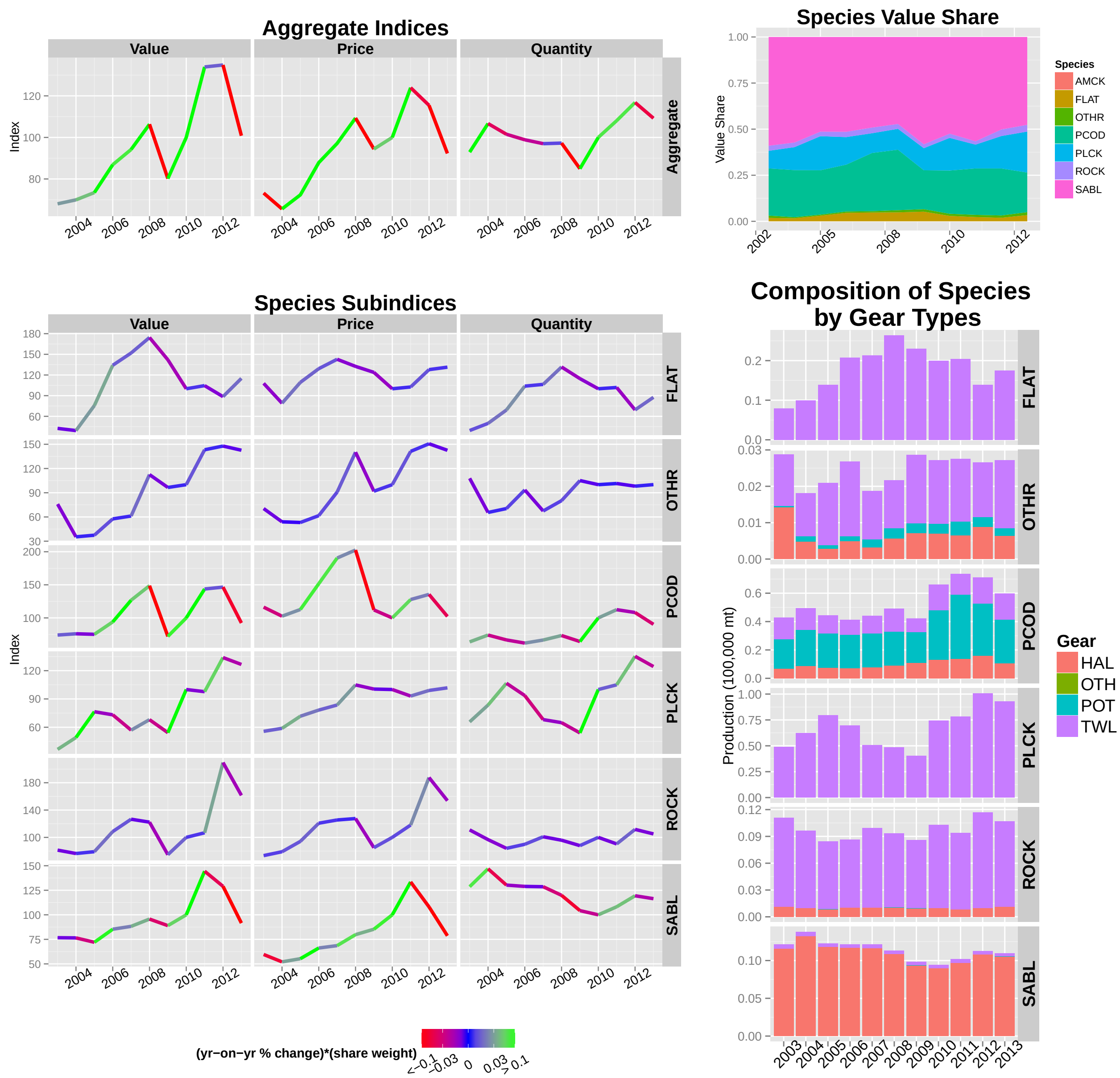

Figure 5.12: GOA shoreside ex-vessel market: species decomposition 2004-2013.
Notes: Index values for 2008-2013, notes and source information for the indices are on Table 5.11. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

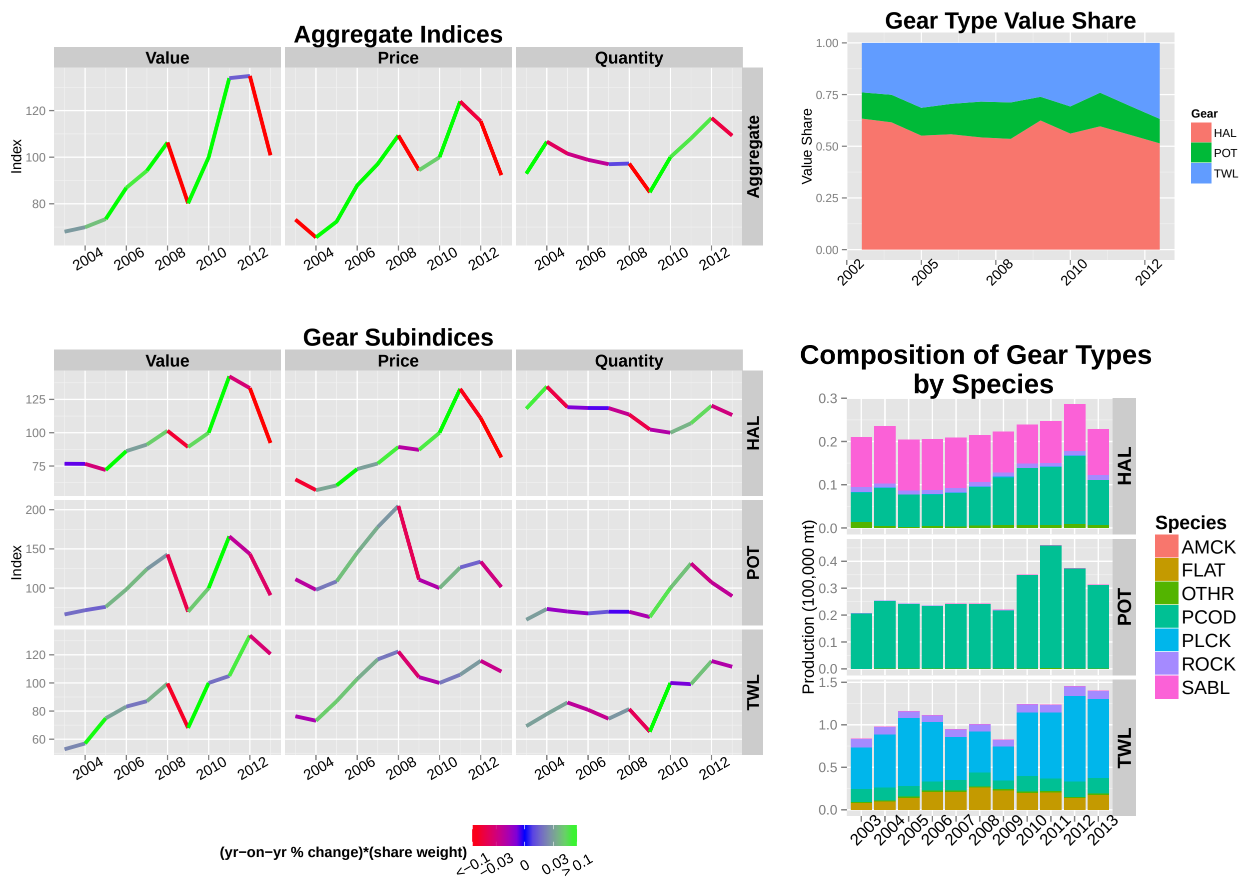

Figure 5.13: GOA shoreside ex-vessel market: gear decomposition 2004-2013 (Index 2010 = 100). **Notes:** Index values for 2008-2013, notes and source information for the indices are on Table 5.12. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

Table 5.1: Species Indicies and Value Share for the BSAI At-Sea First-Wholesale Market 2008 - 2013

Species	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	122.18	92.07	100.00	135.97	138.33	115.30
Aggregate	Price	113.94	93.70	100.00	103.56	105.95	87.93
Aggregate	Quantity	107.23	98.26	100.00	131.29	130.56	131.14
AMCK	Value	66.18	90.69	100.00	99.71	100.26	51.57
AMCK	Price	81.79	90.21	100.00	131.53	145.02	158.84
AMCK	Quantity	80.91	100.52	100.00	75.81	69.13	32.47
AMCK	Value Share	0.04	0.07	0.07	0.05	0.05	0.03
FLAT	Value	107.24	80.56	100.00	139.89	159.16	125.51
FLAT	Price	112.75	95.81	100.00	123.31	133.37	111.75
FLAT	Quantity	95.11	84.09	100.00	113.45	119.34	112.31
FLAT	Value Share	0.14	0.14	0.16	0.16	0.18	0.17
PCOD	Value	132.10	90.43	100.00	143.10	142.14	109.84
PCOD	Price	135.68	87.93	100.00	111.23	99.47	77.39
PCOD	Quantity	97.36	102.84	100.00	128.64	142.90	141.93
PCOD	Value Share	0.19	0.18	0.18	0.19	0.18	0.17
PLCK	Value	132.71	97.32	100.00	135.09	135.24	120.47
PLCK	Price	112.81	95.95	100.00	91.84	96.85	80.38
PLCK	Quantity	117.64	101.43	100.00	147.09	139.64	149.87
PLCK	Value Share	0.61	0.59	0.56	0.56	0.55	0.59
ROCK	Value	63.96	56.91	100.00	187.55	146.92	139.70
ROCK	Price	75.31	76.80	100.00	148.09	123.16	92.64
ROCK	Quantity	84.93	74.11	100.00	126.64	119.30	150.80
ROCK	Value Share	0.01	0.02	0.03	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 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 2008 - 2013

Product	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	122.18	92.07	100.00	135.97	138.33	115.30
Aggregate	Price	113.94	93.70	100.00	103.56	105.95	87.93
Aggregate	Quantity	107.23	98.26	100.00	131.29	130.56	131.14
Deep-skin	Value	92.48	101.98	100.00	108.66	120.46	121.35
Deep-skin	Price	93.11	105.26	100.00	92.69	89.94	90.63
Deep-skin	Quantity	99.32	96.89	100.00	117.23	133.94	133.89
Deep-skin	Value Share	0.08	0.12	0.11	0.09	0.09	0.11
Fillet	Value	140.74	123.94	100.00	162.67	127.75	144.98
Fillet	Price	109.64	104.31	100.00	89.43	86.46	78.43
Fillet	Quantity	128.37	118.81	100.00	181.89	147.75	184.85
Fillet	Value Share	0.13	0.15	0.11	0.13	0.10	0.14
Head&Gut	Value	107.69	83.35	100.00	143.90	139.23	110.94
Head&Gut	Price	115.30	87.14	100.00	120.86	116.02	92.15
Head&Gut	Quantity	93.39	95.65	100.00	119.06	120.01	120.39
Head&Gut	Value Share	0.38	0.39	0.43	0.46	0.44	0.42
Meal	Value	87.08	106.64	100.00	115.69	128.35	103.73
Meal	Price	104.49	97.92	100.00	87.46	90.94	78.46
Meal	Quantity	83.34	108.91	100.00	132.28	141.13	132.21
Meal	Value Share	0.02	0.04	0.03	0.03	0.03	0.03
Other	Value	66.68	81.61	100.00	132.13	117.26	106.93
Other	Price	102.43	94.02	100.00	109.22	114.92	97.37
Other	Quantity	65.10	86.80	100.00	120.97	102.04	109.83
Other	Value Share	0.01	0.02	0.03	0.03	0.02	0.02
Roe	Value	260.91	167.52	100.00	171.17	174.54	116.34
Roe	Price	171.07	137.65	100.00	112.06	143.28	106.15
Roe	Quantity	152.52	121.70	100.00	152.75	121.81	109.60
Roe	Value Share	0.12	0.10	0.06	0.07	0.07	0.06
Surimi	Value	140.43	65.45	100.00	108.08	135.90	94.37
Surimi	Price	114.16	78.45	100.00	80.57	92.04	61.61
Surimi	Quantity	123.02	83.42	100.00	134.14	147.65	153.18
Surimi	Value Share	0.22	0.14	0.19	0.15	0.19	0.16
Whole	Value	119.38	129.87	100.00	172.26	256.01	221.57
Whole	Price	119.49	122.15	100.00	131.46	148.40	255.02
Whole	Quantity	99.91	106.32	100.00	131.04	172.51	86.88
Whole	Value Share	0.02	0.02	0.02	0.02	0.03	0.03

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 2008 - 2013

Species	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	123.58	96.06	100.00	126.37	134.84	118.84
Aggregate	Price	122.20	100.21	100.00	98.42	100.52	84.52
Aggregate	Quantity	101.13	95.86	100.00	128.41	134.14	140.61
PCOD	Value	157.20	66.37	100.00	155.98	183.92	143.94
PCOD	Price	167.22	91.96	100.00	121.76	117.60	85.92
PCOD	Quantity	94.01	72.17	100.00	128.11	156.40	167.53
PCOD	Value Share	0.15	0.08	0.12	0.14	0.16	0.14
PLCK	Value	121.64	101.56	100.00	123.11	129.65	117.01
PLCK	Price	119.16	102.07	100.00	94.55	98.71	84.47
PLCK	Quantity	102.08	99.50	100.00	130.20	131.35	138.52
PLCK	Value Share	0.84	0.90	0.85	0.83	0.82	0.84
SABL	Value	48.17	50.50	100.00	97.68	81.36	73.10
SABL	Price	74.20	75.34	100.00	121.91	81.08	85.05
SABL	Quantity	64.93	67.02	100.00	80.13	100.34	85.95
SABL	Value Share	0.01	0.01	0.03	0.02	0.02	0.02

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 2008 - 2013

Product	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	123.58	96.06	100.00	126.37	134.84	118.84
Aggregate	Price	122.20	100.21	100.00	98.42	100.52	84.52
Aggregate	Quantity	101.13	95.86	100.00	128.41	134.14	140.61
Deep-skin	Value	113.68	113.19	100.00	105.82	155.66	103.64
Deep-skin	Price	96.40	98.85	100.00	96.98	106.66	89.72
Deep-skin	Quantity	117.92	114.51	100.00	109.12	145.94	115.51
Deep-skin	Value Share	0.08	0.10	0.09	0.07	0.10	0.07
Fillet	Value	99.75	102.21	100.00	144.25	118.63	147.90
Fillet	Price	104.04	103.23	100.00	93.73	93.29	86.19
Fillet	Quantity	95.88	99.01	100.00	153.89	127.17	171.60
Fillet	Value Share	0.25	0.33	0.31	0.35	0.27	0.38
Head&Gut	Value	78.34	81.71	100.00	80.27	85.95	40.76
Head&Gut	Price	156.10	97.34	100.00	113.05	98.09	57.96
Head&Gut	Quantity	50.19	83.94	100.00	71.00	87.63	70.33
Head&Gut	Value Share	0.10	0.13	0.16	0.10	0.10	0.05
Meal	Value	140.32	78.63	100.00	141.93	129.85	138.13
Meal	Price	96.73	109.17	100.00	78.14	83.56	72.82
Meal	Quantity	145.06	72.03	100.00	181.64	155.39	189.68
Meal	Value Share	0.02	0.01	0.01	0.02	0.01	0.02
Other	Value	106.60	74.43	100.00	128.29	178.10	145.99
Other	Price	123.82	92.66	100.00	118.69	131.61	122.29
Other	Quantity	86.09	80.33	100.00	108.09	135.33	119.38
Other	Value Share	0.04	0.04	0.05	0.05	0.06	0.06
Roe	Value	226.38	174.26	100.00	126.21	157.68	97.43
Roe	Price	217.71	156.00	100.00	152.73	169.20	135.37
Roe	Quantity	103.98	111.71	100.00	82.64	93.19	71.98
Roe	Value Share	0.12	0.12	0.07	0.07	0.08	0.05
Surimi	Value	168.29	82.41	100.00	135.27	166.40	125.17
Surimi	Price	132.11	90.01	100.00	85.32	93.01	68.58
Surimi	Quantity	127.39	91.56	100.00	158.55	178.91	182.50
Surimi	Value Share	0.35	0.22	0.25	0.27	0.31	0.27

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 - 2013

Species	Index Type	2006	2007	2008	2009	2010	2011	2012	2013
Aggregate	Value	150.89	142.25	167.33	111.62	100.00	156.20	170.01	147.54
Aggregate	Price	90.04	93.81	139.76	113.30	100.00	109.38	114.49	96.86
Aggregate	Quantity	167.57	151.64	119.73	98.52	100.00	142.81	148.50	152.33
PCOD	Value	184.21	199.14	243.03	82.00	100.00	150.42	211.13	162.02
PCOD	Price	157.17	181.92	228.71	99.14	100.00	110.19	128.40	98.60
PCOD	Quantity	117.21	109.47	106.26	82.71	100.00	136.51	164.43	164.32
PCOD	Value Share	0.18	0.21	0.21	0.11	0.15	0.14	0.18	0.16
PLCK	Value	151.11	136.75	161.47	120.61	100.00	159.89	169.66	153.61
PLCK	Price	82.20	83.77	132.53	121.00	100.00	108.25	113.49	98.28
PLCK	Quantity	183.83	163.25	121.84	99.68	100.00	147.70	149.50	156.29
PLCK	Value Share	0.78	0.74	0.75	0.84	0.77	0.79	0.77	0.81
SABL	Value	70.89	73.76	72.14	64.54	100.00	124.40	87.92	58.79
SABL	Price	54.07	52.52	68.93	60.45	100.00	119.92	82.74	66.67
SABL	Quantity	131.10	140.44	104.65	106.77	100.00	103.73	106.27	88.18
SABL	Value Share	0.03	0.04	0.03	0.04	0.07	0.06	0.04	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 - 2013

Gear	Index Type	2006	2007	2008	2009	2010	2011	2012	2013
Aggregate	Value	150.89	142.25	167.33	111.62	100.00	156.20	170.01	147.54
Aggregate	Price	90.04	93.81	139.76	113.30	100.00	109.38	114.49	96.86
Aggregate	Quantity	167.57	151.64	119.73	98.52	100.00	142.81	148.50	152.33
HAL	Value	47.86	28.50	55.73	58.57	100.00	125.88	95.50	64.42
HAL	Price	66.95	66.36	84.74	63.18	100.00	117.99	85.01	68.52
HAL	Quantity	71.48	42.95	65.76	92.71	100.00	106.69	112.34	94.02
HAL	Value Share	0.01	0.01	0.01	0.02	0.04	0.03	0.02	0.02
POT	Value	133.66	138.60	161.64	63.46	100.00	142.28	141.53	111.37
POT	Price	109.49	111.69	139.97	79.63	100.00	107.08	104.03	80.82
POT	Quantity	122.07	124.10	115.48	79.69	100.00	132.87	136.06	137.79
POT	Value Share	0.09	0.10	0.10	0.06	0.10	0.09	0.09	0.08
TWL	Value	158.13	148.38	173.59	120.15	100.00	159.42	177.21	156.10
TWL	Price	89.67	93.69	142.66	119.40	100.00	109.27	116.68	99.60
TWL	Quantity	176.35	158.36	121.68	100.63	100.00	145.89	151.87	156.72
TWL	Value Share	0.89	0.89	0.89	0.92	0.85	0.87	0.89	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 2008 - 2013

Species	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	94.10	81.61	100.00	137.15	102.42	73.31
Aggregate	Price	99.05	86.83	100.00	133.75	113.13	89.70
Aggregate	Quantity	95.00	94.00	100.00	102.54	90.53	81.73
AMCK	Value	53.39	104.58	100.00	128.59	93.58	129.59
AMCK	Price	70.48	101.32	100.00	131.79	139.95	132.36
AMCK	Quantity	75.76	103.22	100.00	97.57	66.87	97.90
AMCK	Value Share	0.02	0.03	0.03	0.03	0.02	0.05
FLAT	Value	110.61	101.94	100.00	166.17	136.88	123.85
FLAT	Price	114.93	98.17	100.00	129.62	138.23	114.13
FLAT	Quantity	96.25	103.84	100.00	128.20	99.02	108.52
FLAT	Value Share	0.18	0.19	0.16	0.19	0.21	0.26
PCOD	Value	106.95	67.92	100.00	116.02	70.59	33.46
PCOD	Price	132.28	88.63	100.00	112.75	101.51	77.56
PCOD	Quantity	80.85	76.64	100.00	102.89	69.54	43.15
PCOD	Value Share	0.30	0.22	0.27	0.23	0.18	0.12
PLCK	Value	46.70	124.47	100.00	134.33	109.44	114.21
PLCK	Price	115.08	104.28	100.00	123.51	113.65	106.48
PLCK	Quantity	40.58	119.36	100.00	108.76	96.29	107.26
PLCK	Value Share	0.01	0.02	0.01	0.01	0.01	0.02
ROCK	Value	67.64	68.11	100.00	138.27	122.51	71.66
ROCK	Price	80.43	78.91	100.00	156.71	126.33	86.89
ROCK	Quantity	84.09	86.31	100.00	88.23	96.97	82.47
ROCK	Value Share	0.25	0.29	0.35	0.35	0.42	0.34
SABL	Value	121.18	103.66	100.00	141.22	80.17	78.96
SABL	Price	83.22	84.74	100.00	127.63	79.27	78.12
SABL	Quantity	145.61	122.31	100.00	110.65	101.13	101.08
SABL	Value Share	0.23	0.23	0.18	0.19	0.14	0.20

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 2008 - 2013

Product	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	94.10	81.61	100.00	137.15	102.42	73.31
Aggregate	Price	99.05	86.83	100.00	133.75	113.13	89.70
Aggregate	Quantity	95.00	94.00	100.00	102.54	90.53	81.73
Head&Gut	Value	97.23	78.12	100.00	148.31	110.87	72.65
Head&Gut	Price	95.56	85.49	100.00	134.53	111.33	85.21
Head&Gut	Quantity	101.75	91.38	100.00	110.24	99.59	85.26
Head&Gut	Value Share	0.87	0.80	0.84	0.91	0.91	0.83
Other	Value	129.24	74.83	100.00	169.28	120.42	85.29
Other	Price	137.67	89.76	100.00	127.40	143.72	126.54
Other	Quantity	93.88	83.38	100.00	132.87	83.78	67.40
Other	Value Share	0.02	0.01	0.02	0.02	0.02	0.02
Whole	Value	71.94	102.63	100.00	68.50	51.16	76.18
Whole	Price	115.49	93.52	100.00	128.71	132.40	137.61
Whole	Quantity	62.29	109.75	100.00	53.22	38.64	55.36
Whole	Value Share	0.11	0.18	0.14	0.07	0.07	0.15

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 2008 - 2013

Species	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	96.69	73.95	100.00	127.90	122.89	111.35
Aggregate	Price	108.13	97.33	100.00	116.01	103.81	98.64
Aggregate	Quantity	89.42	75.98	100.00	110.25	118.38	112.88
FLAT	Value	183.40	143.27	100.00	124.12	99.47	130.80
FLAT	Price	109.81	101.67	100.00	116.62	124.84	133.59
FLAT	Quantity	167.01	140.92	100.00	106.43	79.68	97.91
FLAT	Value Share	0.08	0.08	0.04	0.04	0.03	0.05
OTHR	Value	79.21	66.23	100.00	29.29	170.31	164.80
OTHR	Price	96.57	73.86	100.00	27.36	171.03	148.90
OTHR	Quantity	82.03	89.68	100.00	107.06	99.58	110.68
OTHR	Value Share	0.01	0.01	0.01	0.00	0.02	0.02
PCOD	Value	110.14	67.72	100.00	131.68	118.93	102.56
PCOD	Price	143.95	105.21	100.00	120.63	109.27	114.24
PCOD	Quantity	76.51	64.36	100.00	109.17	108.83	89.77
PCOD	Value Share	0.38	0.31	0.33	0.34	0.32	0.31
PLCK	Value	71.96	52.17	100.00	109.52	132.70	140.75
PLCK	Price	116.06	109.12	100.00	94.08	91.12	92.93
PLCK	Quantity	62.00	47.81	100.00	116.41	145.64	151.47
PLCK	Value Share	0.19	0.18	0.25	0.21	0.27	0.32
ROCK	Value	78.17	76.85	100.00	129.77	158.13	115.80
ROCK	Price	90.95	98.51	100.00	133.21	143.31	112.32
ROCK	Quantity	85.95	78.02	100.00	97.42	110.34	103.10
ROCK	Value Share	0.04	0.05	0.05	0.05	0.07	0.05
SABL	Value	94.09	88.69	100.00	143.05	114.56	91.31
SABL	Price	79.18	83.93	100.00	130.12	97.42	79.20
SABL	Quantity	118.84	105.67	100.00	109.93	117.59	115.29
SABL	Value Share	0.30	0.37	0.31	0.35	0.29	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 2008 - 2013

Product	Index Type	2008	2009	2010	2011	2012	2013
Aggregate	Value	96.69	73.95	100.00	127.90	122.89	111.35
Aggregate	Price	108.13	97.33	100.00	116.01	103.81	98.64
Aggregate	Quantity	89.42	75.98	100.00	110.25	118.38	112.88
Fillet	Value	84.79	73.50	100.00	112.14	105.25	115.95
Fillet	Price	132.09	102.07	100.00	107.84	101.25	108.48
Fillet	Quantity	64.19	72.01	100.00	103.99	103.95	106.88
Fillet	Value Share	0.24	0.28	0.28	0.24	0.24	0.29
Head&Gut	Value	94.47	75.51	100.00	144.02	128.48	103.10
Head&Gut	Price	93.83	92.45	100.00	125.07	103.73	93.10
Head&Gut	Quantity	100.68	81.67	100.00	115.15	123.87	110.75
Head&Gut	Value Share	0.47	0.49	0.48	0.54	0.50	0.45
Other	Value	133.96	93.46	100.00	122.71	128.68	107.86
Other	Price	102.97	104.12	100.00	108.59	109.25	110.54
Other	Quantity	130.10	89.77	100.00	113.00	117.78	97.57
Other	Value Share	0.12	0.11	0.09	0.08	0.09	0.08
Roe	Value	188.05	91.75	100.00	181.81	256.25	285.60
Roe	Price	185.02	172.60	100.00	159.73	169.37	143.37
Roe	Quantity	101.64	53.16	100.00	113.82	151.29	199.21
Roe	Value Share	0.04	0.02	0.02	0.03	0.04	0.05
Surimi	Value	85.12	36.47	100.00	90.51	126.75	93.97
Surimi	Price	127.34	93.78	100.00	83.68	83.72	71.40
Surimi	Quantity	66.84	38.89	100.00	108.17	151.40	131.61
Surimi	Value Share	0.07	0.04	0.08	0.06	0.08	0.07
Whole	Value	98.55	98.44	100.00	132.45	116.06	159.51
Whole	Price	112.13	96.51	100.00	133.44	131.57	127.14
Whole	Quantity	87.89	102.00	100.00	99.25	88.21	125.46
Whole	Value Share	0.04	0.05	0.04	0.04	0.04	0.05

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 - 2013

Species	Index Type	2006	2007	2008	2009	2010	2011	2012	2013
Aggregate	Value	86.87	94.20	106.33	80.19	100.00	133.92	134.86	100.83
Aggregate	Price	87.87	97.12	109.32	94.40	100.00	123.93	115.44	92.30
Aggregate	Quantity	98.86	96.99	97.26	84.94	100.00	108.06	116.82	109.25
FLAT	Value	134.12	151.91	174.41	142.05	100.00	104.55	88.59	115.07
FLAT	Price	129.18	142.82	132.49	123.80	100.00	102.61	127.81	131.35
FLAT	Quantity	103.83	106.36	131.64	114.74	100.00	101.89	69.32	87.60
FLAT	Value Share	0.05	0.05	0.05	0.05	0.03	0.02	0.02	0.03
OTHR	Value	57.62	61.19	112.48	96.53	100.00	143.21	147.81	142.64
OTHR	Price	61.64	90.80	140.22	91.86	100.00	141.22	150.64	142.57
OTHR	Quantity	93.47	67.38	80.21	105.08	100.00	101.41	98.12	100.05
OTHR	Value Share	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
PCOD	Value	93.96	126.77	148.67	72.07	100.00	143.67	146.57	92.35
PCOD	Price	151.71	190.51	202.60	112.08	100.00	127.76	135.52	102.23
PCOD	Quantity	61.93	66.54	73.38	64.30	100.00	112.45	108.15	90.34
PCOD	Value Share	0.25	0.32	0.33	0.21	0.23	0.25	0.26	0.21
PLCK	Value	73.17	56.93	68.02	54.23	100.00	97.71	133.89	126.58
PLCK	Price	78.20	83.59	104.87	100.48	100.00	93.06	99.00	101.78
PLCK	Quantity	93.58	68.10	64.86	53.97	100.00	104.99	135.25	124.37
PLCK	Value Share	0.15	0.11	0.11	0.12	0.18	0.13	0.18	0.22
ROCK	Value	108.52	126.60	122.28	74.61	100.00	106.73	209.60	161.53
ROCK	Price	120.74	125.48	127.56	84.87	100.00	118.07	187.66	153.75
ROCK	Quantity	89.87	100.89	95.86	87.91	100.00	90.40	111.69	105.06
ROCK	Value Share	0.03	0.03	0.03	0.02	0.02	0.02	0.04	0.04
SABL	Value	85.33	88.24	95.66	88.98	100.00	144.43	129.02	91.59
SABL	Price	66.18	68.61	79.80	85.33	100.00	133.50	108.06	78.65
SABL	Quantity	128.94	128.62	119.87	104.28	100.00	108.19	119.40	116.45
SABL	Value Share	0.51	0.49	0.47	0.58	0.52	0.57	0.50	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 - 2013

Gear	Index Type	2006	2007	2008	2009	2010	2011	2012	2013
Aggregate	Value	86.87	94.20	106.33	80.19	100.00	133.92	134.86	100.83
Aggregate	Price	87.87	97.12	109.32	94.40	100.00	123.93	115.44	92.30
Aggregate	Quantity	98.86	96.99	97.26	84.94	100.00	108.06	116.82	109.25
HAL	Value	86.22	91.10	101.47	89.25	100.00	142.30	133.44	92.34
HAL	Price	72.73	76.90	89.30	87.14	100.00	132.87	110.93	81.49
HAL	Quantity	118.55	118.47	113.62	102.42	100.00	107.10	120.30	113.31
HAL	Value Share	0.56	0.54	0.54	0.62	0.56	0.60	0.56	0.51
POT	Value	98.31	124.23	142.90	69.87	100.00	165.98	143.49	90.94
POT	Price	145.16	177.85	204.85	110.81	100.00	126.28	133.74	101.33
POT	Quantity	67.73	69.85	69.76	63.05	100.00	131.44	107.29	89.74
POT	Value Share	0.15	0.17	0.18	0.11	0.13	0.16	0.14	0.12
TWL	Value	83.18	87.04	99.60	68.05	100.00	104.94	133.77	120.56
TWL	Price	102.79	116.77	122.33	104.13	100.00	105.86	115.74	108.11
TWL	Quantity	80.92	74.54	81.42	65.35	100.00	99.14	115.58	111.52
TWL	Value Share	0.29	0.28	0.29	0.26	0.31	0.24	0.31	0.37

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 2013. This is because these prices are derived from the Commercial Operators Annual Report. 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 pricing data available was for the previous year. To provide recent information, current prices are estimated ("nowcast") using corresponding export prices. Furthermore, first-wholesale prices are projected out over the next 4 years (2015-2018). 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 city 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 2011-2016. Prices between 2011-2013 are realized (actual) first-wholesale prices. The summary data provided for the years 2014-2016 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, 2014, 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 2014-2018. 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

Table 6.1: Groundfish Product Price Projection Summary

Species	Product	stat.	2011	2012	2013	2014	2015	2016
pollock	surimi	mean	1.281	1.422	1.005	1.044	0.98	0.998
pollock	surimi	conf.int.90				[1.03,1.06]	[0.89,1.08]	[0.9,1.12]
pollock	roe	mean	3.595	4.226	3.253	2.675	2.901	3.109
pollock	roe	conf.int.90				[2.63,2.72]	[2.67,3.17]	[2.71,3.58]
pollock	fillet	mean	1.5	1.469	1.354	1.351	1.409	1.418
pollock	fillet	conf.int.90				[1.33,1.37]	[1.31,1.52]	[1.29,1.56]
pollock	deep-skin fillet	mean	1.679	1.688	1.622	1.646	1.675	1.707
pollock	deep-skin fillet	conf.int.90				[1.63,1.66]	[1.59,1.77]	[1.59,1.84]
pollock	other products	mean	0.715	0.668	0.687	0.736	0.801	0.845
pollock	other products	conf.int.90				[0.72,0.75]	[0.74,0.86]	[0.78,0.91]
pacific cod	fillet	mean	3.052	2.953	2.993	2.89	3.043	3.17
pacific cod	fillet	conf.int.90				[2.87,2.91]	[2.83,3.27]	[2.88,3.5]
pacific cod	head and gut	mean	1.491	1.343	1.011	0.988	1.045	1.084
pacific cod	head and gut	conf.int.90				[0.97,1.01]	[0.96,1.14]	[0.96,1.23]
pacific cod	other products	mean	0.918	0.792	0.699	0.632	0.625	0.655
pacific cod	other products	conf.int.90				[0.62,0.64]	[0.58,0.67]	[0.58,0.74]
sablefish	head and gut	mean	9.145	6.837	5.774	5.982	6.474	6.886
sablefish	head and gut	conf.int.90				[5.83,6.11]	[5.89,7.1]	[6.03,7.88]
yellowfin (bsai)	head and gut	mean	0.651	0.628	0.506	0.517	0.531	0.542
yellowfin (bsai)	head and gut	conf.int.90				[0.51,0.52]	[0.5,0.57]	[0.49,0.6]
rock sole (bsai)	head and gut with roe	mean	1.048	1.278	0.855	0.83	0.85	0.854
rock sole (bsai)	head and gut with roe	conf.int.90				[0.82,0.84]	[0.78,0.93]	[0.78,0.94]
rock sole (bsai)	head and gut	mean	0.694	0.804	0.541	0.558	0.581	0.595
rock sole (bsai)	head and gut	conf.int.90				[0.54,0.57]	[0.53,0.64]	[0.53,0.67]
greenland turbot (bsai)	head and gut	mean	2.648	2.094	1.951	2.052	2.062	2.107
greenland turbot (bsai)	head and gut	conf.int.90				[1.98,2.12]	[1.84,2.33]	[1.86,2.4]
arrowtooth	head and gut	mean	0.694	0.811	0.545	0.574	0.771	0.781
arrowtooth	head and gut	conf.int.90				[0.55,0.6]	[0.67,0.89]	[0.68,0.9]
flathead sole	head and gut	mean	0.895	0.929	1.066	1.116	1.141	1.156
flathead sole	head and gut	conf.int.90				[1.1,1.13]	[1.07,1.22]	[1.04,1.29]
rex sole (goa)	whole fish	mean	1.115	1.119	1.21	1.154	1.128	1.135
rex sole (goa)	whole fish	conf.int.90				[1.14,1.16]	[1.06,1.2]	[1.05,1.24]

shallow-water flatfish (goa)	fillet	mean	2.057	2.154	1.618	1.488	1.562	1.558
shallow-water flatfish (goa)	fillet	conf.int.90				[1.46,1.51]	[1.43,1.7]	[1.4,1.74]
atka mackerel	head and gut	mean	1.152	1.239	1.326	1.421	1.461	1.505
atka mackerel	head and gut	conf.int.90				[1.38,1.46]	[1.29,1.66]	[1.27,1.8]
rockfish	head and gut	mean	1.707	1.454	1.054	1.099	1.167	1.183
rockfish	head and gut	conf.int.90				[1.08,1.11]	[1.06,1.28]	[1.02,1.37]

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 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 2013 (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).

First-wholesale surimi price projections for 2014 show an marginal increase from the 2013 price (Figure 6.1; Table 6.2). Confidence bounds for 2014 are relatively narrow as export prices provide a reasonably good prediction of the state of surimi prices. The model projects a subsequent drop in 2015 as prices revert to their historical trends. The gradual downward trend is a muted continuation of the trend that started in 2009. Confidence bounds in 2015 and beyond reflect the substantial historical volatility in surimi returns.

Figure 6.1: Pollock Surimi Price Projections and Confidence Bounds

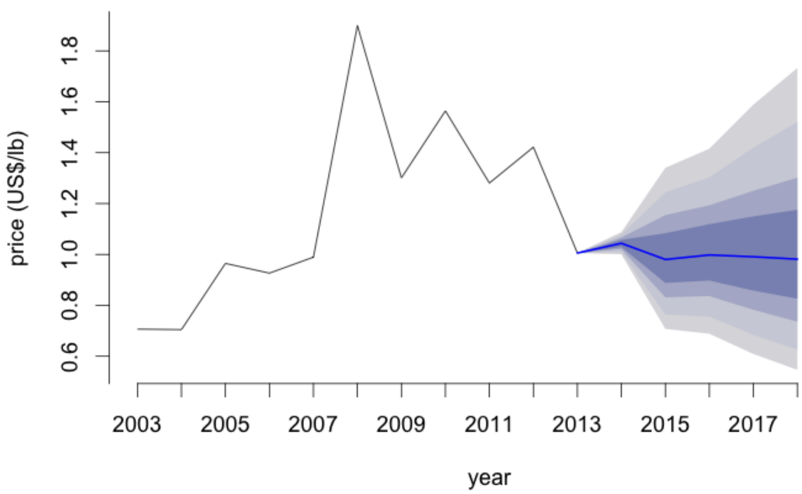

Table 6.2: Projected Mean, Probability Bounds of First-wholesale Pollock Surimi Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.00	1.01	1.02	1.03	1.04	1.04	1.06	1.07	1.08	1.09
2015	0.71	0.76	0.83	0.89	0.98	0.98	1.08	1.15	1.24	1.34
2016	0.69	0.76	0.84	0.90	1.00	1.01	1.12	1.19	1.30	1.42
2017	0.61	0.68	0.78	0.86	0.99	0.99	1.15	1.25	1.42	1.59
2018	0.55	0.63	0.74	0.83	0.98	0.99	1.18	1.30	1.52	1.73

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.	2015	2016	2017	2018	Long-run
20.61	20.60	20.60	20.60	20.60	20.60

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 has remained strong throughout 2014. Media reports indicate that A season surimi prices may have dropped slightly from 2013 but B season prices have increased (Undercurrent, 2014e). Price projections estimate the 2014 first-wholesale fillet price to remain basically unchanged from 2013 (Figure 6.2). Small increases or decreases in the price are possible as prices within the range of $1.30/lb to $1.41/lb (the 90% confidence bounds) are plausible. Mean estimates of fillet prices for 2015 and beyond indicate that based on previous trends fillet prices are expected in increase slightly but not substantially. Volatility projections indicate that there in no expected change in the future volatility.

Figure 6.2: Pollock Fillet Price Projections and Confidence Bounds

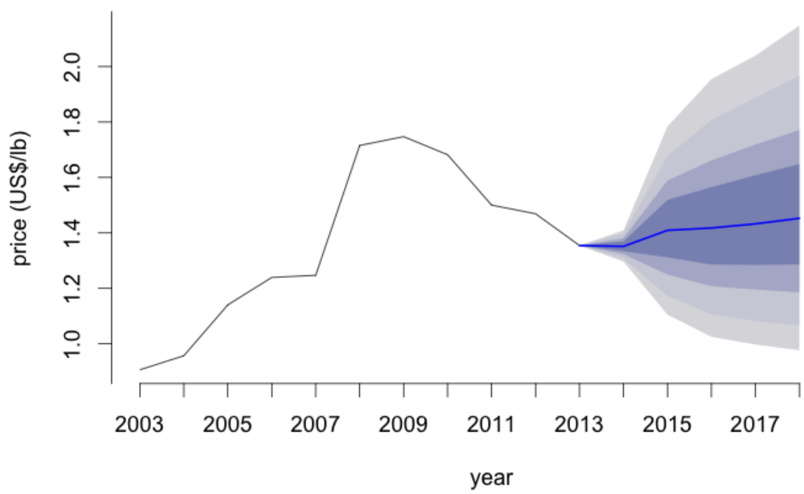

Table 6.3: Projected Mean, Probability Bounds of First-wholesale Pollock Fillet Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.30	1.31	1.32	1.33	1.35	1.35	1.37	1.38	1.40	1.41
2015	1.11	1.17	1.25	1.31	1.41	1.42	1.52	1.59	1.68	1.78
2016	1.03	1.11	1.21	1.29	1.42	1.42	1.56	1.66	1.81	1.95
2017	1.00	1.08	1.20	1.28	1.43	1.43	1.61	1.72	1.89	2.04
2018	0.98	1.07	1.19	1.29	1.45	1.46	1.65	1.77	1.97	2.15

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.	2015	2016	2017	2018	Long-run
14.84	14.84	14.84	14.84	14.84	14.84

Deep-skin fillet price projections show little change between 2013 and 2014 with a marginal increase first-wholesale prices to $1.35/lb (Figure 6.3). Confidence bounds show that the 2014 deep-skin price is estimated to range from $1.59/lb to $1.70/lb so increase or decreases over the 2013 price are possible. Media reports indicate that domestic deep-skin production may drop some as some buyer are switching to pin-bone-out (PBO) which could ultimately result in a drop in the deep-skin price (Undercurrent, 2014f). The reduced domestic demand could result in a drop in the domestic deep-skin price that isn’t being captured in the 2014 estimates. 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

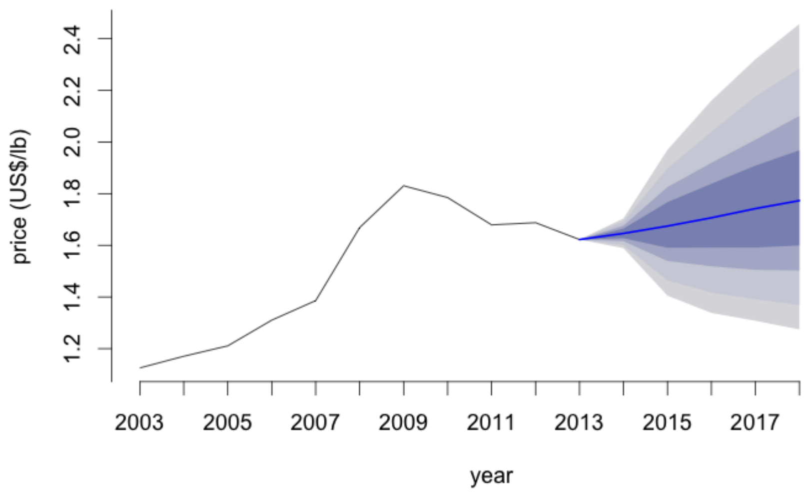

Table 6.4: Projected Mean, Probability Bounds of First-wholesale Pollock Deep-skin-fillet Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.59	1.60	1.62	1.63	1.65	1.65	1.66	1.68	1.69	1.70
2015	1.41	1.47	1.54	1.59	1.67	1.68	1.77	1.83	1.90	1.97
2016	1.34	1.42	1.52	1.59	1.71	1.71	1.84	1.92	2.04	2.16
2017	1.31	1.39	1.51	1.59	1.74	1.74	1.91	2.01	2.18	2.32
2018	1.27	1.37	1.50	1.60	1.77	1.77	1.97	2.10	2.28	2.46

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.	2015	2016	2017	2018	Long-run
10.90	10.76	10.86	10.92	10.97	11.17

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).

The first-wholesale pollock roe price is projected to continue its decline dropping from $3.25/lb in 2013 to $2.67/lb in 2014 (Figure 6.4). Confidence bounds for 2014 place the roe price are within ± 5% of the projected 2014 price. Projections beyond 2014 show some reversion to slightly higher prices in 2015 and 2016. There is considerable volatility in roe returns which could increase. 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

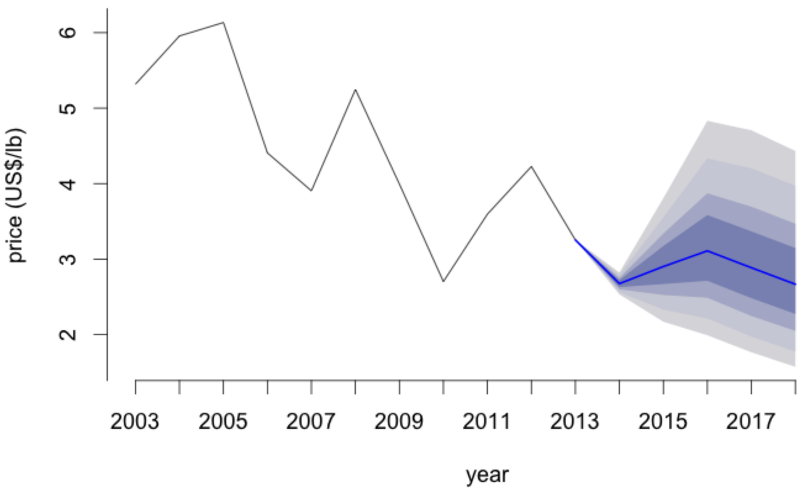

Table 6.5: Projected Mean, Probability Bounds of First-wholesale Pollock Roe Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	2.53	2.56	2.60	2.63	2.67	2.67	2.72	2.75	2.79	2.82
2015	2.17	2.33	2.53	2.67	2.90	2.92	3.17	3.34	3.55	3.81
2016	1.99	2.21	2.49	2.71	3.11	3.11	3.58	3.87	4.33	4.83
2017	1.77	1.97	2.25	2.48	2.89	2.89	3.37	3.69	4.20	4.71
2018	1.57	1.78	2.05	2.27	2.67	2.68	3.15	3.47	3.97	4.43

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.	2015	2016	2017	2018	Long-run
20.10	17.69	20.32	19.91	20.28	20.22

The 'other products' category encompasses a wide array of product types. Price projections in next year's Economic Status Report may breakout some of these product types further. Pollock H&G and fishmeal have seen some significant changes over the recent years. Between 2009 and 2013 fishmeal production has increased 54% with a corresponding 43% increase in prices as well (Tables 25 and 26). H&G prices and production rose at a more modest rate with each increasing roughly 8% over the same time frame. These increases have resulted in the 2013 value of $100 million from H&G and $93 million from fishmeal, almost on par with roe which grossed $116 million. Furthermore, media reports indicated further growth in these product forms mid-way through 2014 (Seafoodnews, 2014c; Undercurrent, 2014g,h). The first-wholesale price of pollock's 'other products' is projected to increase from $0.69/lb to $0.74/lb between 2013 and 2014 (Figure 6.5). Confidence bounds for 2014 are within approximately ± 7% of the projected first-wholesale price and indicate a high probability of an actual price increase. Based on the upward historical trend in this product, aggregate prices for 2015 and beyond are projected to rise steadily.

Figure 6.5: Pollock Other-products Price Projections and Confidence Bounds

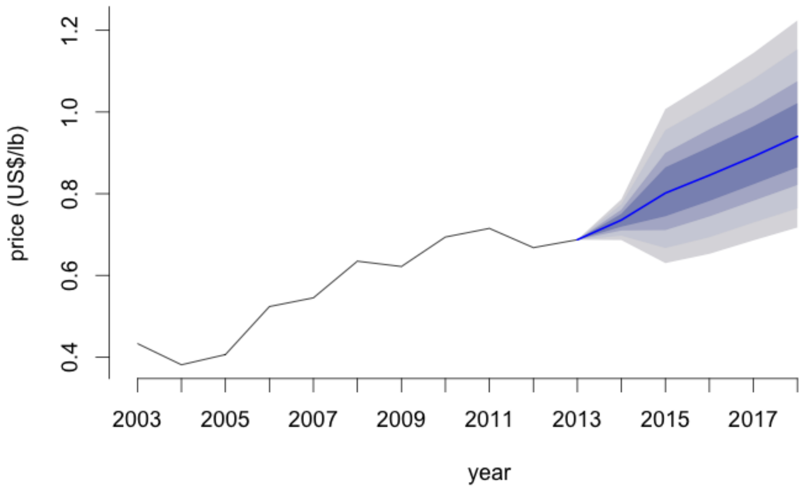

Table 6.6: Projected Mean, Probability Bounds of First-wholesale Pollock Other-products Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.69	0.70	0.71	0.72	0.74	0.73	0.75	0.76	0.77	0.79
2015	0.63	0.67	0.71	0.74	0.80	0.80	0.86	0.90	0.96	1.01
2016	0.65	0.69	0.74	0.78	0.85	0.85	0.91	0.96	1.02	1.07
2017	0.69	0.73	0.78	0.82	0.89	0.89	0.97	1.01	1.08	1.14
2018	0.72	0.76	0.82	0.86	0.94	0.94	1.02	1.08	1.15	1.22

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 Other-products Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
14.80	14.61	15.21	15.39	15.45	15.50

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, 2014i).

Pacific cod prices are showing improvement in 2014 as strong demand has put upward pressure on prices according to media reports mid-way through the 2014 (Undercurrent, 2014i). 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). Demand from the European market, which is the price leader for Atlantic cod (GLOBEFISH, 2014).

Pacific cod is mainly produced into the H&G product form, though fillets constitute a significant portion of the output (Table 25). After falling 25% from 2012 levels to $1.01/lb in 2013, first-wholesale prices are estimated to be relatively stable through 2014. The projected first-wholesale H&G price 90% confidence bound ranges from $0.93/lb to $1.05/lb with a mean of $0.99/lb indicating that year-over-year price could go up or down (Figure 6.6). In 2015 and beyond there is considerable uncertainty in the H&G cod price reflecting the historical and projected volatility.

Figure 6.6: Pacific-cod Head-and-gut Price Projections and Confidence Bounds

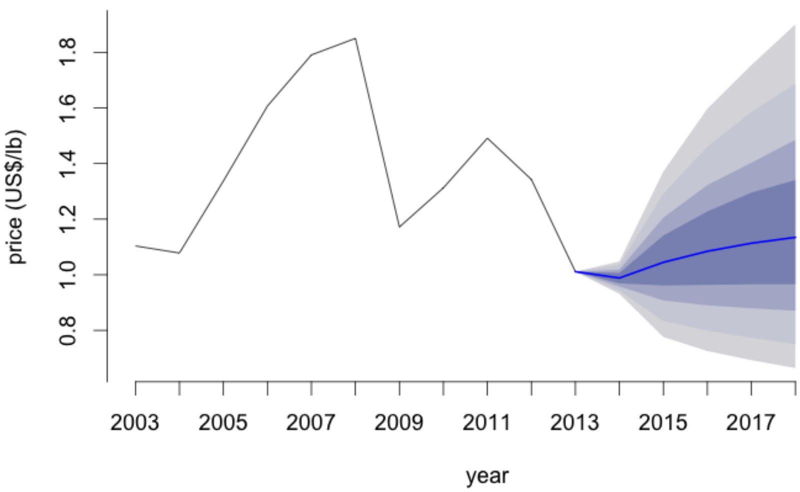

Table 6.7: Projected Mean, Probability Bounds of First-wholesale Pacific-cod Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.93	0.94	0.96	0.97	0.99	0.99	1.01	1.02	1.03	1.05
2015	0.78	0.83	0.91	0.96	1.04	1.05	1.14	1.21	1.29	1.37
2016	0.73	0.80	0.89	0.96	1.08	1.09	1.23	1.32	1.46	1.60
2017	0.69	0.77	0.88	0.97	1.11	1.12	1.30	1.40	1.58	1.75
2018	0.66	0.75	0.87	0.97	1.13	1.14	1.34	1.49	1.69	1.90

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.	2015	2016	2017	2018	Long-run
19.07	18.44	18.51	18.57	18.63	17.88

First-wholesale fillet prices are projected to decrease from $2.99/lb in 2013 to $2.89/lb in 2014 (Figure 6.7). Confidence bounds place the final 2014 price between $2.83/lb and $2.95/lb with 90% probability so some drop in fillet seems likely. If cod prices in 2015 and beyond revert back to their historical trajectory then future cod fillet prices will be increasing. Though not quite as high as cod H&G, there is still considerable uncertainty in future projections.

Figure 6.7: Pacific-cod Fillet Price Projections and Confidence Bounds

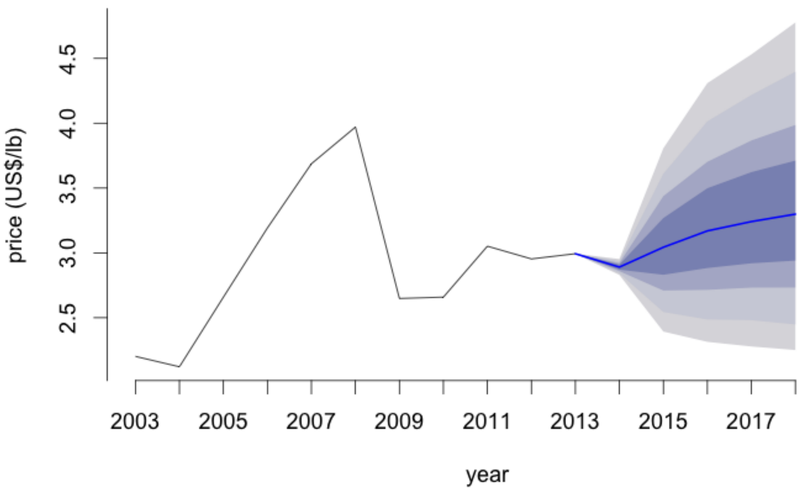

Table 6.8: Projected Mean, Probability Bounds of First-wholesale Pacific-cod Fillet Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	2.83	2.84	2.86	2.87	2.89	2.89	2.91	2.92	2.94	2.95
2015	2.39	2.54	2.71	2.83	3.04	3.06	3.27	3.44	3.61	3.81
2016	2.31	2.49	2.72	2.88	3.17	3.18	3.50	3.70	4.01	4.31
2017	2.28	2.48	2.73	2.92	3.24	3.25	3.62	3.87	4.22	4.53
2018	2.25	2.45	2.73	2.94	3.30	3.32	3.71	3.99	4.40	4.78

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.

Pacific-cod Fillet Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
15.17	15.18	15.25	15.28	15.29	15.31

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. Projections for these other product forms show that prices will continue to decline in 2014 but are expected to level off thereafter (Figure 6.8).

6.4.3 Sablefish

The sablefish first-wholesale price went from $4.80/lb in 2007, to a record high of $9.14/lb in 2011. Subsequently, year-over-year prices dropped 25% in 2012 and 15% in 2013 to $5.77/lb (Figure 6.9). 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 in 2013 may be attributable to the weakening of the 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

Figure 6.8: Pacific-cod Other-products Price Projections and Confidence Bounds

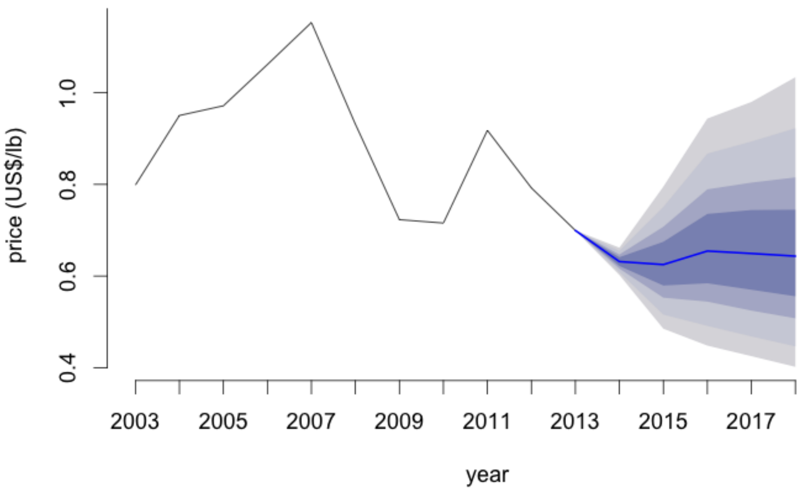

Table 6.9: Projected Mean, Probability Bounds of First-wholesale Pacific-cod Other-products Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.60	0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.66	0.66
2015	0.49	0.52	0.55	0.58	0.63	0.63	0.67	0.71	0.75	0.80
2016	0.45	0.49	0.54	0.58	0.65	0.66	0.74	0.79	0.87	0.94
2017	0.43	0.47	0.52	0.57	0.65	0.65	0.74	0.80	0.89	0.98
2018	0.40	0.45	0.51	0.56	0.64	0.65	0.74	0.82	0.92	1.03

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.

Pacific-cod Other-products Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
15.82	15.60	15.52	15.43	15.33	16.15

more rapidly. Prices in 2014 are expected to be more stable and may even increase with supply constrained by the 10% reduction in the 2014 Alaskan sablefish quota (Fishchoice, 2014b).

The projected 2014 first-wholesale sablefish H&G price of $5.98/lb coincides with media report. However, 90% confidence bounds span $5.55/lb to $6.44/lb (Figure 6.9). Relative to the 2013 price of $5.77/lb the lower bound would be a 3% decrease in price while the upper bound would be an 11% increase. Thus, it is likely that the price will increase, and it is likely that the price will be more stable as the percent change in price will be significantly smaller than the changes seen in previous years. The models project that if prices revert to their historical trend they will continue to increase at a gradual pace through 2018. 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, there is a high degree of uncertainty in future sablefish H&G prices.

Figure 6.9: Sablefish Head-and-gut Price Projections and Confidence Bounds

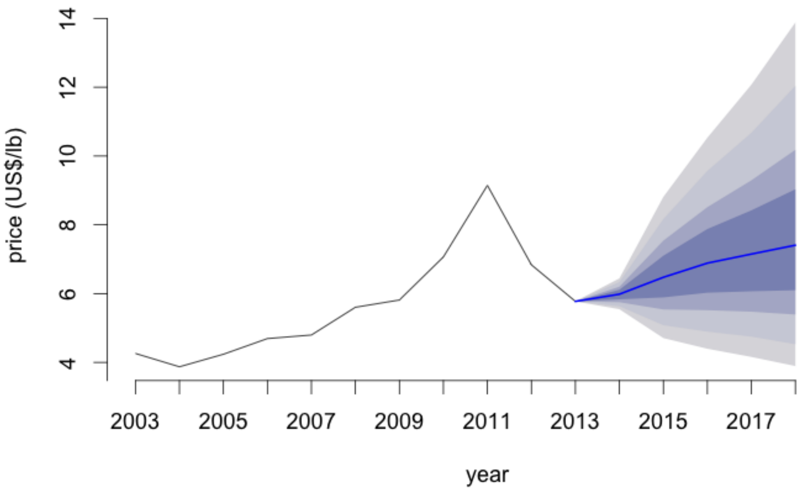

Table 6.10: Projected Mean, Probability Bounds of First-wholesale Sablefish Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	5.55	5.64	5.75	5.83	5.98	5.98	6.11	6.20	6.33	6.44
2015	4.71	5.08	5.54	5.89	6.47	6.49	7.10	7.54	8.16	8.81
2016	4.40	4.90	5.52	6.03	6.89	6.91	7.88	8.51	9.56	10.53
2017	4.16	4.75	5.48	6.07	7.15	7.16	8.42	9.29	10.67	12.07
2018	3.89	4.53	5.39	6.10	7.41	7.41	9.03	10.18	12.04	13.88

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.	2015	2016	2017	2018	Long-run
14.98	19.23	21.59	24.56	28.42	13.28

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, 2014j). Atka mackerel first-wholesale price projections indicate that prices will continue to increase in 2014 through 2018 (Figure 6.9). This projected increase is based on the historical trend and substantial changes in production through the increased TACs and could mitigate or reverse the upward trend in price. There is a high degree of volatility historically which is projected to persist through 2018.

Figure 6.10: Atka-mackerel Head-and-gut Price Projections and Confidence Bounds

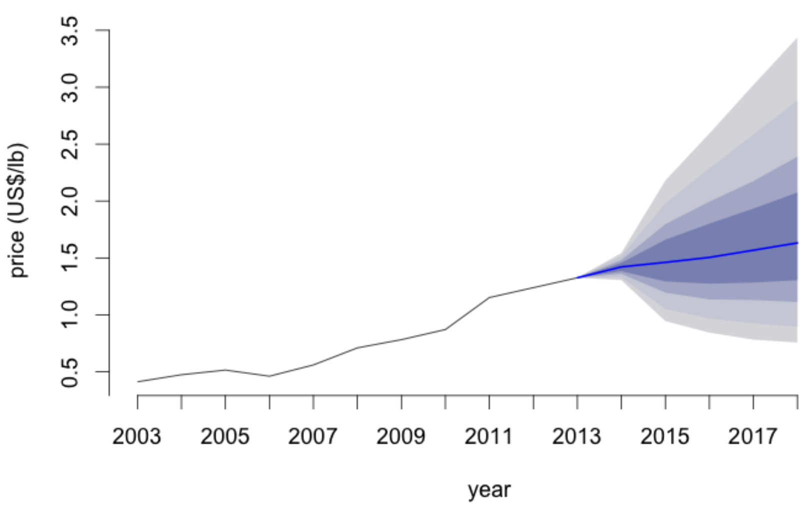

Table 6.11: Projected Mean, Probability Bounds of First-wholesale Atka-mackerel Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.31	1.33	1.36	1.38	1.42	1.42	1.46	1.48	1.52	1.54
2015	0.95	1.05	1.20	1.29	1.46	1.47	1.66	1.80	1.98	2.18
2016	0.84	0.97	1.14	1.27	1.50	1.52	1.80	1.99	2.29	2.59
2017	0.78	0.93	1.13	1.28	1.57	1.59	1.93	2.17	2.58	3.02
2018	0.76	0.90	1.11	1.31	1.63	1.64	2.07	2.39	2.88	3.44

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.

Atka-mackerel Head-and-gut Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
25.92	25.92	25.92	25.92	25.92	25.92

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, 2014k). 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, 2014).

Yellowfin Sole

After 2008, prices for yellowfin sole steadily increased, potentially due to decreases in the availability of substitute groundfish species such as pollock (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 6.11 and 10.51). 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). From 2013 to 2014 the Yellowfin sole TAC increased from 184,000 metric tons to 198,000 metric tons (NFCS, 2014). However, this need not translate into an increase in yellowfin production as catch can be less than the TAC. In 2014, the multi-species Alaska flatfish fishery became RFM certified (Undercurrent, 2014l). Supply of yellowfin sole may be reduced in 2015 as a result of expected increases in quotas of Atka mackerel (Undercurrent, 2014m).

The 2014 first-wholesale prices are projected to remain basically unchanged with a marginal increase from $0.51/lb in 2013 to $0.52/lb in 2014 (Figure 6.11). Yellowfin sole is a species that has a distinct export definition and substantial share of production is exported. Hence, export prices provide fairly precise prediction of first-wholesale prices. The 90% confidence bound for prices place prices in the range of $0.50/lb and $0.54/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 6.11: Yellowfin-(BSAI) Head-and-gut Price Projections and Confidence Bounds

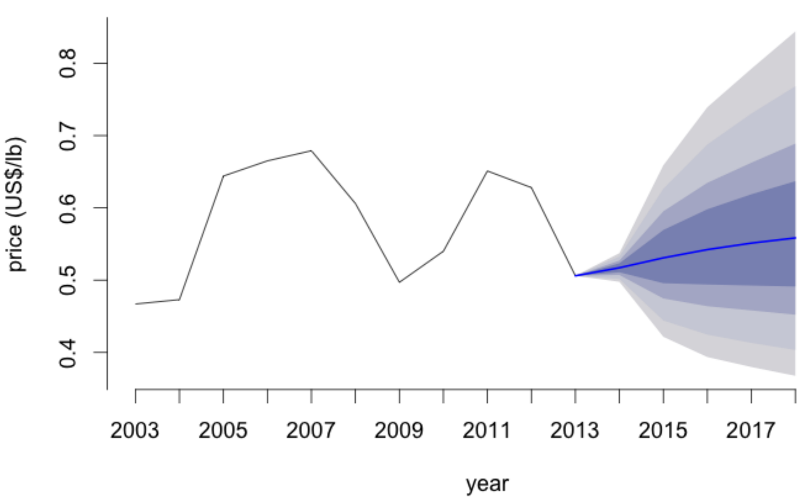

Table 6.12: Projected Mean, Probability Bounds of First-wholesale Yellowfin-(BSAI) Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.50	0.50	0.51	0.51	0.52	0.52	0.52	0.53	0.53	0.54
2015	0.42	0.44	0.47	0.50	0.53	0.53	0.57	0.60	0.63	0.66
2016	0.39	0.42	0.46	0.49	0.54	0.54	0.60	0.63	0.69	0.74
2017	0.38	0.41	0.46	0.49	0.55	0.55	0.62	0.66	0.73	0.79
2018	0.37	0.40	0.45	0.49	0.56	0.56	0.64	0.69	0.77	0.84

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.	2015	2016	2017	2018	Long-run
14.15	14.20	14.21	14.22	14.23	14.21

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 6.12 and 6.13). 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 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.

Projections indicate rather small changes in 2014 rock sole H&G with roe and H&G (without roe) first-wholesale prices. H&G with roe is projected to decrease slightly from $0.86/lb in 2013 to $0.83/lb in 2014. H&G (without roe) is projected to increase slightly from $0.54/lb in 2013 to $0.56/lb in 2014. Confidence bounds are moderately sized showing that 2014 marginal increases or decreases are possible. The rock sole export definition does not distinguish between H&G with roe and H&G (without roe) showing that export prices. Projections for 2015 prices and beyond do not exhibit significant trends; H&G with roe is projected to decrease slightly and H&G is projected to increase slightly over time. However, the projected volatility of prices is large enough to create a wide range of future prices.

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

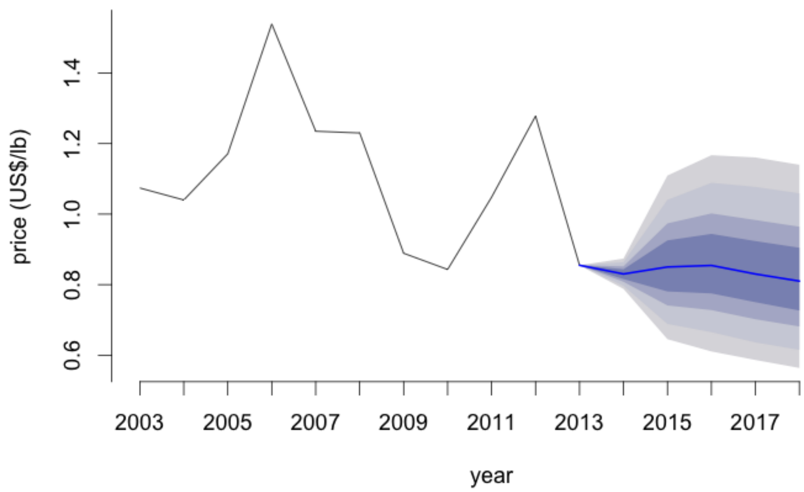

Table 6.13: Projected Mean, Probability Bounds of First-wholesale Rock-sole-(BSAI) Head-and-gut-with-roe Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.79	0.80	0.81	0.82	0.83	0.83	0.84	0.85	0.86	0.87
2015	0.65	0.69	0.74	0.78	0.85	0.85	0.93	0.97	1.04	1.11
2016	0.61	0.67	0.73	0.78	0.85	0.86	0.94	1.00	1.09	1.17
2017	0.59	0.64	0.70	0.75	0.83	0.83	0.92	0.98	1.08	1.16
2018	0.56	0.62	0.68	0.73	0.81	0.81	0.90	0.96	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.	2015	2016	2017	2018	Long-run
17.22	17.32	17.23	17.23	17.22	17.20

Figure 6.13: Rock-sole-(BSAI) Head-and-gut Price Projections and Confidence Bounds

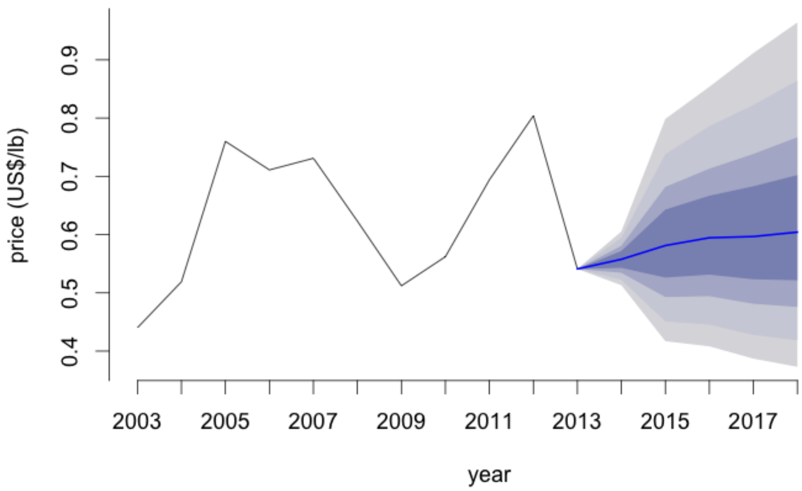

Table 6.14: Projected Mean, Probability Bounds of First-wholesale Rock-sole-(BSAI) Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.51	0.52	0.53	0.54	0.56	0.56	0.57	0.58	0.59	0.61
2015	0.42	0.45	0.49	0.53	0.58	0.58	0.64	0.68	0.74	0.80
2016	0.41	0.45	0.49	0.53	0.59	0.60	0.67	0.71	0.79	0.85
2017	0.39	0.43	0.48	0.52	0.60	0.60	0.68	0.74	0.82	0.91
2018	0.37	0.42	0.48	0.52	0.60	0.61	0.70	0.77	0.86	0.96

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.	2015	2016	2017	2018	Long-run
22.77	20.34	21.11	21.78	22.61	20.85

Other Flatfish

The market shares for other flatfish fisheries are comparatively smaller. These include arrowtooth flounder, flathead sole, greenland turbot, rex sole and the shallow water flatfish complex. 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 6.14: Arrowtooth Head-and-gut Price Projections and Confidence Bounds

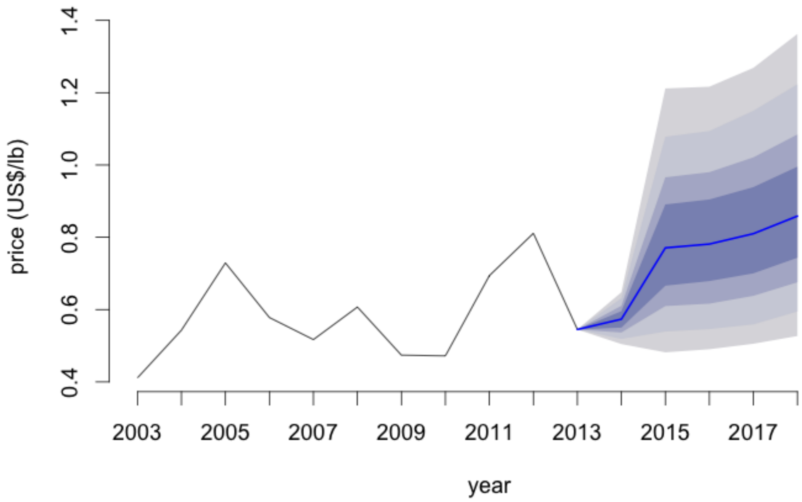

Table 6.15: Projected Mean, Probability Bounds of First-wholesale Arrowtooth Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	0.50	0.52	0.54	0.55	0.57	0.57	0.60	0.61	0.63	0.65
2015	0.48	0.54	0.61	0.67	0.77	0.78	0.89	0.97	1.08	1.21
2016	0.49	0.55	0.62	0.68	0.78	0.79	0.90	0.98	1.09	1.22
2017	0.51	0.56	0.64	0.70	0.81	0.81	0.94	1.02	1.15	1.27
2018	0.53	0.59	0.68	0.74	0.86	0.86	1.00	1.08	1.22	1.36

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.	2015	2016	2017	2018	Long-run
28.06	27.93	28.02	28.06	28.06	29.18

Figure 6.15: Flathead-sole Head-and-gut Price Projections and Confidence Bounds

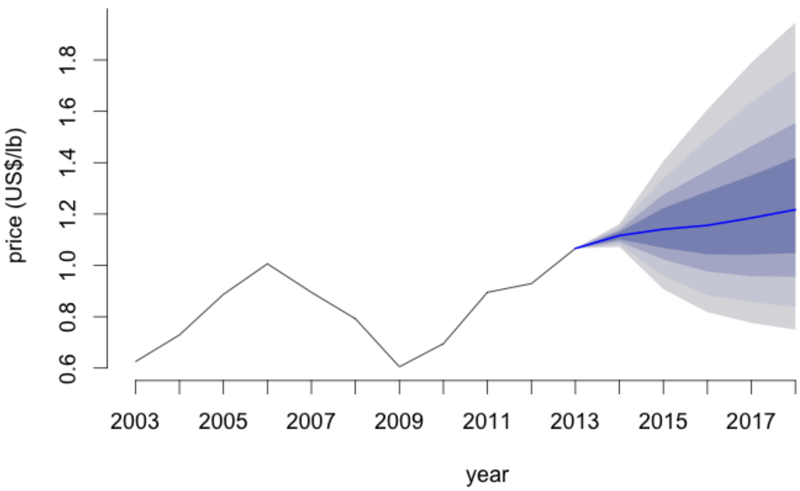

Table 6.16: Projected Mean, Probability Bounds of First-wholesale Flathead-sole Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.07	1.08	1.09	1.10	1.12	1.12	1.13	1.14	1.15	1.16
2015	0.91	0.96	1.02	1.07	1.14	1.15	1.22	1.28	1.34	1.41
2016	0.82	0.88	0.98	1.04	1.16	1.16	1.29	1.37	1.49	1.61
2017	0.78	0.86	0.96	1.04	1.18	1.19	1.35	1.46	1.63	1.79
2018	0.75	0.84	0.96	1.05	1.22	1.22	1.42	1.55	1.76	1.95

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.

Flathead-sole Head-and-gut Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
14.06	14.06	14.06	14.06	14.06	14.05

Figure 6.16: Rex-sole-(GOA) Whole-fish Price Projections and Confidence Bounds

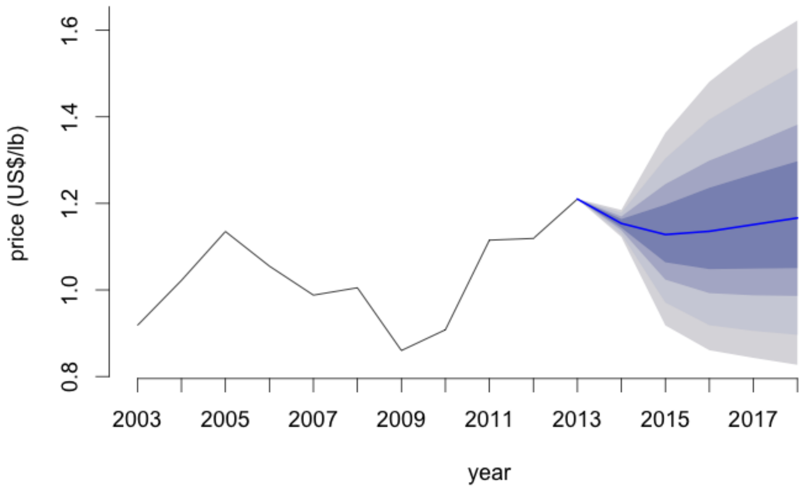

Table 6.17: Projected Mean, Probability Bounds of First-wholesale Rex-sole-(GOA) Whole-fish Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.12	1.13	1.14	1.14	1.15	1.15	1.16	1.17	1.18	1.18
2015	0.92	0.97	1.02	1.06	1.13	1.13	1.20	1.24	1.30	1.36
2016	0.86	0.92	0.99	1.05	1.14	1.14	1.24	1.30	1.39	1.48
2017	0.84	0.91	0.99	1.05	1.15	1.16	1.27	1.34	1.45	1.56
2018	0.83	0.90	0.99	1.05	1.17	1.17	1.30	1.38	1.51	1.62

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.

Rex-sole-(GOA) Whole-fish Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
12.85	12.57	12.46	12.33	12.16	13.44

Figure 6.17: Greenland-turbot-(BSAI) Head-and-gut Price Projections and Confidence Bounds

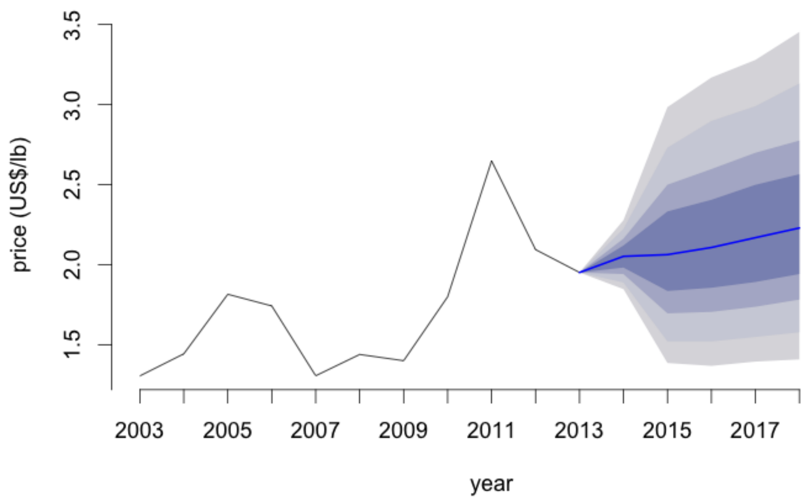

Table 6.18: Projected Mean, Probability Bounds of First-wholesale Greenland-turbot-(BSAI) Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.85	1.89	1.94	1.98	2.05	2.05	2.12	2.16	2.22	2.28
2015	1.39	1.52	1.70	1.84	2.06	2.08	2.33	2.50	2.73	2.98
2016	1.37	1.52	1.71	1.86	2.11	2.11	2.40	2.60	2.90	3.17
2017	1.39	1.55	1.74	1.89	2.17	2.18	2.50	2.70	2.99	3.28
2018	1.41	1.58	1.78	1.94	2.23	2.24	2.56	2.77	3.13	3.45

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.	2015	2016	2017	2018	Long-run
24.15	24.15	24.15	24.15	24.15	24.15

Figure 6.18: Shallow-water-flatfish-(GOA) Fillet Price Projections and Confidence Bounds

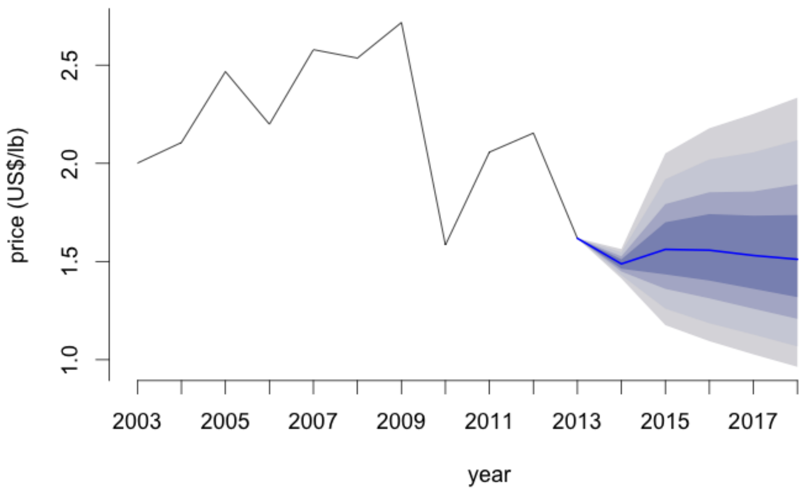

Table 6.19: Projected Mean, Probability Bounds of First-wholesale Shallow-water-flatfish-(GOA) Fillet Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.41	1.43	1.45	1.46	1.49	1.49	1.51	1.53	1.55	1.56
2015	1.18	1.26	1.36	1.43	1.56	1.57	1.70	1.79	1.92	2.05
2016	1.09	1.19	1.31	1.40	1.56	1.56	1.74	1.85	2.02	2.18
2017	1.03	1.13	1.26	1.36	1.53	1.54	1.73	1.86	2.06	2.25
2018	0.96	1.07	1.21	1.32	1.51	1.51	1.74	1.89	2.12	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.

Shallow-water-flatfish-(GOA) Fillet Return Volatility Projections

Hist. Avg.	2015	2016	2017	2018	Long-run
17.34	17.62	17.73	17.87	18.03	16.90

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 6.19: Rockfish Head-and-gut Price Projections and Confidence Bounds

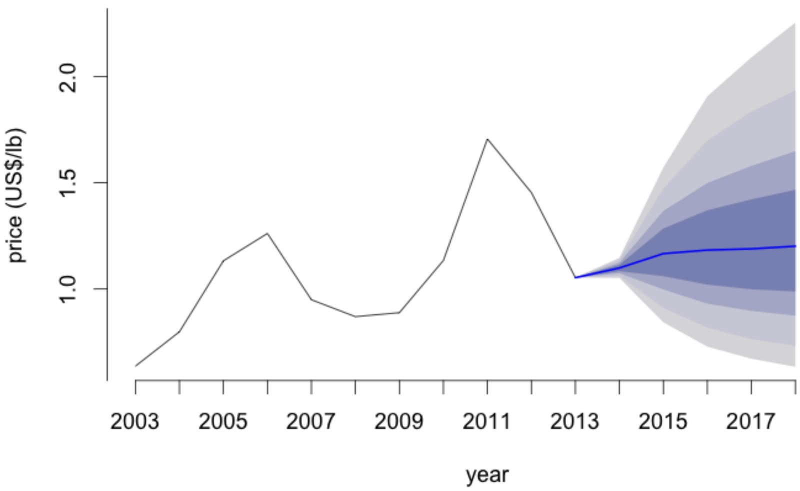

Table 6.20: Projected Mean, Probability Bounds of First-wholesale Rockfish Head-and-gut Prices (US$/lb)

	Lower						Upper			
	5%	10%	20%	30%	mean	median	70%	80%	90%	95%
2014	1.05	1.06	1.07	1.08	1.10	1.10	1.11	1.12	1.14	1.15
2015	0.84	0.91	1.00	1.06	1.17	1.18	1.28	1.37	1.47	1.57
2016	0.73	0.82	0.93	1.02	1.18	1.19	1.37	1.50	1.70	1.91
2017	0.67	0.77	0.90	1.00	1.19	1.19	1.42	1.58	1.83	2.09
2018	0.63	0.73	0.88	0.99	1.20	1.21	1.47	1.65	1.93	2.25

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.	2015	2016	2017	2018	Long-run
19.90	20.16	20.28	20.43	20.61	19.75

6.5. Acknowledgments

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7. ECONOMIC PERFORMANCE METRICS FOR NORTH PACIFIC GROUNDFISH CATCH SHARE PROGRAMS

7.1. 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) (1992), Alaska Halibut and Sablefish IFQ (1995), American Fisheries Act (AFA) Pollock Cooperatives (1999), BSAI Crab Rationalization (2005), Non-Pollock Trawl Catcher/Processor Groundfish Cooperatives (Amendment 80, 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, account for approximately 68% of all state and federal North Pacific groundfish landings as reported in 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 four catch share programs including the halibut IFQ program (which is managed by NOAA Fisheries and the International Pacific Halibut Commission), the sablefish IFQ program, the AFA pollock cooperatives program, the Amendment 80 program, and the central GOA Rockfish Program as well as one non-catch share program, the Bering Sea Freezer Longline Catcher/Processors. These indicators can be broken down into three general categories: catch and landings, effort, and revenue. The catch and landings metrics are the annual catch limit (ACL) or quota level, whether the ACL or quota was exceeded, aggregate landings, the % of the quota that was utilized, and whether there is a share cap in place. The effort metrics are the number of active vessels, the number of entities holding share, and the season length. 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 which is 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 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.

7.2. 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 Magunson-Stevens Act.

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 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.

[1] http://alaskafisheries.noaa.gov/sustainablefisheries/halibut/csp/cspoverview0214.pdf

The Halibut and Sablefish IFQ program is one of only two North Pacific groundfish catch share fisheries that include a cost recovery provision 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 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

[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.

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 2012, IFQ and landings have fallen by 54% and 57%, respectively, while the percent utilization fell from 102.2% (on average exceeding the allocation) during the baseline to 95.5% in 2013. 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 7.1 and 7.2). 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 and landings in 2013 are 63.0% and 64.2% less than their peak IFQ program values in 2002.

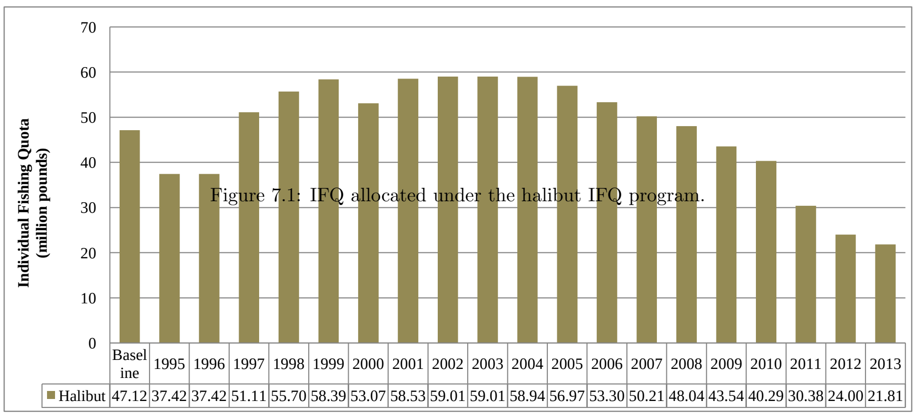


Figure 7.1: IFQ allocated under the halibut IFQ program.

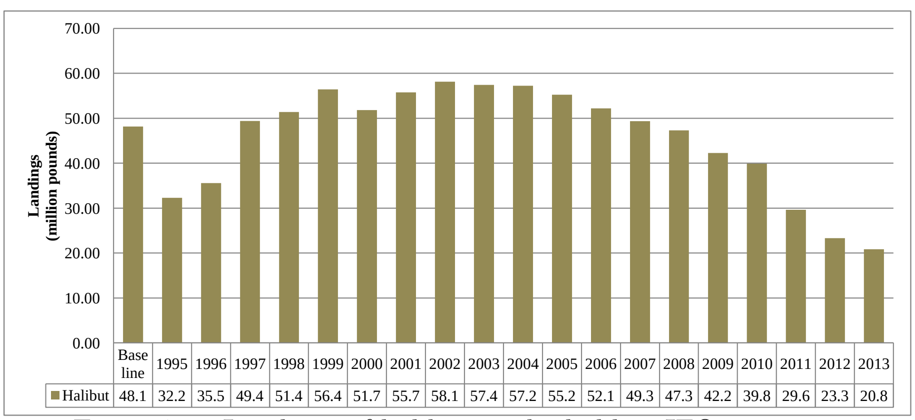
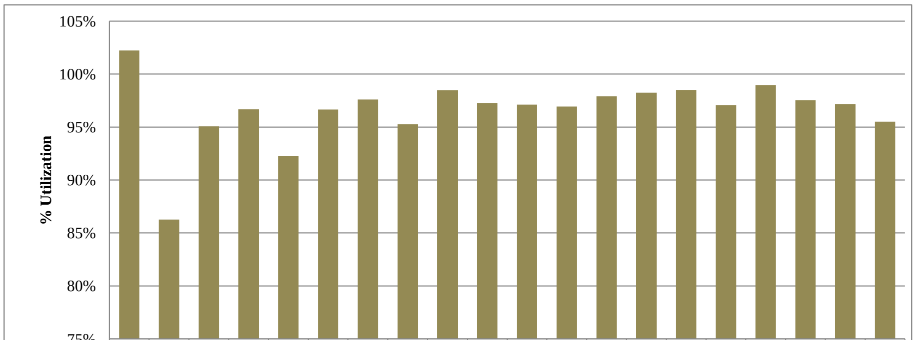


Figure 7.2: Landings of halibut in the halibut IFQ program.

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 96.3% for all years following program implementation (Figure 7.3).

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 allocations that were exceeded during the baseline period, 4 in 1992, 8 in 1993, and 5 in 1994, while only 3 area allocations have been exceeded since program implementation in 1995.

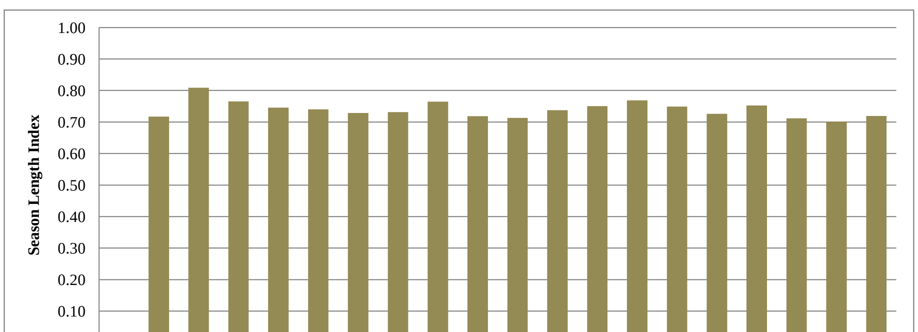
Effort Performance Metrics



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Halibut	102.2	86.26	95.07	96.67	92.28	96.65	97.59	95.26	98.50	97.28	97.12	96.94	97.90	98.24	98.50	97.07	98.96	97.54	97.19	95.51

Figure 7.3: Percent of the allocated IFQ that is landed in the halibut IFQ program.

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 0.70 – 0.81 (Figure 7.4).



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Halibut	0.01	0.72	0.81	0.77	0.75	0.74	0.73	0.73	0.76	0.72	0.71	0.74	0.75	0.77	0.75	0.73	0.75	0.71	0.70	0.72

Figure 7.4: 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 7.5). In years after program implementation (1996-2013), the average annual decrease in the number of active vessels fishing halibut was 4%, leaving 937 unique vessels active in the halibut IFQ fishery in 2013.

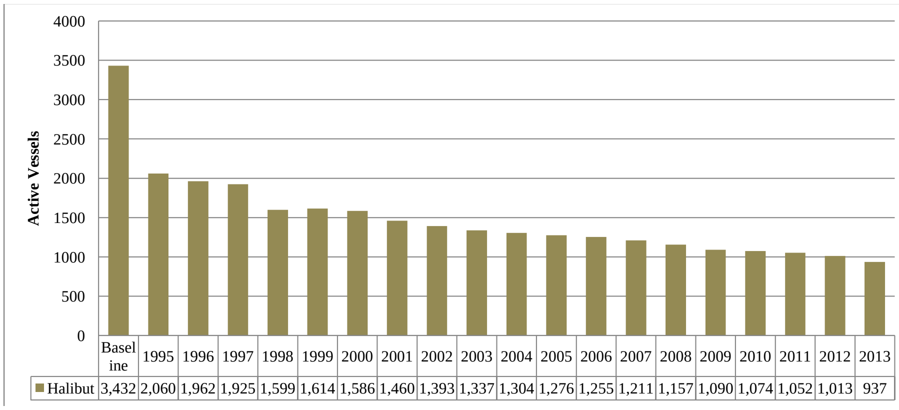


Figure 7.5: Number of active vessels in the halibut IFQ program.

There were 4,829 entities holding halibut QS in 1995. The number of entities has declined steadily since initial allocation. In 2013, 2,570 entities held QS, which is a reduction of 47% relative to 1995 (Figure CS6).

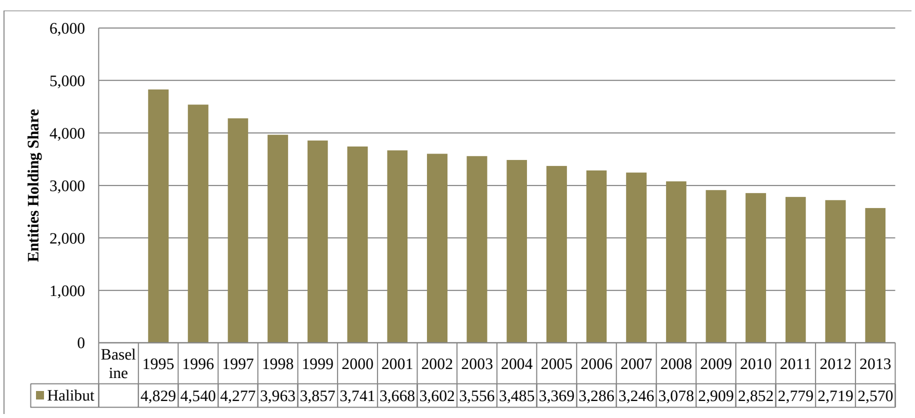
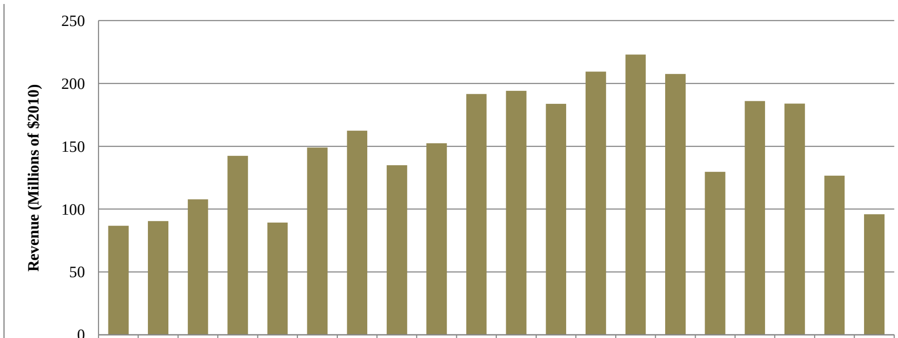


Figure 7.6: Number of entities holding QS in the halibut IFQ program.

Revenue Performance Metrics

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 7.7). Halibut IFQ revenue was generally increasing through 2007, when revenues reached a peak of $223 million, but has declined since that time, falling to $96 million in 2013.

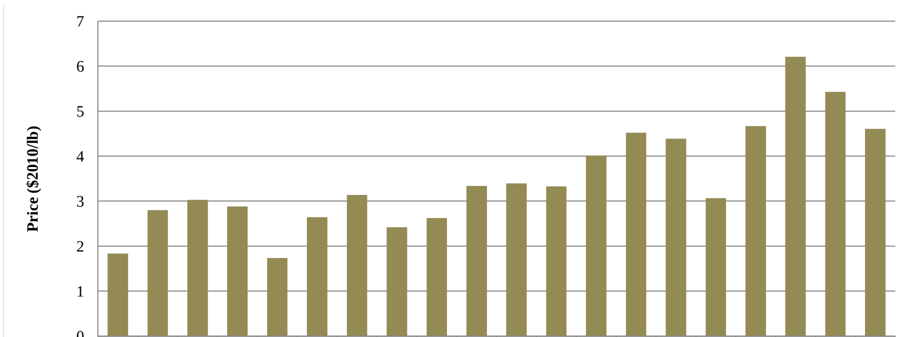
The average real price per pound of halibut has been higher in each year since program implementation, with the exception of 1998. Real average prices of halibut increased by 151% from $1.83/lb during the baseline to $4.61/lb in 2013 (Figure 7.8). There is substantial variation in the average



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Halibut	86.71	90.42	107.7	142.4	89.26	149.1	162.4	134.9	152.4	191.6	194.1	183.7	209.3	223.0	207.6	129.6	186.0	183.9	126.6	95.94

Figure 7.7: Halibut IFQ program revenue.

prices which varied annually by -40% to 53% over the course of the halibut IFQ program, with an average annual rate of change of 8.28%.



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Halibut	1.83	2.80	3.03	2.88	1.74	2.64	3.14	2.42	2.62	3.34	3.39	3.33	4.01	4.52	4.39	3.07	4.67	6.21	5.43	4.61

Figure 7.8: Halibut IFQ program price per pound.

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 305% from a baseline value of $25,000 to $102,000 in 2013 (Figure 7.9). Revenue per vessel increased from the baseline nearly every year and reached a high in 2007 at nearly $180,000 per vessel, but has generally declined after 2007, with both total IFQ and ex-vessel prices declining in each of the last three years.

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 7.10). 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 with an average Gini coefficient of 0.68. The highest Gini coefficient occurred in 2000 at 0.71 while the lowest Gini coefficient since program implementation occurred in 2013 at 0.64.

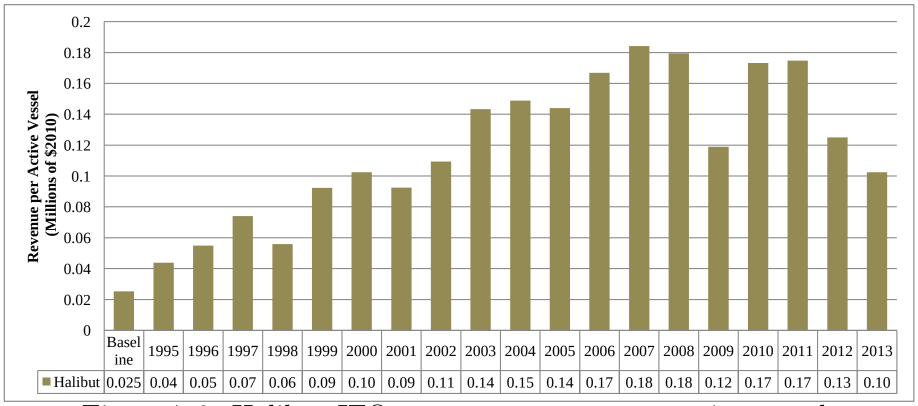


Figure 7.9: Halibut IFQ program revenue per active vessel.

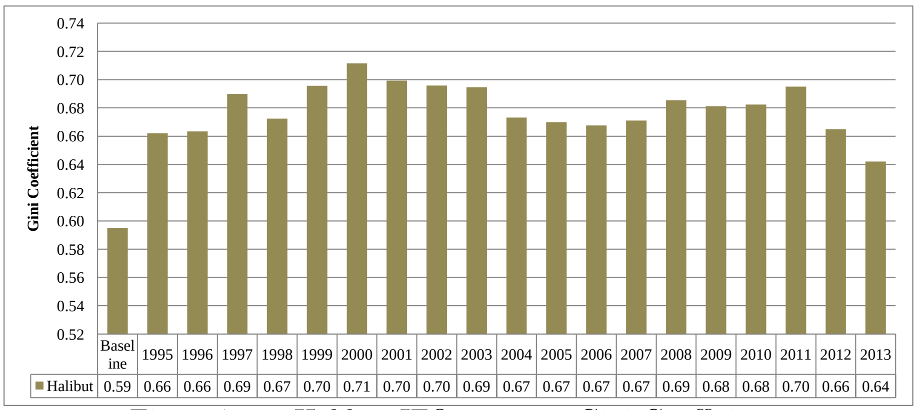


Figure 7.10: Halibut IFQ program Gini Coefficient.

7.3. North Pacific Sablefish IFQ Program

Management Context

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 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.

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 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 $2.23 million and 1.0% to 2.8% of ex-vessel value.[3]

Catch Share Privilege Characteristics

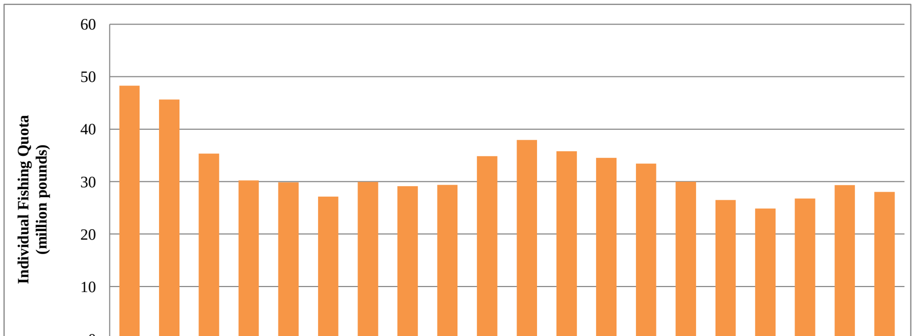
There are two forms of quota in the sablefish IFQ Program, QS and annual IFQ in pounds derived from QS. Quota shares are a revocable, indefinite privilege that entitles the holder to a share of the total area- and vessel class-specific IFQ allocated each year. Quota share holders can be individuals or 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 recommended by the IPHC. 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

[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.

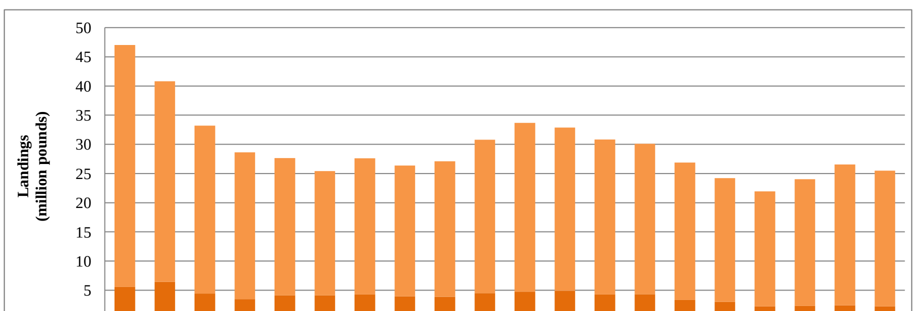
The catch and landings performance metrics include the amount of IFQ allocated to the program, the landings of IFQ sablefish, and the percentage of the IFQ allocated that is landed (percent utilization). Annual metrics are compared with a "baseline" period prior to program implementation, which is the average of the three years prior to program implementation (1992-1994). Between the baseline and 2013, the IFQ and landings have fallen by 42% and 46%, respectively, while the percent utilization fell from 98.3% during the baseline to 91.0% in 2013. The IFQ and landings have followed a cyclical pattern since the baseline with IFQ 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 (Figures 7.11 and 7.12).



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sablefish	48.29	45.64	35.31	30.23	29.84	27.15	29.92	29.12	29.38	34.86	37.93	35.76	34.54	33.45	29.96	26.48	24.87	26.79	29.32	28.01

Figure 7.11: IFQ allocated to the sablefish IFQ program.

Figure 7.12 also separates the landings by CVs and CPs for all years of the program. Overall program landings have declined by 46% in 2013 relative to the baseline, but CV landings have declined by 44% while CP catch has declined by 60%. 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 9% in 2012 and 2013.

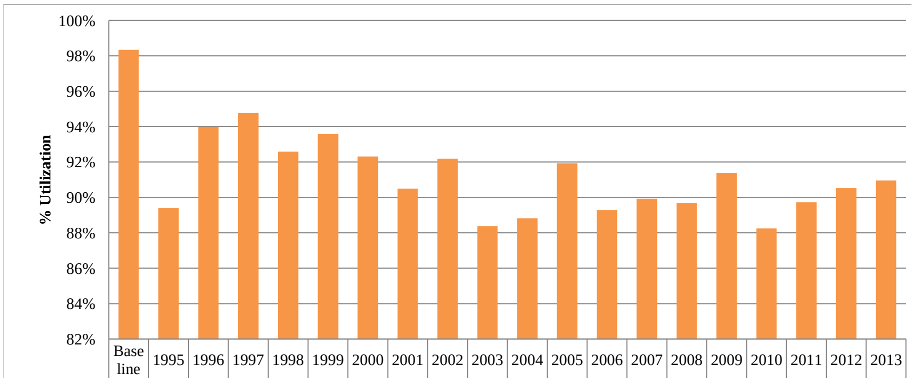


	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	41.45	34.37	28.75	25.17	23.50	21.27	23.34	22.38	23.20	26.28	28.92	27.96	26.55	25.75	23.53	21.18	19.70	21.71	24.13	23.22
CP	5.576	6.434	4.439	3.473	4.131	4.134	4.281	3.969	3.889	4.521	4.770	4.912	4.282	4.321	3.333	3.018	2.252	2.328	2.420	2.252

Figure 7.12: 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 7.13). 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.



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sablefish	98.33	89.41	93.99	94.77	92.60	93.58	92.31	90.50	92.19	88.37	88.82	91.93	89.28	89.93	89.67	91.37	88.24	89.72	90.54	90.95

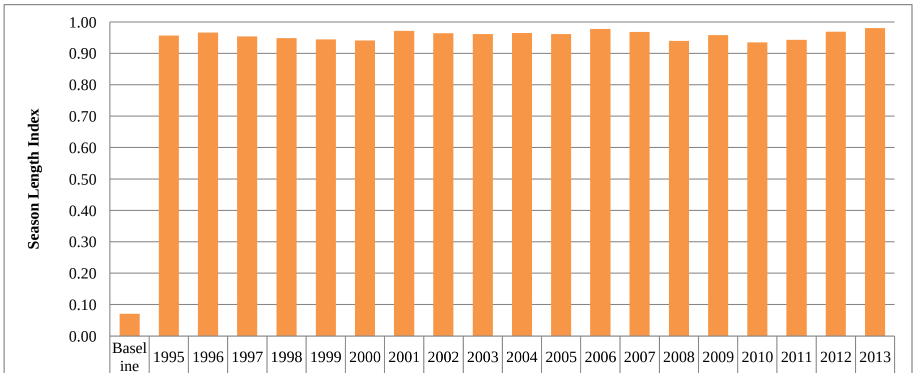
Figure 7.13: Percent of the IFQ that is landed in the sablefish IFQ program.

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 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 7.14).

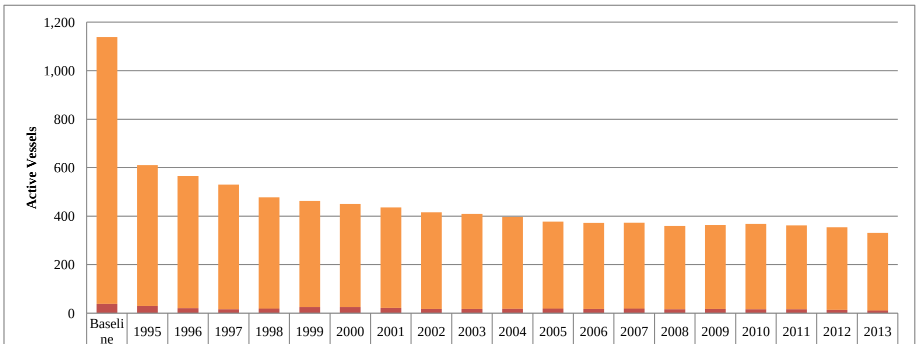
The number of active vessels reflects the number of sablefish CVs and CPs with any commercial landings of IFQ Program sablefish in a given year. The baseline value represents the average number of unique vessels per year with commercial sablefish landings from 1992-1994. After program implementation, there was a 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 7.15). 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 2013 the decline has slowed to a 3% annual rate for CPs and a 2% annual rate for CVs.

There were 1,054 entities holding Sablefish QS in 1995. The number of entities has declined over time with 845, or 20% fewer entities holding QS by 2013 (Figure 7.16).



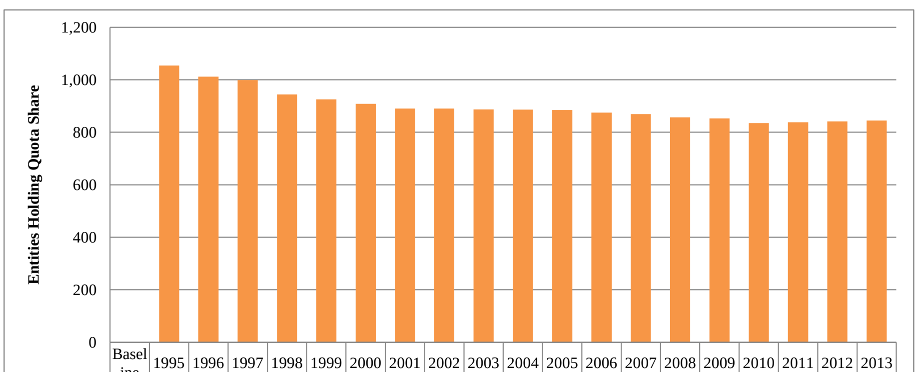
	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sablefish	0.07	0.96	0.97	0.95	0.95	0.94	0.94	0.97	0.96	0.96	0.97	0.96	0.98	0.97	0.94	0.96	0.93	0.94	0.97	0.98

Figure 7.14: Sablefish IFQ program season length index.



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	1,101	581	545	514	458	438	425	415	399	392	378	359	355	354	343	346	352	346	341	320
CP	38	29	20	16	19	25	25	21	17	17	18	19	17	19	16	17	16	16	13	11

Figure 7.15: Number of active vessels in the sablefish IFQ program.



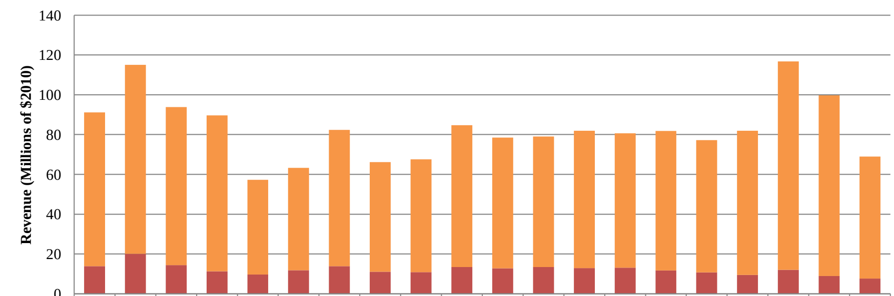
	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sablefish		1,054	1,012	999	944	925	908	890	890	887	886	885	875	869	857	853	835	838	841	845

Figure 7.16: 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. 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

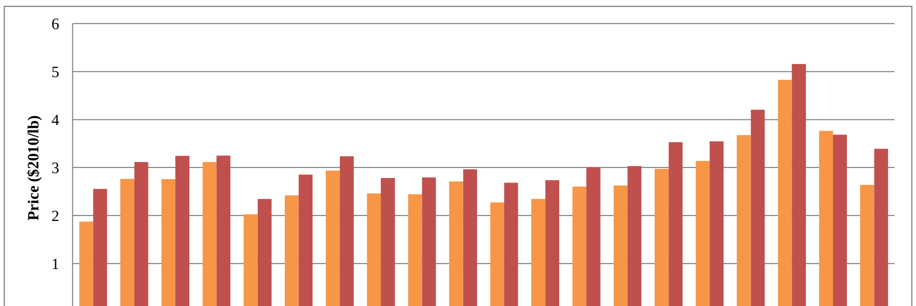
CPs and of 23% for CVs compared to the baseline (Figure 7.17). Sablefish IFQ revenue declined to a low in 1998 of $57 million and was below the peak in 1995 every year afterwards until 2011 which is a program level high of $117 million. However, sablefish IFQ revenue was back below the baseline level in 2013 at $69 million after two years above the baseline revenue level.



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	77.3	94.97	79.41	78.41	47.64	51.49	68.54	55.09	56.69	71.27	65.73	65.55	69.11	67.60	70.02	66.50	72.43	104.8	90.83	61.29
CP	13.9	20.04	14.40	11.29	9.68	11.79	13.86	11.04	10.86	13.40	12.79	13.44	12.87	13.09	11.77	10.70	9.47	12.01	8.92	7.64

Figure 7.17: Sablefish IFQ program revenue.

The average price per pound of sablefish increased for both CVs and CPs since program implementation. Real average prices of sablefish increased by 38.4% from $1.95/lb during the baseline to $2.71/lb in 2013 with CVs benefiting more than the CPs with prices increasing by 41% and 33%, respectively (Figure 7.18). 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 $3.25) than CVs (real average price of $2.87). 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.

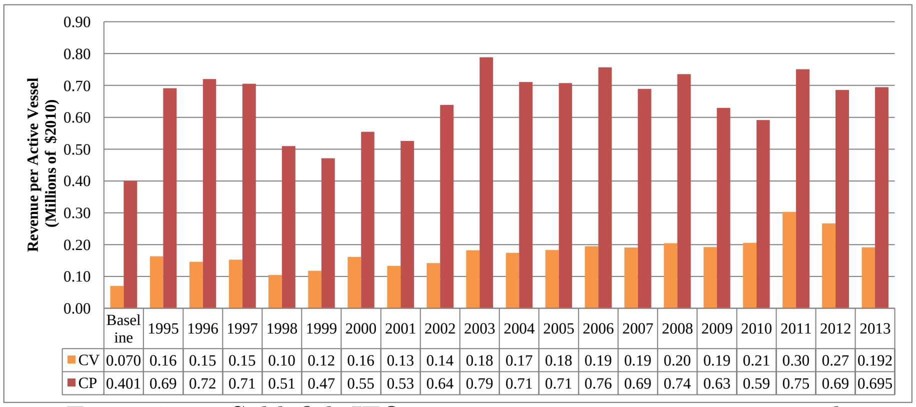


	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	1.87	2.76	2.76	3.11	2.03	2.42	2.94	2.46	2.44	2.71	2.27	2.34	2.60	2.62	2.97	3.14	3.68	4.83	3.76	2.64
CP	2.55	3.11	3.24	3.25	2.34	2.85	3.24	2.78	2.79	2.96	2.68	2.74	3.00	3.03	3.53	3.54	4.20	5.16	3.68	3.39

Figure 7.18: Sablefish IFQ program price per pound.

Sablefish IFQ revenue per vessel increased by 160% from a baseline of $80,000 to $208,000 in 2013, with the majority of revenues accruing to the CVs which increased by 173% (from $70,000 in the baseline to $192,000 in 2013) while CP revenues increased by 73% (from $401,000 in the baseline to $695,000 in 2013) (Figure 7.19).

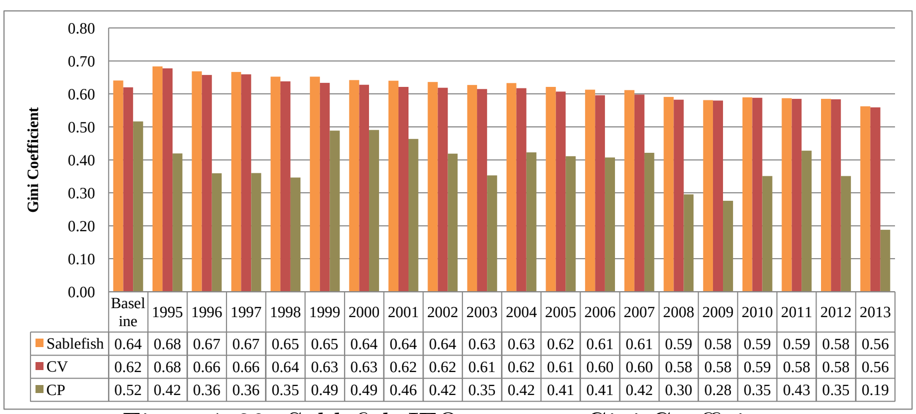
The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the sablefish IFQ program in a given year. The Gini coefficient varies between 0 and 1, where a value of 0 indicates that all vessels earn exactly the same revenue, while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, revenue becomes more concentrated on fewer



	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
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	0.192
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	0.695

Figure 7.19: Sablefish IFQ program revenue per active vessel.

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 7.20). This is because the revenue per vessel among CVs and CPs is very different (Figure 7.19) 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 0.56 and 0.56 in 2013, respectively. The distribution of CP revenue has become more even since program inception from 0.52 in the baseline to 0.35 in 2012 and 0.19 in 2013, and while it shows a lot more variation throughout the years, the Gini coefficient has always been below 0.51 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 2013, 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 7.15).



	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 7.20: Sablefish IFQ program Gini Coefficient.

7.4. 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 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 United States 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 is deducted and for incidental catch in other fisheries), 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.

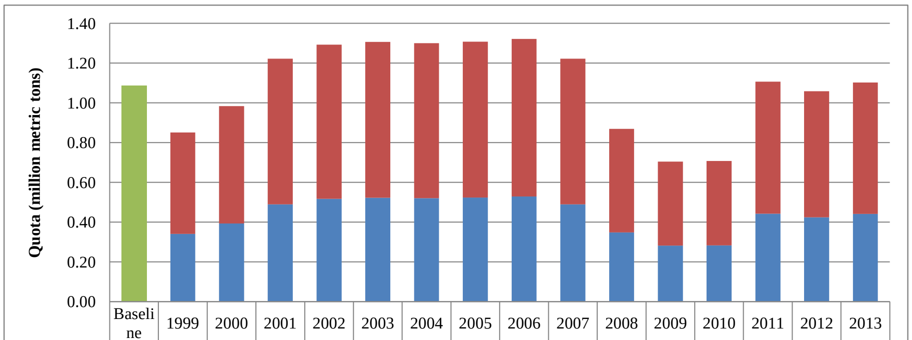
Catch Share Privilege Characteristics

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 optimally 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 2013, the overall quota has increased by 1.5%, while landings increased by 8.2%, and the percent utilization increased from 93.6% during the baseline to 99.8% in 2013 (Figures 7.21, 7.22, and 7.23). 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 and 2013, which resulted in a slightly larger harvest and a larger share of the quota being utilized in 2012 and 2013 compared with the baseline.

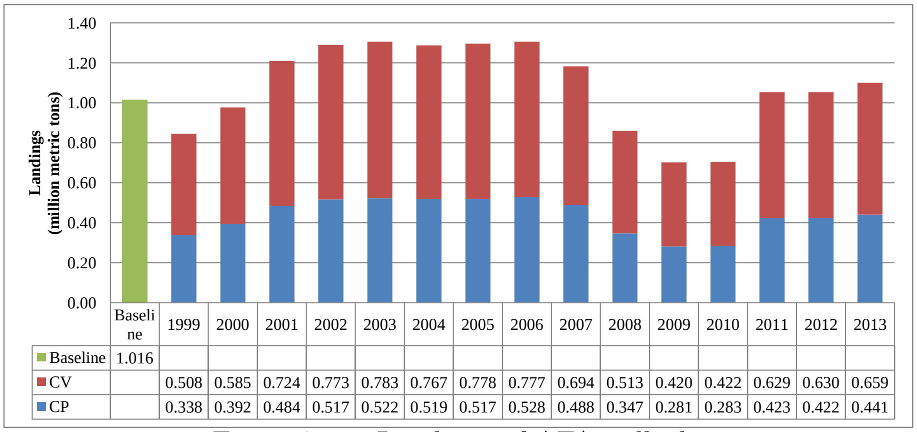


	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Baseline	1.085															
CV		0.511	0.590	0.733	0.775	0.784	0.779	0.785	0.792	0.733	0.521	0.422	0.424	0.663	0.635	0.661
CP		0.340	0.393	0.489	0.517	0.522	0.520	0.523	0.528	0.489	0.347	0.282	0.283	0.442	0.423	0.441

Figure 7.21: Quota allocated to the AFA Pollock Program.

Figure 7.22 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 8.2% in 2013 relative to the baseline, but the CP sector landings declined by 11.1% while the CV landings increased by 26.6%, 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.

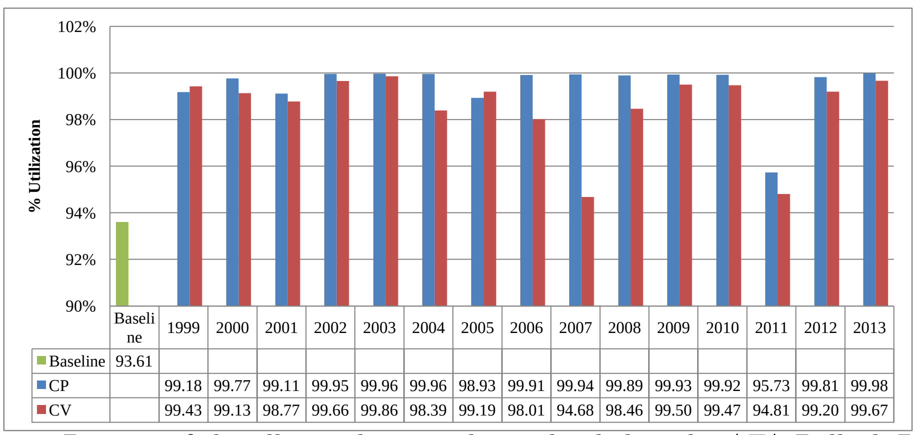
As a result of ending the race for fish, utilization (% of the quota that is landed) increased substantially after the AFA. With the exception of the CV sector in 2007 and both sectors in 2011, utilization has always been above 98% since program implementation. With the exception of 1999



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Baseline	1.016															
CV		0.508	0.585	0.724	0.773	0.783	0.767	0.778	0.777	0.694	0.513	0.420	0.422	0.629	0.630	0.659
CP		0.338	0.392	0.484	0.517	0.522	0.519	0.517	0.528	0.488	0.347	0.281	0.283	0.423	0.422	0.441

Figure 7.22: Landings of AFA pollock.

and 2005, the CP sector has always exceeded the utilization of the CV sector, which is surprising as 1999 was the year in which the CP sector had active cooperatives and the CV sector did not.



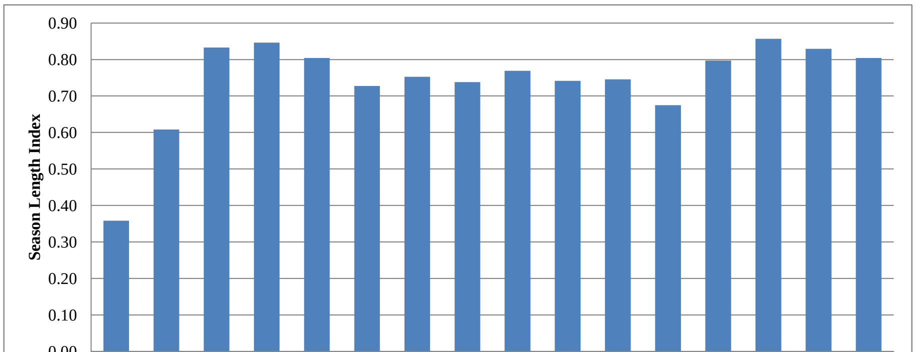
	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Baseline	93.61															
CP		99.18	99.77	99.11	99.95	99.96	99.96	98.93	99.91	99.94	99.89	99.93	99.92	95.73	99.81	99.98
CV		99.43	99.13	98.77	99.66	99.86	98.39	99.19	98.01	94.68	98.46	99.50	99.47	94.81	99.20	99.67

Figure 7.23: 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 7.24).

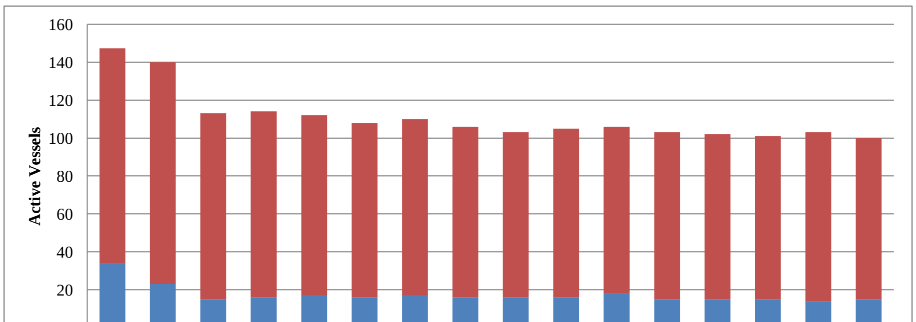
The number of active vessels reflects the number of AFA pollock CV and CP vessels with any commercial landings of AFA pollock in a given year. The baseline value represents the average



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AFA	0.36	0.61	0.83	0.85	0.80	0.73	0.75	0.74	0.77	0.74	0.75	0.67	0.80	0.86	0.83	0.80

Figure 7.24: AFA Pollock Program season length index.

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 7.25). 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.



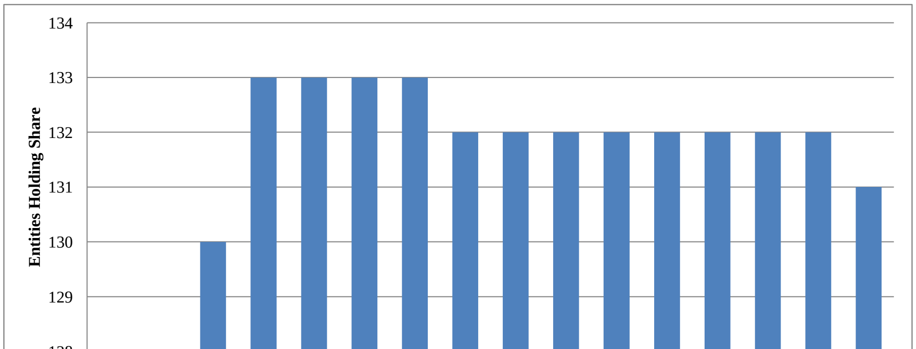
	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	114	117	98	98	95	92	93	90	87	89	88	88	87	86	89	85
CP	34	23	15	16	17	16	17	16	16	16	18	15	15	15	14	15

Figure 7.25: Number of active vessels in the AFA Pollock Program.

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, has remained nearly constant from 2000 through 2013 at 130 and 131 entities, respectively (Figure 7.26). 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

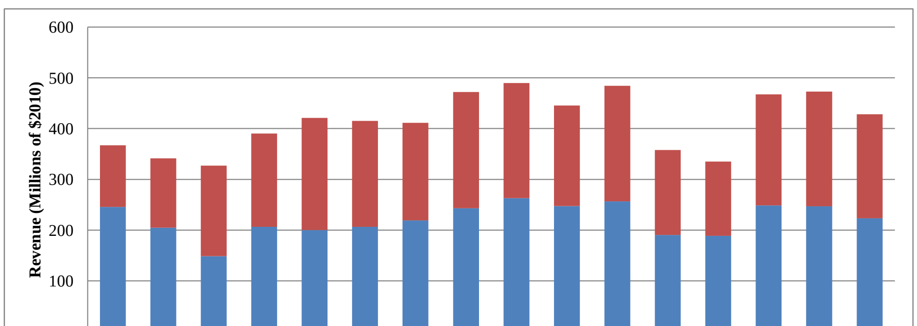
The revenue performance metrics are the aggregate revenue from AFA pollock, average prices of AFA pollock, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among the active vessels. Revenues are adjusted for inflation by using the GDP price deflator and are reported in 2010 equivalent dollars. For the AFA Pollock Program, revenues are



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AFA			130	133	133	133	133	132	132	132	132	132	132	132	132	131

Figure 7.26: 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 7.27). Aggregate revenues were above the baseline levels for 11 of the 15 years since program implementation, from 2001-2008 and 2011-2013. The highest annual pollock revenue occurred in 2006 at $490 million.

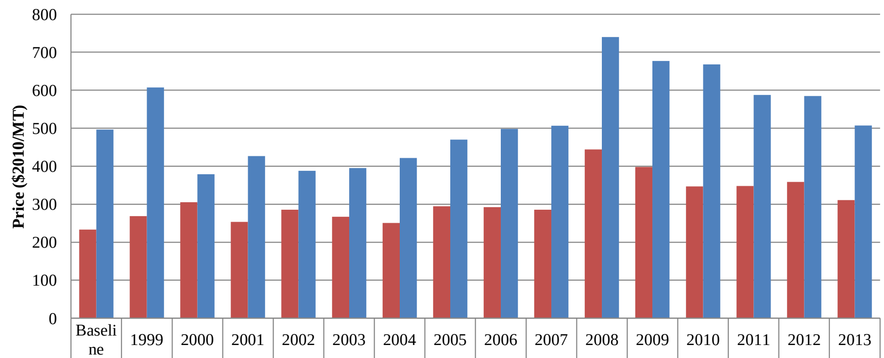


	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	121	136	178	184	221	209	192	229	227	198	228	167	146	219	226	205
CP	246	205	149	207	200	206	219	243	263	247	257	191	189	249	247	223

Figure 7.27: AFA Pollock Program revenue.

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 2013 by 33% from $233/ton to $311/ton ex-vessel for CVs and 2% from $496/ton to $507 first wholesale for CPs (Figure 7.28). 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 6 of the 15 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).

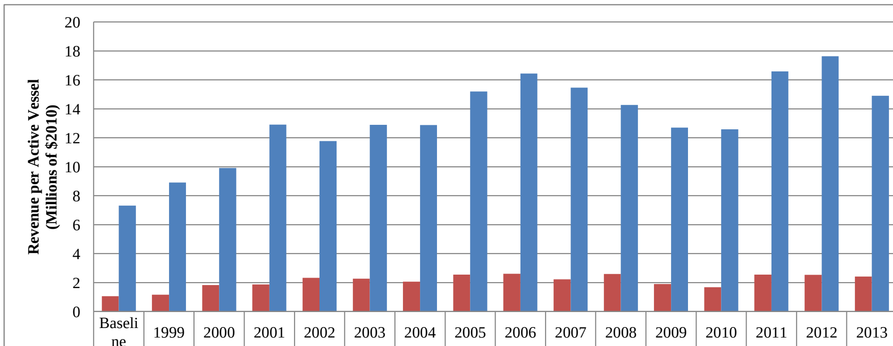
Both the CV and CP sectors experienced a doubling in revenue per vessel over the course of the AFA Pollock Program, by 127% for CVs (from $1.06 million during the baseline to $2.41 million in



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	233	268	305	254	286	267	251	294	292	285	444	398	347	348	359	311
CP	496	607	379	426	388	395	422	470	498	506	740	677	668	588	585	507

Figure 7.28: AFA Pollock Program price per metric ton.

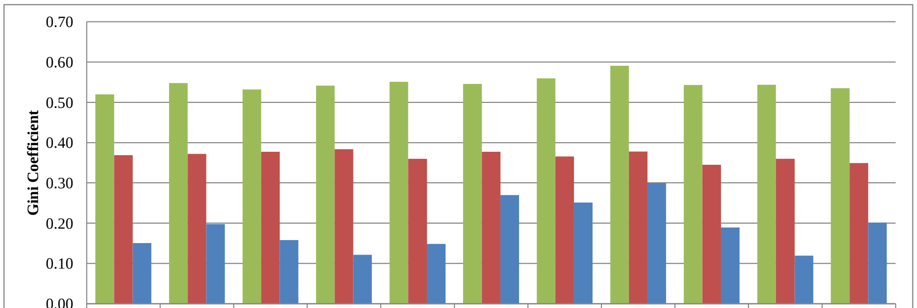
2013) while CP revenue per vessel increased by 104% (from $7.32 million in the baseline to $14.90 million in 2013) (Figure 7.29). Both sectors also experienced an increase in real revenue per vessel in all years compared with the baseline value.



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
CV	1.06	1.16	1.82	1.87	2.32	2.27	2.07	2.54	2.61	2.22	2.59	1.90	1.68	2.54	2.54	2.41
CP	7.32	8.91	9.91	12.91	11.78	12.90	12.88	15.20	16.43	15.46	14.26	12.70	12.58	16.59	17.64	14.90

Figure 7.29: AFA Pollock Program revenue per active vessel.

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 7.30). This is because the revenue per vessel among CVs and CPs is very different (Figure 7.29) 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 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 2013, the CV sector's Gini coefficient fell from 0.37 during the baseline to 0.35 in 2013, while the CP sector Gini coefficient increased from 0.15 during 2003 to 0.20 in 2013.



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
AFA	0.52	0.55	0.53	0.54	0.55	0.55	0.56	0.59	0.54	0.54	0.54
CV	0.37	0.37	0.38	0.38	0.36	0.38	0.37	0.38	0.34	0.36	0.35
CP	0.15	0.20	0.16	0.12	0.15	0.27	0.25	0.30	0.19	0.12	0.20

Figure 7.30: AFA Pollock Program Gini coefficient.

7.5. 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

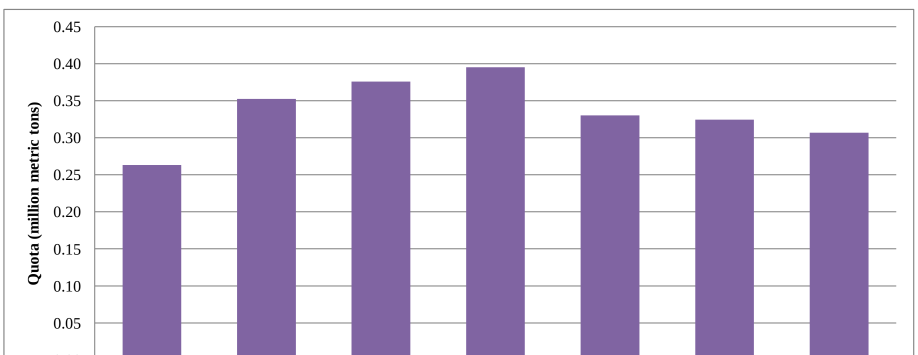
Amendment 80 QS are tied to the participating vessels and are allocated to their cooperative based on the vessel's catch history. Amendment 80 vessels that do not join a cooperative do not receive an exclusive harvest privilege and must fish in the Amendment 80 limited access sector. Amendment

[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.

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

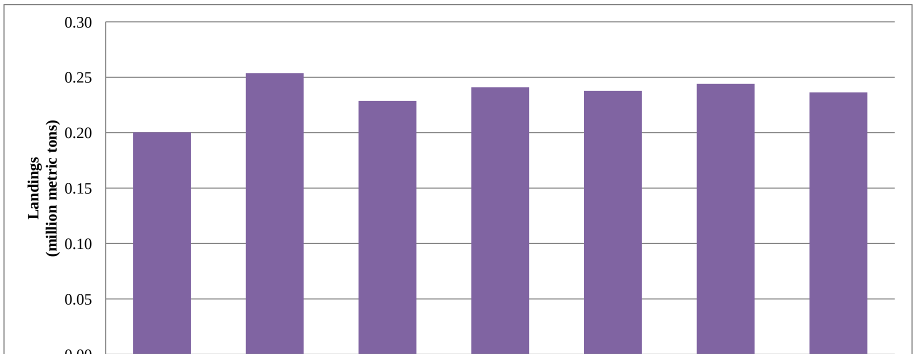
The catch and landings performance metrics for the Amendment 80 Program include the amount of Amendment 80 species allocated to the program, the landings of Amendment 80 species in the Amendment 80 Program, and the percentage of Amendment 80 species allocated to the program that is landed (percent utilization). 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 2013, species allocations and landings have increased by 17% and 18%, respectively (Figures 7.31 and 7.32). 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 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.



	Baseline	2008	2009	2010	2011	2012	2013
Am 80	0.263	0.352	0.376	0.395	0.330	0.325	0.307

Figure 7.31: Aggregate quota allocated to the Amendment 80 Program.

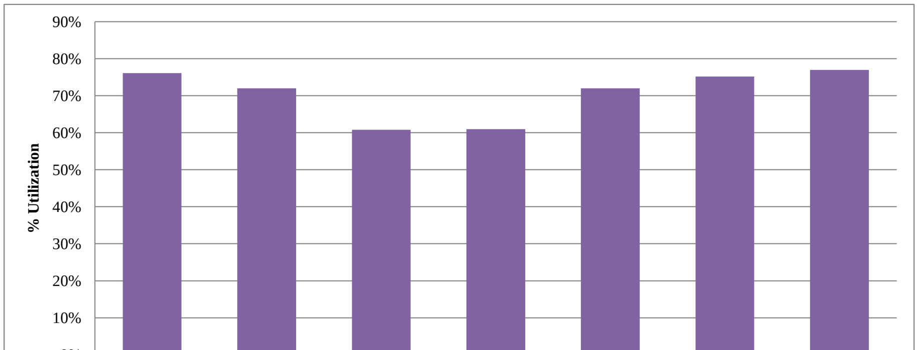
As a result of the historically low AFA pollock TACs from 2008-2010, the allocations of Amendment 80 species to the Amendment 80 Program was much larger than during the baseline. Similarly, the landings in the Amendment 80 program were larger than their baseline levels in all years following implementation (Figure 7.32).



	Baseline	2008	2009	2010	2011	2012	2013
Am 80	0.200	0.254	0.229	0.241	0.238	0.244	0.236

Figure 7.32: 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 to 77.0% in 2013, and has been below the baseline level every year of the program except 2013 (Figure 7.33). 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
Am 80	76.14%	72.02%	60.81%	60.96%	72.00%	75.20%	77.02%

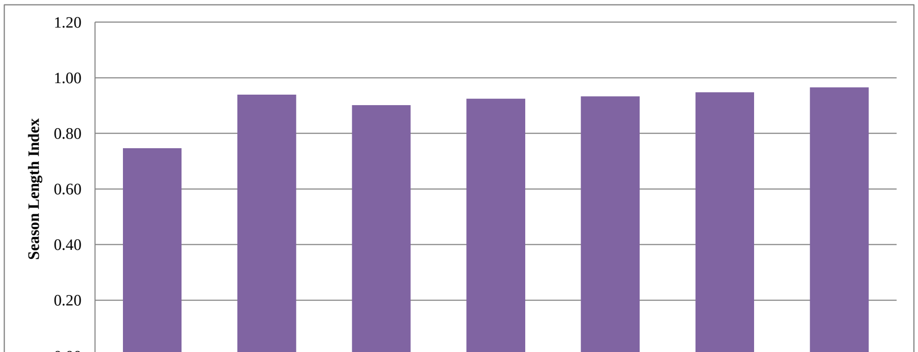
Figure 7.33: Percent of the allocated quota that is landed in the Amendment 80 Program.

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 would be an opening on January 20th and closure on December 31st.[5] This index measures the relative proportion of the legal fishing season during

[5]The maximum regulatory season length was 347 days in 2008 and 2012 due to the leap year.

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 324 days from 2008-2013, which implies an average season length index of 0.94 over that same period (Figure 7.34).



	Baseline	2008	2009	2010	2011	2012	2013
Am 80	0.75	0.94	0.90	0.92	0.93	0.95	0.97

Figure 7.34: Amendment 80 Program season length index.

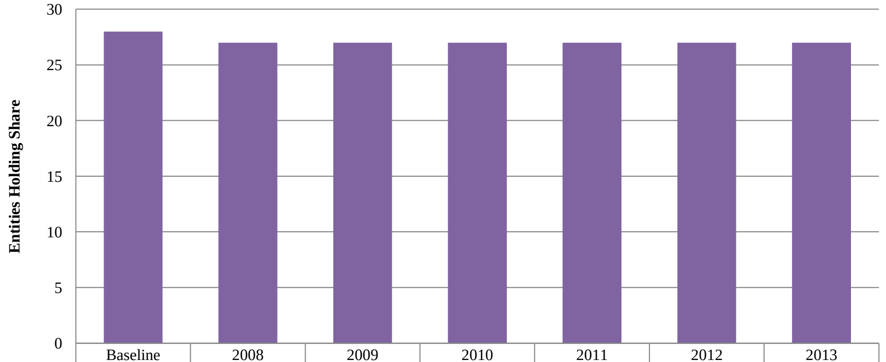
The number of active vessels reflects the number of Amendment 80 eligible CP vessels with any reported landings of Amendment 80 species in a given year. The baseline value of 22 vessels represents the average number of unique vessels per year from 2005-2007. After program implementation there were still 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 7.35). 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 2013 at 18.

	Baseline	2008	2009	2010	2011	2012	2013
Am 80	22	22	21	20	20	19	18

Figure 7.35: Number of active vessels in the Amendment 80 Program.

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

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]



	Baseline	2008	2009	2010	2011	2012	2013
Am 80	28	27	27	27	27	27	27

Figure 7.36: Number of entities holding quota share in the Amendment 80 Program.

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 7.37). Amendment 80 revenue declined to a low in 2009 of $206 million 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 to $209 million.

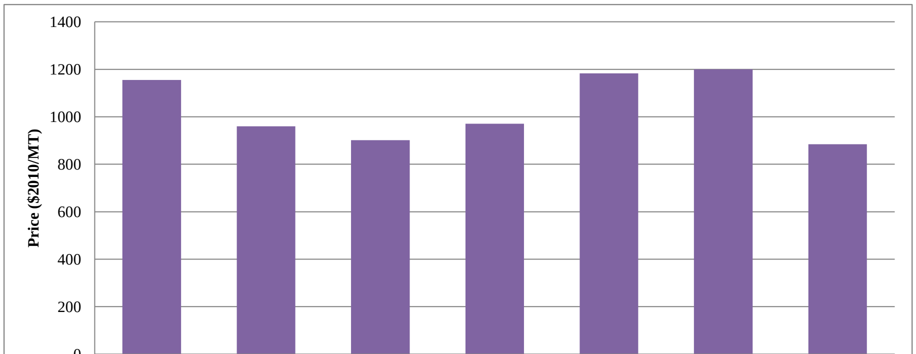
	Baseline	2008	2009	2010	2011	2012	2013
Am 80	231.69	243.59	206.30	233.97	281.34	292.90	209.01

Figure 7.37: 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. Real average prices of Amendment 80 species decreased by 24% from $1,156/ton during the baseline to $884/ton in 2013

[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.

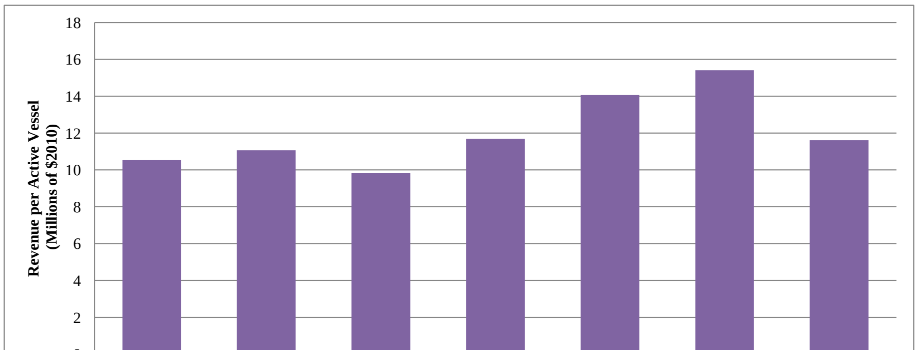
(Figure 7.38). Real weighted average prices do not vary as much as in many of the other programs, possibly because reported Amendment 80 prices are aggregated over several species and vessels have the ability to change targets to species with higher prices, with annual changes that range between -26% and 22% over the course of the Amendment 80 Program.



	Baseline	2008	2009	2010	2011	2012	2013
Am 80	1,156	960	902	970	1,183	1,200	884

Figure 7.38: Amendment 80 Program weighted average price per metric ton across all species.

Amendment 80 first wholesale revenue per vessel increased by 10% from a baseline of $10.53 million to $11.61 in 2013 (Figure 7.39). Revenues per vessel were below their baseline level in 2009, but were above the baseline for all other years of the program.



	Baseline	2008	2009	2010	2011	2012	2013
Am 80	10.53	11.07	9.82	11.70	14.07	15.42	11.61

Figure 7.39: Amendment 80 Program revenue per active vessel.

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 0.15 in 2013 (Figure 7.40). 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 similarity of the Amendment 80 vessels and the small number of active vessels, all of which operate at near-maximum capacity.

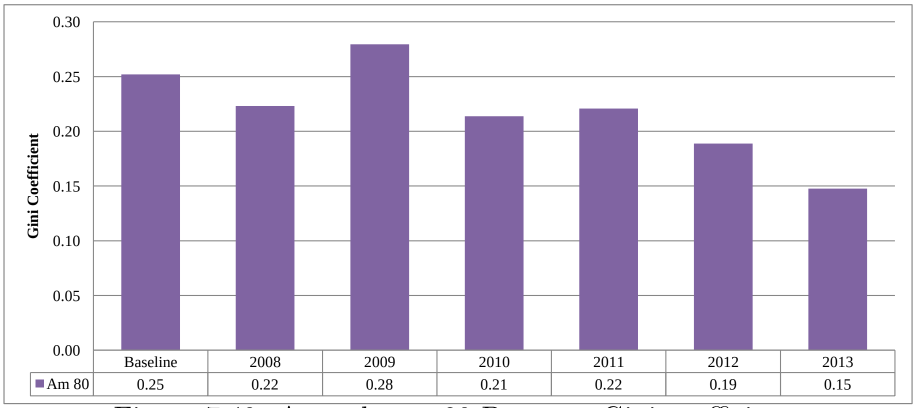


Figure 7.40: Amendment 80 Program Gini coefficient.

7.6. 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.

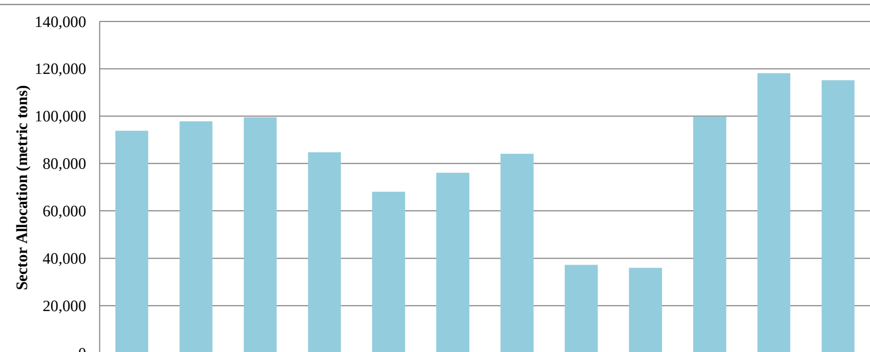
Catch Share Privilege Characteristics

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 optimal 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 2003-2013 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 2013, the sector allocation and landings have increased by 23% and 13%, respectively, while the percent utilization fell from 99.7% in 2003 to 91.7% in 2013 (Figures 7.41, 7.42, and 7.43).



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012	2013
FL	93,843	97,795	99,519	84,709	68,105	76,074	84,075	37,230	35,960	99,853	118,106	115,171

Figure 7.41: Freezer Longline sector allocation for BSAI Pacific cod.

The sector allocation and landings have varied between 2003 and 2013, with the two highest sector allocations occurring in 2012 and 2013 and the highest landings occurring in 2012 followed by 2013. 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.

Utilization has been above 95% for all years since 2003, with the exception of 2013. Sector allocation utilization was above 98% in 2003 and from 2005-2010 in the A season (Figure 7.43). However, since the formation of the voluntary cooperative in the 2010 B season, utilization has been declining to a low of 91.71% in 2013. 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

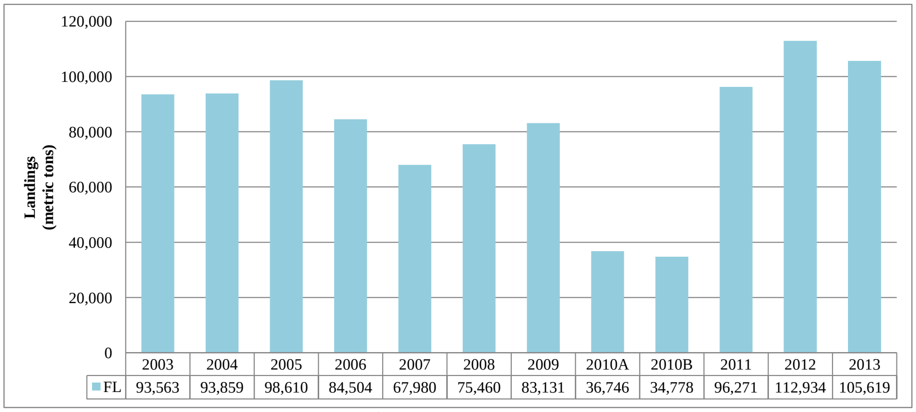


Figure 7.42: Landings of BSAI Pacific cod by Freezer Longline vessels.

2007 and 2010. The acceptable biological catch (ABC) has not been exceeded in any year since 1994.

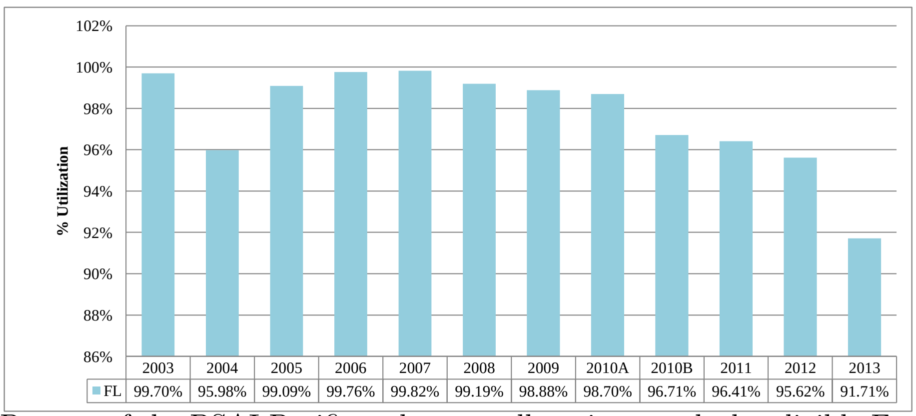


Figure 7.43: Percent of the BSAI Pacific cod sector allocation caught by eligible Freezer Longline vessels.

Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of hook-and-line CP LLP licenses, 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 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 7.44). 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, which is a decrease of 21%.

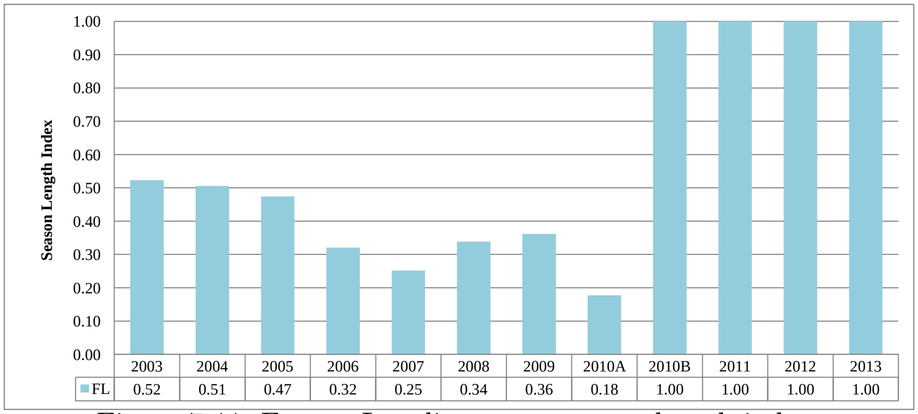


Figure 7.44: Freezer Longline sector season length index.

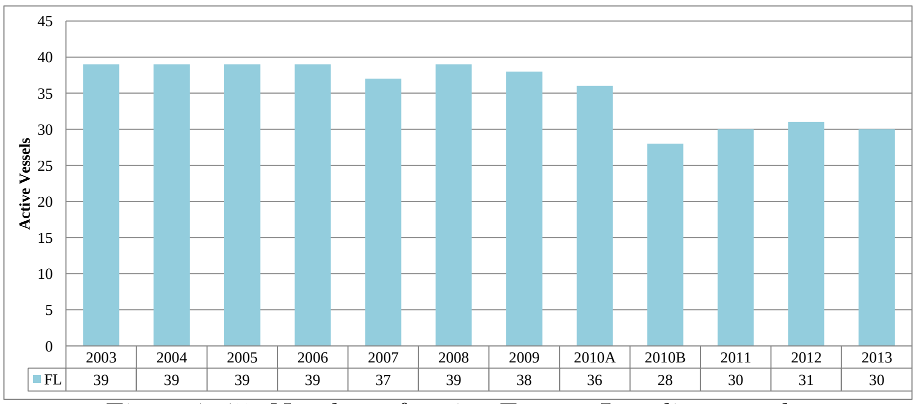


Figure 7.45: Number of active Freezer Longline vessels.

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 2013 (Figure CS46).

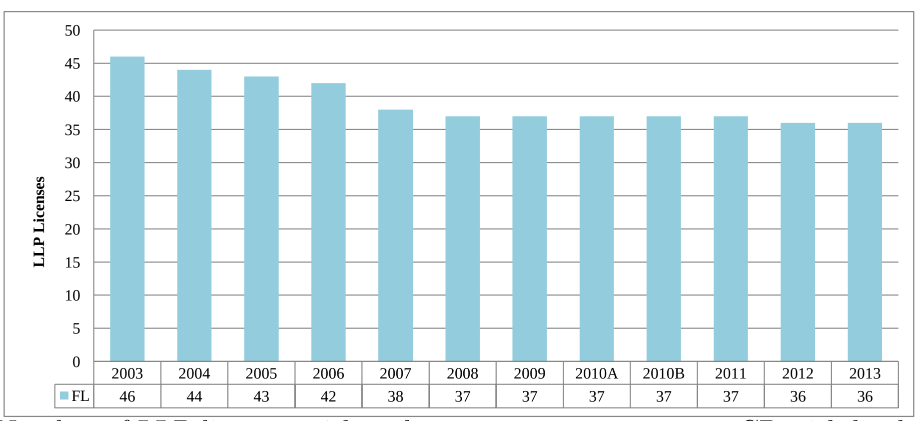


Figure 7.46: Number of LLP licenses with endorsements to operate as a CP with hook-and-line gear in the Bering Sea or Aleutian Islands.

Revenue Performance Metrics

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 decreased from $143 million in 2003 to $126 million in 2013, which is a decrease of 14.5% (Figure 7.47). Even with the two highest sector allocations and landings over the period 2003-2013 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 2009-2013 (Figure 7.48).

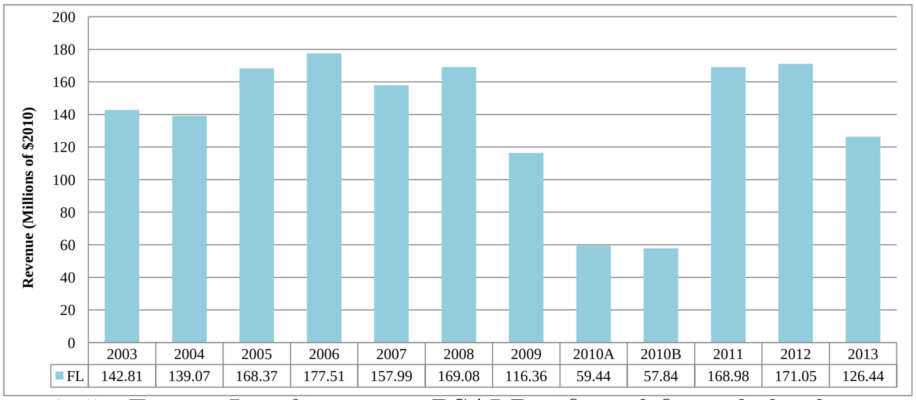


Figure 7.47: Freezer Longline sector BSAI Pacific cod first wholesale revenue.

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 7.48), but then fell to a new low of $1,197/ton in 2013. This price decline is likely the result of increased supply of substitute products for Pacific cod including Atlantic cod and other whitefish species. Prices have decreased by 22% between 2003 and 2013, 48% below the peak prices observed in 2007.

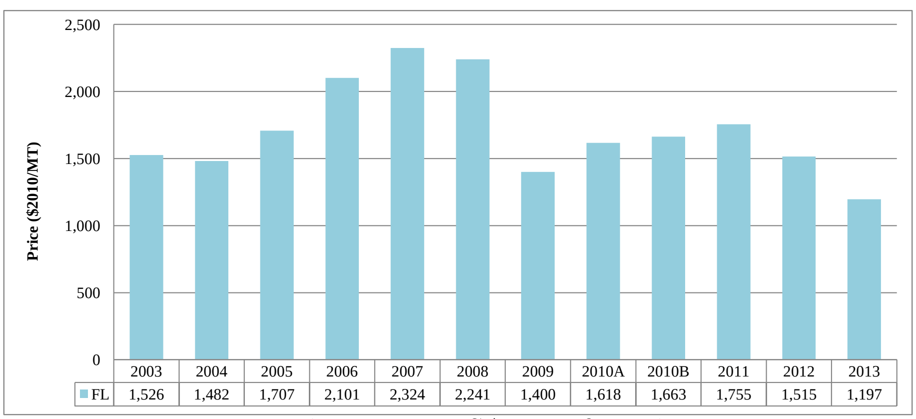


Figure 7.48: Freezer Longline sector BSAI Pacific cod price per metric ton.

Revenue per active vessel in the Freezer Longline sector increased by 15% of $3.7 million in 2003 to $4.2 million in 2013 (Figure 7.49). As a result of the FLCC, there were fewer active vessels in the 2010 B season and in 2011-2013 compared with previous time periods, which has resulted in an increase in revenue per active vessel for this sector.

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

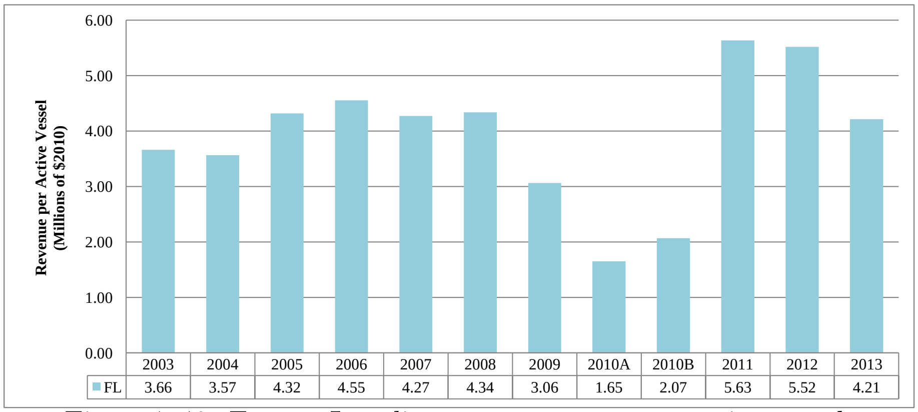


Figure 7.49: Freezer Longline sector revenue per active vessel.

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 7.50). However, vessel revenues became more concentrated from 2007-2012, with a 2012 Gini coefficient of 0.27, but fell to 0.21 in 2013. 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.

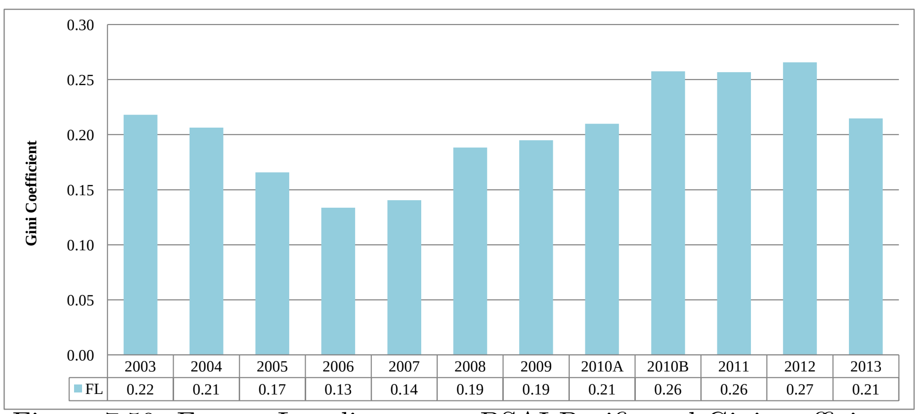


Figure 7.50: Freezer Longline sector BSAI Pacific cod Gini coefficient.

7.7. 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 were 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 assesses 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 2.3% 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).

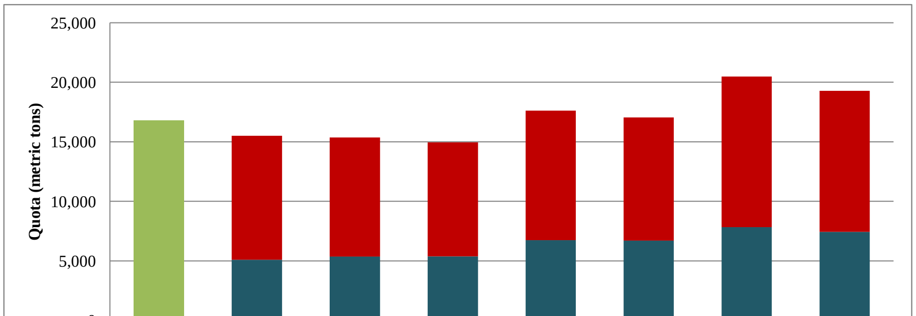
The Rockfish Program allocated revocable shares and the Rockfish Program is only authorized until December 31st, 2021 (10 years from the start of the program). The Rockfish Program includes excessive share provisions. No person may hold or use more than 4% of the CV QS and resulting CQ, or 40% of the CP QS and resulting CQ. No CV co-op may hold or use more than 30% of the

[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.

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 2013 increased by 15% and 12%, respectively, while the percent utilization increased from 87.1% during the baseline to 89.9% in 2013 (Figures 7.51, 7.52, and 7.53). 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
Baseline	16,774							
CV		10,411	10,010	9,577	10,876	10,330	12,646	11,841
CP		5,098	5,358	5,380	6,737	6,708	7,830	7,441

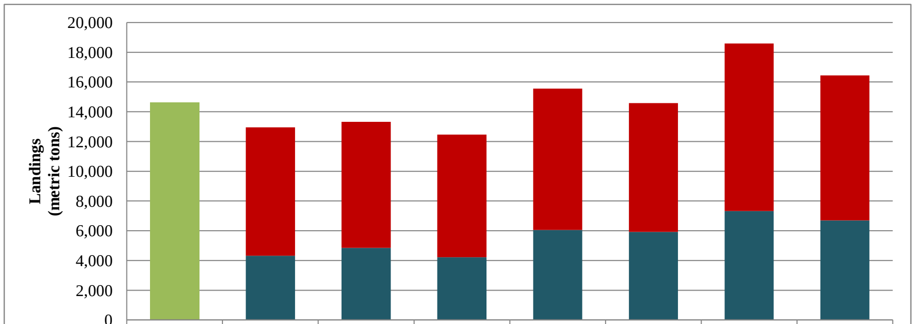
Figure 7.51: Rockfish Program species allocated to the Rockfish Program.

Figure 7.52 also separates the landings by CVs and CPs for all years of the program. Overall program landings have increased by 12% in 2013 relative to the baseline, with CV landings increasing by 14% and CP landings increasing by 10%. 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 two years of the Rockfish Program (2012-2013).

Utilization of the allocated species by sector is reported shown in Figure 7.53. The percent utilization of the CV sector has remained relatively constant since 2007, changing from 83% in 2007 to 82% in 2013. 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 93% in 2012.

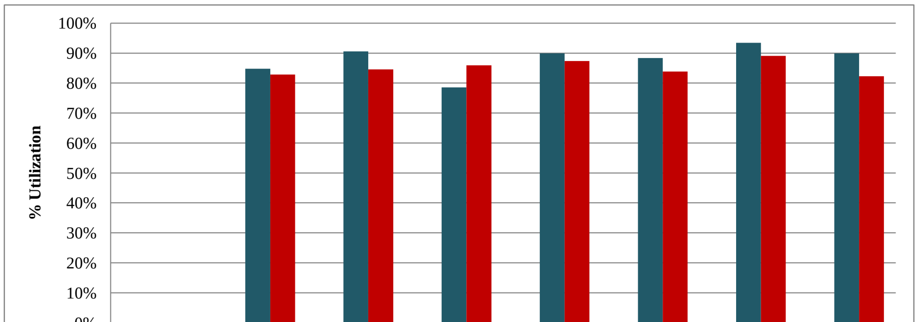
Effort Performance Metrics

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 15th). This index measures the relative proportion of the legal fishing season during



	Baseline	2007	2008	2009	2010	2011	2012	2013
Baseline	14,617							
CV		8,628	8,469	8,229	9,498	8,659	11,262	9,745
CP		4,320	4,851	4,226	6,058	5,924	7,319	6,691

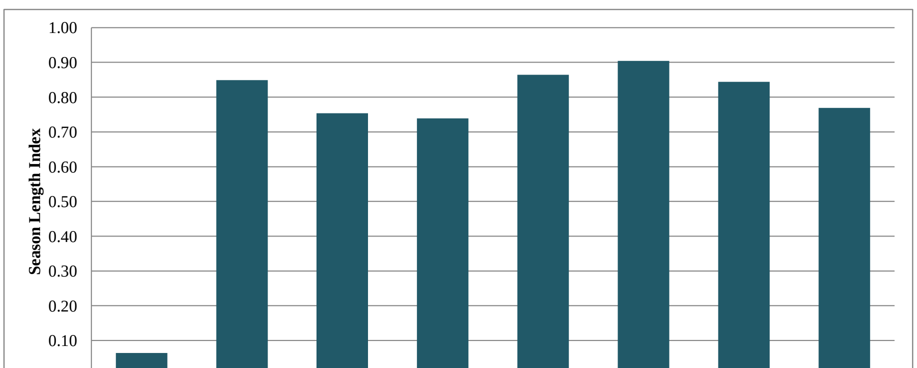
Figure 7.52: Aggregate landings of all Rockfish Program species in the Rockfish Program.



	Baseline	2007	2008	2009	2010	2011	2012	2013
Baseline	0.00%							
CP		84.75%	90.54%	78.56%	89.93%	88.32%	93.47%	89.92%
CV		82.87%	84.60%	85.93%	87.34%	83.82%	89.06%	82.29%

Figure 7.53: Percent of the allocated species that are landed in the Rockfish Program.

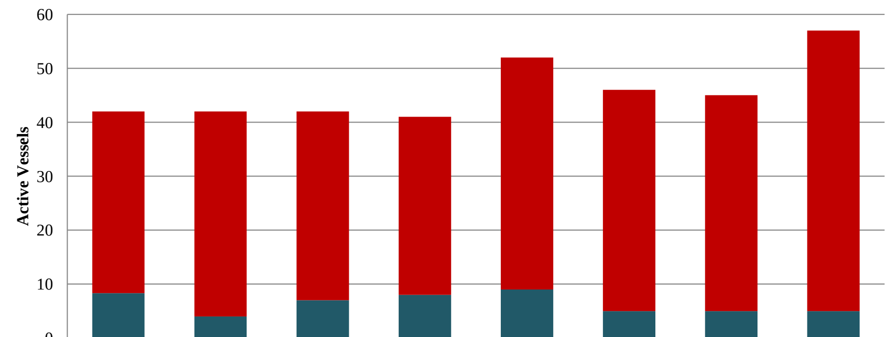
which some or all vessels actively fished Rockfish Program species allocations. The number of active days for these vessels increased significantly from 12 days during the baseline to an average of 163 days per year from 2007-2013, which corresponds to a season length index of $12/199 = 0.06$ during the baseline and averaged $163/199{=}0.82$ from 2007-2013 (Figure 7.54).



	Baseline	2007	2008	2009	2010	2011	2012	2013
RP	0.06	0.85	0.75	0.74	0.86	0.90	0.84	0.77

Figure 7.54: Rockfish Program season length index.

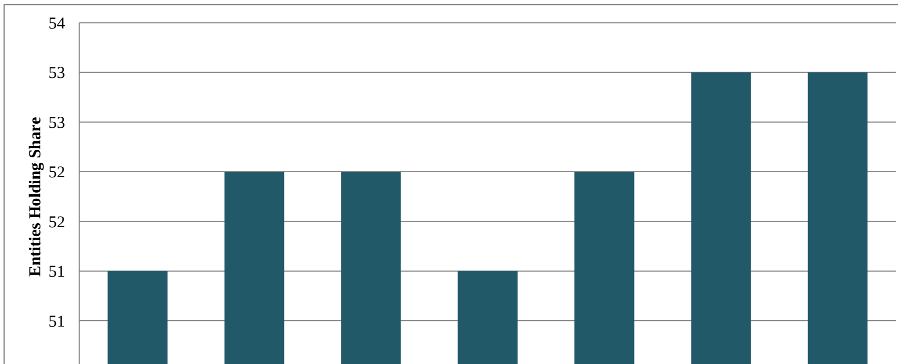
The number of active vessels reflects the number of Rockfish Program CVs and CPs with any commercial landings of Rockfish Program species in a given year, and includes the entry-level longline CVs as active vessels in the program. The total number of active vessels has increased from 42 vessels during the baseline to 57 vessels participating in the fishery in 2013. The number of CVs has varied from 33 and 52 vessels, while the number of CPs varied between 4 and 9 vessels (Figure 7.55). 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.



	Baseline	2007	2008	2009	2010	2011	2012	2013
CV	34	38	35	33	43	41	40	52
CP	8	4	7	8	9	5	5	5

Figure 7.55: Number of active vessels in the Rockfish Program.

The number of entities holding QS (LLP licenses) in the Rockfish Program has been very stable throughout the Rockfish Pilot Program (2007-2011) and the Rockfish Program (2012 to 2013), varying between 51 and 53 entities (Figure 7.56).

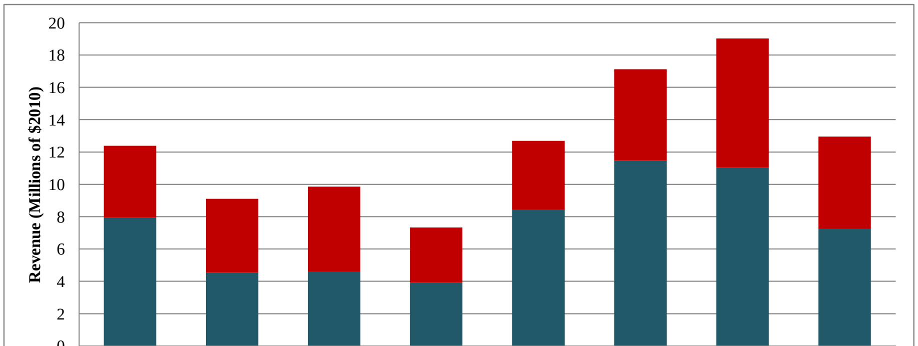


	2007	2008	2009	2010	2011	2012	2013
RP	51	52	52	51	52	53	53

Figure 7.56: Number of entities holding QS in the Rockfish Program.

Revenue Performance Metrics

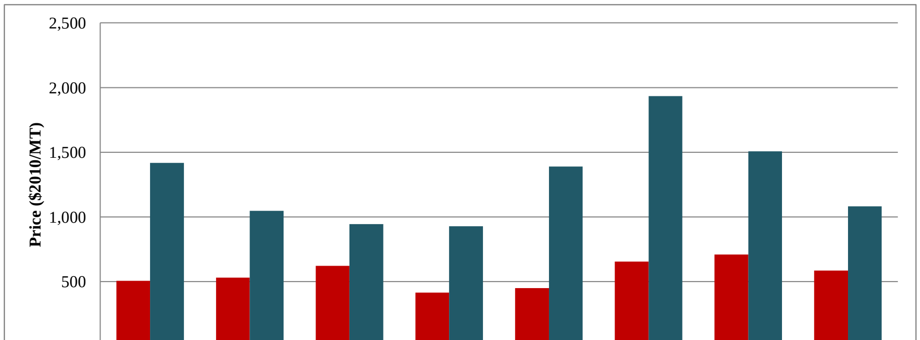
The revenue performance metrics are the aggregate revenue from Rockfish Program species, average prices of Rockfish Program species, the revenue per active vessel, and the Gini coefficient which is a measure of revenue concentration among the active vessels. Revenues are adjusted for inflation by using 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 5% between the baseline and 2013, from $12.38 million during the baseline to $12.95 million in 2013 (Figure 7.57). While the overall program revenue increased slightly, the CP sector has experienced an 8% decline in revenues while the CV sector has experienced an 28% increase in average revenues from 2007-2013 compared with the baseline. While landings have increased for both sectors in 2013 relative to the baseline, as shown below, prices have decreased for the CP sector while they have increased for the CV sector, which has lead to the differing revenue outcomes among sectors.



	Baseline	2007	2008	2009	2010	2011	2012	2013
CV	4.45	4.58	5.28	3.41	4.27	5.67	7.99	5.71
CP	7.93	4.53	4.58	3.92	8.42	11.46	11.02	7.25

Figure 7.57: Rockfish Program revenue.

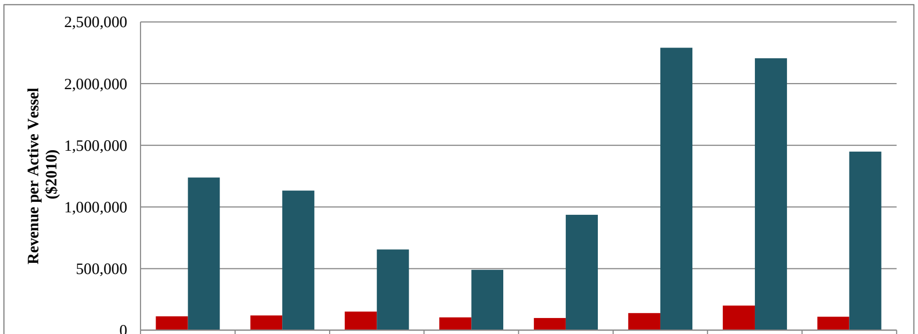
As the CV sector revenues are in ex-vessel value and CP sector revenues are in first wholesale value, the weighted average price per ton of Rockfish Program species varies by, and is reported separately for, each sector. Real weighted average prices of Rockfish Program species increased between the baseline and 2013 by 15.7% from $506/ton to $586/ton for CVs, but declined 24% from $1,417/ton to $1,083 for CPs (Figure 7.58). 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 2013, and the CPs have a higher coefficient of variation in prices at 0.27 than the CVs at 0.18.



	Baseline	2007	2008	2009	2010	2011	2012	2013
CV	506	531	623	415	450	655	710	586
CP	1,417	1,048	944	928	1,390	1,934	1,506	1,083

Figure 7.58: Weighted average of all Rockfish Program species price per metric ton.

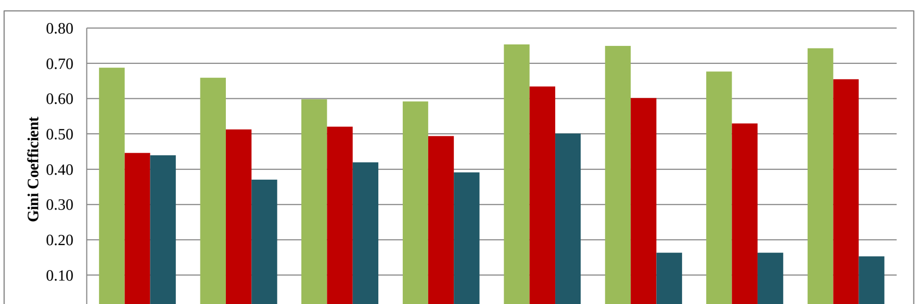
Rockfish Program revenue per vessel overall decreased by 14% from $265,089 during the baseline to $227,255 in 2013. The CV revenue per vessel fell slightly from $113,681 during the baseline to $109,777 during 2013, while revenue per CP increased by 17% (from $1.24 million during the baseline to $1.45 million in 2013) (Figure 7.59). 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
CV	113,681	120,522	150,735	103,467	99,300	138,276	199,860	109,777
CP	1,239,015	1,131,526	654,370	490,321	935,481	2,291,243	2,204,801	1,449,027

Figure 7.59: 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 7.60). This is because the revenue per vessel among CVs and CPs is very different (Figure 7.59) 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 0.74 in 2013, 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 0.65 in 2013. 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 0.15 from 2011-2013, which suggests the 5 remaining CP vessels participating in the Rockfish Program from 2011-2013 have a more equal split of revenues than the 8 vessels that participated in the baseline.



	Baseline	2007	2008	2009	2010	2011	2012	2013
RP	0.69	0.66	0.60	0.59	0.75	0.75	0.68	0.74
CV	0.45	0.51	0.52	0.49	0.63	0.60	0.53	0.65
CP	0.44	0.37	0.42	0.39	0.50	0.16	0.16	0.15

Figure 7.60: Rockfish Program Gini coefficient.

8. COMMUNITY PARTICIPATION IN NORTH PACIFIC GROUNDFISH FISHERIES

The 2010 Decennial Census 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.

8.1. People and Places

8.1.1 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.

8.1.2 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 (2010). Profile of selected social, economic and housing characteristics of all places within Alaska. Datasets utilized include the 2010 (Demographic Profile SF) Decennial Census. Retrieved November 1, 2011 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. Of the 352 Census communities (Places) in Alaska with a positive population in 2010, 60.5% (213 communities) had fewer than 400 residents, while 8.8% (31 communities) had fewer than 25 residents (Table 8.1). Other States have a very small percentage of their populations living in communities of less than 400.

Table 8.1: Census Places in Alaska by population size, and cumulative percent in 2010.

Population	Number of Census Places	Cum. %	Mean	Median	Min	Max
≤25	31	8.80%				
25-400	182	60.50%				
400-4,000	111	92.00%				
4,000-20,000	25	99.10%				
20,000+	3	100%				
Total population	710,231		4,092	358	0	290,588

Source: U.S. Census Bureau (2010). Profile of selected social, economic and housing characteristics of all places within Alaska. Datasets utilized include the 2010 (Demographic Profile SF) Decennial Census. Retrieved November 1, 2011 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 4,376 residents in 2010.[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 local economic conditions (especially those recently influenced by global trends) make getting by more difficult and opportunities elsewhere draw residents away.

[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. (2010). Profile of selected social, economic and housing characteristics of all places within Alaska. Datasets utilized include the 2010 (Demographic Profile SF) Decennial Census. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

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).[6] For purposes of comparison, Table 8.2 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 2010 Decennial Census, 37.2% (132 communities) exhibited more than 75% White residents and 39.7% (141 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% in 2010, Anchorage 5.8% and 5.6% in 2010, and Juneau 0.8% and 0.9% in 2010). 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. Unalaska, for example, has a particularly high percentage of Asian processing workers (32.6% of the 2010 population). About 50.4% (46.7% in 2000) of communities did not include any Asian residents.

In 2010, only about 28.4% 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 2.1% Hispanic in 2010, with a range of 0% to 20.8% in both years. 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

[6]All data presented here on race and ethnicity was obtained from the following 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 (SF1 100% and SF3 sample data) and 2010 (Demographic Profile SF) Decennial Census. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

Table 8.2: Racial distribution of the Alaskan and U.S. populations in 2000 and 2010.

2000				
	Alaska		U.S.	
Total population	626,932		281,421,906	
One race	592,786	94.60%	274,595,678	97.60%
Two or more races	34,146	5.40%	6,826,228	2.40%
White	434,534	69.30%	211,460,626	75.10%
Black or African American	21,787	3.50%	34,658,190	12.30%
American Indian and Alaska Native	98,043	15.60%	2,475,956	0.90%
Asian	25,116	4.00%	10,242,998	3.60%
Native Hawaiian and Other Pacific Islander	3,309	0.50%	398,835	0.10%
Some other race	9,997	1.60%	15,359,073	5.50%
Hispanic or Latino (of any race)	25,852	4.10%	35,305,818	12.50%
Not Hispanic or Latino	601,080	95.90%	246,116,088	87.50%
2010				
	Alaska		U.S.	
Total population	710,231		308,745,538	
One race	658,356	92.70%	299,736,465	97.10%
Two or more races	45,368	6.40%	9,009,073	2.90%
White	518,949	73.10%	223,553,265	72.40%
Black or African American	33,150	4.70%	38,929,319	12.60%
American Indian and Alaska Native	138,312	19.50%	2,932,248	0.90%
Asian	50,402	7.10%	14,674,252	4.80%
Native Hawaiian and Other Pacific Islander	11,154	1.60%	540,013	0.20%
Some other race	15,183	2.10%	21,748,084	7.00%
Hispanic or Latino (of any race)	39,249	5.50%	50,477,594	16.30%
Not Hispanic or Latino	670,982	94.50%	258,267,944	83.70%

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 (SF1 100% and SF3 sample data) and 2010 (Demographic Profile SF) Decennial Census. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

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 2010), and even when compared to the overall population of the State of Alaska (51.7% male in 2000 and 52.0% in 2010), a majority of the communities are more heavily skewed toward male residents. Over 70% in 2000 and 66% in 2010 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 50.8% in 2010), Ketchikan (50.4% male in 2000 and 50.8% in 2010), and Juneau (50.4% male in 2000 and 51.0% in 2010) 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 48.4% in 2010) and Hooper Bay (49.7% male in 2000 and 51.5% in 2010), 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. Excursion Inlet, Nikolski, Portage Creek and Wiseman 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 10.4% 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 36.2 years in 2010, somewhat younger than the U.S. median of 35.3 years in 2000 and 37.2 in 2010. This indicates a slight trend toward a young working-age population with few elderly residents for the entire State of Alaska. Approximately 54% 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 Native communities. These trends are also represented graphically in Figure 8.1.

8.2. Current Economy

There were 304,851 Alaskan residents employed throughout the state in 2010, compared to 284,000 in 2000. The government sector-including federal, state and local levels-was the largest in terms of employment figures, with 70,260 jobs in 2010 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) and mining (10,300, with oil and gas extraction contributing the most jobs at 8,800).[7] This changed slightly in 2010 to where trade transportation and utilities (63,028 or 20.7%) providing the most

[7] 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.

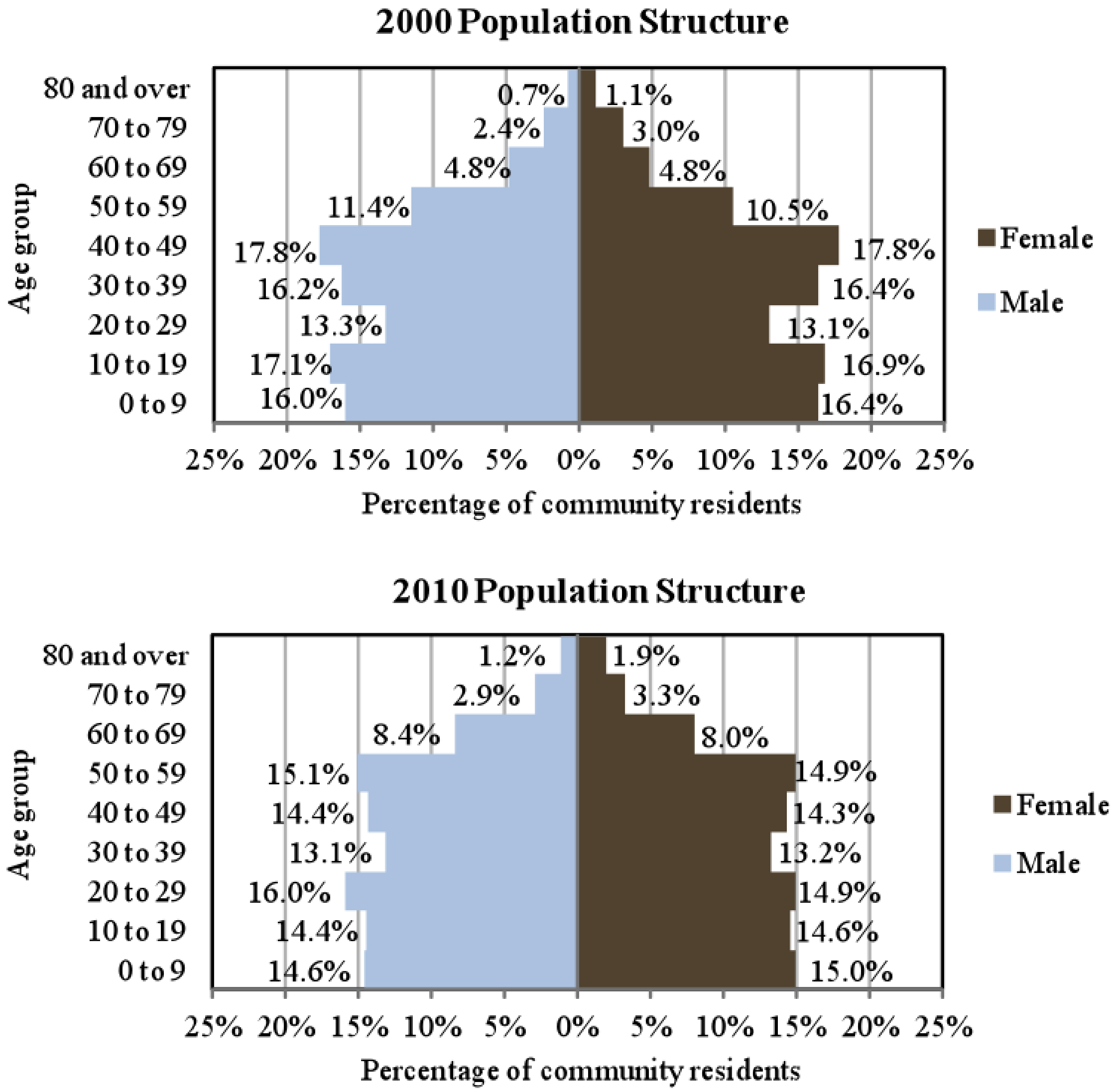


Figure 8.1: Population structure of the population as a whole in Alaska.
Source: U.S. Census Bureau. (n.d.). Profile of selected social, economic and housing characteristics of all places within Alaska. Datasets utilized include the 2000 (SF1 100% and SF3 sample data) and 2010 (Demographic Profile SF) Decennial Census. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

jobs, followed by educational and health services (42,534 or 14.0%), leisure and hospitality (29, 835 or 9.8%) and professional and business services (25,777 or 8.5%).[8] Employment in commercial fishing 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.[9]

[8] Alaska Department of Labor and Workforce Development (n.d.). Alaska Local and Regional Information Database. Retrieved August 4, 2012 from http://live.laborstats.alaska.gov/alari/.

[9] 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.

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. Crab[10] 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.

8.3. 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 shore-side 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 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.

[10] 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.

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.

8.4. Involvement in North Pacific Fisheries

8.4.1 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 $32 million in fiscal year 2010 to total Alaska state revenue.[11]

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 $12.6 million in fiscal year 2010 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 0.3% of total state fiscal revenues in both 2000 and 2010.[12]

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.

[11] 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. (2011). Fiscal Year 2011 Annual Report. Anchorage: Alaska Department of Revenue. Retrieved November 5, 2012 from http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?2470f

[12] Ibid.

8.4.2 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.[13] 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.[14] 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.[15] 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.[16] 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 by the 1920s.[17] 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

[13] 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.

[14] 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.

[15] 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.

[16] 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.

[17] International Pacific Halibut Commission. 1978. The Pacific Halibut: Biology, Fishery, and Management. Technical Report No. 16 (Revision of No. 6).

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.[18]

Between 2000 and 2009, groundfish were caught in the highest volume and accounted for the highest percentage of total landings revenue of all Alaskan fisheries. In particular, walleye pollock landings averaged 3 billion pounds through the 2000-2009 period, compared to an average of 680 million pounds of salmon landings per year. Although walleye pollock was valued at an average of only $0.13 per pound during this period, pollock landings still accounted for the highest landings revenue of any fishery between 2000 and 2009, averaging $371 million per year compared to $262 million per year from salmon fisheries. Pacific cod fisheries produced the third greatest volume and landings value over the decade, averaging 520 million pounds harvested per year and an average of $168 million in landings revenue. It is also important to note that sablefish had the highest average annual ex-vessel price between 2000 and 2009 ($2.47), followed by crab ($2.42), and Pacific halibut ($2.33), although these fisheries accounted for smaller overall portions of total Alaska catch volume.[19]

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.[20] 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.[21] 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.[22]

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

[18] See footnote 15.

[19] National Marine Service. (2010). Fisheries Economics of the United States, 2009. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-118, 172 p. Retrieved November 20, 2012 from http://www.st.nmfs.noaa.gov/st5/publication/econ/2009/FEUS%202009%20ALL.pdf.

[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] See footnote 15.

[22] 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.

been transitioned out and the entire American groundfish fisheries were harvested by U.S. vessels. The fisheries changed with the introduction of the first independent factory trawler in 1980 and subsequent over-harvest.[23]

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.[24]

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. Managers of CDQ organizations authorize individual fishermen and fishing vessels to harvest a certain portion of the allocated CDQ.

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 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. 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

[23]See footnote 20.

[24]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.

commercial and recreational sectors; however, as of the printing of this document, NMFS has not issued a final rule on how the new management structure would work.

Halibut and sablefish are primarily caught using longline gear on vessels of between approximately 50 to 100 feet in length, although some state-managed sablefish fisheries in inside waters allow for use of pot, jig, hand-troll gear, or bottom-trawl gear. 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.[25] Today the groundfish fisheries are the largest in terms of both weight and value out of all the North Pacific fisheries. Walleye pollock independently accounted for almost half of all landings weight in North Pacific fisheries between 2000 and 2009,[26] and in fact the Eastern Bering Sea pollock fishery is the largest by-volume fishery' in the U.S.[27] Pacific cod was landed in the third greatest volume in Alaska over the decade, after salmon.[28]

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.[29] 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.[30] 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.

8.4.3 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 ss 1802 (16) and further specified in NMFS guidelines,[31][32] we are primarily concerned with inshore processing activity. Offshore activities are relevant insofar as 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

[25] See footnote 29.

[26] National Marine Fisheries Service. (2010). Fisheries Economics of the United States, 2009. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-118, 172 p. Retrieved November 20, 2012 from http://www.st.nmfs.noaa.gov/st5/publication/econ/2009/FEUS%202009%20ALL.pdf.

[27] NOAA Fisheries Service, Alaska Fisheries Science Center. (2010). Walleye Pollock Fact Sheet. Retrieved November 21, 2012 from http://www.afsc.noaa.gov/Education/factsheets/10_Wpoll_FS.pdf.

[28] See footnote 32.

[29] Prince William Sound Science Center. (2007). Steller Sea Lion Research. Retrieved November 21, 2012 from http://www.pwssc.org/research/biological/Stellar/ssl.shtml.

[30] 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.

[31] 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.

[32] 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.

Alaska communities as processed product is converted into a whole fish weight by NOAA for statewide tabulation.[33] 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 8.3 and 8.4, below, list the top ten communities by weight and value of landings purchased by local fish buyers. Not surprisingly, in both 2000 and 2010, Dutch Harbor ranked highest both in terms of ex-vessel weight of landings and in terms of the monetary value of landings. In 2000, Akutan, ranked third 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. By 2010, processing in Kodiak activities had increased significantly, moving it ahead of Akutan in both pounds landed and ex-vessel value. But the changing order of communities between volume and value underscores the difference in fishery resource value.

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 shore-side processing facility present between 2000 and 2010, processed a greater volume of fish than Kodiak with its 13 shore-side processors in 2000 and 11 in 2010. This underscores the profitability of operating many small-scale specialty processors in a high per-unit value market such as Kodiak.

Sixty-five communities included fish buyers that filed fish tickets with the CFEC in 2010. Twenty-four communities included more than 10 fish buyers, 20 communities had 3 to 10 fish buyers, 1 community had 2 fish buyers, 20 communities had 1 fish buyer, and 130 communities did not have an active fish buyer present in 2010.[34] Similarly few communities have shore-side processing facilities available to them. Again, 66 had shore-side processing facilities that filed Intent to Operate declarations with ADF&G in 2010 (Table 8.5). Of these, two communities had more than 10 shore-side processing facilities, 8 had 6 to 10 shore-side facilities, 11 had 3 to 5 shore-side facilities, 7 had two shore-side facilities, and 38 had only one shore-side facility.

8.4.4 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. According to the CFEC, in 2000 there were 21,009 commercial permits sold for all fisheries in

[33]National Oceanic and Atmospheric Administration. (2003). Commercial Fisheries Landings: Data Caveats.

[34]Alaska Department of Fish and Game. (2011). 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.]

Table 8.3: Top Ten Communities by Landings (ex-vessel weight) in 2000 and 2010.

	Year 2000		Year 2010	
Rank	Community	# of Fish Buyers	Community	# of Fish Buyers
1	Unalaska/Dutch Harbor	29	Unalaska/Dutch Harbor	14
2	Akutan	3	Kodiak	33
3	Kodiak	27	Akutan	4
4	Cordova	50	Cordova	33
5	Sitka	147	Ketchikan	76
6	Sand Point	4	Sitka	115
7	King Cove	9	King Cove	7
8	Naknek	17	Sand Point	6
9	Valdez	13	Valdez	20
10	Seward	18	Naknek	23
Top Ten Communities: Total Fish Buyers		317		331
Top Ten Communities Combined Landings (weight)		911,156 tons		853,304 tons
Total Statewide Landings (weight)		992,809 tons*		1,053,702 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 81.0% of landings made in all Alaskan communities in 2010.

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2011). 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.]

Alaska; 58% of which were actively fished. The number of permits issued to residents of Alaskan communities declined over the decade to 17,698 in 2010 with 56% being actively fished (Table 8.6).

The number of licensed crew members employed annually in Alaskan commercial fisheries has declined over recent decades, from more than 32,000 in 1993 to approximately 17,500 in 2003 to 11,387 in 2010, an average decrease of 5.7% per year during that period.[35][36] 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 (59%), the labor pool also draws from Washington (22%), 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.[37] 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 (Table 8.7).

[35] Alaska Department of Fish and Game. (2011). Alaska sport fish and crew license holders, 2000 - 2010. 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.]

[36] 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.

[37] Ibid.

Table 8.4: Top 10 Communities by Landings (ex-vessel value) in 2000 and 2010.

	Year 2000		Year 2010	
Rank	Community	# of Fish Buyers	Community	# of Fish Buyers
1	Unalaska/Dutch Harbor	29	Unalaska/Dutch Harbor	14
2	Kodiak	27	Kodiak	33
3	Akutan	3	Cordova	33
4	Cordova	50	Akutan	4
5	Sitka	147	Sitka	115
6	Seward	18	Homer	27
7	King Cove	9	Naknek	23
8	Homer	37	Seward	13
9	Naknek	17	Ketchikan	76
10	Petersburg	36	Dillingham	18
Top Ten Communities: Total Fish Buyers		337		338
Top Ten Communities Combined Landings (U.S. dollars)		$581.2 million		$835.9 million
Total Landings made in Alaskan communities (U.S. dollars)		$1,232.3 million*		$733.5 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 68% of landings made in all Alaskan communities in 2010.

Source: Ibid.

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. Also, when examining the total figure for the category which includes fishing, the number is simply too small to be accurate even when compared to just the number of individuals in a community which fished their permits.

The numbers of CFEC groundfish permits fished/not fished are given in Table 8.6, however; as well as the number of community members which held a crew license (Table 8.7). Processing sector employment data was not available to us 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.

Table 8.5: Communities with more than three shore-side processors in 2000 and 2010.

	Year 2000			Year 2010		
Rank	Community	# of Shore-side Processors	# of Fish Buyers	Community	# of Shore-side Processors	# of Fish Buyers
1	Anchorage	17	8	Anchorage	13	11
2	Kodiak	15	27	Kodiak	11	33
3	Juneau	13	31	Juneau	9	85
4	Naknek	13	17	Naknek	9	23
5	Homer	12	37	Ketchikan	8	76
6	Kenai	11	11	Petersburg	8	52
7	Sitka	10	147	Kenai	8	43
8	Ketchikan	10	80	Cordova	7	33
9	Cordova	9	50	Unalaska/Dutch Harbor	7	14
10	Petersburg	9	36	Seward	6	13
11	Unalaska/Dutch Harbor	8	29	Sitka	5	115
12	Haines	6	87	Craig	5	42
13	Yakutat	5	21	Homer	5	27
14	Seward	5	18	Haines	4	21
15	Valdez	5	13	Yakutat	4	18
16	Craig	4	27	Egegik	4	13
17	Egegik	4	6	Klawock	4	3
18	Kasilof	4	3			
19	Soldotna	4	0			

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2011). 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 8.6: Total Permits Held and Fished, and Permit Holders by Species in Alaskan communities: 2000-2010.

Species		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Federal Fisheries Permits[1]	Total permits	1,184	1,228	1,256	1,031	1,083	1,113	920	1,044	1,110	942	971
	Fished permits	9	11	9	604	607	584	578	618	635	614	614
	% of permits fished	%	%	%	58%	56%	52%	62%	59%	57%	65%	63%
	Total permit holders	1,087	1,121	1,146	959	1,005	1,025	871	987	1,044	895	920
Groundfish (LLP)[1]	Total permits	1,593	1,557	1,536	1,531	1,518	1,528	1,533	1,530	1,538	1,542	1,550
	Active permits	668	660	635	635	610	591	564	562	565	575	590
	% of permits fished	41%	42%	41%	41%	40%	38%	36%	36%	36%	37%	38%
	Total permit holders	1,414	1,384	1,370	1,360	1,346	1,353	1,359	1,358	1,366	1,360	1,366
Sablefish (CFEC)[2]	Total permits	698	699	653	649	642	621	620	613	594	592	581
	Fished permits	580	602	584	571	575	559	562	552	536	541	530
	% of permits fished	83%	86%	89%	87%	89%	90%	90%	90%	90%	91%	91%
	Total permit holders	619	619	587	579	576	561	558	547	537	537	527
Groundfish (CFEC)[2]	Total permits	2,712	2,363	1,992	1,908	1,905	1,761	1,358	1,298	1,399	1,289	1,190
	Fished permits	1,048	772	635	709	674	583	485	505	588	556	540
	% of permits fished	38%	32%	31%	37%	35%	33%	35%	38%	42%	43%	45%
	Total permit holders	1,841	1,656	1,415	1,376	1,367	1,279	1,044	1,017	1,053	990	936

Source: 1-National Marine Fisheries Service. (2011). Data on Limited Liability Permits, Alaska Federal Processor Permits (FPP), Federal Fisheries Permits (FFP), and Permit holders. NMFS Alaska Regional Office. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]
2-Alaska Commercial Fisheries Entry Commission. (2011). Alaska commercial fishing permits, permit holders, and vessel licenses, 2000 - 2010. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 8.7: Characteristics of the Commercial Fishing Sector in all Alaskan communities: 2000-2010.

Year	Crew licenses holders[1]	Count of all fish buyers[2]	Count of shore-side processing facilities[3]	Vessels primarily owned by Alaskan residents[4]	Vessels homeported in Alaska[4]	Vessels landing catch in Alaskan communities[2]	Total net pounds landed in Alaskan communities[2]	Total ex-vessel value of landings in Alaskan communities[2]
2000	13,969	233	583	12,028	13,017	6,466	2,188,769,897	$733,483,275
2001	11,467	214	531	11,538	12,528	6,027	2,378,957,389	$627,142,796
2002	9,837	220	545	10,882	11,832	5,647	2,508,194,612	$676,262,504
2003	10,461	199	512	10,555	11,576	5,624	2,599,980,888	$797,536,302
2004	10,518	194	583	10,370	11,466	6,088	2,720,867,260	$863,035,877
2005	10,754	200	613	7,479	8,265	6,295	2,925,949,753	$975,161,750
2006	10,709	194	598	7,219	8,044	6,101	2,772,927,194	$1,029,754,286
2007	10,957	195	597	7,184	8,015	6,017	2,739,863,072	$1,137,916,591
2008	10,828	192	606	7,140	8,017	6,006	2,245,098,643	$1,317,397,706
2009	10,779	187	591	7,069	8,010	6,020	2,025,613,609	$1,008,743,788
2010	11,387	181	595	7,218	8,140	6,010	2,323,017,267	$1,232,334,327

Notes: Cells showing - indicate that the data are considered confidential.

Source: 1-Alaska Department of Fish and Game. (2011). Alaska sport fish and crew license holders, 2000 - 2010. 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.]
2-Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. (2011). 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.]
3-Alaska Department of Fish and Game. (2011). 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.]
4-Alaska Commercial Fisheries Entry Commission. (2011). Alaska commercial fishing permits, permit holders, and vessel licenses, 2000 - 2010. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

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 2008-2013 are provided in the Economic Performance Metrics for North Pacific Groundfish Catch Share Programs section of the report (see especially Figures 7.21-7.30 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 incease 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, are 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 for 2010 and 2011. Effective as of March, 2013, the GRS program requirements have been rescinded for the A80 fleet under Amendment 93 to the FMP (77 FR 59852, October 1, 2012).

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 2013. 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 2013 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 2009-2013. A80-qualified vessels holding quota share and active in EEZ fisheries in the BSAI fell to 18 during 2013, 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 a relatively small decrease in aggregate capacity compared to the previous four years, with aggregate net and gross tonnage across the fleet declining by 2% and less than 1%, respectively, compared to substantial increases in average values for 2013 (e.g. median net- and gross tonnage metrics increasing 27% and 40%) compared to the average over the previous four years. 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. Physical processing line capacity metrics have remained largely constant, with the exception of overall maximum throughput, which has increased from 3.63 metric tons (t) per hour in 2009 to 4.62 metric tons per hour in 2013 (increasing 17% over the previous four-year average); the same metric calculated for whole-fish products alone has not shown any increase, suggesting that production capacity in the fleet has been augmented to increase production efficiency of more value-added forms.

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 metric tons, but declined to an estimated 7,345 metric tons in 2013. Reported data for freezer throughput capacity indicates that vessel-level average throughput has increased from approximately 2.68 to 3.92 metric tons per hour over the 2009-2013 period. As freezer throughput is commonly cited as the principal limiting factor in processing capacity on A80 CP's, this result indicates a significant measure of increased production capacity in the fleet.

Table 9.1: Fleet Characteristics - Vessel Size.

	Obs	Gross Tonnage		Net Tonnage		Length Overall		Beam		Shaft Horsepower		Fuel Capacity	
Year	Count	Median	Total	Median	Total	Median	Total	Median	Total	Median	Total	Median	Total
2009	21	560	15,482	380	8,723	169	3,546	38	784	2,250	48,300	76,840	1,819,951
2010	20	775	15,285	403	8,589	177	3,424	39	758	2,385	47,475	77,920	1,781,457
2011	20	775	15,285	403	8,568	177	3,434	39	748	2,385	47,400	77,920	1,772,343
2012	20	775	15,880	403	8,712	177	3,434	40	761	2,385	47,400	77,920	1,818,826
2013	18	1,008	15,495	506	8,451	185	3,218	40	706	2,560	45,075	89,077	1,773,457

Source: Amendment 80 Economic Data Reports.

Table 9.2: Fleet Characteristics - Vessel Processing Capacity.

	Obs	Proccessing Lines on Vessel		Species Processed	Total No. Products Proccessed (species+product)	Any Product, Max Throughput (mt/hr)	Whole-fish Product, Max Throughput (mt/hr)
Year	Count	Total	Median	Median	Median	Median	Median
2009	21	39	1	12	17	3.63	3.33
2010	20	38	1	12	18	3.85	3.32
2011	20	37	1	12	17	3.92	3.31
2012	19	37	1	12	16	4.43	3.22
2013	18	36	1	12	16	4.62	3.32

Source: Amendment 80 Economic Data Reports.

Table 9.3: Fleet Characteristics - Vessel Freezer Capacity.

	Obs	Freezer Space (t)		Maximum Freezing Capacity (t/hr)	
Year	Count	Median	Total	Median	Total
2009	21	317.51	7,693.25	2.68	58.83
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

Source: Amendment 80 Economic Data Reports.

Table 9.4: Vessel Fuel Consumption - Average By Vessel Activity.

	Obs	Fishing/Processing (gal/hr)		Steam Loaded (gal/hr)		Steaming Empty (gal/hr)		All Vessel Activities (gal/hr)
Year	Count	Median	Total	Median	Total	Median	Total	Total
2009	21	90	2105	89	2120	87	1901	6126
2010	20	97	2106	95	2096	94	1854	6056
2011	20	97	2000	95	2004	93	1833	5837
2012	20	100	1946	105	2057	96	1865	5868
2013	18	103	1922	121	1996	100	1828	5746

Source: Amendment 80 Economic Data Reports.

Table 9.4 shows median values for reported estimates of average hourly fuel consumption rate of A80 vessels during fishing and processing, steaming loaded, and steaming empty operational modes, and Table 9.4 shows aggregate and vessel median annual fuel consumption. Reported hourly fuel use rates vary by activity, averaging 100 gallons per hour (gph) steaming empty, 103 gph fishing and processing, and 121 steaming loading (it should be noted that rates reported by individual vessels commonly vary by 10-15 gallons per hour from year to year). Average fuel consumption rates in the fleet have increased substantially over the last five years, by approximately 13% over rates reported in 2009 for fishing/processing and steaming empty, and 30% for steaming loaded, reflecting the increase in average tonnage within the currently active fleet. Total A80 fleet fuel consumption in fishing and processing during 2013 was 9.7 million gallons, and 12.4 million gallons including fuel used in vessel transiting, both approximately equal to the average over the 2009-2012 period.

9.2. Fishing Effort - A80 Vessel Days at Sea

Table 9.5 reports fleet aggregate and median statistics for vessel activity days reported in EDR data from 2009-2013, 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 consistently declined from 2009, when days processing totaled 3,774 (181 days on average) through 2012 (3,425 days in aggregate, and 178 on average), but increased in 2013. Although total sector catch allocations over all A80 species were reduced by 5% in 2013 to 307 thousand t (Figure CS31 in the Performance Metrics for Catch Shares section of this report), total vessel-days processing increased by 134 days (4%) to 3559 in 2013, a median 8% increase of 15 processing days per vessel. In contrast, days fishing and processing in other fisheries (primarily sideboard allowances in the Gulf of Alaska) show a substantial increase over the period 2009-2011 as the number of vessels reporting activity days increased from 11 to 17, and both total aggregate and average vessel processing days increasing each year. In both 2012 and 2013, vessel processing days in non-A80 fisheries declined, with 649 aggregate vessel days, and 28 median days per vessel in 2013.

9.3. Catch, Production, and Value

Table 9.6 reports annual fleet aggregate and vessel average values for catch, discard, volume of production in roundweight and finished weight terms (in metric tons), and estimated wholesale value of finished processed volume (in US$, all years adjusted to 2013-equivalent value), stratified by A80- and 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) has remained relatively stable over the period, varying between 240-270 thousand t, with the rate of discard varying between 2-5% and generally declining over the period. Retained catch of A80 species in 2013 was 260.4 thousand t, with 6.8 thousand t discard (3%). Total catch of other species in the BSAI varied between 74-84 thousand t from 2009-2012, but increased to 91.2 thousand t in 2013, with retained catch of 70.9 thousand t and discard of 20.3 thousand t (a discard rate of 29%, 3% lower than the previous four-year average). Total catch in GOA fisheries has varied from approximately 24-29 thousand t, with a retained catch in 2013 of 20.5 thousand t and discard of 3.6 thousand t (18%).

Finished production and value information displayed in Table 9.6 indicate 2009-2013 total finished production over all A80 target species varying between 141-167 thousand t per year, and gross wholesale revenue value varying between $236 million - $341 million over the period. Finished volume and value in 2013 were 159.8 thousand t and $245.1 million, respectively. This represented a 2% increase in volume over the previous four-year average, but a 17% decline in revenue due to a general decline in average price for A80 species during 2013. While Atka mackerel value per metric ton rose to its highest point over the last five years ($1,681/t in the BSAI C/P sector; see Table 27 in Chapter 4 of the report), average values for flatfish and Pacific cod declined substantially compared to 2009-2012. Finished production during 2013 of 37.9 thousand t and 11.7 thousand t in non-A80 target species in the BSAI and GOA, respectively, produced gross wholesale value of $54.3 and $23.5 million. Compared to the previous four-year average, 2013 non-A80 finished production volume in the BSAI increased by 14% and declined in the GOA by 7%, while first wholesale revenue value declined for both regions - by 17% and 27%, respectively.

Table 9.7 presents a summary of annual volume and revenue of 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 2013, 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

[3] Note that discrepancies between Table 9.7 and Table 9.6 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.

2010, 2012, and 2013 (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 2013 was 195.4 thousand t, with first wholesale value of $309 million; as noted previously, although total volume of product sold during 2013 was approximately the same as in 2012, a general decline in groundfish prices in 2013 resulted in gross earnings falling by 24%.

Table 9.5: Vessel Activity Days.

		Stat	2009	2010	2011	2012	2013
Amendment 80 Fisheries	Days Fishing	Obs	21	20	20	19	18
		Median	181	182	175	178	200
		Total	3,765	3,639	3,405	3,395	3,513
	Days Processing	Obs	21	20	20	19	18
		Median	181	189	173	185	200
		Total	3,774	3,747	3,454	3,425	3,559
All Other Fisheries	Days Fishing	Obs	11	14	17	17	12
		Median	20	30	32	30	28
		Total	261	535	812	735	648
	Days Processing	Obs	11	14	17	17	12
		Median	20	30	32	30	28
		Total	259	534	819	730	649
Non-Fishing and Inactive	Days Travel/Offload	Obs	21	20	20	20	18
		Median	72	77	80	69	80
		Total	1,398	1,681	1,956	1,682	1,560
	Days Inactive	Obs	21	20	20	20	18
		Median	100	81	78	98	74
		Total	2,355	1,928	1,857	2,089	1,466

Source: Amendment 80 Economic Data Reports.

Table 9.6: Amendment 80 Vessel Annual Catch, Production, And Value, By Fishery And Region

			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	2009	21	239.7	12.8	5 %	221.3	140.5	$ 236.1	886	29	5 %	1,006	568	$ 1.10
	2010	20	257.5	12.7	5 %	247.3	154.9	$ 267.7	1,521	44	3 %	1,518	820	$ 1.57
	2011	20	262.3	6.5	2 %	259.2	163.6	$ 333.8	1,368	15	2 %	1,356	719	$ 1.89
	2012	20	265.0	6.8	3 %	261.7	167.2	$ 340.5	1,386	26	2 %	1,528	790	$ 2.02
	2013	18	260.4	6.8	3 %	260.8	159.8	$ 245.1	2,175	26	2 %	2,195	1,202	$ 2.06
BSAI - All other fishery/species	2009	21	55.4	20.9	38 %	47.7	29.7	$ 48.8	79	198	49 %	77	45	$ 0.12
	2010	20	63.2	20.5	32 %	56.3	34.3	$ 49.4	170	127	28 %	216	122	$ 0.19
	2011	20	62.1	17.5	28 %	56.9	34.8	$ 62.3	124	92	17 %	194	107	$ 0.32
	2012	20	60.4	13.5	22 %	55.1	34.0	$ 67.7	71	78	15 %	197	100	$ 0.28
	2013	18	70.9	20.3	29 %	63.3	37.9	$ 54.3	198	166	17 %	173	94	$ 0.27
GOA - All fishery/species	2009	17	20.2	6.1	30 %	18.9	10.9	$ 23.9	27	6	22 %	24	15	$ 0.05
	2010	16	21.4	5.3	25 %	21.0	12.2	$ 29.1	31	4	14 %	28	16	$ 0.06
	2011	16	24.4	4.4	18 %	24.3	13.8	$ 41.1	32	4	14 %	23	12	$ 0.05
	2012	16	24.2	3.4	14 %	23.7	13.2	$ 35.2	27	4	13 %	17	11	$ 0.04
	2013	13	20.5	3.6	18 %	20.7	11.7	$ 23.5	26	4	16 %	20	11	$ 0.04

Notes: All dollar values are inflation-adjusted to 2013-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 9.7: Annual Revenue, All Sources

	Year	Volume (1,000t) Obs	Volume (1,000t) Median	Volume (1,000t) Total	Revenue ($million) Obs	Revenue ($million) Median	Revenue ($million) Total
Total Fishery Product Sales	2009	21	8.45	168.31	21	$ 12.63	$ 282.59
	2010	20	9.76	183.48	20	$ 14.93	$ 325.21
	2011	20	10.17	196.97	20	$ 20.29	$ 414.83
	2012	20	9.39	198.31	20	$ 19.48	$ 405.94
	2013	18	10.38	195.42	18	$ 15.62	$ 308.99
Other Income from Vessel Operations	2009	-	-	-	0	$ -	$ 0.00
	2010	-	-	-	1	$ *	$ *
	2011	-	-	-	0	$ -	$ 0.00
	2012	-	-	-	1	$ *	$ *
	2013	-	-	-	1	$ *	$ *
LLP License Sales, All	2009	-	-	-	0	$ -	$ 0.00
	2010	-	-	-	0	$ -	$ -
	2011	-	-	-	0	$ -	$ 0.00
	2012	-	-	-	0	$ -	$ -
	2013	-	-	-	0	$ -	$ -

Notes: All dollar values are inflation-adjusted to 2013-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. Capital Expenditures and Vessel Operating Costs

Table 9.8 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 $9-$25 million over the 2009-2013 period, $17.6 million during 2013. On an average basis, aggregate capital expenditure has varied between $530,000 to a high of $917,000, 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 57% of all capital investment costs reported over the period). Eleven vessels reported such investment in 2013, totaling nearly $10.4 million, with a median of $546,000.

Table 9.9 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 metric ton 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 9.11 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 2013 totaled $243 million, down from $303 million in 2012 (-20%). Consistent with previous years, labor costs, including direct wages, benefits, and at-sea provisions, represented the largest category of expenses at $98 million (40% of total operating costs for the year), with a median cost of $5.1 million. Direct payments to labor totaled $82 million for 2013, including approximately $13 million paid to fishing crews, $40 million to processing employees, and $29 million to other on-board employees (captains and other officers, engineers, and others). On a daily basis, aggregate fishing crew payment during 2013 was $2,548, and represented 4.2% of total gross revenue, with processing labor accounting for 13% of gross revenue.

Fuel costs for the fleet during both 2012 and 2013 totaled $48 million, however, fuel costs increased substantially as a proportion of overall costs in 2013, from 16% to 20%, and increased from $2.5 to $2.7 million on a median vessel basis, the highest level over the five-year period. Repair and maintenance expenses for 2013 decreased to $35 million across the fleet, representing 14.5% of overall costs, but increased 5% on a median basis compared to 2012, to $1.9 million. General administrative and insurance costs decreased from 2012, to a median of $13 million (5.4% of total aggregate expenses) and $10 million (4.1% of total aggregate expenses), respectively. The remaining operating cost items make up an additional 14.5% of total operating expenses for 2013.

An important result of this analysis, as shown in the bottom section of Table 9.9, is the prorata comparison of total operating expenses to total vessel revenue. Operating costs in 2009 represented 86% percent of gross revenue alone, not accounting for capital investments during that year. This ratio initially declined to a low point of 72% in 2011, but increased in 2012 and again in 2013, to 78.8%.

9.5. Employment

Table 9.10 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 declined slightly to 105 in 2013, down from 107 in 2012, and the total number of individuals participating as crew during 2013 was 214, down from 242 in 2012. Median crew positions per vessel has remained unchanged at 6, suggesting that reduced crew employment is not a general trend, but has occurred at the margin on a subset of vessels. Processing employment shows the same pattern over the period, declining to the lowest level over the period during 2013, to 433 total positions, while median number of positions per vessel is largely constant at 22-23. 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 160 positions across the fleet during 2013 from the previous high of 170 during 2012.

9.6. Quota Share Transfers

Table 9.11 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, reporting of these results is 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 vessels leasing out QS to other vessels has ranged from zero (0) to as many as nine vessels, with the latter occurring in 2012 with the lease of yellowfin sole QS to three lessee vessels.

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.

Table 9.8: Capital Expenditures, By Category And Year: Median, Total, Total As Percent Of Annual Sum Over All Expense Categories

	Year	Obs	Expenditure per vessel, median (1,000)	Total fleet expenditure ($million)	Percent of Total Annual Capital Expenditures
Fishing gear	2009	8	$ 60.81	$ 0.70	7 %
	2010	8	$ *	$ *	* %
	2011	9	$ 103.72	$ 1.30	16 %
	2012	10	$ 280.65	$ 2.97	12 %
	2013	9	$ 75.00	$ 1.51	9 %
Other capital expenditures	2009	5	$ 48.95	$ 0.69	7 %
	2010	4	$ *	$ *	* %
	2011	8	$ 142.67	$ 1.88	22 %
	2012	7	$ 100.31	$ 0.87	3 %
	2013	7	$ 156.50	$ 0.78	4 %
Processing gear	2009	9	$ 105.40	$ 1.14	12 %
	2010	13	$ 164.91	$ 3.12	28 %
	2011	10	$ 155.01	$ 2.46	31 %
	2012	14	$ 82.99	$ 3.13	13 %
	2013	9	$ 140.00	$ 4.92	28 %
Vessel and other onboard equipment	2009	13	$ 467.10	$ 7.33	74 %
	2010	15	$ 116.89	$ 5.75	52 %
	2011	11	$ 128.35	$ 3.10	35 %
	2012	18	$ 67.42	$ 18.03	72 %
	2013	11	$ 545.50	$ 10.41	59 %
Total over all capital costs	2009	13	$ 682.27	$ 9.86	100 %
	2010	15	$ 564.14	$ 11.06	100 %
	2011	11	$ 529.75	$ 8.74	100 %
	2012	18	$ 531.37	$ 24.99	100 %
	2013	11	$ 917.00	$ 17.61	100 %

Notes: All dollar values are inflation-adjusted to 2013-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 9.9: Fishing And Processing Operating Expenses, By Category And Year, And 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
Labor	Food and Provisions	2009	18	$ 314	$ 6	2.47 %	$ 1,131	$ 36	2.13 %
		2010	17	$ 302	$ 5	2.02 %	$ 950	$ 28	1.57 %
		2011	17	$ 353	$ 6	1.91 %	$ 1,045	$ 29	1.37 %
		2012	17	$ 348	$ 6	1.90 %	$ 1,104	$ 29	1.42 %
		2013	15	$ 339	$ 6	2.34 %	$ 1,116	$ 29	1.84 %
	Labor Payment, Fishing Crew	2009	21	$ 857	$ 25	10.39 %	$ 4,752	$ 150	8.93 %
		2010	20	$ 673	$ 14	5.71 %	$ 2,684	$ 79	4.43 %
		2011	20	$ 898	$ 17	5.88 %	$ 3,211	$ 89	4.21 %
		2012	20	$ 796	$ 17	5.62 %	$ 3,270	$ 86	4.20 %
		2013	18	$ 638	$ 13	5.34 %	$ 2,548	$ 67	4.21 %
	Labor Payment, Other Employees	2009	17	$ 1,396	$ 26	10.52 %	$ 4,812	$ 152	9.04 %
		2010	20	$ 1,519	$ 31	12.19 %	$ 5,728	$ 168	9.46 %
		2011	20	$ 1,967	$ 37	12.59 %	$ 6,875	$ 190	9.02 %
		2012	20	$ 2,116	$ 39	12.87 %	$ 7,485	$ 197	9.61 %
		2013	18	$ 1,635	$ 29	11.81 %	$ 5,632	$ 147	9.30 %
	Labor Payment, Processing Employees	2009	17	$ 1,909	$ 33	13.75 %	$ 6,291	$ 198	11.82 %
		2010	20	$ 2,014	$ 45	17.81 %	$ 8,368	$ 245	13.82 %
		2011	20	$ 2,648	$ 53	17.90 %	$ 9,779	$ 270	12.83 %
		2012	20	$ 2,669	$ 54	17.87 %	$ 10,392	$ 273	13.34 %
		2013	18	$ 1,930	$ 40	16.33 %	$ 7,786	$ 203	12.86 %
	Other Employment Related Costs	2009	21	$ 394	$ 9	3.76 %	$ 1,721	$ 54	3.23 %
		2010	20	$ 435	$ 9	3.76 %	$ 1,766	$ 52	2.92 %
		2011	20	$ 536	$ 12	4.11 %	$ 2,246	$ 62	2.95 %
		2012	20	$ 519	$ 10	3.24 %	$ 1,885	$ 50	2.42 %
		2013	18	$ 595	$ 10	4.22 %	$ 2,011	$ 53	3.32 %

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Table 9.9: 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	2009	21	$ 449	$ 10	4.28 %	$ 1,959	$ 62	3.68 %
		2010	20	$ 439	$ 9	3.53 %	$ 1,659	$ 49	2.74 %
		2011	20	$ 359	$ 9	3.18 %	$ 1,737	$ 48	2.28 %
		2012	19	$ 396	$ 10	3.17 %	$ 1,841	$ 48	2.36 %
		2013	18	$ 471	$ 8	3.48 %	$ 1,660	$ 43	2.74 %
	Freight	2009	21	$ 62	$ 2	0.93 %	$ 425	$ 13	0.80 %
		2010	20	$ 76	$ 2	0.67 %	$ 316	$ 9	0.52 %
		2011	20	$ 63	$ 2	0.61 %	$ 335	$ 9	0.44 %
		2012	20	$ 67	$ 2	0.61 %	$ 357	$ 9	0.46 %
		2013	18	$ 85	$ 2	0.74 %	$ 355	$ 9	0.59 %
	Lease Expenses	2009	5	$ 5	$ 0	0.02 %	$ 11	$ 0	0.02 %
		2010	6	$ *	$ *	* %	$ *	$ *	* %
		2011	7	$ 7	$ 0	0.03 %	$ 17	$ 0	0.02 %
		2012	8	$ 10	$ 0	0.04 %	$ 21	$ 1	0.03 %
		2013	5	$ 8	$ 0	0.03 %	$ 14	$ 0	0.02 %
	Repair and Maintenance	2009	21	$ 1,355	$ 34	13.88 %	$ 6,349	$ 200	11.93 %
		2010	20	$ 1,828	$ 42	16.65 %	$ 7,821	$ 229	12.92 %
		2011	19	$ 1,500	$ 36	11.97 %	$ 6,536	$ 181	8.58 %
		2012	20	$ 1,780	$ 43	14.33 %	$ 8,332	$ 219	10.70 %
		2013	18	$ 1,877	$ 35	14.53 %	$ 6,931	$ 181	11.45 %

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Table 9.9: 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	2009	21	$ 824	$ 18	7.46 %	$ 3,412	$ 108	6.41 %
		2010	16	$ 783	$ 12	4.88 %	$ 2,293	$ 67	3.79 %
		2011	16	$ 1,188	$ 28	9.33 %	$ 5,099	$ 141	6.69 %
		2012	20	$ 744	$ 28	9.36 %	$ 5,443	$ 143	6.99 %
		2013	18	$ 546	$ 13	5.42 %	$ 2,584	$ 67	4.27 %
	Insurance	2009	21	$ 531	$ 13	5.28 %	$ 2,415	$ 76	4.54 %
		2010	20	$ 532	$ 11	4.51 %	$ 2,118	$ 62	3.50 %
		2011	20	$ 514	$ 14	4.70 %	$ 2,566	$ 71	3.37 %
		2012	20	$ 596	$ 16	5.30 %	$ 3,082	$ 81	3.96 %
		2013	17	$ 563	$ 10	4.09 %	$ 1,950	$ 51	3.22 %
Services	Freight and Storage	2009	10	$ 292	$ 14	5.94 %	$ 2,715	$ 86	5.10 %
		2010	8	$ 1,548	$ 15	6.13 %	$ 2,878	$ 84	4.75 %
		2011	4	$ *	$ *	* %	$ *	$ *	* %
		2012	4	$ *	$ *	* %	$ *	$ *	* %
		2013	4	$ *	$ *	* %	$ *	$ *	* %
Fees	Cooperative Costs	2009	15	$ 81	$ 1	0.53 %	$ 242	$ 8	0.46 %
		2010	14	$ 79	$ 1	0.44 %	$ 207	$ 6	0.34 %
		2011	16	$ 82	$ 1	0.44 %	$ 243	$ 7	0.32 %
		2012	16	$ 83	$ 1	0.40 %	$ 232	$ 6	0.30 %
		2013	14	$ 91	$ 1	0.44 %	$ 211	$ 6	0.35 %
	Fish Tax	2009	21	$ 164	$ 4	1.47 %	$ 673	$ 21	1.26 %
		2010	20	$ 89	$ 2	0.84 %	$ 393	$ 12	0.65 %
		2011	20	$ 103	$ 2	0.72 %	$ 395	$ 11	0.52 %
		2012	20	$ 143	$ 3	1.06 %	$ 618	$ 16	0.79 %
		2013	18	$ 159	$ 3	1.37 %	$ 656	$ 17	1.08 %
	Observer	2009	21	$ 203	$ 4	1.76 %	$ 804	$ 25	1.51 %
		2010	20	$ 207	$ 4	1.60 %	$ 750	$ 22	1.24 %
		2011	20	$ 200	$ 4	1.27 %	$ 693	$ 19	0.91 %
		2012	19	$ 196	$ 4	1.24 %	$ 720	$ 19	0.92 %
		2013	18	$ 206	$ 4	1.52 %	$ 726	$ 19	1.20 %

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Table 9.9: 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	2009	21	$ 1,739	$ 36	14.93 %	$ 6,827	$ 215	12.83 %
		2010	20	$ 2,001	$ 38	15.21 %	$ 7,147	$ 209	11.81 %
		2011	20	$ 2,192	$ 46	15.46 %	$ 8,445	$ 233	11.08 %
		2012	20	$ 2,493	$ 48	15.90 %	$ 9,244	$ 243	11.87 %
		2013	18	$ 2,733	$ 48	19.91 %	$ 9,497	$ 248	15.69 %
	Lubrication and Fluids	2009	21	$ 122	$ 3	1.03 %	$ 471	$ 15	0.89 %
		2010	20	$ 103	$ 6	2.30 %	$ 1,081	$ 32	1.79 %
		2011	20	$ 114	$ 8	2.74 %	$ 1,498	$ 41	1.97 %
		2012	19	$ 116	$ 2	0.80 %	$ 466	$ 12	0.60 %
		2013	18	$ 133	$ 3	1.09 %	$ 520	$ 14	0.86 %
	Product and Packaging Materials	2009	21	$ 173	$ 4	1.60 %	$ 731	$ 23	1.37 %
		2010	20	$ 185	$ 4	1.67 %	$ 787	$ 23	1.30 %
		2011	20	$ 258	$ 5	1.58 %	$ 861	$ 24	1.13 %
		2012	20	$ 253	$ 5	1.72 %	$ 999	$ 26	1.28 %
		2013	18	$ 220	$ 5	1.96 %	$ 933	$ 24	1.54 %
	Raw Fish Purchases	2009	0	$ -	$ 0	0.00 %	$ 0	$ 0	0.00 %
		2010	1	$ *	$ *	* %	$ *	$ *	* %
		2011	1	$ *	$ *	* %	$ *	$ *	* %
		2012	1	$ *	$ *	* %	$ *	$ *	* %
		2013	1	$ *	$ *	* %	$ *	$ *	* %

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Table 9.9: 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
	2009	21	$ 10,869	$ 243	100.00 %	$ 45,742	$ 1,443	85.95 %
Total	2010	20	$ 12,852	$ 252	100.00 %	$ 46,981	$ 1,376	77.61 %
Over All	2011	20	$ 18,250	$ 297	100.00 %	$ 54,621	$ 1,509	71.67 %
Expenses	2012	20	$ 17,939	$ 303	100.00 %	$ 58,145	$ 1,528	74.64 %
	2013	18	$ 16,304	$ 243	100.00 %	$ 47,692	$ 1,246	78.78 %

Notes: All dollar values are inflation-adjusted to 2013-equivalent value. Fleet 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.

Table 9.10: Employment In Fishing, Processing, And Other Positions On-Board Vessel

		Year	Obs	Median	Total
Fishing	Number of Employees During the Year	2009	17	10	173
		2010	20	13	276
		2011	20	9	234
		2012	20	10	242
		2013	18	8	214
	Positions on Board	2009	21	6	120
		2010	20	6	114
		2011	20	6	111
		2012	20	6	107
		2013	18	6	105
Processing	Number of Employees During the Year	2009	17	54	1,043
		2010	16	60	1,283
		2011	20	61	1,234
		2012	20	52	1,296
		2013	18	59	1,183
	Positions on Board	2009	21	23	516
		2010	20	23	476
		2011	20	23	473
		2012	20	23	448
		2013	18	23	433
Other	Number of Employees During the Year	2009	17	14	291
		2010	16	17	473
		2011	20	18	356
		2012	20	20	436
		2013	18	19	383
	Positions on Board	2009	21	6	136
		2010	20	7	145
		2011	20	7	150
		2012	20	7	170
		2013	18	7	160

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.

Table 9.11: Amendment 80 QS Transfers and Lease Activity

	Year	QS Leased to Others	QS Leased from Others
Atka mackerel	2009	3	3
	2010	4	1
	2011	5	1
	2012	0	0
	2013	0	0
Flathead sole	2009	0	0
	2010	0	0
	2011	0	1
	2012	1	1
	2013	0	0
Rockhead sole	2009	0	0
	2010	0	0
	2011	0	1
	2012	4	3
	2013	0	0
Yellowfin sole	2009	0	0
	2010	0	0
	2011	5	3
	2012	9	3
	2013	7	3
Pacific cod	2009	1	1
	2010	4	1
	2011	1	5
	2012	1	1
	2013	3	3
Pacific Ocean perch	2009	2	1
	2010	2	1
	2011	2	2
	2012	3	1
	2013	0	0
Other species	2009	0	0
	2010	0	0
	2011	2	1
	2012	0	1
	2013	0	0
Halibut PSC	2009	0	0
	2010	0	0
	2011	0	0
	2012	1	0
	2013	0	0
Crab PSC	2009	0	0
	2010	0	0
	2011	0	0
	2012	1	0
	2013	0	0

Notes: Quantity and value of lease transfers cannot be shown due to confidentiality restrictions.

Source: Amendment 80 Economic Data Reports.

Alaska Groundfish Market Profiles[4]

10.8. Alaska Pollock Fillets Market Profile

10.8.1 Description of the Fishery

Alaska pollock or walleye pollock (*Gadus chalcogramma*) is widely distributed in the temperate to boreal North Pacific, from Central California into the eastern Bering Sea along the Aleutian arc, around Kamchatka, in the Okhotsk Sea and into the southern Sea of Japan.

The Alaska pollock fishery in the waters off Alaska is among the world's largest fisheries. Under U.S. federal law, the fishery is subject to total allowable catch (TAC) limitations, quota allocations among the different sectors of participants in the fishery, and rules that give exclusive harvesting rights to specifically identified vessels, with the result that any potential new competitors face significant barriers to entry. In recent years, approximately 93% of the Alaska pollock fishery has been harvested in the Bering Sea and Aleutian Islands (BSAI) with the remainder harvested in the Gulf of Alaska (GOA).

In 1998, the United States Congress passed the American Fisheries Act (AFA) which specifies how the TAC is allocated annually among the three sectors of the BSAI pollock fishery (inshore, catcher/processors, and motherships) and community development quota (CDQ) groups. The AFA also specifically identifies the catcher/processors and catcher vessels that are eligible to participate in the Bering Sea-Aleutian Islands (BSAI) pollock fishery, and provides for the formation of cooperatives that effectively eliminates the race for fish. Under the cooperative agreements, members limit their individual catches to a specific percentage of the TAC allocated to their sector. Once the catch is allocated, members can freely transfer their quota to other members.

The BSAI pollock fishery is also split into two distinct seasons, known as the "A" and "B" seasons. The "A" season opens January 20^{th} and typically ends in April. The "A" season accounts for 40% of the annual quota, while the "B" season accounts for the remaining 60%. During the "A" season, pollock are spawning and develop significant quantities of high-value roe. During the "A" season other primary products, such as surimi and fillet blocks, are also produced although yields on these products are slightly lower in "A" season compared to "B" season due to the higher roe content of pollock harvested in the "A" season. The "B" season begins in June and extending through the end of October. The primary products produced in the "B" season are surimi and fillet blocks. Figure 10.1 shows the wholesale prices for U.S. primary production of Alaska pollock products. Roe prices are not included because the per unit value of roe is so much higher than other products.

Prior to the implementation of the American Fisheries Act in 1999, most of the U.S. Alaska pollock catches were processed into surimi. Since the BSAI fishery was managed as an "open-access" fishery, the focus was on obtaining as large a share of the TAC as possible. Surimi production can handle more raw material in a short period of time than fillet and fillet block production. With the establishment of the quota allocation program and cooperatives, the companies involved were given more time to produce products according to the current market situation (Sjøholt 1998). As the

[4] Updated, November 2014 by Ben Fissel, Economist, NMFS-Alaska Fisheries Science Center and Jean Lee, PSMFC-AKFIN. Originally prepared in 2008 for the National Marine Fisheries Service Alaska Fisheries Science Center by Northern Economics, Inc.. Original Preparers, 2008: Marcus Hartley, Project Manager, Northern Economics, Inc.; Dr. Don Schug, Research Analyst, Northern Economics, Inc.; Bill Schenken, Data Analyst, Northern Economics, Inc.; Dr. James L. Anderson, Export Market Analyst, J.L. Anderson Associates.

global decrease in the supply of traditional whitefish strengthened the demand for other product forms made from Alaska pollock, the share of fillets in total Alaska pollock production increased (Guenneugues and Morrissey 2005; Knapp 2006).

The changes in the quantity and wholesale value of fillet and other product production are shown in Figure 10.2 and Figure 10.3.

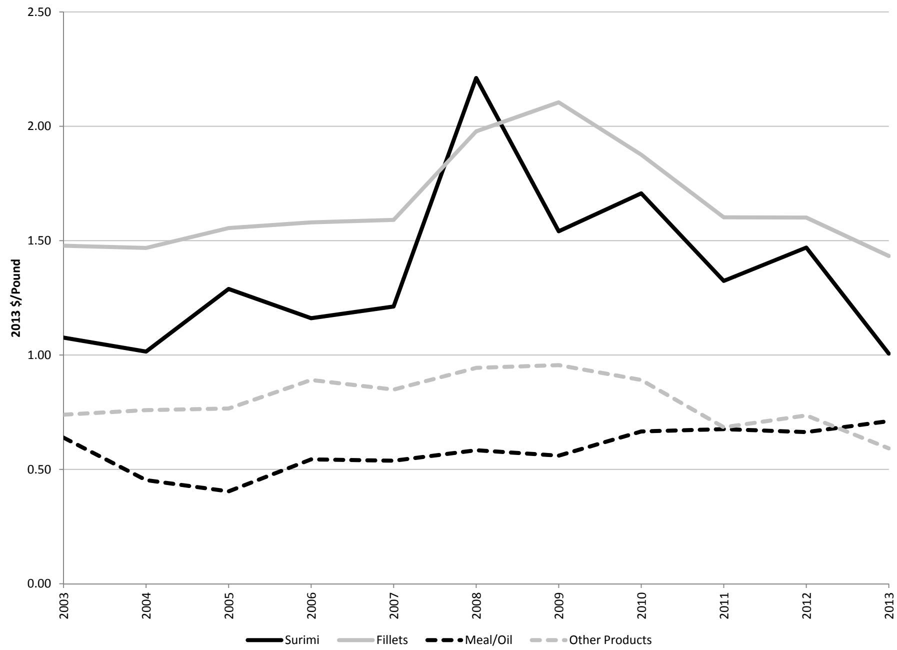

Figure 10.1: Wholesale Prices for Alaska Primary Production of Alaska Pollock Products (excluding Roe) by Product Type, 2003-2013.
Notes: The variable 'Fillets' is an aggregate over different types of fillets products made from pollock. 'Other products' is an aggregate over all products that are not 'Fillets', 'Surimi', 'Meal/Oil' or 'Roe'.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

10.8.2 Production

The Alaska pollock is the most abundant groundfish/whitefish species in the world (Sjøholt 1998). With the exception of a small portion caught in Washington State, all of the Alaska pollock landed in the United States is harvested in the fishery off the coast of Alaska (Figure 10.4). This fishery is the largest U.S. fishery by volume.

U.S. Alaska pollock fillet producers face competition from Russian Alaska pollock, largely processed in China.[5] Catches in Russia's pollock fishery, used to be twice the size of catches in the U.S. pollock fishery. Since 2000 catch levels of the two countries have been roughly equal (Figure 10.4).

[5]Alaska pollock is the correct species name for any pollock harvested in the Bering Sea, regardless of national boundaries. Russian Alaska pollock refers to the species "Alaska pollock" caught by Russia.

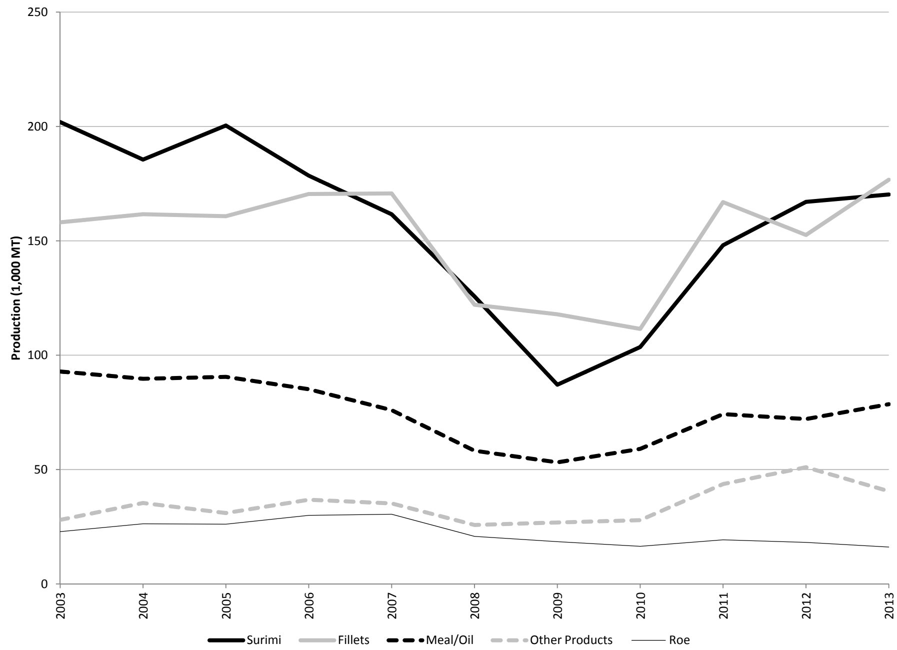

Figure 10.2: Alaska Primary Production of Alaska Pollock by Product Type, 2003-2013.
Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

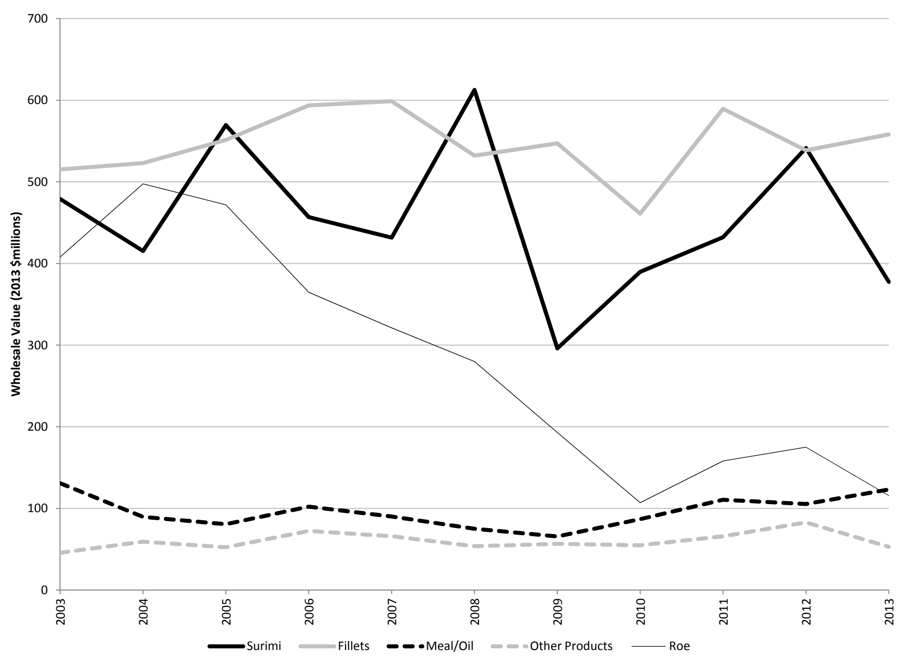

Figure 10.3: Wholesale Value of Alaska Primary Alaska Pollock Production by Product Type, 2003-2013.
Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

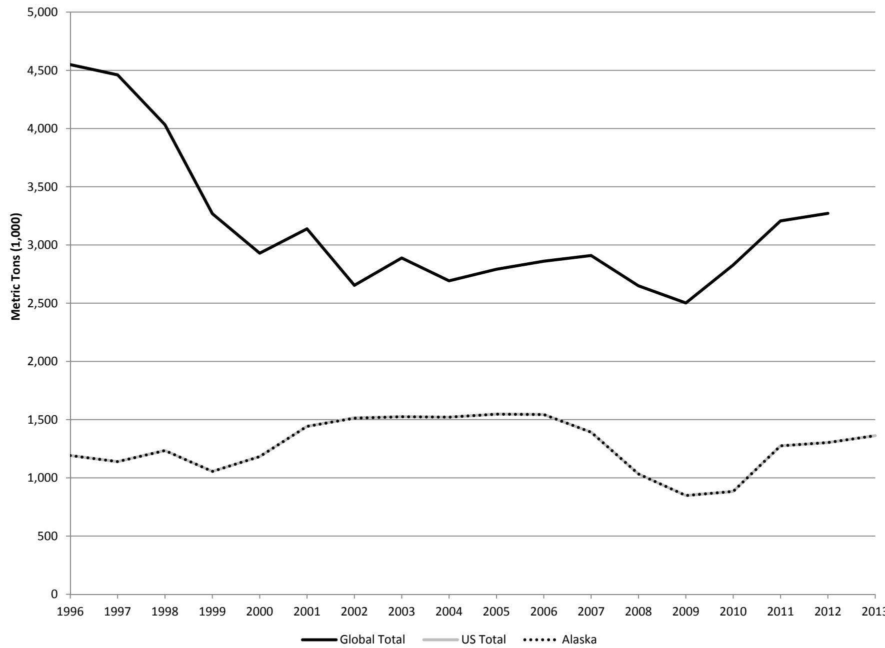

Figure 10.4: Alaska, Total U.S. and Global Retained Harvests of Alaska Pollock, 1996-2013.
Notes: Data for 2013 were unavailable for global total.

Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at: `http://www.psmfc.org/pacfin/pfmc.html`. Global data from FAO, "FishStat" database available at `http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073`.

10.8.3 Product Composition and Flow

Pollock fillets are typically sold as fillets and fillet blocks (frozen, compressed slabs of fillets used as raw material for value-added products such as breaded items, including nuggets, fish sticks, and fish burgers), either as pin-bone-out fillets, pin-bone-in fillets, or deep-skinned fillets. Deep-skinned fillets are generally leaner and whiter than other fillets and command the highest wholesale price (Figure 10.5).

The price of pollock fillets also varies according to the freezing process. The highest-priced pollock fillets are single-frozen, frozen at sea (FAS), products produced by Alaska and Russian catcher/processors. Next are single-frozen fillets processed by Alaska shoreside plants. Twice-frozen (also referred to as double-frozen or refrozen) pollock fillets, most of which are processed in China, have traditionally been considered the lowest grade of fillets and have sold at a lower price, especially in comparison to FAS single-frozen fillets (Pacific Seafood Group undated). Twice-frozen fillets can be stored for a maximum of six months, whereas single-frozen can be stored for nine to 12 months; moreover, twice-frozen fillets are reportedly greyer in color and often have a fishy aroma (Eurofish 2003). However, industry representatives noted that, by the early 2000's, the acceptability of twice-frozen fillets had increased in many markets. Pollock is a fragile fish that deteriorates rather quickly after harvest, so little is sold fresh (NMFS 2001).

Historically, the primary market for pollock fillets has been the domestic market. Fillets made into deep-skin blocks were destined primarily for U.S. foodservice industry, including fast food restaurants such as McDonald's, Long John Silver's, and Burger King (NMFS 2001). According to an industry representative, these high-volume buyers utilized enough product that they could cut it into portion sizes while still semi-frozen for re-processing as battered fish fillets or fish sticks. In recent years, however, the U.S market has shown more interest in skinless/boneless fillets than in deep-skin blocks (Figure 10.6 and Figure 10.7). Regular-skinned fillets are sold as individually quick frozen (IQF), shatterpack (layered frozen fillets that separate individually when struck upon a hard surface) or layer pack.

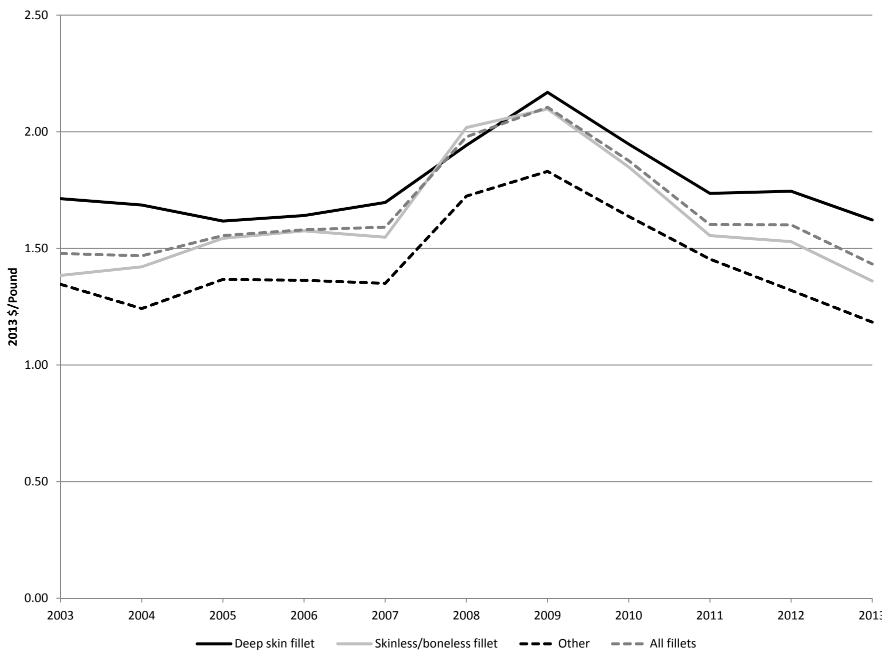

Figure 10.5: Wholesale Prices for Alaska Primary Production of Alaska Pollock Fillets by Fillet Type, 2003-2013.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

10.8.4 International Trade

As shown in Figure 10.8, the single most important export market for pollock fillets has been Germany since 2001. Another important European destination for Alaska-caught pollock is the Netherlands because it has two of Europe's leading ports (Rotterdam and Amsterdam) and is in close proximity to other countries in Western Europe; most product imported by the Netherlands is further processed and re-exported to other EU countries (Chetrick 2007). U.S. seafood companies are increasingly taking advantage of the higher recovery rates and lower labor costs associated with outsourcing some fish processing operations. A significant amount of headed and gutted pollock is exported to China, which is in turn processed into twice-frozen pollock fillets that are exported to markets in North America, Europe and elsewhere.

10.8.5 Market Position

Pollock fillet producers in Alaska face competition in the U.S. domestic market from imported twice-frozen pollock fillets and fillet blocks-caught in Russia and reprocessed in China (Knapp 2006). One challenge for pollock marketers is the use of the term "Alaska pollock" to refer to

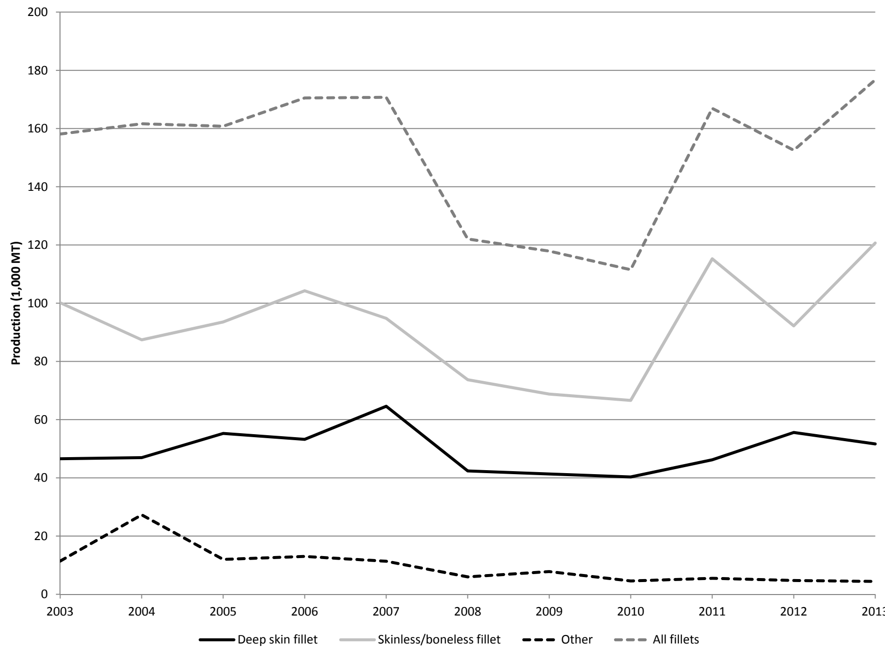

Figure 10.6: Alaska Primary Production of Alaska Pollock Fillets by Fillet Type, 2003-2013.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

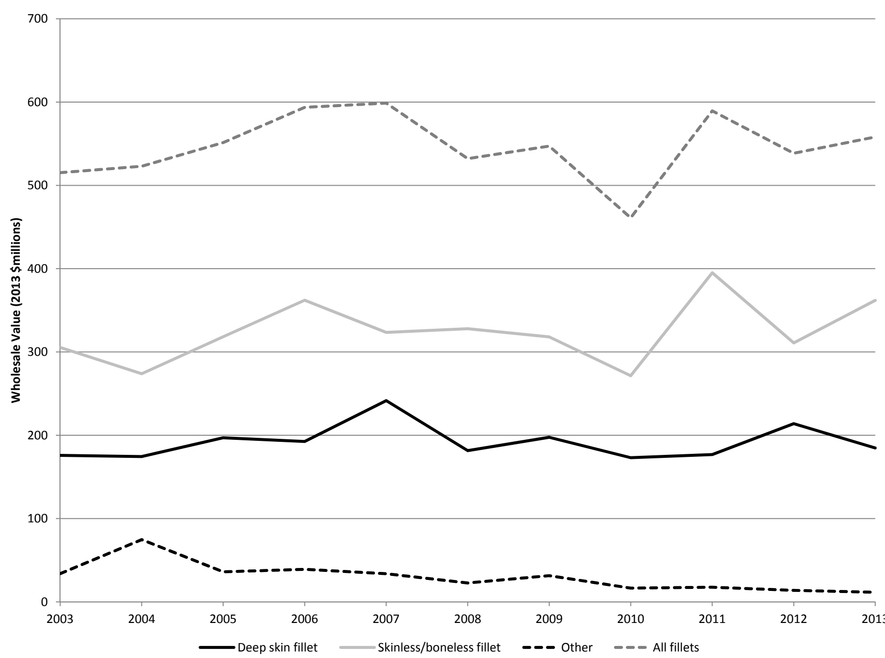

Figure 10.7: Wholesale Value of Alaska Primary Production of Alaska Pollock Fillets by Fillet Type, 2003-2013.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

Russian-produced pollock, as well as its Alaska counterpart, which is not technically misbranded (Seafood Market Bulletin 2005). But pollock companies are compelled to differentiate the product from that which is produced in Russia. U.S. pollock producers began a "Genuine Alaska Pollock

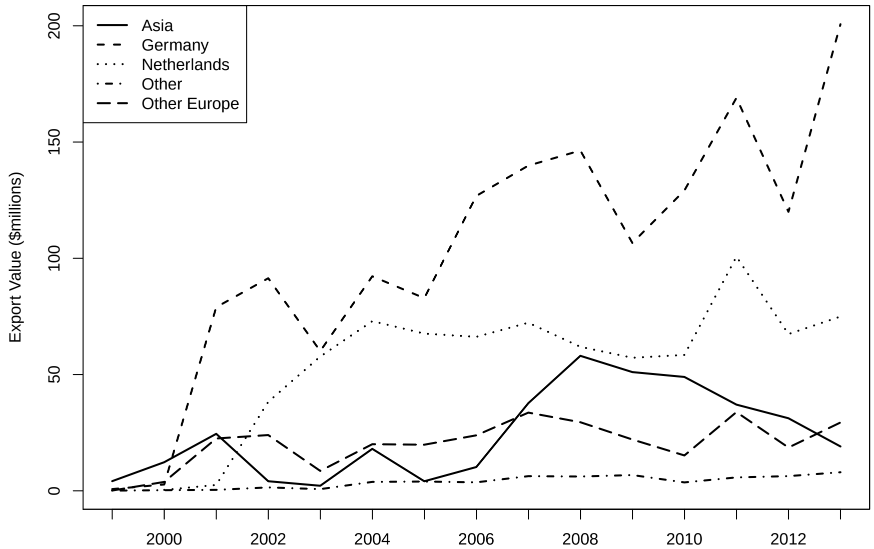

Figure 10.8: Nominal U.S. Export Value of Alaska Pollock Fillets to Leading Importing Countries, 1999-2013.

Notes: Data include all exports of Alaska pollock from all U.S. Customs Districts.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

Producers" marketing campaign to promote Alaska-harvested pollock as sustainably managed and superior to twice-frozen Russian pollock (Association of Genuine Alaska Pollock Producers 2004; Knapp 2006). This marketing campaign was bolstered by Marine Stewardship Council (MSC) certification of the U.S. pollock fishery in the waters off Alaska as a "well managed and sustainable fishery." The MSC certification was expected to boost Alaska-harvested pollock sales and help develop the already strong European market for pollock (Van Zile 2005).

Alaska-caught pollock competes in world fillet markets with numerous other traditional whitefish marine species, such as Pacific and Atlantic cod, hake (whiting), hoki (blue grenadiers), and saithe (Atlantic pollock). Price competitive whitefish fillets and products can also be prepared from freshwater species such as pangasius (basa catfish), Nile perch, and tilapia, so that while freshwater whitefish currently represent a relatively small sector of the total market, it can be anticipated that they will be used to both substitute for traditional whitefish marine species as well as to be used to grow the overall market (EU Fish Processors' Association 2006).

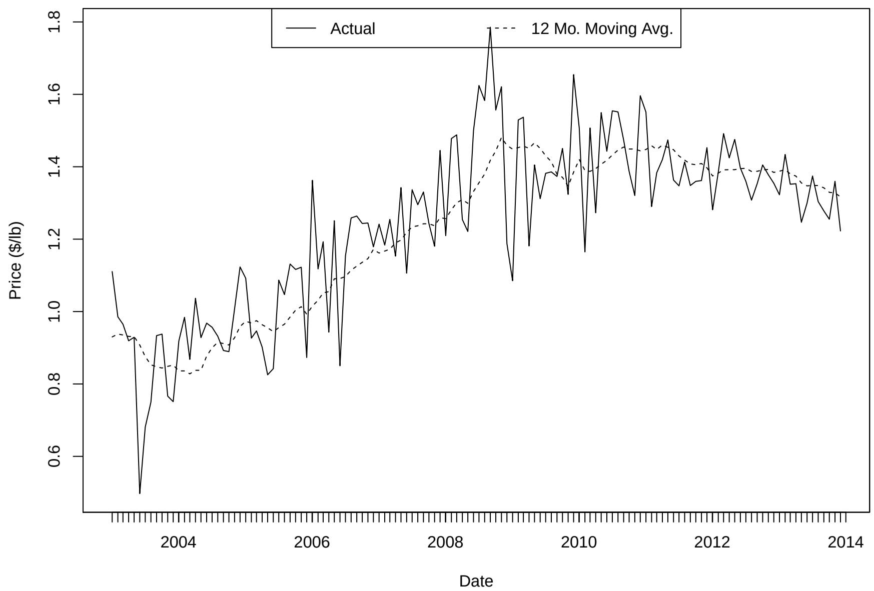

Figure 10.9: Nominal Monthly U.S. Export Prices of Alaska Pollock Fillets to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

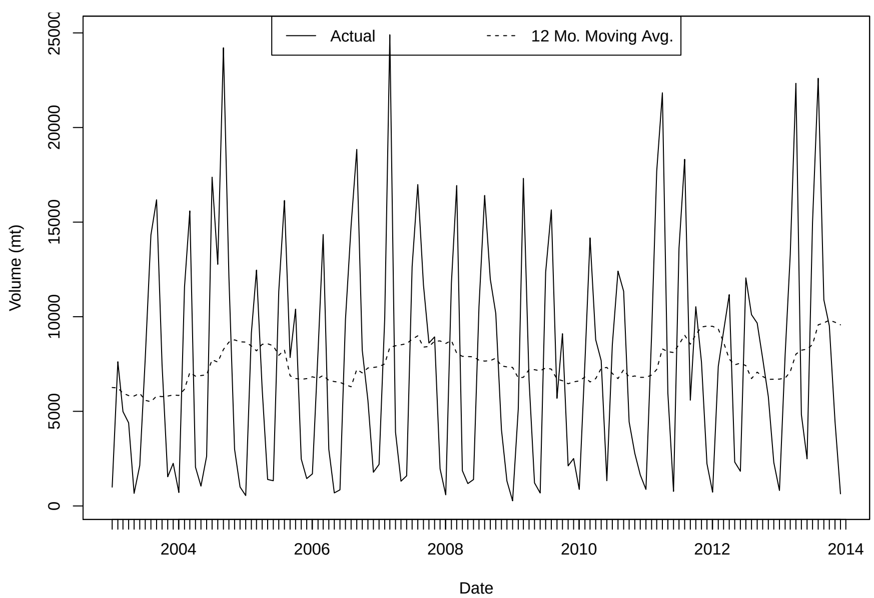

Figure 10.10: Monthly U.S. Export Volumes of Alaska Pollock Fillets to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

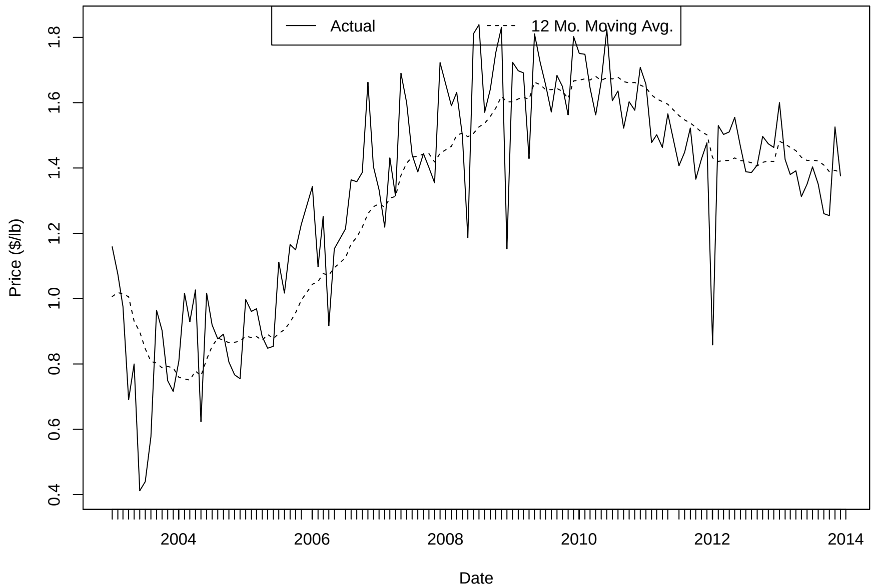

Figure 10.11: Nominal Monthly U.S. Export Prices of Alaska Pollock Fillets to Germany, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

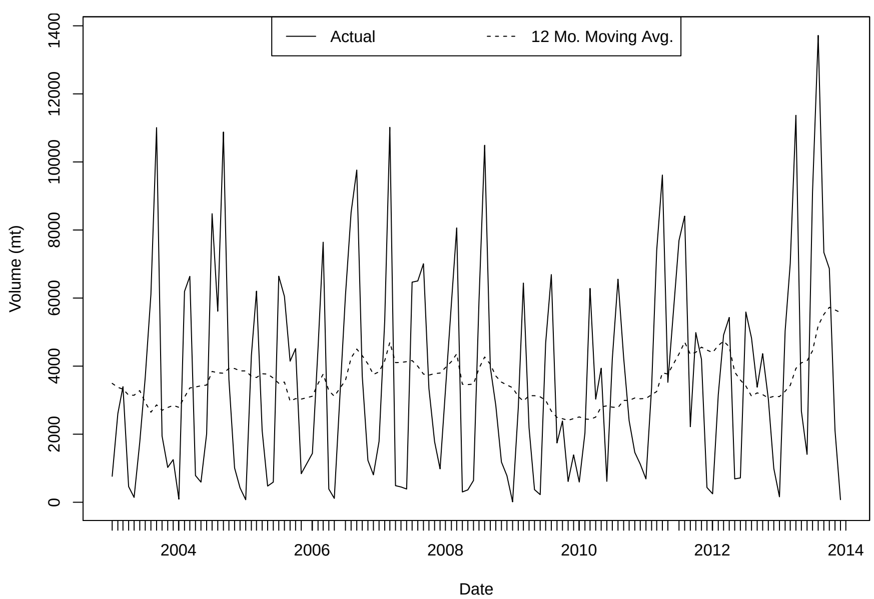

Figure 10.12: Monthly U.S. Export Volumes of Alaska Pollock Fillets to Germany, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.9. Alaska Pollock Surimi Market Profile

10.9.1 Production

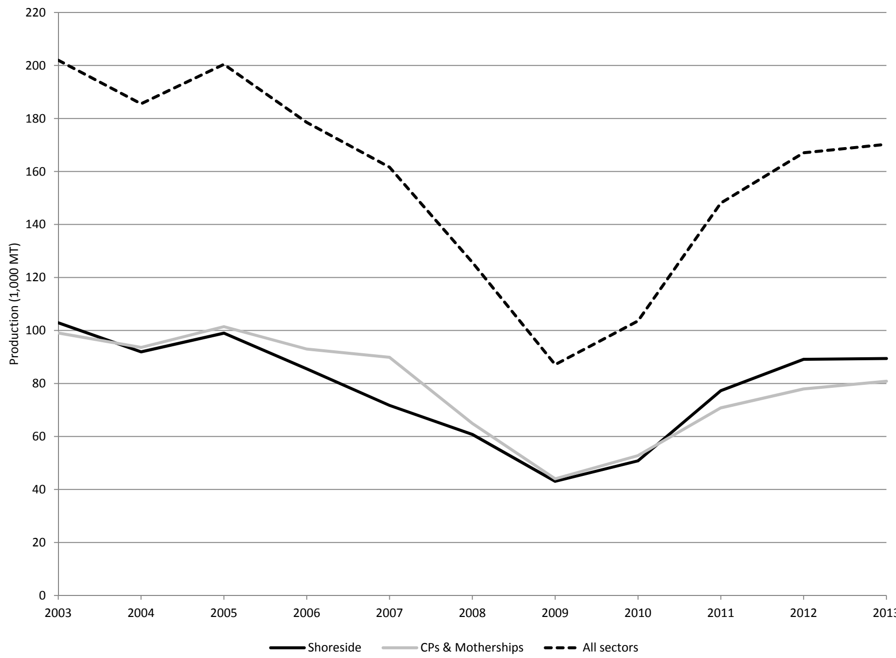

Figure 10.13: Alaska Primary Production of Alaska Pollock Surimi by Sector, 2003-2013.
Notes: Reported surimi production and value do not specify the grade of products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

10.9.2 Product Composition and Flow

Surimi is the generic name for a processed white paste fish product made from whitefish. In the case of Alaska pollock surimi, the fish are first filleted and then minced. Fat, blood, pigments and odorous substances are removed through repeated washing and dewatering. As washings continue, lower-quality product is funneled out; thus, higher quality surimi is more costly to produce since it requires additional water, time and fish (Hawco and Reimer 1987 cited in Larkin and Sylvia 2000). Cryoprotectants, such as sugar and/or sorbitol, are then added to maintain important gel strength during frozen storage. The resulting surimi is an odorless, high protein, white paste that is an intermediate product used in the preparation of a variety of seafood products. Analog shellfish products are made from surimi that has been thawed, blended with flavorings, stabilizers and colorings and then heat processed to make fibrous, flake, chunk and composite molded products, most commonly imitating crab meat, lobster tails, and shrimp. Higher-end surimi is mixed with actual crab, lobster or shrimp. In Japan, surimi is also used to make a wide range of *neriseihin* products, including fish hams and sausages and kamaboko, a traditional Japanese food typically shaped into loaves, and then steamed until fully cooked and firm in texture (NMFS 2001).

Most of the surimi is produced for Asian markets, with Japan and South Korea being the largest markets. The demand for surimi-based products in Japan is highest during the winter season as a result of the increased consumption of kamaboko during the New Year holidays. In the United States,

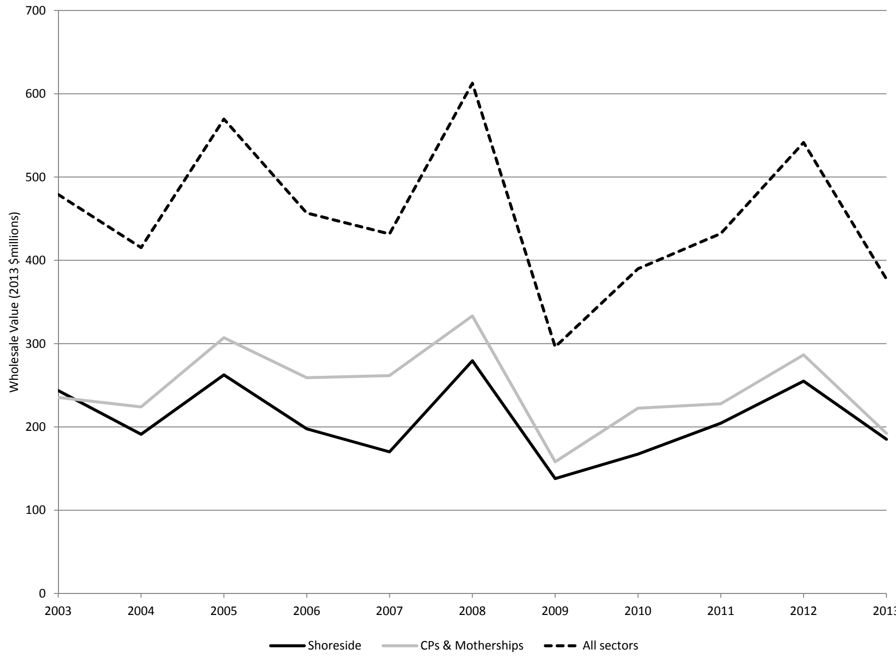

Figure 10.14: Wholesale Value of Alaska Primary Production of Alaska Pollock Surimi by Sector, 2003-2013.

Notes: Reported surimi production and value do not specify the grade of products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

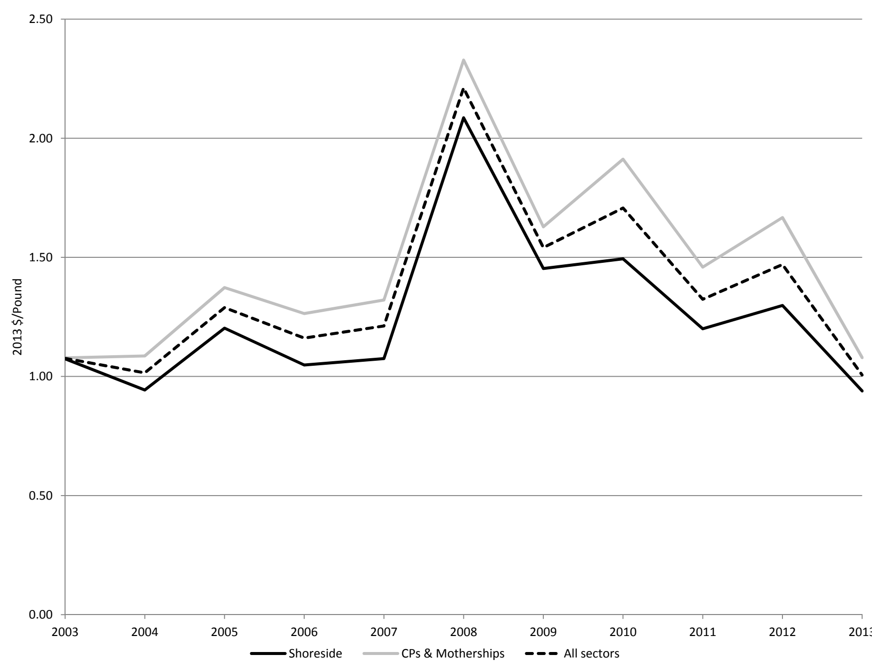

Figure 10.15: Average Wholesale Prices for US Primary Production of Pollock Surimi by Sector, 2003-2013.

Notes: Reported surimi production and value do not specify the grade of products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

the demand is highest during the summer months when artificial crab meat and other surimi-based products are popular as salad ingredients (Park 2005).

Producers assign commercial grades to surimi based on the level of color, texture, water content, gelling ability, pH level, impurities and bacterial load (Park and Morrissey 1994). However, there is not necessarily a direct correlation between surimi grade and surimi price. This could be because there is no common grading schedule for surimi, implying that each manufacturer decides which characteristics to include, how they are measured, and the levels and nomenclature that define each grade (Burden et al. 2004; Park and Morrissey 1994). Although there are no uniform grades among companies, many suppliers have adopted the general nomenclature and relative rankings of the grades developed by the National Surimi Association in Japan (Larkin and Sylvia 2000). The highest quality surimi is given the SA grade, and the FA grade is typically applied to the second highest quality (Park and Morrissey 1994). For lower grades the nomenclature becomes less consistent. Either "AA" or "A" often denote third grade surimi, and the labels "KA" or "K" are frequently applied to the fourth grade of surimi. The lowest grade products may be designated "RA" or "B." Data indicating the grades of pollock surimi produced are not generally available. Industry representatives indicate that, overall, the pollock surimi produced in the United States has shifted toward lower levels of quality ("recovery grades"), as a greater portion of surimi production utilizes flesh trimmed during the production of fillets.

World demand for lower-quality surimi has allowed processors to market recovery grade surimi or to blend it with primary grades to produce medium/low-quality surimi (Guenneugues and Morrissey 2005). In a survey of U.S. and EU surimi buyers which accounted for more than half of the total surimi purchases in those markets, Trondsen (1998) found that most buyers mainly use the second, third, and fourth quality grades in their product mixes. SA and FA grades are only used as a part of the raw material mix. AA is the grade most used, both with respect to the number of users and to the share of the product mix. A lower grade product allows the use of protein that was formerly lost in surimi processing waste or used for fish meal production (Guenneugues and Morrissey 2005). In addition, industry representatives noted that lower grade surimi product allows the use of flesh trimmed during the production of fillets.

10.9.3 International Trade

As shown in Figure 10.16, most U.S. Alaska pollock surimi production is exported, the primary buyers being Japan and South Korea. Most of the balance of exports reaches European countries. However, the amount delivered to Korea includes not only that directed to the Korean domestic market but also the amount kept in custody at the bonded warehouse in Busan, which is an international hub port. The surimi products deposited at Busan are finally destined to the Japanese market in most cases. Several factors played a role in the growing U.S. exports to the EU, including seafood's popularity due to interest in healthy eating and the great variety of surimi-based convenience foods sold in the retail sector (Chetrick 2005). According to an industry representative, exports to EU markets consisted mainly of recovery grades of pollock surimi.

In 2006 U.S. Alaska pollock surimi exports to all leading importers fell (Figure 10.16) and continued to fall through 2008 and 2009, except for a slight increase in exports to the EU in 2008 from their level in 2007 and a significant increase in exports to South Korea in 2009 from their level in 2008. The decline in exports between 2006 and 2009 occurred despite the dollar's weakening versus the yen, won, euro, and yuan. The reason for the decline is likely related to increased export prices for U.S. surimi in 2006 (Figure 10.17) and reductions in the pollock total allowable catch of U.S. pollock between 2008-2010. U.S. surimi is replaced by lower-priced Asian-produced surimi in Korea, by Chilean horse-mackerel surimi in the EU, and by domestically-produced mixed surimi in China (Seafood.com News 2007a). After 2009 the export of surimi to Japan and South Korea gradually began resume normal levels with pollock catch while exports to Europe grew (Figure 10.16). Export prices after 2010 have oscillated between $1-$1.2 but have remained fairly stable (Figure 10.17) as exports to Japan, South Korea and the EU increased.

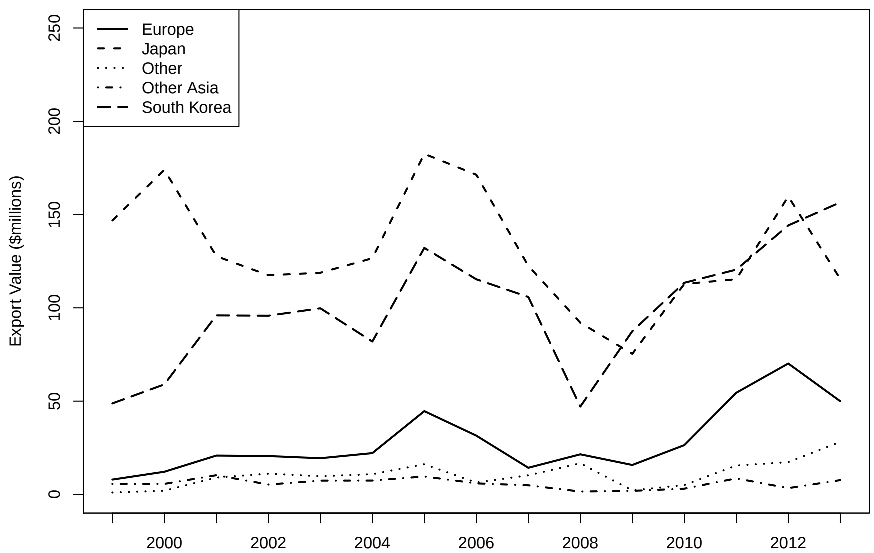

Figure 10.16: Nominal U.S. Export Value of Alaska Pollock Surimi to Leading Importing Countries, 1999-2013.
Notes: Data include all exports of Alaska pollock from the U.S. Customs Pacific District.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.9.4 Market Position

In addition to grade mix, the price for U.S. Alaska pollock surimi is influenced by factors such as Japanese inventory levels and seasonal production from the U.S. and Russian pollock fisheries. Over the longer term, prices depend on changing demand for surimi-based products in Japan and other markets, and the supply of surimi from other sources. In Japan, where heavy surimi consumption is a tradition, rising prices of Alaska pollock surimi raw material, dwindling birth rates, and changing food habits could challenge surimi-based products consumption.

As shown in Figure 10.17, the 2009 surge in surimi export prices softened after 2010 and since have oscillated but remained fairly stable. The production of pollock surimi in 2009 continued to decline, while the rate of decline of fillet production lessened (Figure 10.2). Fillet production continued on its 2009 downward trajectory into 2010, despite TAC increases, while surimi production increased. The more precipitous decline in the fillet price in 2010 may have been contributing factor. In 2011 average prices for both products declined at a rather modest rate but production increased significantly to offset the prices resulting in wholesale value increases for both product types. Prices remained stable throughout 2012 while production decreased.

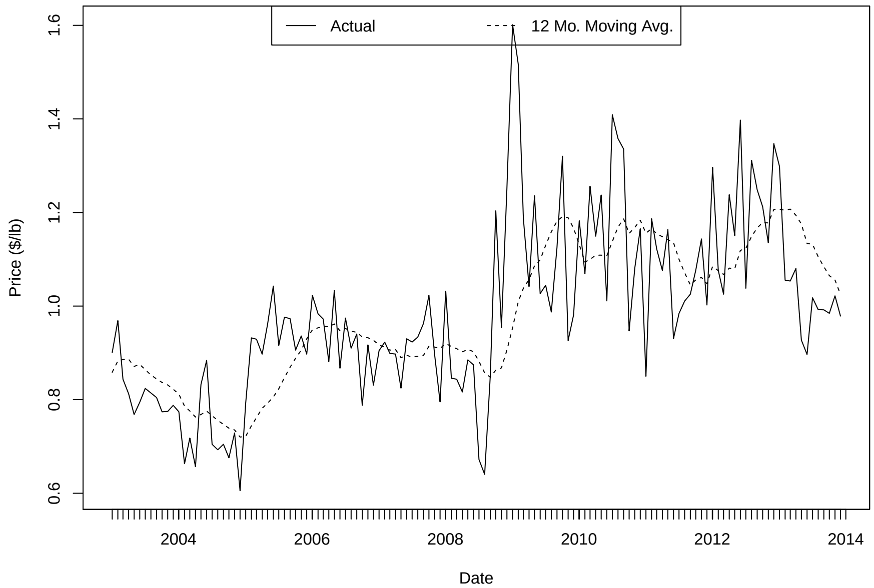

Figure 10.17: Nominal Monthly U.S. Export Prices of Alaska Pollock Surimi to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

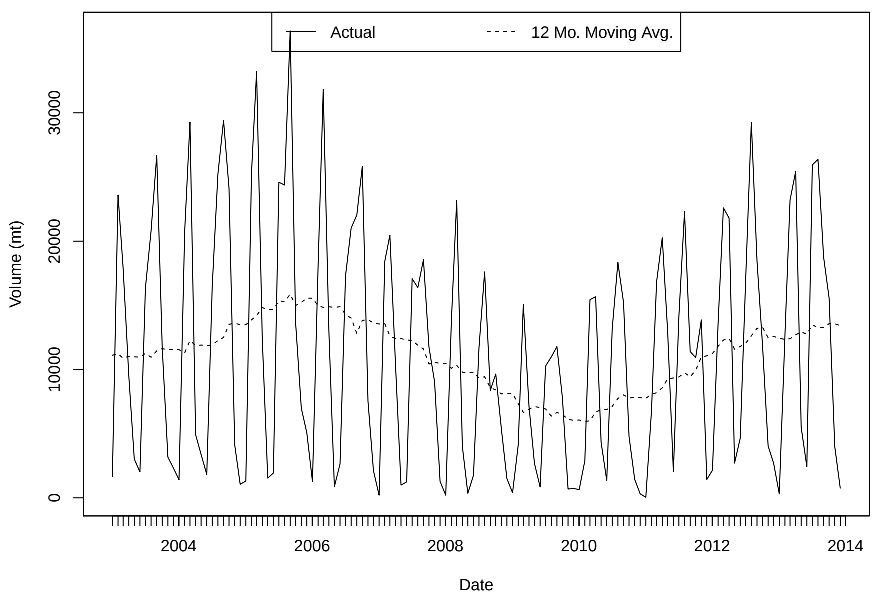

Figure 10.18: Monthly U.S. Export Volumes of Alaska Pollock Surimi to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.10. Alaska Pollock Roe Market Profile

10.10.1 Production

The two major sources of Alaska pollock roe are the United States and Russia. U.S. pollock roe production between 1999 and 2006 was significantly higher than in prior years, reflecting both an increase in pollock harvests as well as an increase in pollock roe yields–the latter a result of the AFA according to industry representatives interviewed for this assessment. However, increasing U.S. production of pollock roe through 2006 was offset in world markets by a decline in Russian pollock harvests. Despite increased U.S. production, total Japanese pollock roe imports in the first few years of the 2000's were lower than in the previous decade, because of reduced imports of Russian pollock roe (Knapp 2005). The primary season for harvesting pollock for roe production is in winter, just before the pollock spawn, which is when the eggs are largest.

Roe is an important product component of the Alaska pollock market. Although pollock roe accounts for only a small share of the volume of Alaska pollock products, it is a high-priced product. The wholesale prices of pollock roe and other pollock products are compared in Figure 10.19. U.S. production of roe remained stable in 2007 despite lower overall harvests (Figure 10.20), but declined dramatically in 2008. Production declines continued at a more measured pace through 2010. Roe production increased in 2011 has since continued to decline despite the pollock harvest returning to levels near pre-2008 levels.

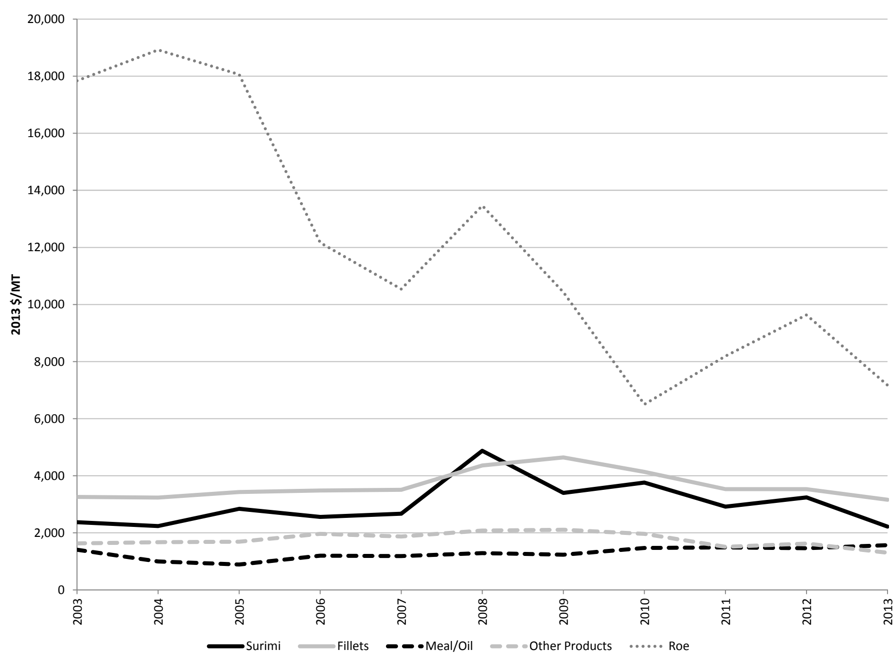

Figure 10.19: Wholesale Prices for Alaska Primary Production of Pollock by Product Types, 2003-2013.

Notes: Reported roe production and value do not specify the grade of products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

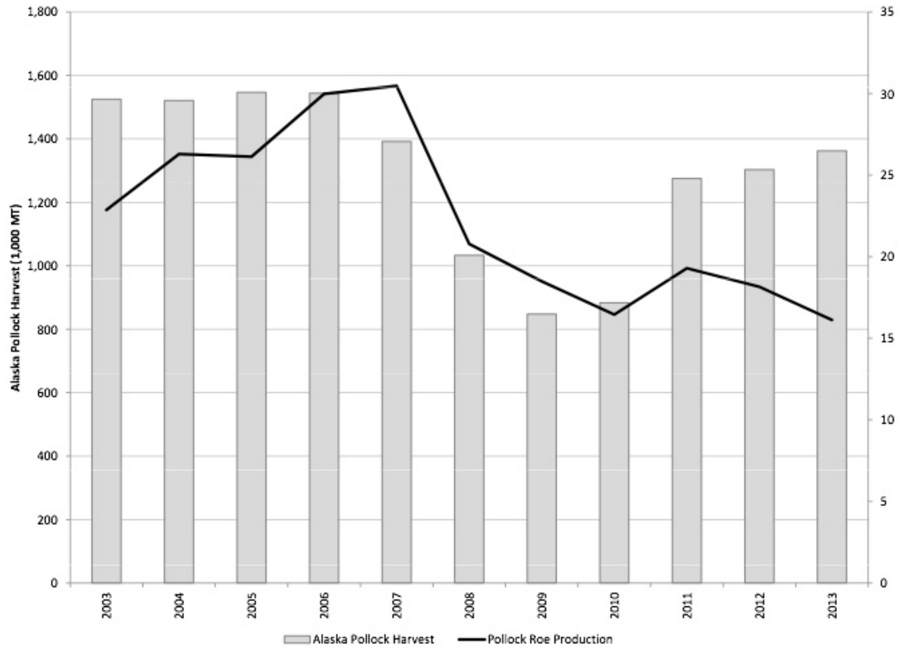

Figure 10.20: Alaska Pollock Harvest and Primary Production of Pollock Roe, 2003-2013.
Source: NMFS Blend, Catch-Accounting System, and Weekly Production Reports 2003-2013.

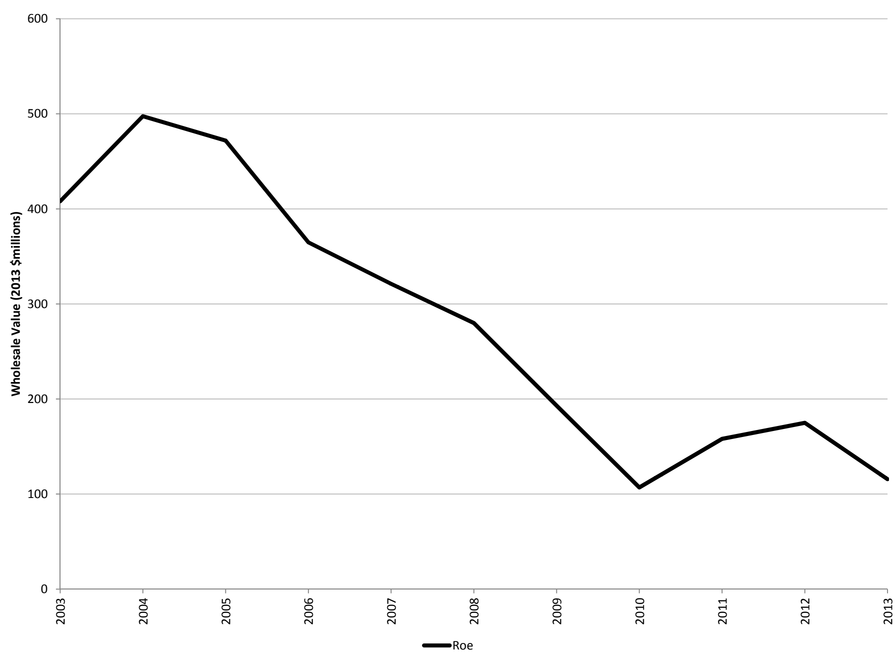

Figure 10.21: Wholesale Value of Alaska Primary Production of Pollock Roe, 2003-2013.
Notes: Reported roe production and value do not specify the grade of products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

10.10.2 Product Composition and Flow

The roe is extracted from the fish after heading, separated from the other viscera, washed, sorted, and frozen. After the roe is stripped from the pollock, the fish can be further processed into surimi or fillets (NMFS 2001). There are dozens of different grades of pollock roe, which command widely varying prices. The grade is determined by the size and condition of the roe skeins (egg sacs), color and freshness of the roe, and the maturity of the fish caught. The highest quality is defect-free matched skeins in which both ovaries are of uniform size with the oviduct intact, with no bruises, no prominent dark veins, no discolorations, and no cuts. Intact skeins of pollock roe, which include defects, are of lower value, and broken skeins of roe are of the lowest value (Bledsoe et al. 2003). According to Knapp (2005), different producers have different grading systems, there is no standardized industry-wide grading system. However, Bledsoe et al. (2003) note that *mako* is the grade of pollock roe with no defects. Important defects include defective (generally, *kireko*), broken skeins, skeins with cuts or tears, discolorations (*aoko* for a blue green discoloration from contact with bile; *kuroko* for dark colored roe; *iroko* for orange stains from contact with digestive fluids), hemorrhages or bruising, crushed roe skeins, large veins or unattractive veining, immature (*gamako*), overly mature (*mizuko*), soft (*yawoko*), fracture of the oviduct connection between the two skeins, paired skeins of non-uniform size, and skeins that are not uniform in color or no longer connected (Bledsoe et al. 2003).

Most U.S. pollock roe is sold at auctions held each year in Seattle and Busan, South Korea, in which numerous pollock roe producers and buyers participate (Knapp 2005). The buyers must fill their individual product needs, and their keen sight and sense of smell are critical to setting the price. Once the pollock roe is purchased and exported to Japan or Korea, it is processed into two main types of products: salted pollock roe, which is often used in rice ball sushi or mixed with side dishes, and seasoned or “spicy” pollock roe (Knapp 2005). Lower-grade pollock roe is commonly used for producing spicy pollock roe. Examples of seasonings include salt, sugar, monosodium glutamate, garlic and other spices, sesame, soy sauce, and sake. Spicy roe is sold as a condiment in Korean markets (Bledsoe et al. 2003).

Catcher/processors are more likely to produce higher quality roe because they process the fish within hours of being caught, rather than days, as is typically the case with shoreside processors (American Seafoods Group LLC 2002). Knapp (2005) notes that prices for pollock roe produced at sea were generally \$1.50-\$2.00/lb higher than pollock roe produced by shoreside processors, presumably reflecting higher roe quality for at-sea production. The price difference between at-sea and shoreside roe has persisted through recent years.

10.10.3 International Trade

Almost all U.S. pollock roe production is exported, the primary buyers being Japan and South Korea (Figure 10.22). Since 2007 roe export to Japan have fell precipitously. Export to South Korea have declined as well but have remained more stable and since 2009 were the roe export value from South Korea has exceed the export value from Japan. It is possible that a substantial amount of the pollock roe exported to Korea is subsequently re-exported from Korea to Japan. Most pollock roe imports occur between March and July, with imports being highest in April and May (Knapp 2005).

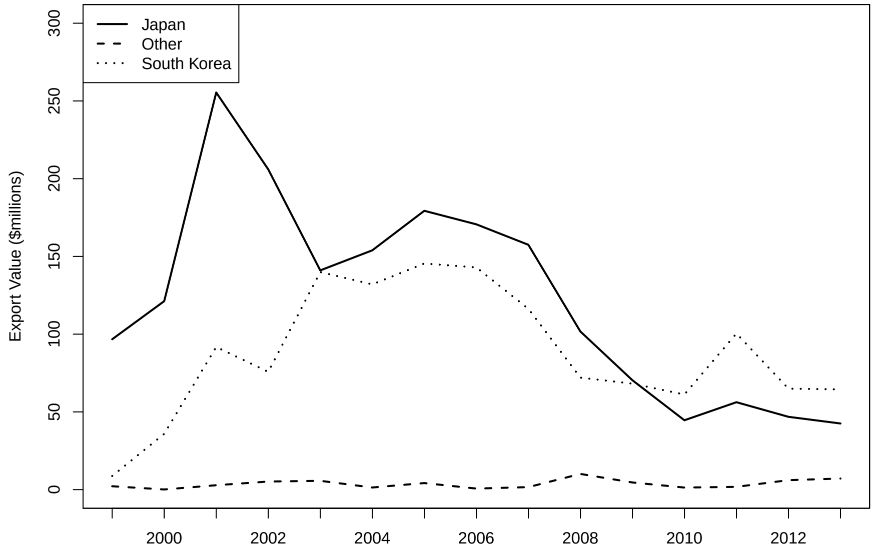

Figure 10.22: Nominal U.S. Export Value of Alaska Pollock Roe to Leading Importing Countries, 1999-2013.

Notes: Data include all exports of Alaska pollock from the U.S. Customs Pacific District.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.10.4 Market Position

U.S. pollock roe commands premium prices in Japan because of its consistent quality. However, U.S. pollock roe also competes in Asian markets with Russian pollock roe. In general, the decline in Russian pollock production during the early 2000's reduced competition for U.S. pollock roe producers and helped to strengthen markets for pollock roe (SeafoodNews.com 2007). Robust pollock harvests in Russia and the U.S. provide an environment for a competitive roe market. Prices are influenced by anticipated Russian and U.S. production and Japanese inventory carryover. As a result, pollock roe prices have often experienced significant volatility (American Seafoods Group LLC 2002) (Figure 10.24 and Figure 10.26).

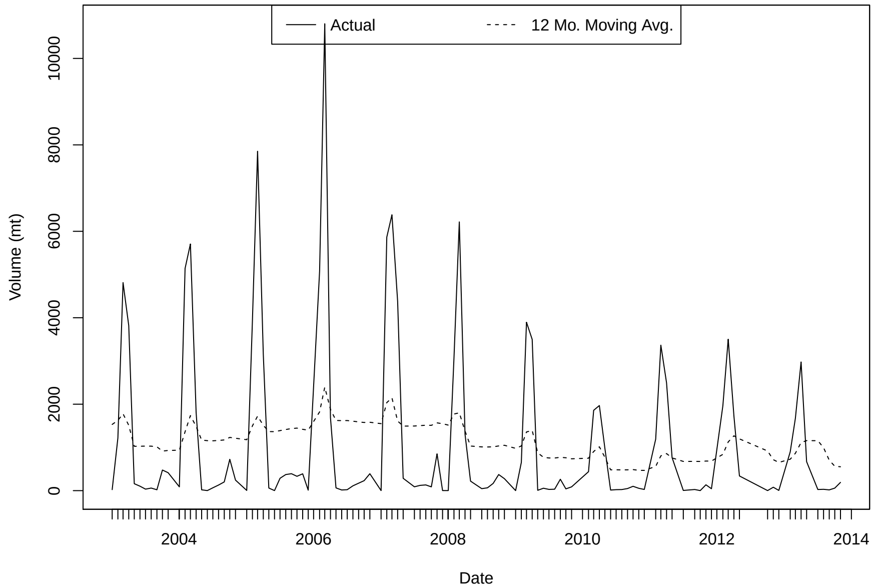

Figure 10.23: Monthly U.S. Export Volumes of Pollock Roe to Japan, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

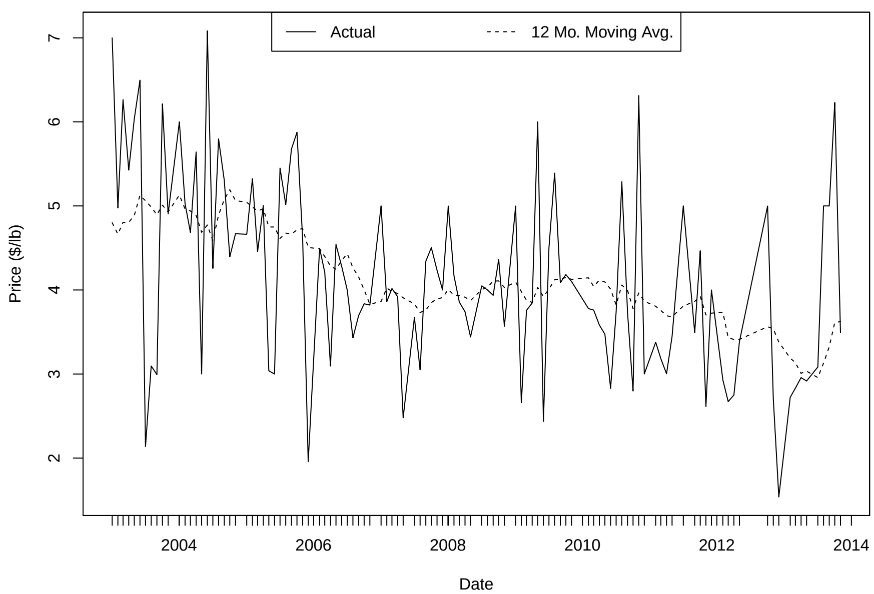

Figure 10.24: Nominal Monthly U.S. Export Prices of Pollock Roe to Japan, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

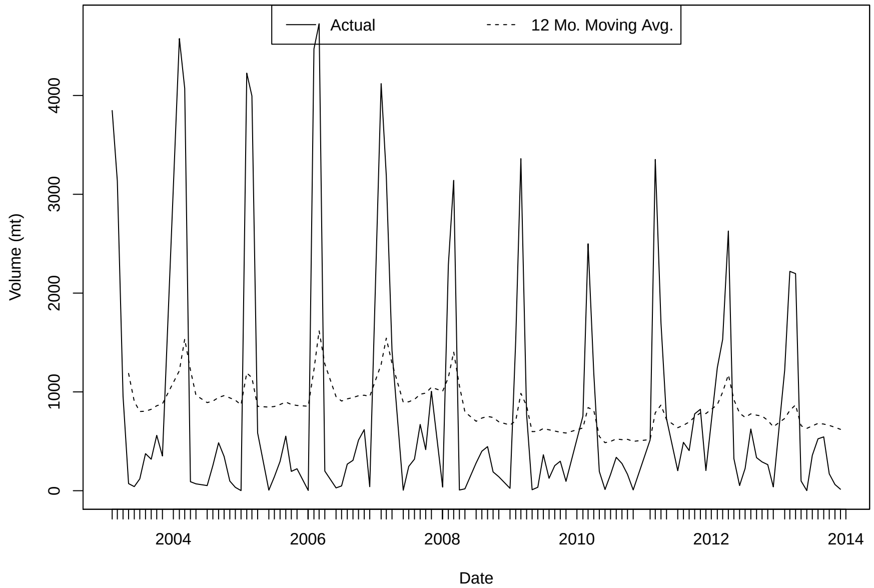

Figure 10.25: Monthly U.S. Export Volumes of Pollock Roe to Korea, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

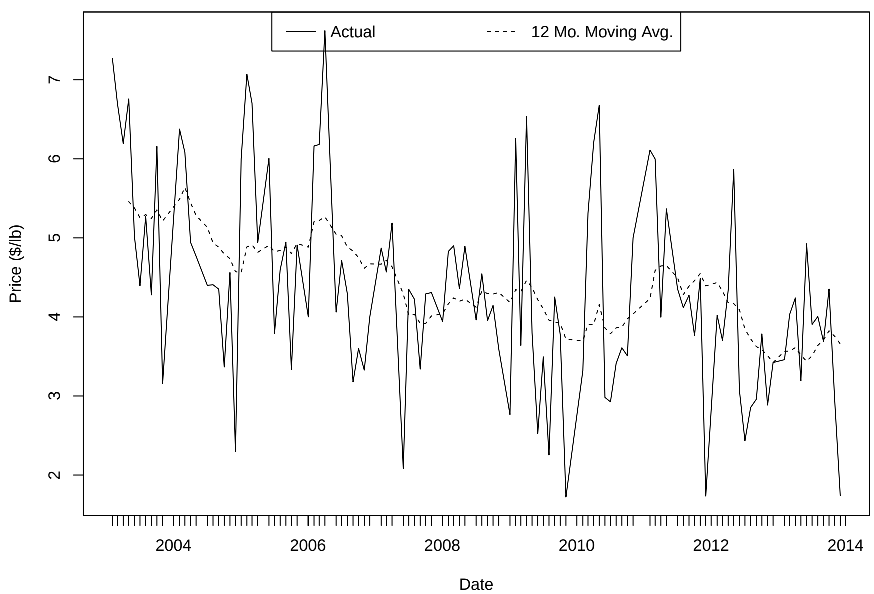

Figure 10.26: Nominal Monthly U.S. Export Prices of Pollock Roe to Korea, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.11. Pacific Cod Market Profile

10.11.1 Description of the Fishery

Pacific cod (*Gadus macrocephalus*) is widely distributed over the eastern Bering Sea and Aleutian Islands (BSAI) areas. Behind Alaska pollock, Pacific cod is the second most dominant species in the commercial groundfish catch off Alaska. The BSAI Pacific cod fishery is targeted by multiple gear types, primarily by hook-and-line catcher/processors and trawl gear, and in smaller amounts by hook-and-line catcher vessels, jig vessels, and pot gear. The BSAI Pacific cod TAC has been apportioned among the different gear sectors since 1994, and the CDQ Program has received a BSAI Pacific cod allocation since 1998.

The Gulf of Alaska (GOA) Pacific cod TAC is also apportioned among by multiple gear types, including trawl, longline, pot, and jig components. In addition to area allocations, GOA Pacific cod is also allocated on the basis of processor component (inshore/offshore) and season. The longline and trawl fisheries are also associated with a Pacific halibut (*Hippoglossus stenolepis*) mortality limit which has in the past constrained the magnitude and timing of harvests taken by these two gear types. With the Amendment 80 rationalization in 2007 and the associated reduction in halibut bycatch these constraints on the cod harvest were released.

10.11.2 Production

Until the 1980s, Japan accounted for most of the world harvests of Pacific cod. In the 1980s, harvests of both the Soviet Union and the United States increased rapidly. Since the late 1980s, harvests of both Japan and the Soviet Union/Russia have fallen by about half (as of 2008). As a result, by the middle of the last decade the United States accounted for more than two-thirds of the world Pacific cod supply (Knapp 2006), this trend continued. As seen in Figure 10.27, virtually all of the U.S. Pacific cod catches are from Alaska waters-Pacific cod harvests from the U.S. West Coast were on average only 1 percent of the total U.S. harvest. Between 2004 and 2007 and U.S. harvests fell to 226,700 mt but have since grown and in 2013 harvests were 318,900 mt (Table 1).

10.11.3 Product Composition and Flow

Product flows for Pacific cod have changed following the decline of Atlantic cod (*G. morhua*) harvests. Buyers from Norway and Portugal began purchasing Pacific cod from Alaska for the first time in the late 2000's. Historically, Pacific cod was considered an inferior product compared to Atlantic cod, but the decline of Atlantic cod has made Pacific cod more acceptable.

As shown in Figure 10.28, Pacific cod are processed as either headed and gutted (H&G), fillet blocks, or individually frozen fillets, which are either individually quick-frozen (IQF) or processed into shatterpack (layered frozen fillets that separate individually when struck upon a hard surface) or layer pack.

Wholesale prices are highest for fillet products, but H&G accounts for the largest share of Alaska Pacific cod production. The H&G production was significant in the mid-90's at roughly 50%. Since then, the H&G's share of production increased reaching 66% in 2003 and climbed further to upwards of 70% in recent years (Table 25). Fillet production since 2009 has ranged between 12% and 13%.

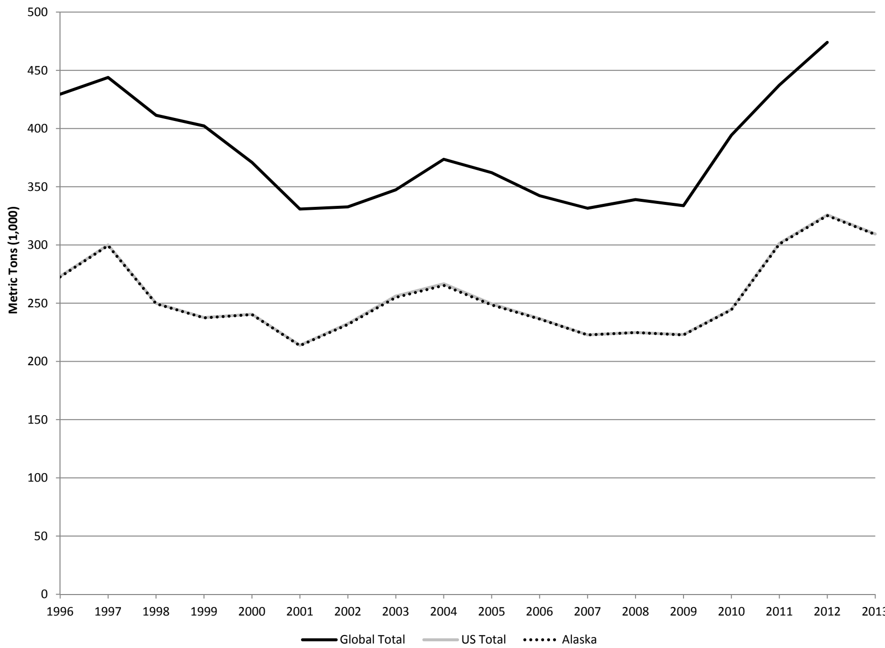

Figure 10.27: Alaska, Total U.S. and Global Retained Harvests of Pacific Cod, 1996-2013.
Notes: Data for 2013 were unavailable for global total. The fish landing statistics of some countries may not distinguish between Pacific cod and other cod species.

Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at: `http://www.psmfc.org/pacfin/pfmc.html`. Global data from FAO, "FishStat" database available at: `http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073`.

Production shares of other minimally processed goods such have decreased substantially since the mid-90's with salted-and-split (29% to <1%) and whole fish (47% to 3%). Increased exports of H&G product to China where it is filleted and re-exported have surely contributed to the shift. Regulations that led to a redistribution of the Pacific cod harvest among sectors, with trawl "head-and-gut" catcher/processors also account for the larger H&G production share.

IQF and shatterpack fillets of Pacific cod are graded as 4-8 ounce, 8-16 ounce, 16-32 ounce, and 32+ ounce. They are used by white tablecloth restaurants, by institutional food service, and by retail fish markets. In most cases, these products are used with the fillet still intact; hence the processing requires preservation of individual fillets. Larger institutional buyers or retail fish markets may buy the products directly from the processors, while smaller buyers typically purchase through a distributor.

Fillet blocks are used when the customer desires a product that requires a high degree of uniformity. Blocks are typically cut into smaller portions of uniform size and weight. Breaded fish portions as used in fish sandwiches or casual "fish and chips" style restaurants are typical of this type of use. Institutions, including hospitals, prisons, and schools, also purchase fillet blocks, as do some grocery retailers.

H&G Pacific cod is frozen after the first processing, and then proceeds to another processor within the U.S., or is exported for secondary processing. Some domestic H&G Pacific cod is sent to the East Coast refresh market, where it is thawed and filleted before being processed further, or sold as

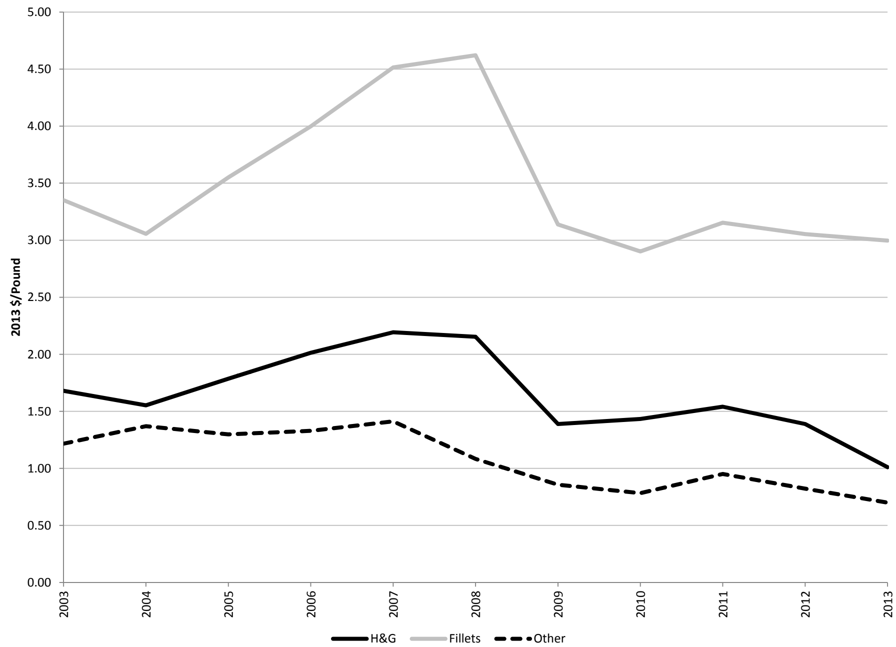

Figure 10.28: Wholesale Prices for Alaska Primary Production of Pacific Cod by Product Type, 2003-2013 Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

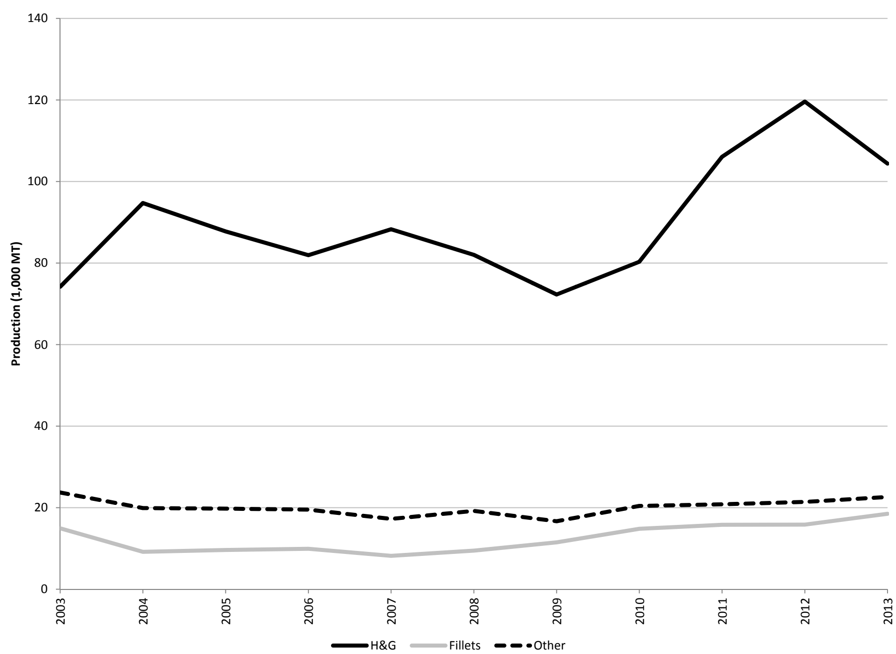

Figure 10.29: Alaska Primary Production of Pacific Cod by Product Type, 2003-2013.
Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

refreshed. Other U.S. processors may purchase H&G Pacific cod and further process it by cutting it into sticks and portions, or breading it for sale in grocery stores or food services.

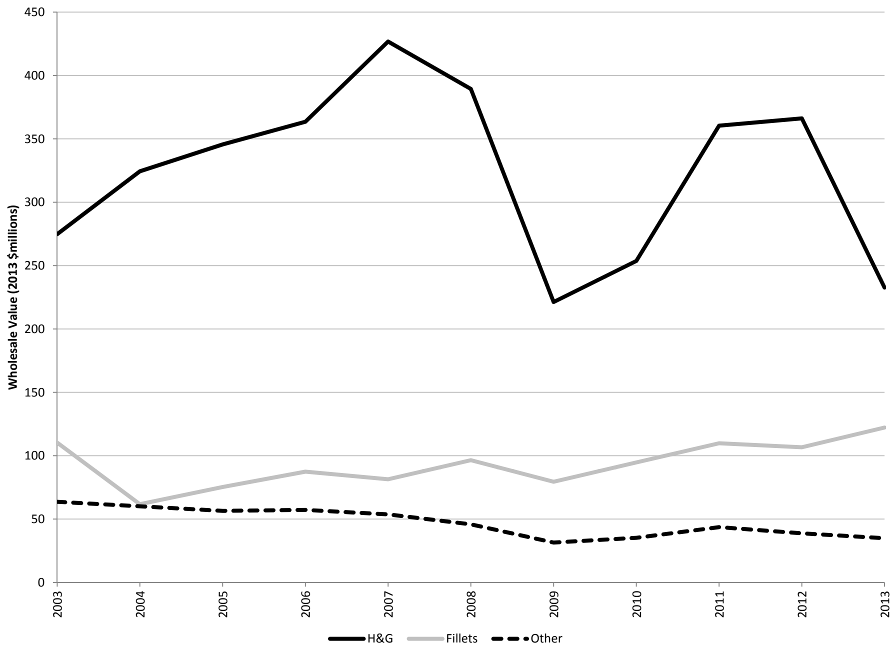

Figure 10.30: Wholesale Value of Alaska Primary Production of Pacific Cod by Product Type, 2003-2013.

Notes: Product types may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

Foreign consumers, especially China, Japan, and Europe, also purchase H&G Pacific cod for further processing, including the production of salt cod. According to industry representatives, large H&G Pacific cod command the highest price, and it is these fish that are processed into salt cod. Salt cod is a high-value product popular in Europe, parts of Africa, and Latin America (Chetrick 2007). Early Easter is the peak consumption period for salt cod, and Brazil is the largest market for salted Pacific cod. Most of the Pacific cod that becomes salt cod is processed outside the U.S.

H&G cod obtained by China from the United States and other countries is further processed and re-exported to the United States, Europe and other overseas markets. Since the latter half of the 1990s, China has consolidated its leading position as a supplier of frozen Pacific cod fillets to international markets, a development which reflects the country's success as a re-processor of seafood raw materials. Overseas processors either bread and portion the H&G cod or thaw and refreeze it into blocks, referred to as "twice-frozen fillet blocks." These twice-frozen blocks from China have gained considerable popularity in the United States. Traditionally, the quality of the fish was considered to be lower than the quality of fish in single-frozen, U.S.-produced fillet blocks and commanded a lower price. However, industry representatives note that the quality and workmanship of overseas processors has improved; as a result, twice-frozen is more acceptable, and in some cases has become the standard (GSGislason & Associates Ltd. 2003).

Figure 10.31 shows that wholesale prices for H&G Pacific cod caught and processed by fixed gear (freezer longline) vessels have been consistently higher than the prices received by trawl vessels. According to an industry representative, this price difference occurs because fish caught by longline gear can be bled while still alive, which results in a better color fish, and there is less skin damage and scale loss than if they are caught in nets. In contrast, shoreside processors obtain fish from both fixed gear and trawl vessels, and the fish have been dead for many hours before they are processed (although they are generally kept in refrigerated saltwater holds).

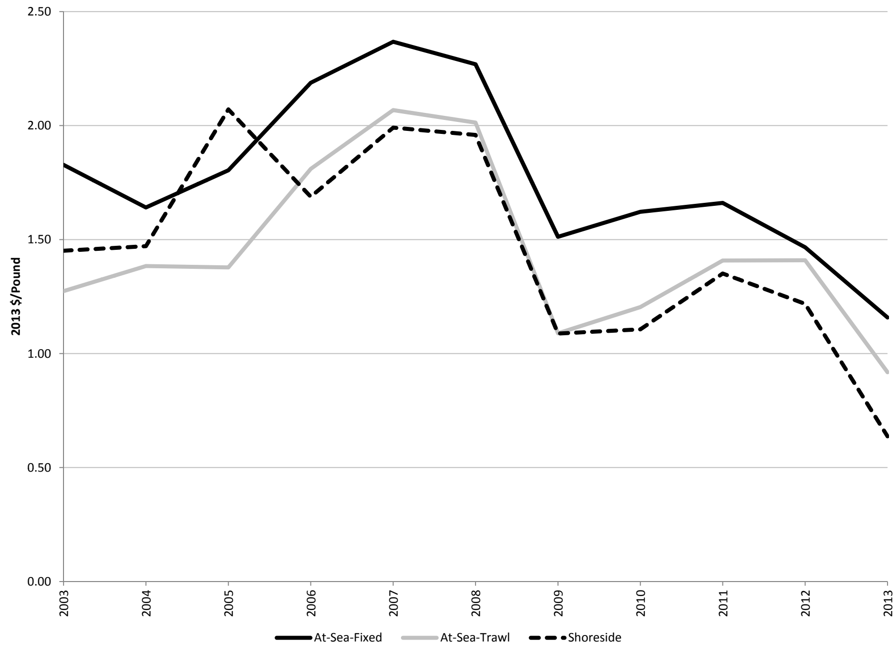

Figure 10.31: Wholesale Prices for Alaska Primary Production of H&G Cod by Sector, 2003-2013.
Notes: Product type may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

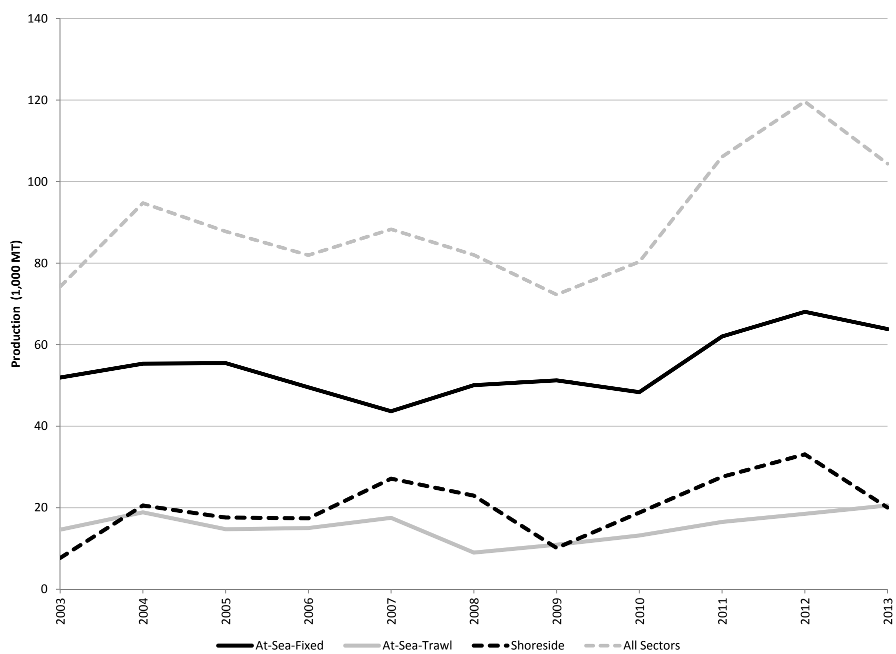

Figure 10.32: Alaska Primary Production of H&G Pacific Cod by Sector, 2003-2013.
Notes: Product types may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

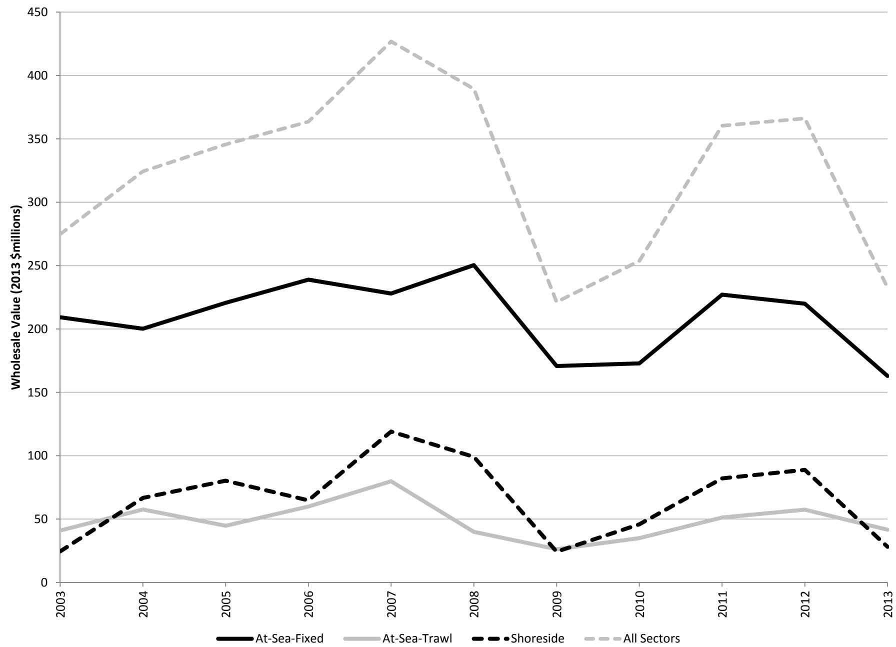

Figure 10.33: Wholesale Value of Alaska Primary Production of H&G Pacific Cod by Sector, 2003-2013.

Notes: Product type may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

10.11.4 International Trade

Most domestically-produced Pacific cod fillets are destined primarily for the domestic market for use in the foodservice industry. However, Pacific cod harvested in Alaska groundfish fisheries and processed as H&G primarily enters the international market. U.S. foreign trade statistics do not differentiate between Pacific and Atlantic cod; exports of both species are coded as "cod." However, given the preponderance of Pacific cod in total U.S. landings, it is likely that exports are also overwhelmingly Pacific Cod (Knapp 2006). Furthermore, the fact that most of this product category is exported from the U.S. West Coast indicates that Pacific cod dominates U.S. production. U.S. foreign trade records also do not specify an "H&G" product form for exports. The export value of H&G product is included in Figure 10.34.

The value of Pacific cod moving into European markets increased steadily from 2002 through 2007, then declined in 2008 and 2009 coincident with the reduction in the Alaskan Pacific cod harvest. Export value increased somewhat after 2010, primarily as a result of exports to China (Figure 10.34). Since 2011 cod export value to Japan and Europe have declined substantially.

10.11.5 Market Position

Pacific cod is a popular item in the foodservice sector because of its versatility, abundance, and year-round availability (NMFS 2001; Seafood Market Bulletin 2006a). In addition, the product is used in finer and casual restaurants, institutions, and retail fish markets. U.S. export prices and volumes of frozen cod are shown in Figure 10.35 and Figure 10.11.5, with much of the product

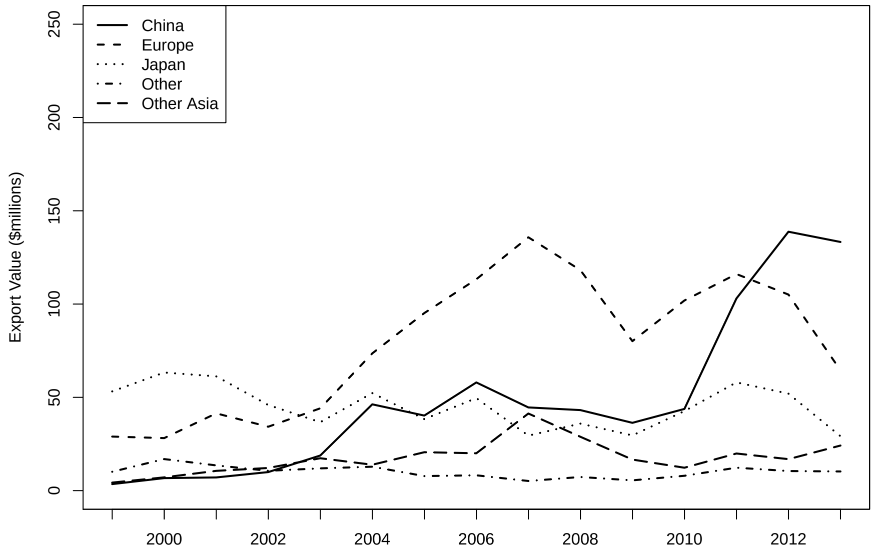

Figure 10.34: Nominal U.S. Export Value of Frozen Pacific Cod to Leading Importing Countries, 1999-2013.

Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

destined for re-processors in China and Europe (Figure 10.39 through Figure 10.42). The volume of frozen cod exported to all countries peaked in 2006, declined through 2009, and increased again through 2010 to 2012. The export prices of these products increased dramatically from 2003 through 2008, but began to decline in 2009, likely due to the global economic recession. Since then, fillet export prices steadily increased while the prices of cod's other frozen product has oscillated.

Marketing seafood from well-managed fisheries, such as Pacific cod, is especially important to EU seafood processors (Chetrick 2005). Some U.S. companies have also begun to shift their seafood purchases toward species caught in fisheries considered sustainable. Alaska-caught Pacific cod was certified by the Marine Stewardship Council of the Bering Sea and Aleutian Islands freezer longline fishery in February 2006. This fishery became the first cod fishery in the world to be certified by the MSC as a "well managed and sustainable fishery." Initially certification did not apply to all Pacific Cod longliners because certified vessels and companies must opt in by paying the required fees. On January 22, 2010 all Alaskan Pacific Cod fisheries were certified sustainable (Marine Stewardship Council 2010).

Industry representatives also noted that they expect to benefit from expanded use of the name "Alaska cod" to market Pacific cod products. The term "Alaska" conjures up a positive flavor and quality image in seafood consumers' minds due to the branding efforts of organizations such as the Alaska Seafood Marketing Institute (Munson 2004). "Alaska cod" is one of the existing acceptable market names for Pacific cod according to the U.S. Food and Drug Administration (2005).

Alaska Pacific cod competes in world fillet markets with numerous other traditional whitefish marine species, such as Atlantic cod, hake (whiting), Alaska pollock, hoki (grenadiers), and saithe (Atlantic pollock). Attractively priced whitefish fillets and products can also be prepared from freshwater species such as pangasius (basa catfish), Nile perch, and tilapia. In the future, Alaska-caught Pacific cod may be in direct competition with farmed cod. Cod aquaculture is also a developing industry. Because the development of farmed cod is occurring largely in the private sector, comprehensive third-party data on projected farmed cod production does not exist. While cod aquaculture may have potential down the road, currently volumes remain low and hasn't put any competitive pressure on wild-caught cod.

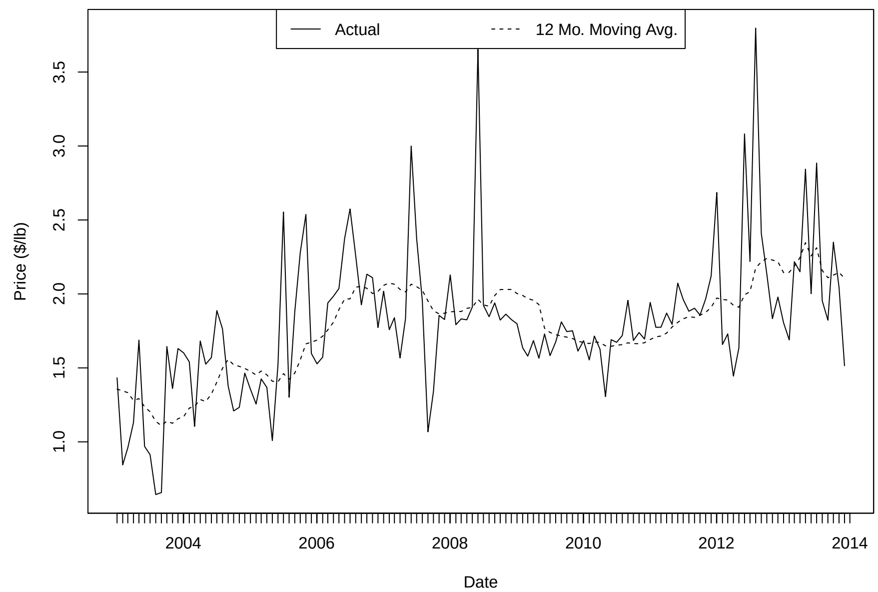

Figure 10.35: Nominal Monthly U.S. Export Prices of Cod Fillets to All Countries, Jan.2003-Dec.2013.

Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

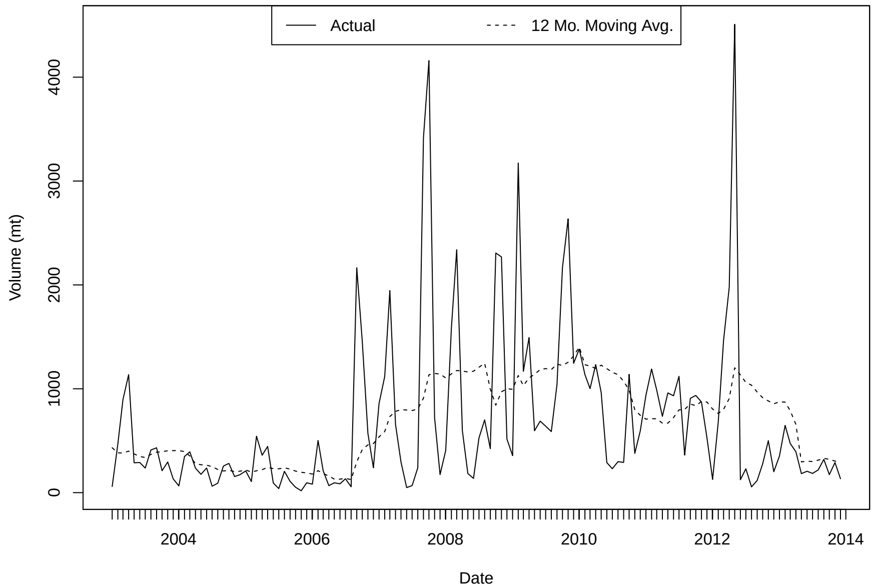

Figure 10.36: Monthly U.S. Export Volumes of Cod Fillets to All Countries, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

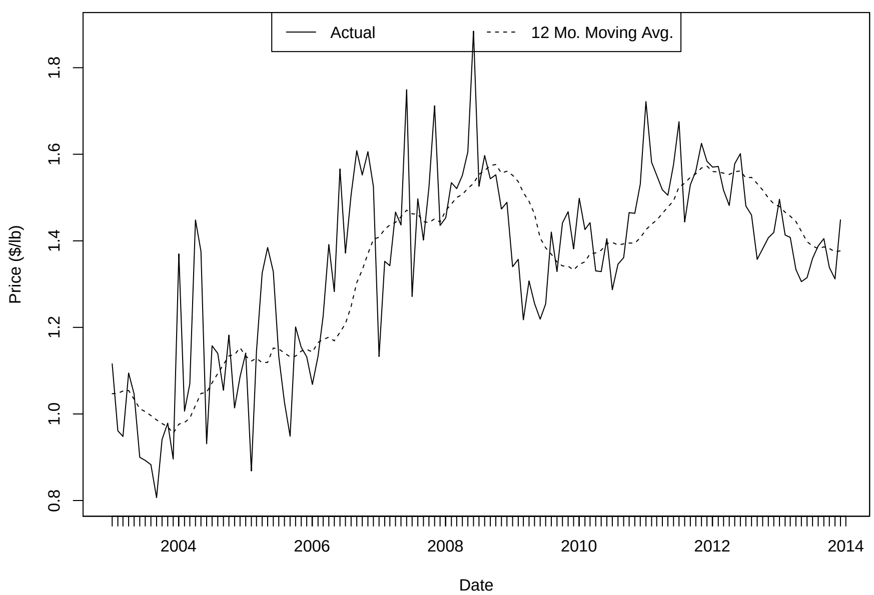

Figure 10.37: Nominal Monthly U.S. Export Prices of Frozen Cod to All Countries, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

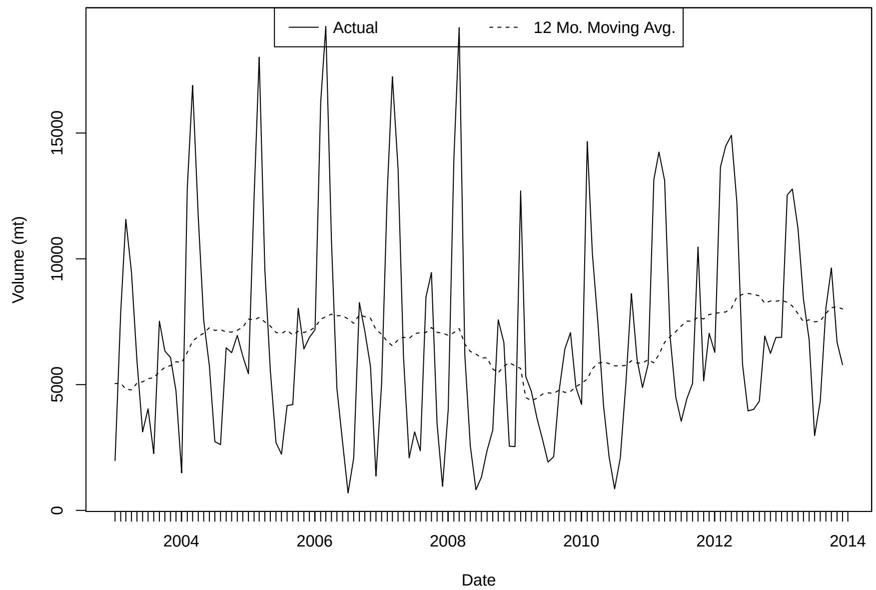

Figure 10.38: Monthly U.S. Export Volumes of Frozen Cod to All Countries, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

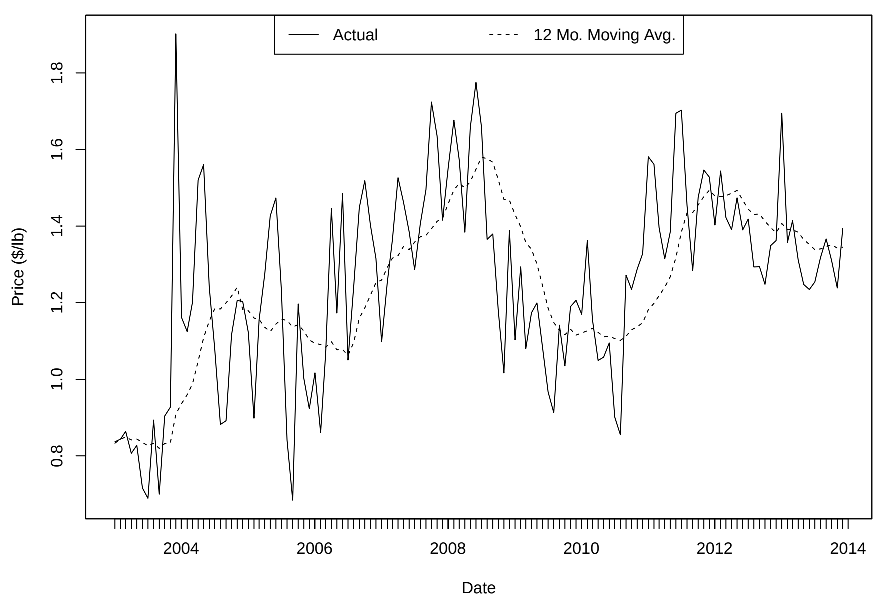

Figure 10.39: Nominal Monthly U.S. Export Prices of Frozen Cod to China, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

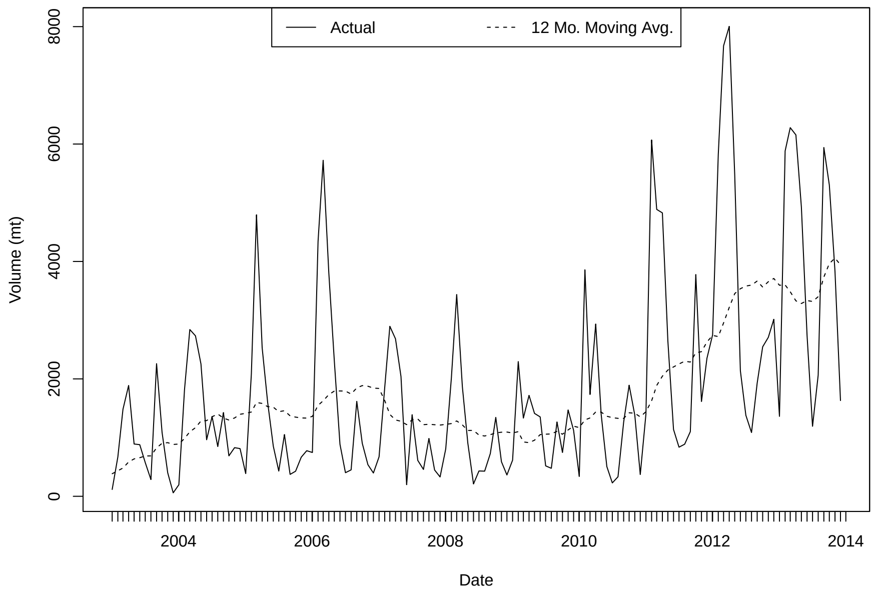

Figure 10.40: Monthly U.S. Export Volumes of Frozen Cod to China, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

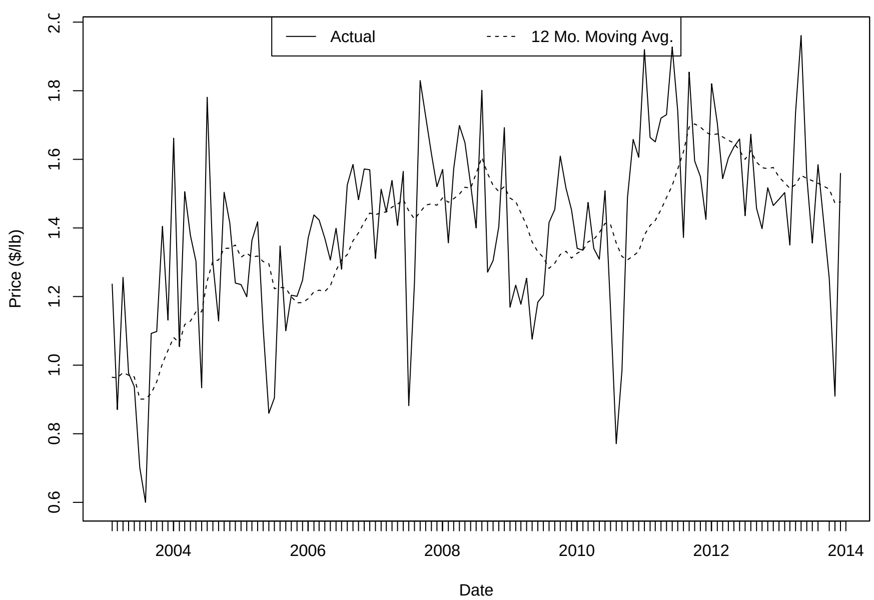

Figure 10.41: Nominal Monthly U.S. Export Prices of Frozen Cod to Portugal, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

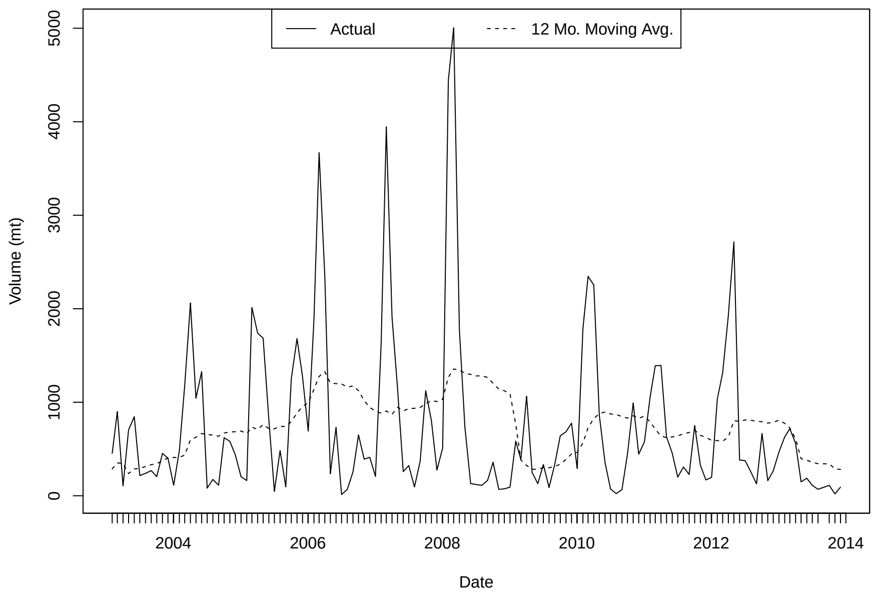

Figure 10.42: Monthly U.S. Export Volumes of Frozen Cod to Portugal, Jan.2003-Dec.2013.
Notes: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.12. Sablefish Market Profile

10.12.1 Description of the Fishery

Sablefish (*Anoplopoma fimbria*) are distributed along the continental shelf and slope of the North Pacific Ocean from Baja California through Alaska and the Bering Sea, and westward to Japan. The greatest abundance of sablefish is found in the Gulf of Alaska and Bering Sea. The sablefish catch is largely concentrated in the Gulf of Alaska which typically for just under 90% of the total catch in the Federal waters off Alaska (Table 1).

The fishing fleet for sablefish is primarily composed of owner-operated vessels that use hook-and-line or pot (fish trap) gear. An fisheries quota (IFQ) program for the Alaska sablefish and halibut fisheries was developed by the North Pacific Fishery Management Council and implemented by NMFS in 1995. The program was designed, in part, to help improve safety for fishermen, enhance efficiency, reduce excessive investment in fishing capacity, and protect the owner-operator character of the fleet. The program set caps on the amount of quota that any one person may hold, limited transfers to bona fide fishermen, issued quota in four vessel categories, and prohibited quota transfers across vessel categories.

The IFQ system has allowed fishers to time their catch to receive the best prices. In a survey of sablefish fishers in the first year of the program, more than 75 percent said that price was important in determining when to fish IFQs (Knapp and Hull 1996).

10.12.2 Production

Most of the total world catch of sablefish comes from Alaska (Figure 10.43). Alaska accounts for approximately two-thirds of total U.S. harvests. This share of total U.S. harvests has remained relatively stable throughout the years. The U.S. share of production has averaged over 85%. Canadian vessels from the Vancouver north to the Alaskan border harvest sablefish as well (Cascorbi 2007).

10.12.3 Product Composition and Flow

Sablefish delivered by catcher vessels to shoreside processors as whole fish or already headed and gutted (H&G) in an eastern cut-head removed just behind the collar bone. At the shoreside plants, the fish are graded by size into small (less than 4.25 or 5 pounds), medium (4.25 or 5 to 7 pounds), and large (over 7 pounds), with larger sablefish garnering higher prices per pound (Flick et al. 1990). This trend persists as Tokyo wholesale prices from Nov. 2011 indicate that 5-7 pound fish sell at approximately a $0.96 premium over 4-5 pound fish (Sonu 2011). As shown in Figure 10.44, most sablefish are sold on the wholesale market as H&G product, eastern cut.

As a result of its high oil content, sablefish is an excellent fish for smoking. Smoked “sable” has long been a working-class Jewish deli staple in New York City (Cascorbi 2007). It is normally hot-smoked and requires additional cooking. In addition, as a premium-quality whitefish with a delicate texture and moderate flavor, sablefish is prized in up-scale restaurants (Cascorbi 2007). Sablefish has several market names in its processed forms. The U.S. consumer may see smoked

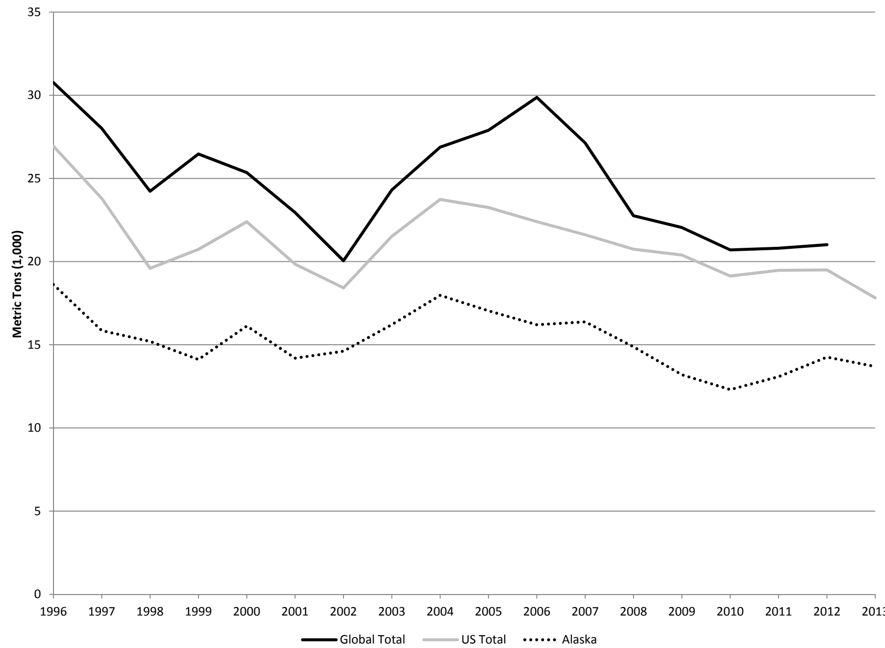

Figure 10.43: Alaska, Total U.S. and Global Production of Sablefish, 1996-2013.

Notes: Data for 2013 were unavailable for Global totals.

Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at: `http://www.psmfc.org/pacfin/pfmc.html`. Global data from FAO, "FishStat" database available at: `http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073`.

sablefish as smoked Alaskan cod or sable, and fresh and frozen fillets as butterfish or black cod (Flick et al. 1990).

10.12.4 International Trade

Although smoked sable has long been a traditional item in the U.S. deli trade, most of the Alaska sablefish catch has historically been exported to Japan, where it is a popular fish that is primarily consumed during the winter months (Niemeier 1989). Japan continues to be the major market as is evident from U.S. export data (Figure 10.47). It is believed that a portion of the sablefish shipped to China was re-exported to Japan, rather than used for domestic Chinese consumption. Product shipped to other Asian (e.g., South Korea) and European markets was largely for local consumption.

10.12.5 Market Position

Japan remains the primary market destination for Alaska sablefish. As noted above, sablefish market prices generally respond inversely to fluctuations in the Alaska sablefish harvest. Marine Stewardship Council certified the Alaska sablefish longline fishery as a "well managed and sustainable fishery" starting in 2006. The longline sector entered re-assessment in May 2010 and was re-certified by the MSC. Growing demand for sablefish in alternative markets, may have been a factor upward pressure on sablefish prices through 2011 (Seafood Market Bulletin 2008), as depicted in Figure 10.48. Alaska

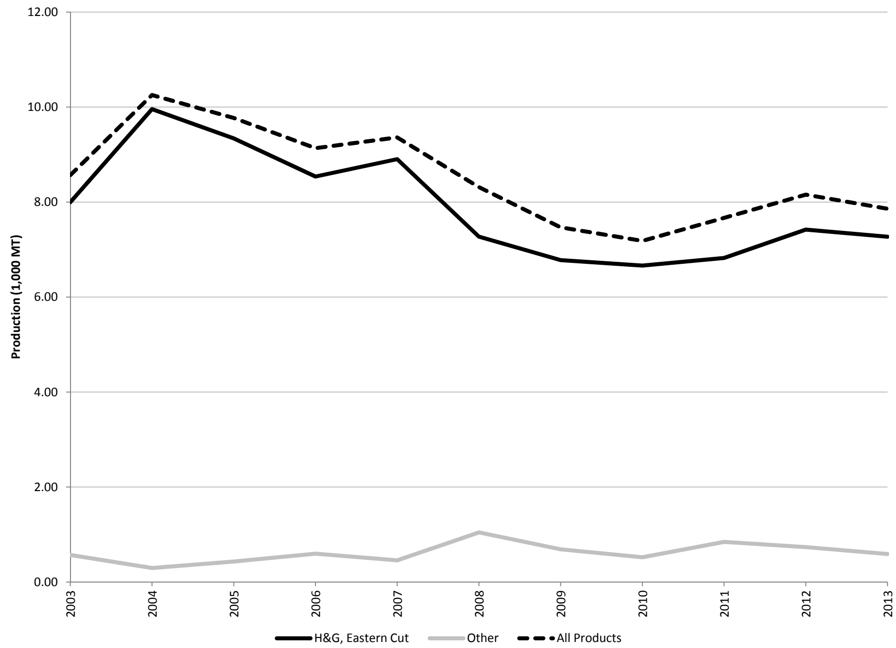

Figure 10.44: Alaska Primary Production of Sablefish by Product Type, 2003-2013.

Notes: Product types may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

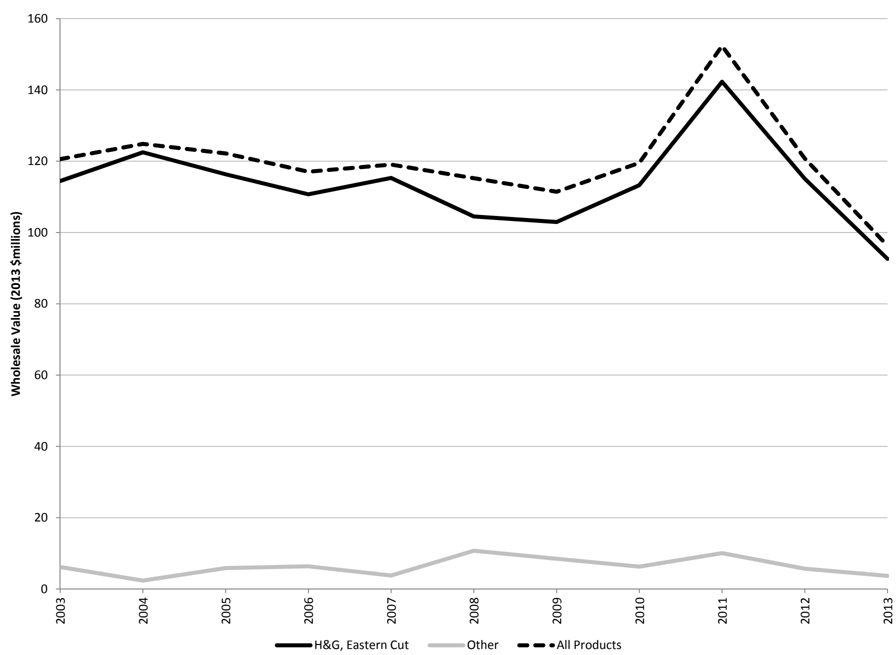

Figure 10.45: Wholesale Value of Alaska Primary Production of Sablefish by Product Type, 2003-2013.

Notes: Product types may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

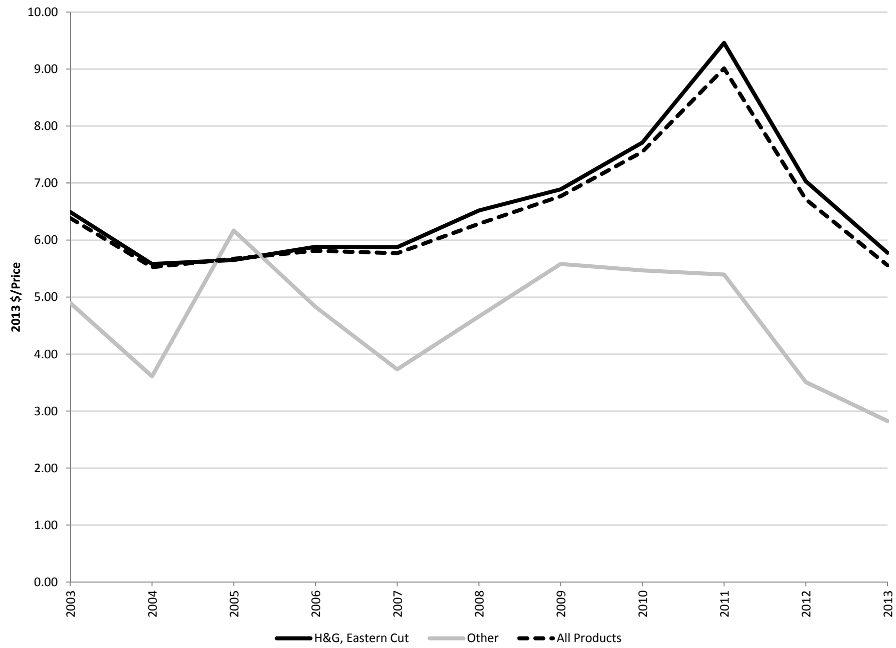

Figure 10.46: Wholesale Prices for Alaska Primary Production of Sablefish by Product Type, 2003-2013.

Notes: Product types may include several more specific products.

Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

first whole sablefish prices have fallen since peaking 2011 (Figure 10.46) while export prices have increased (Figure 10.48).

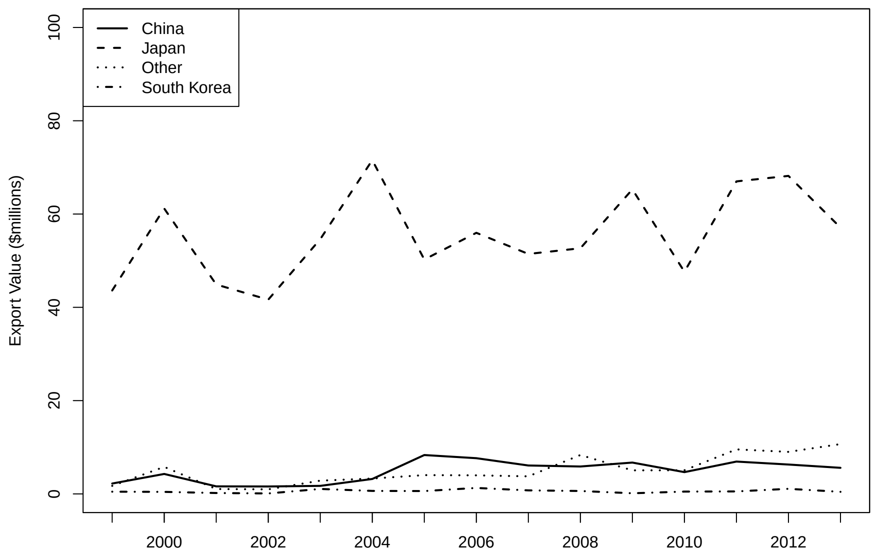

Figure 10.47: Nominal U.S. Export Value of Frozen Sablefish to Leading Importing Countries, 1999-2013.

Notes: Data include all exports of frozen sablefish recorded at the Anchorage and Seattle offices of the U.S. Customs Pacific District. It should be noted that sablefish are also harvested on the West Coast and that it is likely that some of this sablefish may be from West Coast harvests.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

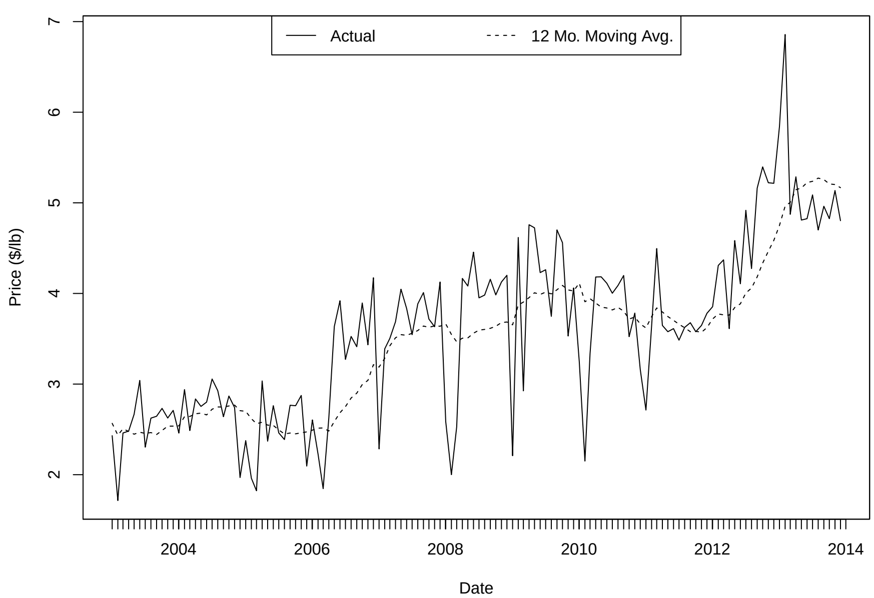

Figure 10.48: Nominal Monthly U.S. Export Prices of Sablefish to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

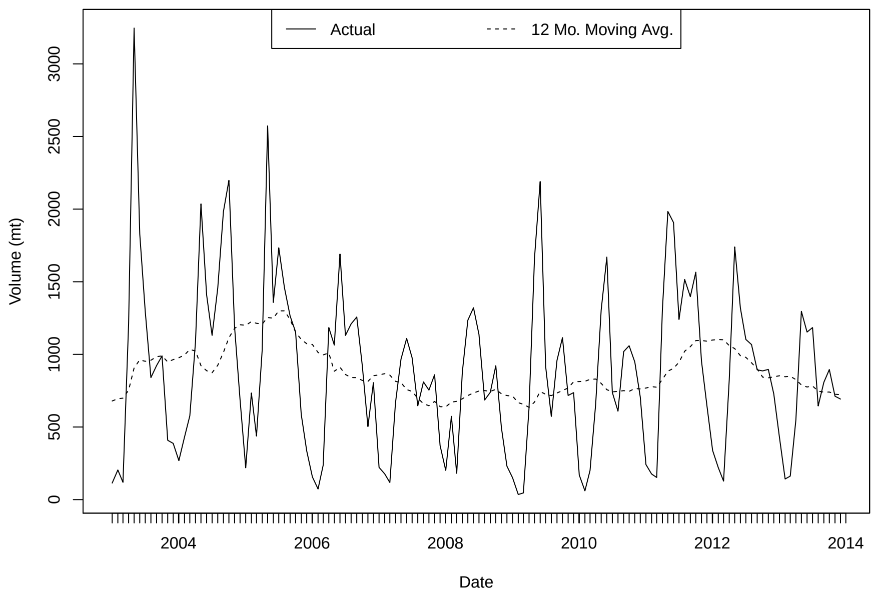

Figure 10.49: Monthly U.S. Export Volumes of Sablefish to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.13. Yellowfin Sole Market Profile

10.13.1 Description of the Fishery

The yellowfin sole (*Limanda aspera*) is one of the most abundant flatfish species in the eastern Bering Sea. Yellowfin sole are targeted primarily by trawl catcher/processors, and the directed fishery typically occurs from spring through December.

10.13.2 Production

The yellowfin sole is the largest flatfish fishery in the United States. U.S. catches of yellowfin sole occur only in the waters off Alaska (Figure 10.50). The fish landings statistics available indicate that Alaska fisheries account for the entire worldwide production of yellowfin. However, the catch reporting standards and fisheries landings data available from some countries may be inadequate, and commonly used groupings for similar species lead to difficulties in isolating species-specific landings (NMFS 2001). For example, seafood market reports (e.g., IntraFish Media 2004; SeaFood Business undated), seafood supplier Web sites (e.g., Siam Canadian Foods Company, Ltd. 2004), scientific articles (e.g., Kupriyanov 1996) and other information sources (e.g., Vaisman 2001) refer to Russian harvests of yellowfin sole in the western Bering Sea. However, no records of these catches are found in fishery statistics compiled by the U.N. Food and Agriculture Organization (Figure 10.50).

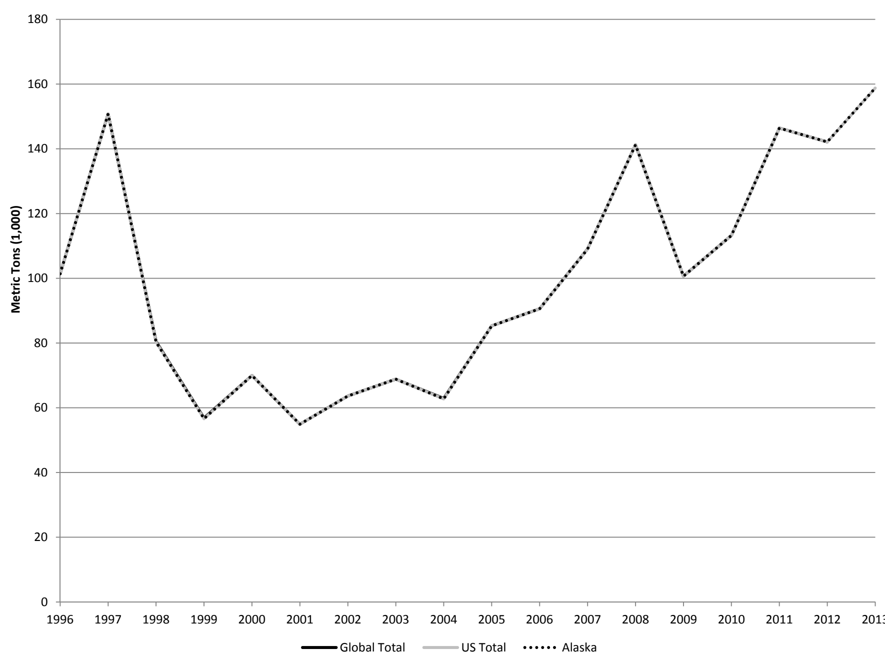

Figure 10.50: Alaska, Total U.S. and Global Retained Harvest of Yellowfin Sole, 1996-2013.

Notes: The global harvest estimate may not be accurate because the fish landing statistics of some countries may not distinguish between yellowfin sole and other flatfish species. The global total in the figure is the higher of the FAO estimate or U.S. total. Global estimates for 2011 are unavailable.

Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at `http://www.psmfc.org/pacfin/pfmc.html`. Global data from FAO, "FishStat" database available at `http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073`.

10.13.3 Product Composition and Flow

Yellowfin sole products processed offshore are sold as whole fish and headed and gutted (H&G) fish (Figure 10.51). Industry representatives indicate that fish that yield a fillet of 3 oz. or more receive a higher price. H&G fish is primarily sold to re-processors in China for conversion into individual frozen skinless, boneless fillets. A relatively low percentage of yellowfin sole products are sold as kirimi, a steak-like product with head and tail off. Smaller fish tend to be used in the production of kirimi.

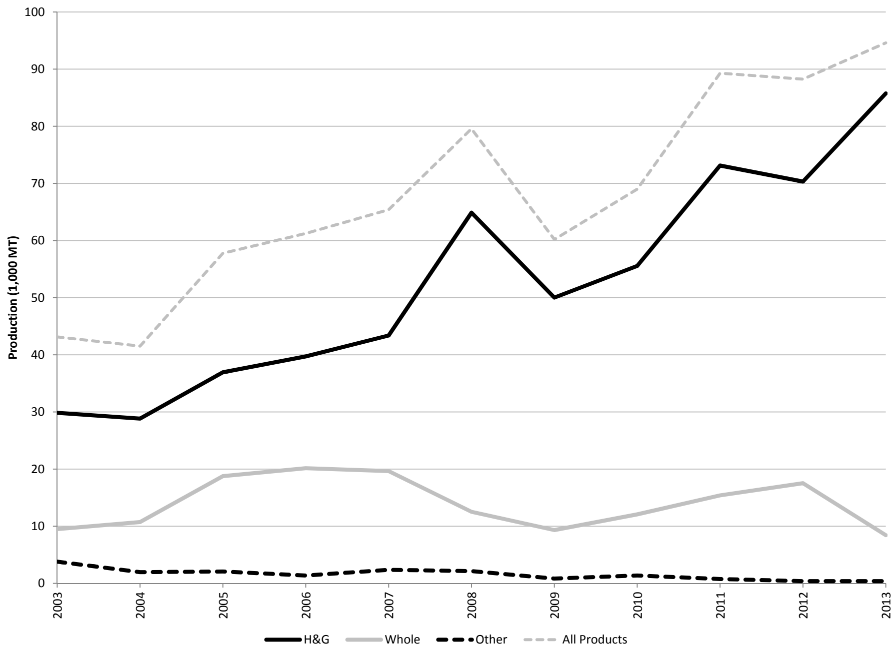

Figure 10.51: Alaska Primary Production of Yellowfin Sole by Product Type, 2003-2013.
Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

10.13.4 International Trade

Approximately 80 to 90% of the sole harvested in the Alaska groundfish fisheries is shipped to Asia. Whole and H&G yellowfin sole have separate and distinct markets. As noted above, headed and gutted fish are primarily sold to re-processors in China for conversion into individual frozen skinless, boneless fillets. The majority of these fillets are eventually exported from China to the United States and Canada for use in foodservice applications (American Seafoods Group LLC 2002). As of 2007, however, an increasing portion of the China-processed fillets were being exported to Europe or sold in China itself (Ramseyer 2007).

U.S. shoreside processors produce some fillets as well as other products, with some products going to Asia and others remaining in the United States. However, the relatively small fillets of yellowfin sole have a high labor cost per pound. This high labor cost makes it more attractive to ship the fish to China, where labor costs for secondary processing tend to be relatively low (NMFS 2001). Yellowfin sole processed into kirimi is exported to Japan.

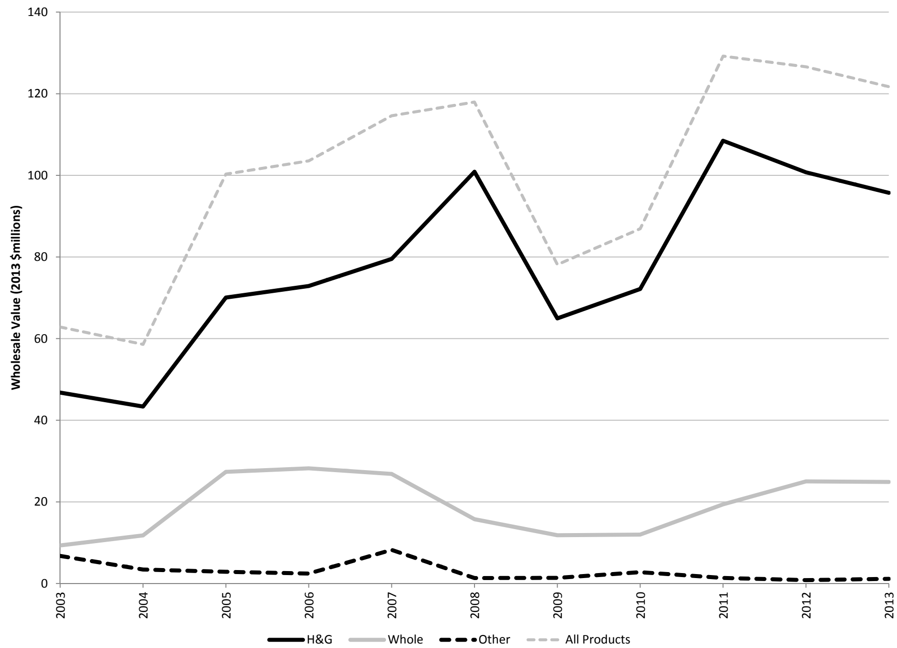

Figure 10.52: Wholesale Value of Alaska Primary Production of Yellowfin Sole by Product Type, 2003-2013.
Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

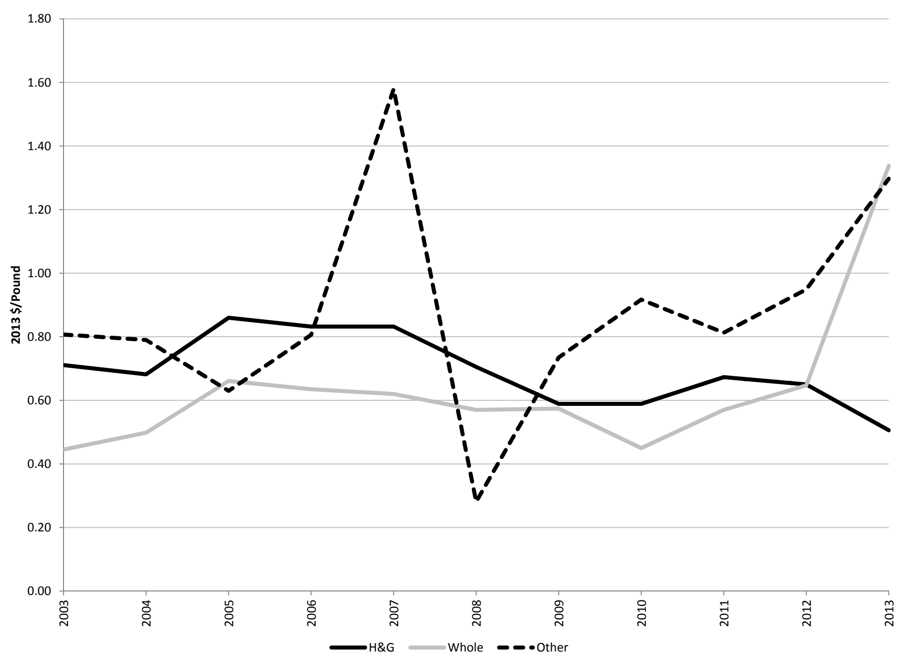

Figure 10.53: Wholesale Prices for Alaska Primary Production of Yellowfin Sole by Product Type, 2003-2013.
Notes: Product types may include several more specific products.
Source: NMFS Daily Production Reports and ADF&G Commercial Operator Annual Reports 2003-2013.

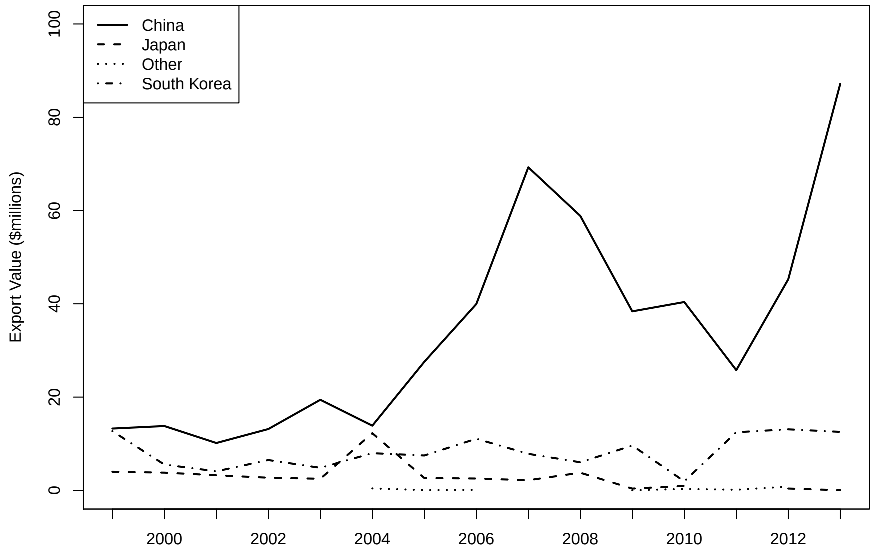

Figure 10.54: Nominal U.S. Export Value of Yellowfin Sole to Leading Importing Countries, 1998-2013.

Notes: Data include all exports of yellowfin sole from the U.S. Customs Pacific District.

Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.13.5 Market Position

Yellowfin harvested off Alaska compete in international markets with other flatfish species caught in fisheries off Alaska and the U.S. West and East Coasts and in foreign fisheries. It is likely that Alaska-harvested yellowfin sole competes in international markets with yellowfin sole harvested by Russian trawlers operating in the western Bering Sea. However, as discussed earlier, the harvest levels in the Russian fishery are uncertain. Similar to the Alaska harvest, most of the Russian yellowfin sole catch is likely imported by China as H&G, thawed, reprocessed as fillets and re-exported. Alaska-harvested yellowfin also compete in domestic and foreign markets with farmed flatfish. Yellowfin sole is among the Alaskan flatfish fisheries that were certified sustainable by the Marine Stewardship Council on June 1, 2010 (Marine Stewardship Council 2010).

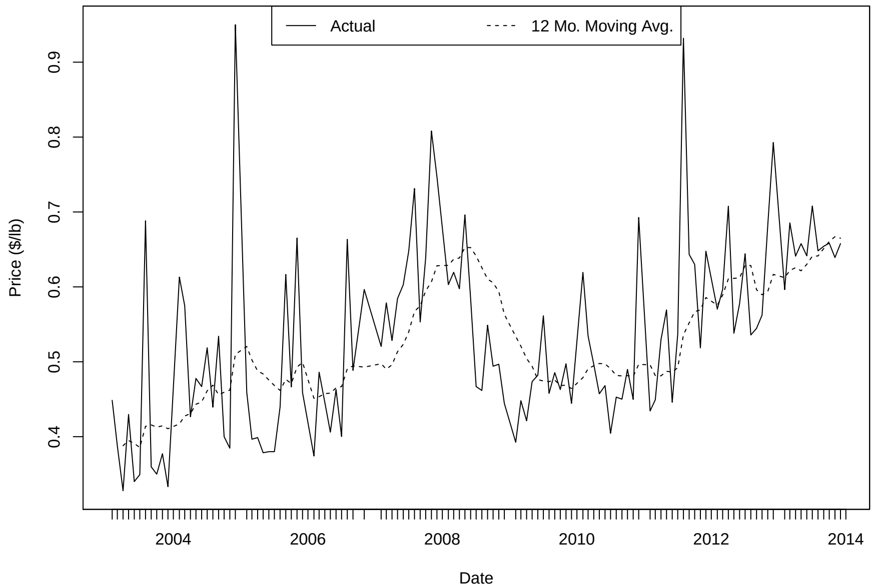

Figure 10.55: Nominal Monthly U.S. Export Prices of Yellowfin Sole to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

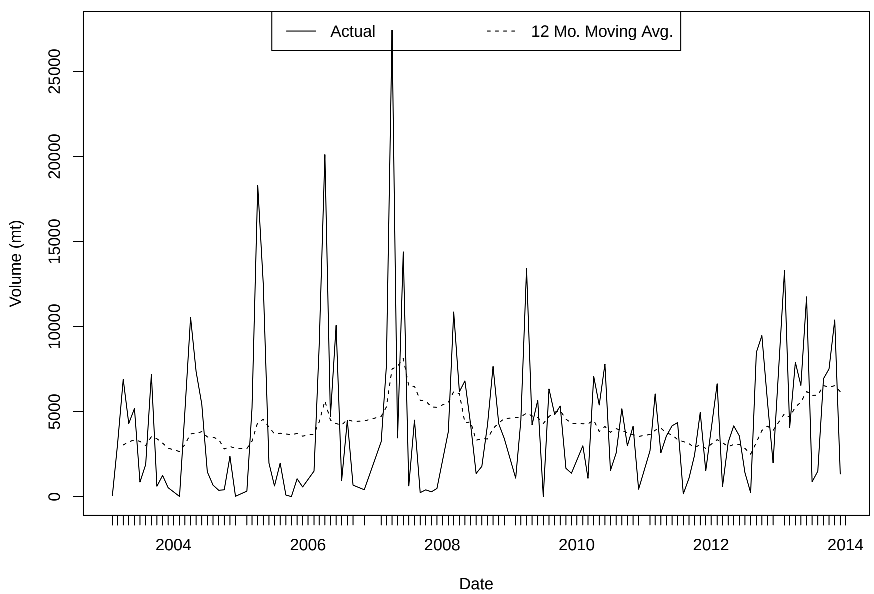

Figure 10.56: Monthly U.S. Export Volumes of Yellowfin Sole to All Countries, Jan.2003-Dec.2013.
Source: U.S. Census Bureau Foreign Trade Data available at `www.st.nmfs.gov/st1/trade/`.

10.14. Acknowledgments and Source Information

Contributors
The primary author of Market Profiles was Donald M. Schug of Northern Economics, Inc. Other contributors from Northern Economics were Marcus L. Hartley and Anne Bunger. Quentin Fong of the Fishery Information and Technology Center, University of Alaska Fairbanks assisted with gathering information on seafood processors in the People's Republic of China.

Seafood industry representatives were interviewed during the preparation of this document. These individuals participated with the assurance that information they provided would not be directly attributed to them. The information they offered provided new insights in seafood markets and was also used to cross-check published material. Listed in no specific order, the industry participants are as follows:
Dave Little and Paul Gilliland, Bering Select Seafoods Company
Nancy Kercheval and Todd Loomis, Cascade Fishing, Inc.
Rick Kruger, Summit Seafood Company
Torunn Halhjem, Trident Seafoods Corporation
Joe Plesha, Trident Seafoods Corporation
George Souza, Endeavor Seafood, Inc.
John Gauvin, Independent consultant
William Guo, Qingdao Fortune Seafoods, Inc.
John Hendershedt, Premier Pacific Seafoods
Merle Knapp, Glacier Fish Company
Jan Jacobs, American Seafoods, Inc.
Bill Orr, Best Use Cooperative

Sources of Market Information
For information on seafood markets presented in the original 2008 report and for some of the updates in the current report, the following online sources were consulted:

- Seafood.com News, a seafood industry daily news service. This service also publishes BANR JAPAN REPORTS, selected articles and statistical data originally sourced and translated from the Japanese Fisheries Press.
- GLOBEFISH, a non-governmental seafood market and trade organization associated with the United Nations.
- FAS Worldwide, a magazine from the U.S. Department of Agriculture's Foreign Agricultural Service.
- IntraFish.com, a seafood industry daily news service.
- SeaFood Business, a trade magazine for seafood buyers.

Archival information from these sources was also reviewed in order to obtain a broader perspective of market trends. Other news services consulted were FISHupdate.com and Fishnet.ru.
For a general overview of Alaska pollock and Pacific cod markets, the analysis relied primarily on the following reports:

- Studies of Alaska pollock and Pacific cod markets prepared by Gunnar Knapp, Institute of Social and Economic Research, University of Alaska Anchorage for the North Pacific Fisheries Management Council developed in 2005 and 2006.
- A description of markets for Alaska pollock and Pacific cod prepared by the National Marine Fisheries Service for the 2001 Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement.

Information from the above news services and reports was supplemented with market facts found in various reports and articles identified through Web searches. In sifting through the extensive information garnered from these searches, the following precautionary advice offered by Gunnar Knapp was considered:

In reading trade press articles about market conditions, it is important to keep in mind that individual articles tend to be narrowly focused on particular topics-such as a particular auction or supply or product quality from a particular fishery. A "bigger picture" view of market conditions only emerges after reading articles over a long period of time-ideally several years.
In addition, it is important to keep in mind that ... seafood trade press articles-like any press analysis of any topic–are not necessarily objective or accurate. Some articles reflect the point of view of particular market participants.[6]

Several sources of fishery statistics were used to prepare and update the figures presented in this document, including databases maintained by the National Marine Fisheries Service (NMFS) Alaska Regional Office, Alaska Department of Fish and Game (ADF&G), Pacific Fisheries Information Network (PacFIN), Foreign Trade Division of the U.S. Census Bureau, and the U.N. Food and Agriculture Organization (FAO).

A Notice on Terminology
In this document, we make frequent use of such terms as "Alaska groundfish fishery", "groundfish fishery off Alaska", and "Alaska fishery" for various groundfish species. These terms should be taken to include both groundfish fisheries managed under a federal Fisheries Management Plan (FMP) developed by the North Pacific Fisheries Management Council (NPFMC) and groundfish fisheries managed by the state of Alaska. Similarly, such terms as "Alaskan waters" or "waters off Alaska" should be understood to mean both waters inside the 3-mile limit of the state of Alaska and waters outside Alaska's 3-mile limit in the federal exclusive economic zone (EEZ). Consequently, all of the catch, production, and revenue information presented in this report applies to all groundfish catch from both Alaska-state waters and waters of the EEZ off Alaska, whether the catch was made under a federal FMP or under Alaska-state management. No attempt has been made to include only one of these categories of Alaskan groundfish or to exclude the other. The reader of this document should also be aware that the export data presented in this report in some cases include both groundfish caught in the waters off Alaska and groundfish of the same species caught elsewhere in the U.S. The profiles for the individual species will discuss what portion of the total exports of the species is represented by catch from Alaskan fisheries.

[6] Knapp, G. 2005. An Overview of Markets for Alaska Pollock Roe. Paper prepared for the North Pacific Fisheries Management Council, Anchorage, AK. p.34.

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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 - 2013 ; calculations based on CFEC fish tickets ($ millions, base year = 2013)

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
2004	238.8	367.5	20.2	243.1	753.6	1,623.1
2005	224.9	419.1	19.6	227.2	874.0	1,764.8
2006	176.8	393.1	12.4	241.6	893.3	1,717.2
2007	230.8	473.4	18.9	266.2	888.7	1,878.0
2008	302.2	482.9	29.9	243.9	1,059.8	2,118.6
2009	229.0	459.9	28.3	159.5	659.5	1,536.3
2010	252.0	569.1	24.1	218.8	720.4	1,784.5
2011	307.7	632.4	11.2	212.1	913.9	2,077.4
2012	329.8	550.9	22.4	149.7	972.4	2,025.2
2013	238.4	679.5	16.3	111.5	823.4	1,869.1

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2013 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 Report, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, Fisheries of the United States (housed at 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 - 2013 ; 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	12.8 %	36.4 %	0.9 %	6.0 %	44.1 %

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. (housed at 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, 2009 - 2013 ; 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	2009	0.102	0.164	0.066	0.135	0.136
	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	0.154	0.150	0.139	0.134	0.135
Sablefish	2009	3.117	2.052	2.996	1.280	3.013
	2010	3.689	2.844	3.588	1.595	3.599
	2011	4.935	4.032	4.883	1.792	4.844
	2012	3.968	3.246	3.506	1.013	3.824
	2013	2.774	2.317	2.719	1.014	2.717
Pacific Cod	2009	0.279	0.238	0.190	0.163	0.201
	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	0.271	0.234	0.221	0.222	0.229
Flatfish	2009	0.036	0.119	0.130	0.139	0.137
	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	0.113	0.314	0.194	0.186
Rockfish	2009	0.677	0.141	0.553	0.171	0.172
	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	0.796	0.233	0.546	0.292	0.282
Atka Mackerel	2009	*	0.280	*	0.188	0.190
	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	*	0.387	0.033	0.294	0.297

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, (housed at 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, 2009 - 2013 ; calculations based on CFEC fish tickets ($ millions)

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Proces-sor	All Sectors	Catcher Vessel	Catcher Proces-sor	All Sectors	Catcher Vessel	Catcher Proces-sor	All Sectors
Hook & Line	Sablefish	2009	64.3	6.9	71.2	3.9	4.2	8.1	68.3	11.1	79.4
		2010	72.8	5.3	78.2	5.2	4.7	9.8	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	64.4	4.1	68.4	3.6	2.9	6.5	67.9	7.0	74.9
	Pacific Cod	2009	7.7	2.1	9.8	0.4	39.6	40.0	8.1	41.7	49.9
		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	53.0	64.4
		2012	13.1	1.6	14.7	0.7	46.2	46.9	13.8	47.8	61.6
		2013	6.5	1.7	8.3	0.7	54.3	55.0	7.2	56.0	63.3
	Flatfish	2009	0	0	0	*	0.5	0.5	0	0.5	0.5
		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	*	0.5	0.5	0	0.5	0.5
	Rockfish	2009	1.5	0.1	1.6	0.1	0.2	0.3	1.5	0.4	1.9
		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	2.0	0.1	2.1	0.1	0.1	0.2	2.0	0.3	2.3
	All Species	2009	74.0	9.2	83.2	4.4	45.6	50.0	78.4	54.8	133.2
		2010	82.9	10.8	93.7	5.7	65.0	70.7	88.6	75.7	164.3
		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	73.5	6.0	79.5	4.3	63.0	67.3	77.8	69.0	146.8

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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
Pot	Pacific Cod	2009	13.7	*	13.7	6.6	2.0	8.7	20.3	2.0	22.3
		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	18.4	-	18.4	16.4	*	16.4	34.8	*	34.8
Trawl	Pollock	2009	14.8	0.2	15.0	170.6	68.1	238.7	185.4	68.3	253.7
		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	30.7	0.4	31.1	194.8	179.2	373.9	225.5	179.5	405.0
	Sablefish	2009	2.1	1.6	3.7	0	0.5	0.5	2.1	2.1	4.1
		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	*	0.4	0.4	2.1	2.4	4.5
	Pacific Cod	2009	5.5	0.2	5.8	12.0	8.5	20.5	17.5	8.8	26.3
		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	9.5	0.5	10.0	21.2	22.0	43.2	30.7	22.5	53.2
	Flatfish	2009	5.3	2.5	7.8	0.6	60.4	61.0	5.9	62.9	68.7
		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	4.2	2.7	6.9	0.3	115.3	115.6	4.5	118.0	122.5

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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
Trawl	Rockfish	2009	1.5	4.7	6.2	0.1	6.3	6.4	1.6	11.0	12.6
		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	3.9	6.7	10.7	0	21.6	21.7	4.0	28.4	32.3
	Atka Mackerel	2009	0	0.8	0.8	0	28.9	28.9	0	29.7	29.7
		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	14.6	14.6	0	15.3	15.3
	All Species	2009	29.8	10.1	39.9	183.3	173.0	356.3	213.1	183.0	396.1
		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	51.9	13.1	65.0	216.3	353.2	569.5	268.2	366.2	634.5
All Gear	Pollock	2009	14.9	0.2	15.0	170.6	68.7	239.3	185.4	68.9	254.3
		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	30.8	0.4	31.1	194.8	180.5	375.3	225.5	180.9	406.4
	Sablefish	2009	66.4	8.5	74.9	7.9	4.7	12.5	74.3	13.2	87.4
		2010	75.7	7.9	83.5	5.2	5.0	10.2	80.9	12.9	93.7
		2011	109.7	11.8	121.5	12.7	4.9	17.6	122.3	16.8	139.1
		2012	97.4	8.9	106.3	6.1	4.6	10.7	103.5	13.5	117.0
		2013	66.6	6.1	72.7	3.6	3.4	6.9	70.2	9.4	79.6

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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	2009	26.9	2.4	29.3	19.0	50.2	69.2	45.9	52.5	98.5
		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	34.3	2.3	36.6	38.3	76.3	114.6	72.7	78.5	151.2
	Flatfish	2009	5.3	2.5	7.8	0.6	60.9	61.5	5.9	63.4	69.2
		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	102.5	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	4.2	2.7	6.9	0.3	115.9	116.1	4.5	118.5	123.0
	Rockfish	2009	2.9	4.8	7.8	0.2	6.5	6.7	3.1	11.3	14.5
		2010	3.9	6.7	10.5	0.1	11.0	11.0	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	5.9	6.9	12.8	0.1	21.8	21.8	6.0	28.6	34.6
	Atka Mackerel	2009	0	0.8	0.8	0	28.9	28.9	0	29.7	29.7
		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	14.6	14.6	0	15.3	15.3
	All Species	2009	117.8	19.3	137.0	198.3	220.6	418.9	316.0	239.9	555.9
		2010	149.8	23.9	173.7	175.5	306.6	482.1	325.2	330.5	655.8
		2011	201.9	28.8	230.7	273.5	378.6	652.1	475.4	407.4	882.8
		2012	204.0	22.7	226.7	290.5	419.2	709.7	494.5	441.9	936.4
		2013	144.2	19.0	163.3	237.0	416.2	653.3	381.2	435.3	816.5

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 (housed at 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, 2004 - 2013 ; 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	2004	58.5	21.9	0.1	3.9	8.0	1.8	62.4	29.8	1.9
	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	68.3	24.0	*	11.7	8.1	3.2	80.0	32.1	3.2
Trawl	2004	4.1	22.8	-	*	76.9	83.1	4.1	99.7	83.1
	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	123.9	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	8.2	43.7	-	*	86.1	96.7	8.2	129.8	96.7
All Gear	2004	62.6	44.6	0.1	3.9	84.9	85.0	66.5	129.5	85.1
	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	71.3	70.7	90.3	137.9	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	76.5	67.7	*	11.7	94.3	99.9	88.2	162.0	99.9

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 (housed at 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, 2004 - 2013 ; 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	2004	60	168	27	72	107	100	63	185	101
	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	*	172	275	497	109	496	442
	2012	91	471	*	241	230	403	104	464	363
	2013	74	324	*	148	173	358	84	328	358
Trawl	2004	178	422	-	*	1,025	3,080	164	1,038	3,080
	2005	266	554	-	*	1,180	3,934	266	1,218	3,934
	2006	279	654	-	*	1,285	4,241	279	1,319	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	315	994	-	*	1,325	3,582	315	1,583	3,582
All Gear	2004	64	255	27	64	574	1,888	67	527	1,849
	2005	66	327	55	56	708	2,541	69	633	2,547
	2006	67	383	60	92	790	2,995	72	727	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	82	589	*	145	842	2,776	92	915	2,776

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 (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 22.B: Ex-vessel value of the groundfish catch off Alaska by area, residency, and species, 2009 - 2013 ; calculations based on CFEC fish tickets ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2009	7.2	7.9	38.4	200.8	45.6	208.7
	2010	13.3	14.4	47.2	205.2	60.5	219.6
	2011	11.9	16.3	55.6	318.1	67.5	334.4
	2012	15.6	22.7	60.1	354.8	75.7	377.5
	2013	11.4	19.7	55.8	319.5	67.2	339.2
Sablefish	2009	42.5	32.4	4.0	8.5	46.5	41.0
	2010	46.2	37.6	2.4	7.8	48.6	45.4
	2011	67.4	54.5	7.3	10.3	74.7	64.8
	2012	58.2	48.4	3.0	7.7	61.2	56.1
	2013	40.5	32.3	4.1	5.1	44.6	37.4
Pacific Cod	2009	21.2	8.1	13.6	55.6	34.7	63.7
	2010	29.2	14.0	24.1	78.5	53.3	92.6
	2011	42.2	15.6	23.1	82.5	65.3	98.1
	2012	42.1	14.6	24.5	90.0	66.6	104.6
	2013	25.2	11.5	25.5	89.1	50.6	100.6
Flatfish	2009	2.8	5.0	16.7	44.8	19.5	49.8
	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	5.3	6.3	109.8	7.9	115.2
Rockfish	2009	2.6	5.2	0.2	6.5	2.8	11.7
	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	3.3	9.5	0.2	21.6	3.5	31.1
Atka Mackerel	2009	0	0.8	0	28.9	0.1	29.7
	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	14.6	0	15.3
All Groundfish	2009	77.2	59.8	73.0	345.9	150.2	405.7
	2010	95.5	78.4	94.9	387.2	190.4	465.6
	2011	127.0	104.2	95.1	557.0	222.1	661.1
	2012	123.0	104.1	90.1	619.6	213.1	723.6
	2013	83.1	80.3	92.8	562.9	175.9	643.1

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 (housed at 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, 2008 - 2013 ; calculations based on CFEC fish tickets ($ millions)

Region	2008	2009	2010	2011	2012	2013
Bering Sea Pollock	258.0	174.3	172.5	247.7	262.8	230.2
AK Peninsula/Aleutians	23.9	10.1	5.7	12.0	19.7	14.9
Kodiak	67.7	42.3	60.1	79.0	87.7	68.8
South Central	25.9	25.7	26.8	44.3	36.5	26.0
Southeastern	33.3	28.6	31.2	41.9	39.9	26.2
All Regions	408.8	281.0	296.4	424.9	446.5	366.1

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, 2008 - 2013 ; calculations based on CFEC fish tickets (percent)

Region	2008	2009	2010	2011	2012	2013
Bering Sea Pollock	62.8	61.4	58.2	59.2	64.3	63.3
AK Peninsula/Aleutians	11.8	5.4	2.6	4.4	7.2	5.8
Kodiak	45.2	37.1	45.6	43.7	49.2	41.5
South Central	12.3	16.7	9.4	17.0	15.6	9.7
Southeastern	15.3	15.6	13.7	13.9	15.4	9.0
All Regions	34.3	30.5	25.6	29.6	32.9	27.2

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: Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, ADFG intent to process (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R2: Rockfish retained catch off Alaska by area, gear, and species, 2004-2013 (1,000 metric tons, round weight).

Area	Gear	Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GOA	FIX	Northern	0.153	*	1.598	1.111	0.725	0.247	0.283	*	*	0.039
		Other	409.431	288.763	303.370	338.141	355.744	344.925	308.218	246.184	284.148	302.101
		Popa	0.181	13.391	1.188	0.315	*	*	0.065	0.227	*	*
		Rougheye	152.850	114.808	144.549	133.785	136.339	102.796	113.914	111.554	123.674	116.867
		Shortraker	189.939	161.172	171.243	158.827	196.297	153.044	152.529	122.193	166.373	134.447
		Dusky	65.265	39.333	18.610	35.327	18.645	10.623	10.103	14.326	12.310	24.767
		Thornyhead	313.592	319.293	387.298	369.890	338.173	321.874	315.291	322.844	425.117	485.572
	TWL	Northern	4,435.107	4,319.697	4,503.185	4,083.093	3,868.737	3,829.836	3,841.976	3,309.502	4,949.199	4,679.280
		Other	312.793	361.157	237.222	308.092	222.558	297.439	265.513	305.824	417.096	171.424
		Popa	10,684.186	10,597.114	12,527.040	12,471.402	11,947.704	12,098.125	14,968.667	13,287.171	14,193.727	12,177.438
		Rougheye	122.560	121.368	119.101	141.853	140.048	120.771	230.316	341.677	356.343	325.986
		Shortraker	288.701	259.740	339.522	346.053	290.911	248.804	172.801	304.735	301.434	272.702
		Dusky	2,440.216	2,106.930	2,250.766	3,257.550	3,566.861	2,989.370	2,981.931	2,444.156	3,839.315	2,968.600
		Thornyhead	414.152	332.748	297.321	367.853	317.853	251.616	178.826	214.261	140.719	198.881
BSAI	FIX	Northern	0.740	0.955	0.502	0.255	*	10.806	67.082	1.204	5.018	3.325
		Other	131.328	138.584	167.228	128.329	120.897	167.120	198.440	148.325	171.224	142.366
		Popa	1.757	0.058	*	3.811	*	0.214	0.669	1.156	0.710	0.397
		Rougheye	3.413	3.557	8.583	22.887	27.733	20.921	27.433	8.776	21.846	3.900
		Shortraker	49.840	40.422	48.744	30.280	23.834	36.680	73.177	35.566	33.332	12.473
	TWL	Northern	720.340	956.426	1,073.927	873.450	1,530.713	1,970.865	3,287.424	2,606.937	2,048.932	1,813.299
		Other	264.974	191.850	200.422	227.102	291.401	259.016	384.657	601.940	618.586	465.594
		Popa	9,819.904	8,726.598	10,620.347	15,554.529	16,957.736	14,473.912	17,334.748	23,268.110	23,341.821	30,839.313
		Rougheye	94.379	71.389	162.630	111.444	120.557	143.719	164.154	135.080	145.119	258.512
		Shortraker	92.826	88.862	81.426	132.256	77.917	99.402	156.834	263.127	256.672	249.140

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 (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R3: Real ex-vessel value of the catch rockfish off Alaska by area, gear, and species, 2004-2013; calculations based on COAR ($ millions, base year = 2013).

Area	Gear	Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GOA	FIX	Northern	235	*	2,019	1,447	341	157	268	*	*	29
		Other	967,174	603,273	594,584	668,045	761,386	676,113	560,843	521,935	812,937	781,069
		Popa	194	1,885	1,379	413	*	*	77	204	*	*
		Rougheye	116,957	81,000	116,381	114,696	100,594	83,176	90,096	91,213	115,973	92,573
		Shortraker	176,914	137,383	128,143	118,684	156,403	112,634	112,790	101,221	171,014	126,978
		Dusky	39,804	24,629	14,666	18,861	13,171	6,698	5,931	10,193	11,251	19,637
		Thornyhead	440,421	394,248	485,992	483,901	439,108	381,432	350,503	366,183	505,963	598,066
	TWL	Northern	614,196	989,154	1,553,788	1,443,762	1,478,016	731,402	1,006,136	1,072,626	2,862,775	2,074,100
		Other	48,479	84,734	82,596	111,883	86,382	62,988	75,161	99,482	240,596	76,542
		Popa	1,484,777	2,441,245	4,377,194	4,546,016	4,330,622	2,188,578	4,001,036	4,561,087	8,289,643	5,560,704
		Rougheye	26,371	33,214	50,036	59,057	56,221	32,559	67,588	119,763	200,592	150,203
		Shortraker	52,279	74,829	129,062	127,661	119,194	56,564	53,379	110,044	172,684	125,549
		Dusky	340,653	488,062	772,973	1,159,784	1,376,944	778,189	834,002	820,368	2,220,943	1,307,300
		Thornyhead	100,357	100,745	129,250	160,611	148,819	84,982	79,392	99,795	95,780	110,294
BSAI	FIX	Northern	947	1,382	674	140	*	14,197	94,982	1,424	5,421	4,675
		Other	202,567	198,765	228,317	135,840	169,046	219,879	282,320	176,035	186,121	202,309
		Popa	2,643	85	*	4,015	*	281	947	1,367	767	559
		Rougheye	2,662	4,627	10,942	23,188	34,495	26,310	38,150	5,499	21,337	4,881
		Shortraker	71,642	58,124	63,074	31,279	30,137	46,596	99,207	40,209	35,237	16,830
	TWL	Northern	137,926	342,718	392,547	440,427	412,044	546,547	1,270,762	1,675,790	1,035,762	555,148
		Other	229,976	185,068	157,652	180,577	273,948	150,678	344,056	632,090	539,297	444,392
		Popa	3,088,620	4,731,105	6,153,519	6,838,389	6,346,530	5,600,367	8,881,951	17,874,769	14,928,830	14,318,406
		Rougheye	48,955	45,056	92,821	47,011	60,215	84,310	90,833	85,188	88,466	117,482
		Shortraker	69,883	53,228	72,155	47,533	76,995	71,876	141,523	326,859	279,540	217,034

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2013 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 (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R4: Ex-vessel prices of rockfish off Alaska by area, gear, and species, 2004-2013; calculations based on COAR ($/lb, round weight).

		Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GOA	FIX	Northern	0.697	*	0.573	0.591	0.213	0.289	0.429	*	*	0.333
		Other	1.071	0.948	0.889	0.896	0.971	0.889	0.825	0.962	1.298	1.173
		Popa	0.487	0.064	0.526	0.595	*	*	0.536	0.408	*	*
		Rougheye	0.347	0.320	0.365	0.389	0.335	0.367	0.359	0.371	0.425	0.359
		Shortraker	0.422	0.387	0.339	0.339	0.361	0.334	0.335	0.376	0.466	0.428
		Dusky	0.277	0.284	0.357	0.242	0.320	0.286	0.266	0.323	0.415	0.360
		Thornyhead	0.637	0.560	0.569	0.593	0.589	0.538	0.504	0.514	0.540	0.559
	TWL	Northern	0.063	0.104	0.157	0.160	0.173	0.087	0.119	0.147	0.262	0.201
		Other	0.070	0.106	0.158	0.165	0.176	0.096	0.128	0.148	0.262	0.203
		Popa	0.063	0.104	0.158	0.165	0.164	0.082	0.121	0.156	0.265	0.207
		Rougheye	0.098	0.124	0.191	0.189	0.182	0.122	0.133	0.159	0.255	0.209
		Shortraker	0.082	0.131	0.172	0.167	0.186	0.103	0.140	0.164	0.260	0.209
		Dusky	0.063	0.105	0.156	0.161	0.175	0.118	0.127	0.152	0.262	0.200
		Thornyhead	0.110	0.137	0.197	0.198	0.212	0.153	0.201	0.211	0.309	0.252
BSAI	FIX	Northern	0.580	0.657	0.609	0.249	*	0.596	0.642	0.537	0.490	0.638
		Other	0.700	0.651	0.619	0.480	0.634	0.597	0.645	0.538	0.493	0.645
		Popa	0.682	0.661	*	0.478	*	0.596	0.642	0.537	0.490	0.639
		Rougheye	0.354	0.590	0.578	0.460	0.564	0.570	0.631	0.284	0.443	0.568
		Shortraker	0.652	0.652	0.587	0.469	0.574	0.576	0.615	0.513	0.480	0.612
	TWL	Northern	0.087	0.163	0.166	0.229	0.122	0.126	0.175	0.292	0.229	0.139
		Other	0.394	0.438	0.357	0.361	0.426	0.264	0.406	0.476	0.395	0.433
		Popa	0.143	0.246	0.263	0.199	0.170	0.176	0.232	0.348	0.290	0.211
		Rougheye	0.235	0.286	0.259	0.191	0.227	0.266	0.251	0.286	0.277	0.206
		Shortraker	0.341	0.272	0.402	0.163	0.448	0.328	0.409	0.563	0.494	0.395

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, (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table R5: Number of vessels that caught rockfish off Alaska by area, gear, and species,2004-2013.

Area	Gear	Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GOA	FIX	Northern	5	3	6	5	4	4	6	2	2	5
		Other	47	45	65	60	58	61	54	57	46	45
		Popa	11	5	5	4	2	3	4	5	2	3
		Rougheye	42	42	49	48	46	40	36	38	40	36
		Shortraker	37	39	43	47	41	36	36	37	33	32
		Dusky	26	20	24	27	24	24	21	24	27	25
		Thornyhead	46	48	56	51	46	47	42	44	40	42
	TWL	Northern	20	21	17	19	21	24	24	25	24	25
		Other	13	18	15	16	18	23	23	23	25	21
		Popa	22	26	21	24	25	28	30	30	30	26
		Rougheye	18	19	18	20	19	25	27	25	26	18
		Shortraker	19	18	19	14	17	21	23	24	22	16
		Dusky	21	25	21	23	23	25	27	26	27	24
		Thornyhead	20	22	21	22	20	25	27	25	25	18
BSAI	FIX	Northern	10	9	8	10	2	6	9	9	8	12
		Other	35	28	32	24	24	26	40	36	28	27
		Popa	4	6	2	6	3	6	10	10	7	9
		Rougheye	15	20	17	15	14	14	27	14	17	18
		Shortraker	26	19	16	19	20	24	30	22	22	18
	TWL	Northern	32	29	32	34	26	30	29	38	31	29
		Other	40	40	36	40	40	34	33	42	40	34
		Popa	40	42	42	42	40	40	38	43	41	39
		Rougheye	21	23	23	26	24	20	19	26	25	18
		Shortraker	16	19	23	29	27	23	20	31	26	18

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 (housed at the Alaska Fisheries Information Network (AKFIN)). National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

A.2. Supplementary Data Tables

Table E.1: Global production and value of whitefish (cods, hakes, haddocks) 2009 - 2012 (1,000 metric tons product weight and million dollars)

Data	2009	2010	2011	2012
Production	5510	5961	6506	6499
Value	6101	7188	8359	7565

Notes: Production and Value include capture and aquaculture.

Source: FAO, Yearbook of Fishery Statistics Summary tables, Appendix II - World fishery production: estimated value by groups of species; 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 2010 - 2014 (through June 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
Alaska Pollock	Japan	Frozen	0.26	$ 0.44	0.19	$ 0.44	0.23	$ 0.42	1.75	$ 4.97	1.91	$ 3.35
		Fillet Frozen	0.72	$ 1.72	0.31	$ 0.75	0.14	$ 0.32	0.9	$ 2.81	0.01	$ 0.05
		Surimi	45.66	$ 112.8	53.97	$ 115.33	67.6	$ 159.7	56.23	$ 115.84	30.05	$ 63.93
		Roe Frozen	5.54	$ 44.62	8.03	$ 56.24	7.62	$ 46.83	6.54	$ 42.54	11.04	$ 66.72
		Meat Frozen	-	$ -	-	$ -	-	$ -	-	$ -	0.4	$ 1.87
	China	Frozen	13.62	$ 26.56	25.02	$ 63.22	24.15	$ 53.91	43.38	$ 89.34	23.88	$ 51.67
		Fillet Frozen	11.88	$ 29.28	11.31	$ 27.43	8.87	$ 22.38	5.06	$ 11.8	2.06	$ 5.09
		Surimi	1.17	$ 2.73	3.08	$ 6.73	1.43	$ 3.07	3.3	$ 6.61	1.55	$ 3.36
		Roe Frozen	0.14	$ 1.31	0.31	$ 1.72	0.55	$ 4.55	0.9	$ 6.19	0.67	$ 4.34
		Meat Frozen	-	$ -	-	$ -	-	$ -	0.09	$ 0.17	0.29	$ 0.9
	South Korea	Frozen	0.14	$ 0.29	1.85	$ 3.66	0.86	$ 1.71	2.59	$ 4.72	3.21	$ 5.51
		Fillet Frozen	6.91	$ 17.04	3.37	$ 7.08	1.6	$ 4	0.85	$ 1.73	0.34	$ 0.91
		Surimi	33.67	$ 113.43	41.54	$ 120.49	44.95	$ 144.18	61.41	$ 156.44	22.2	$ 56.02
		Roe Frozen	5.6	$ 61.17	9.2	$ 100.42	7.56	$ 64.94	7.41	$ 64.55	8.01	$ 66.17
		Meat Frozen	-	$ -	-	$ -	0.95	$ 1.76	0.04	$ 0.1	0.22	$ 0.48
	Germany	Frozen	1.15	$ 4.27	3.94	$ 14.72	23.77	$ 74.58	4.44	$ 12.35	0.65	$ 1.81
		Fillet Frozen	35.76	$ 129.18	52.54	$ 169	37.35	$ 119.99	66.9	$ 200.35	28.56	$ 87
		Surimi	0.79	$ 1.41	6.15	$ 11.34	8.52	$ 18.69	10.41	$ 20.89	2.48	$ 5.08
		Roe Frozen	-	$ -	-	$ -	0.02	$ 0.1	-	$ -	-	$ -
		Meat Frozen	-	$ -	-	$ -	0.27	$ 0.53	0.33	$ 0.81	0.38	$ 1.06

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Table E.2: Continued

		Product	2010 Quantity	2010 Value	2011 Quantity	2011 Value	2012 Quantity	2012 Value	2013 Quantity	2013 Value	2014 Quantity	2014 Value
Alaska Pollock	Netherlands	Frozen	0.05	$ 0.1	0.02	$ 0.04	1.54	$ 4.08	0.81	$ 1.75	0.45	$ 0.95
		Fillet Frozen	17.2	$ 58.44	31.54	$ 100.69	21.57	$ 67.41	25.38	$ 75.49	11.59	$ 34.81
		Surimi	2.64	$ 8.16	4.42	$ 11.29	4.47	$ 13.76	2.35	$ 6.11	1.15	$ 2.76
		Roe Frozen	-	$ -	0	$ 0.06	-	$ -	-	$ -	-	$ -
		Meat Frozen	-	$ -	-	$ -	0	$ 0.01	0.14	$ 0.27	0.12	$ 0.3
	Other	Frozen	2.07	$ 5.15	7.99	$ 20.43	11.24	$ 27.26	10.74	$ 26.04	5.84	$ 14.72
		Fillet Frozen	7.2	$ 19.75	14.32	$ 41.43	9.95	$ 29.43	14.23	$ 41.37	9.07	$ 28
		Surimi	9.68	$ 22.19	23.47	$ 49.19	23.97	$ 55.3	25.74	$ 53.7	11.52	$ 25.3
		Roe Frozen	0	$ 0.02	-	$ -	0.15	$ 1.45	0.11	$ 0.96	0.01	$ 0.11
		Meat Frozen	-	$ -	-	$ -	3.47	$ 12.47	3.29	$ 7.85	2.36	$ 6.59
Sablefish	Japan	Frozen	5.72	$ 47.63	8.53	$ 67	6.39	$ 68.18	5.79	$ 60.93	2.3	$ 25.02
		Fresh	0.89	$ 9.63	0.9	$ 8.19	0.92	$ 8.9	0.5	$ 5.6	0.14	$ 1.6
	China	Frozen	0.62	$ 4.67	0.9	$ 6.93	0.67	$ 6.3	0.53	$ 6.89	0.27	$ 4.02
		Fresh	0.32	$ 3.03	0.39	$ 3.27	0.47	$ 4.28	0.27	$ 3.16	0.02	$ 0.15
	South Korea	Frozen	0.07	$ 0.5	0.08	$ 0.53	0.14	$ 1.09	0.04	$ 0.46	-	$ -
		Fresh	0.03	$ 0.27	-	$ -	0.02	$ 0.1	0.01	$ 0.17	-	$ -
	Germany	Frozen	0.02	$ 0.18	0.03	$ 0.23	0.03	$ 0.26	0.01	$ 0.19	0.01	$ 0.18
		Fresh	0	$ 0.03	-	$ -	-	$ -	-	$ -	0	$ 0.03
	Netherlands	Frozen	0.01	$ 0.11	0.02	$ 0.25	0.01	$ 0.08	0.05	$ 0.48	0.04	$ 0.31
		Fresh	0.07	$ 0.66	0.03	$ 0.26	-	$ -	0.02	$ 0.03	-	$ -
	Other	Frozen	0.66	$ 4.78	1.15	$ 9.07	0.87	$ 8.67	0.85	$ 11.54	0.22	$ 3.47
		Fresh	0.11	$ 1.11	0.26	$ 1.56	0.15	$ 1.25	0.08	$ 0.87	0.06	$ 0.52

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Table E.2: Continued

			2010		2011		2012		2013		2014	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Cod NSPF	Japan	Frozen	9.93	$ 33.22	12.46	$ 41.9	14.62	$ 50.43	10.75	$ 33.94	8.14	$ 23.71
		Fillet Frozen	1.84	$ 6.86	3.91	$ 16.07	0.47	$ 1.43	0.06	$ 0.18	0.02	$ 0.11
		Fresh	1.53	$ 4.68	0.97	$ 2.75	0.17	$ 0.53	0.16	$ 0.55	-	$ -
		Salted | Dried	0.05	$ 0.14	-	$ -	0.01	$ 0.02	0.13	$ 0.32	-	$ -
		Minced Frozen	0.65	$ 2.55	0.02	$ 0.05	0.06	$ 0.13	0.02	$ 0.05	0.07	$ 0.1
	China	Frozen	14.37	$ 38.27	30.28	$ 97.06	40.37	$ 125.39	46.77	$ 136.19	36.86	$ 100.63
		Fillet Frozen	1.52	$ 4.69	1.52	$ 5.79	4.24	$ 13.2	0.98	$ 3.87	0.66	$ 2.76
		Fresh	9.02	$ 25.03	10.65	$ 30.89	4.71	$ 14.15	0.19	$ 0.53	-	$ -
		Salted | Dried	0.12	$ 0.26	0.53	$ 1.49	1.57	$ 4.03	2.52	$ 6.03	1.23	$ 3.09
		Minced Frozen	0.46	$ 0.83	0.06	$ 0.14	0.1	$ 0.18	0.02	$ 0.06	-	$ -
	South Korea	Frozen	2.63	$ 7.95	4.35	$ 13.1	4.61	$ 13.7	7.69	$ 21.38	2.94	$ 6.65
		Fillet Frozen	0.95	$ 3.01	1.19	$ 3.29	0.05	$ 0.11	-	$ -	-	$ -
		Fresh	3.57	$ 10.45	1.41	$ 4.12	0.85	$ 2.46	-	$ -	0.02	$ 0.07
		Salted | Dried	-	$ -	-	$ -	0.94	$ 2.73	0.28	$ 0.68	0.02	$ 0.04
		Minced Frozen	0.09	$ 0.15	0.18	$ 0.34	0.04	$ 0.07	-	$ -	-	$ -
	Germany	Frozen	2.88	$ 9.75	3.55	$ 12.73	3.04	$ 11.01	2.85	$ 9.04	2.27	$ 8.08
		Fillet Frozen	0.44	$ 1.61	0.14	$ 0.54	0.05	$ 0.18	0.03	$ 0.07	-	$ -

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Table E.2: Continued

			2010		2011		2012		2013		2014	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Cod NSPF	Nether-lands	Frozen	7.62	$ 23.67	7.43	$ 25.72	6.15	$ 19.93	5.01	$ 16.15	2.69	$ 9.42
		Fillet Frozen	0.17	$ 0.54	0.02	$ 0.06	0.1	$ 0.37	0.22	$ 0.81	0.11	$ 0.4
		Fresh	0.14	$ 0.33	0.21	$ 0.37	0.02	$ 0.04	-	$ -	-	$ -
		Minced Frozen	0	$ 0	-	$ -	-	$ -	-	$ -	-	$ -
	Other	Frozen	18.94	$ 62.95	20.6	$ 77.26	18.73	$ 66.2	16.49	$ 51.74	6.46	$ 21.49
		Fillet Frozen	3.2	$ 12.48	2.95	$ 15.08	4.84	$ 20.9	1.23	$ 6.86	0.53	$ 2.83
		Fresh	1.31	$ 3.45	0.22	$ 0.52	0.08	$ 0.31	0.23	$ 0.79	0.17	$ 0.55
		Salted | Dried	0.18	$ 0.56	0.18	$ 0.34	0.39	$ 1.17	0.51	$ 1.45	1.37	$ 3.42
		Minced Frozen	0	$ 0.01	0.08	$ 0.17	-	$ -	0.04	$ 0.11	-	$ -
Yellowfin Sole	Japan	Frozen	0.93	$ 0.96	-	$ -	0.32	$ 0.4	0.03	$ 0.04	-	$ -
	China	Frozen	38.06	$ 40.38	23.27	$ 25.78	33.82	$ 45.26	62.54	$ 88.88	39.12	$ 54
	South Korea	Frozen	1.93	$ 1.94	10.18	$ 12.47	10.58	$ 13.09	9.38	$ 12.77	5.24	$ 6.57
	Germany	Frozen	0.01	$ 0.01	-	$ -	-	$ -	-	$ -	-	$ -
	Other	Frozen	0.2	$ 0.3	0.1	$ 0.13	0.53	$ 0.81	-	$ -	-	$ -
Flatfish NSPF	Japan	Frozen	8.24	$ 13.51	6.2	$ 9.95	2.44	$ 3.92	3.95	$ 7.54	3.92	$ 7.14
		Fillet Frozen	-	$ -	-	$ -	0.01	$ 0.03	0	$ 0.01	0	$ 0
		Fresh	3.15	$ 5.34	0.94	$ 1.46	0.36	$ 0.58	-	$ -	0	$ 0
		Fillet Fresh	-	$ -	-	$ -	0	$ 0.01	-	$ -	-	$ -
	China	Frozen	29.16	$ 44.87	22.29	$ 35.37	16.47	$ 28.1	34.56	$ 57.74	23.21	$ 37.46
		Fillet Frozen	-	$ -	-	$ -	0.03	$ 0.12	0.21	$ 0.85	0.03	$ 0.13
		Fresh	10.48	$ 16.58	6.06	$ 10.03	4.07	$ 6.38	-	$ -	-	$ -

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Table E.2: Continued

			2010		2011		2012		2013		2014	
		Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Flatfish NSPF	South Korea	Frozen	3.09	$ 5.23	3.22	$ 4.58	4.03	$ 5.85	1.48	$ 2.35	0.54	$ 0.79
		Fillet Frozen	-	$ -	-	$ -	0.06	$ 0.24	0.26	$ 0.97	0.09	$ 0.29
		Fresh	0.08	$ 0.15	0.02	$ 0.11	0.22	$ 0.34	0.01	$ 0.08	0.02	$ 0.05
	Nether-lands	Frozen	0.07	$ 0.13	-	$ -	-	$ -	0	$ 0.01	-	$ -
	Other	Frozen	2.25	$ 2.76	6.37	$ 7.72	0.76	$ 0.97	0.75	$ 1.24	0.41	$ 0.86
		Fillet Frozen	-	$ -	-	$ -	0.02	$ 0.15	0.03	$ 0.13	0	$ 0.02
		Fresh	0.05	$ 0.12	0	$ 0.03	0.03	$ 0.09	0.09	$ 0.24	0.02	$ 0.1
		Fillet Fresh	-	$ -	-	$ -	0.17	$ 1.39	0.15	$ 1.25	0.06	$ 0.47
Pac. Ocean Perch	Japan	Frozen	3.63	$ 4.55	1.55	$ 2.17	3.23	$ 7.91	9.33	$ 33.63	1	$ 3.27
	China	Frozen	4.26	$ 7.1	8.08	$ 15.76	8.14	$ 24.55	8.98	$ 27.64	4.67	$ 15.05
	South Korea	Frozen	0.46	$ 0.73	0.74	$ 1.21	1.41	$ 4.06	1.4	$ 4.44	0.34	$ 0.89
	Other	Frozen	0.06	$ 0.19	0.26	$ 0.6	-	$ -	0.1	$ 0.17	0.03	$ 0.07
Atka Mackerel	Japan	Frozen	15.31	$ 20.77	12.18	$ 16.63	11.45	$ 24.7	7.79	$ 21.69	3.99	$ 11.1
	China	Frozen	7.84	$ 10.57	6.83	$ 9.26	5.86	$ 11.2	2.5	$ 6.95	1.4	$ 3.88
	South Korea	Frozen	2.19	$ 2.95	2.68	$ 3.78	2.42	$ 3.92	2.24	$ 5.83	0.59	$ 1.64
	Other	Frozen	-	$ -	-	$ -	0.29	$ 0.5	0.15	$ 0.2	-	$ -

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, 2009 - 2014.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2009	6900	8300	8400	7600	6600	11900	19400	16600	10600	6100	4600	2800	9200
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	8400	10500	10600	9900	8600	14600	22500	-	-	-	-	-	-

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 2014 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. We hope to have the report completed by September 2015.

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 2014 the most recent available official prices were from 2012). 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 2015 - 2018. Resampling methods are used estimate a prediction 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*. The methods will be published in a forthcoming NOAA Technical Memorandum.

Economic Indices for the North Pacific Groundfish Fisheries: Calculation and Visualization.

Benjamin Fissel*

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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 AFAâĂŘpermitted 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 towâĂŘlevel 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 (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 (2014). This process led to population-level estimates being generated and compiled into a report (Lew et al. 2014). Additional analyses are planned. For example, a regional economic model will be developed using IMPLAN data and the employment, cost, and earnings data from the survey. The model will be used to examine the contribution or impacts of the charter boat sector on the regional economy.

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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 (see r 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. During 2014, models were developed to analyze the data and preliminary estimates of willingness to pay were generated.

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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 preliminary 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. These results are being incorporated into a paper for submission to a peer-reviewed scientific journal.

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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 (2014), 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. The paper reporting these results is currently being revised for submission to a peer-reviewed journal.

In related work, we more closely examine spatial distribution of individual willingness to pay values using tools from geographical analysis (Johnston et al. 2014). 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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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

Economic Base Analysis of the Alaska Seafood Industry with Linkages to International Markets: Application to the Alaska Head and Gut Fleet

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The Alaska Head and Gut (H&G) fleet was rationalized recently. An economic assessment of rationalization of this fleet should consider the effects of global market conditions on benefits and costs since it relies on global markets as a primary source of revenue. This research seeks to quantify the economic contribution of this fleet. In 2006, an industry group commissioned a study that used input-output (IO) analysis to estimate the economic contribution of the H&G sector to a particular port (Dutch Harbor) and to the state of the Alaska. However, for the Alaska seafood industry, Seung and Waters (2005) recommend the use of a regional social-accounting-matrix (SAM) model over IO analysis. These models can be used to quantify the contribution of an industry to the regional economic base, or to evaluate impacts of year-to-year changes in prices and quantities (e.g., TACs) on regional employment and income. Regional economic models do not usually explicitly distinguish between domestic and foreign markets that are outside the regional economic zone. But that distinction can be important for analyzing the regional impacts of price changes that are driven by global market conditions.

Seung and Waters (2005) developed a regional SAM model to estimate the total contribution of commercial fishing to the economic base of Alaska. In addition to the regional economy, that model contained a single 'rest of world' (ROW) region and did not explicitly distinguish between US domestic and foreign markets. The model and methodology developed here were extended and refined for application to the Alaska H&G sector in two ways. First, it utilized an existing source of economic data for this sector, the Amendment 80 Non-AFA Trawl Gear Catcher Processor Economic Data Report (AM80 EDR) for 2009. Second, demand from the single ROW region in the Alaska regional SAM was disaggregated based on export values and quantities compiled from NMFS trade statistics (i.e., US Merchandise Trade Statistics) for select species and market categories.

This project was completed. Drs. Seung and Waters developed a multi-regional social accounting matrix (MRSAM) model and conducted simulations using the MRSAM to analyze the H&G sector's contribution to the Alaska and West Coast regional economies and to estimate effects of selected demand-side and supply-side shocks to the H&G industry. Results from the simulations were documented in the final project report, and published in *Marine Policy* (Waters et al. 2014)

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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, RosÃl'n 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). Since response rates from simple mailout surveys are likely to be very low, we will work with the community development quota (CDQ) groups, tribes, tribal councils and other groups in the region to help deliver and explain survey instruments to those selected by the sampling protocol and to facilitate data collection and follow up. 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.

The UPS sampling plan for this data collection has been recently developed based on Seung (2010). Jean Lee generated information on ex-vessel revenues for year 2012 of all vessels landing fish in Southwest region. A preliminary UPS sampling was conducted using the 2012 data. When 2013 ex-vessel revenue data are available, the UPS sampling for the 2013 data will be conducted. We hired three contractors who will conduct the informal interviews of processors and local businesses (Stage 1 above), and submit the federal register notice. The contactors developed a draft survey and interview worksheets which are now under revision. Once the revision is completed, we will pretest the survey instrument and the final version of the survey instrument will be prepared. Next, we will prepare and submit the Paperwork Reduction Act documents. 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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Assessing Changes in Geographic Concentration of Fishing Activities

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Fishing activities change due to regulatory, environmental, and economic factors. The changes in fishing activities may lead to changes in location of landings of different species, and have implications for the economies of the communities that receive the fish for processing and provide inputs to fishing activities. There are several indices that measure the geographical concentration/distribution of economic activities, including the location quotient (LQ), Gini index, Herfindahl–Hirschman (HH) index, and Ellison-Glaeser (EG) index. This project will use these indices and investigate how and why the geographic distribution and concentration of fish landings have changed over time for North Pacific fisheries. The changes in geographical concentration of fish landings will be measured using data on landings in weight and ex-vessel revenue. The results will show how regulatory and environmental changes have altered the geographic distribution of fish landing and processing, and provide some policy implications for how the seafood-dependent ports or communities will be impacted by these changes. Seung is currently refining the scope of the research, investigating data requirement and availability, and examining the econometric models for analysis.

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 revenuesannually. However, the analysis supporting management plans focuses on describing theflow of these monies through each fishery (e.g., NOAA AFSC 2013), rather than acrossthe individual cities and states in which harvesters live and spend their fishing returns. Inthe last two decades North Pacific fisheries have undergone a series of managementchanges aimed at ensuring healthy and sustainable profits for those participating inharvesting and processing, and healthy fish stocks. The formation of effec-tivecooperatives and rationalization programs that have been designed by harvesters andprocessors support an economically successful industry. However, a variety ofnarratives have emerged about the distributional effects of these management changes,and in particular their effects on the participation of people in coastal communities in theNorth Pacific.

Previous work has adopted a variety of perspectives to establish the effects of a changingfishing industry in the North Pacific. Carothers (2008) focuses on individualcommunities in the Aleutian islands and argues that shifts in the processing industry,away from small canneries in strongly place-identified communities, are exacerbatedby rationalization that monetizes historical fishing access and draws fishing activity outof small communities when fishermen fall under duress. Carothers et al. (2010) adopts astate-wide perspective on a single fishery, and finds that small fishing communities as acategory were more likely to divest of halibut IFQ in the years immediately following thecreation of the program. Sethi et al. (2014) propose a suite of rapid assessmentcommunity-level indicators that integrate across fisheries, and identify that Alaskancommunities are affected by trends of reduced fishery participation and dependence,characterized by fewer fishermen who participate in fewer fisheries and growth in othersectors of the economy during 1980-2010. However, they also observe that this effect isprimarily distributional, as total fishing revenues within communities are stable andincreasing.

This study contributes by providing a regional overview of the benefits from NorthPacific fishing, looking beyond the changes in any particular community or any particularfishery. It seeks to describe the regions to which revenues from North Pacific fisheriesare accruing, whether that distribution has changed significantly over the last decade, andhow any changes might be caused or affected by management. This is important becausemanagers or stakeholders may have preferences over the distribution of benefits withintheir jurisdiction, and while the movement of fishing activity out of communities isfrequently the focus of academic and policy research, research focusing on singlecommunities often does not follow where those benefits go. Of particular interest iswhether movement of North Pacific fishery revenues is dominated by movement withincoastal Alaska, or primarily shifts away from coastal communities to other regionsoutside of Alaska.

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Gulf of Alaska Trawl Fishery Social Survey: Preliminary Results

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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.

Data were collected using a multiple methods approach in order to obtain the highest response rates possible and to make the survey available to a wide variety of respondent types. Fieldwork was completed in Kodiak, Sand Point, King Cove, Seattle, and Petersburg to administer as many of the surveys in person as possible. The survey was conducted 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. We presented preliminary results of the 2014 survey at the October North Pacific Fishery Management Council (NPFMC) meeting. The full preliminary analysis report can be found on the ***NPFMC's October 2014 agenda***, item C-7.

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 completed a 5-Year Review of the Bering Sea and Aleutian Islands Crab Rationalization program. The review highlighted a suite of unintended social issues that have emerged in the fishery as a result of the management program. The central issues perceived by the Council were the impact of high quota share lease rates on crew pay, difficulty for skippers and crew to purchase quota shares, and concerns about absentee quota ownership. The Council initiated discussion and analyses on these issues; however, they decided instead to encourage the crab fleet to address the issues through voluntary measures. The crab cooperatives developed measures to address the Council's concerns, which were put in place in 2013. The measures include the Right of First Offer program that gives skippers and crew an initial opportunity to purchase quota shares and a voluntary lease rate cap for two of the crab fisheries.

The Alaska Fisheries Science Center developed a study to gather perspectives on the voluntary cooperative measures. Semi-structured interviews were conducted with participants in the fishery, including quota share holders, vessel owners, skippers, crew, cooperative representatives, Community Development Quota groups, and expert respondents involved in the financial and brokerage aspects of the fishery. Interview respondents were asked to speak to six main topic areas:

1) Access to purchasing quota shares
2) Experience with the Right of First Offer program
3) Perspectives on quota share lease rate caps
4) Crew compensation in the crab fisheries
5) Access to financing for quota share purchases
6) The future of the crab fisheries

Ownership records and contact information from the 2012-2013 season were requested through the Alaska Fisheries Information Network. Contact information was obtained for hired skippers and crew license holders from the crab fisheries' yearly Economic Data Report (EDR). The Commercial Fishery Entry Commission (CFEC) issues gear operator permits and the Alaska Department of Fish and Game (ADF&G) issues crew licenses, either of which are required to crew aboard a vessel. Vessel owners report the CFEC and ADF&G operator and license data through their annual EDRs and contact information for vessel owners, and quota share holders was sourced from the NMFS Alaska Regional Office (AKRO).

Participants were contacted via phone, mail, and/or email. Between February 2014 and September 2014 a total of 220 industry participants were interviewed. This included 43% of all quota share holders, 71% of vessel owners, 47% of skippers, and 13% of crewmembers in the fleet. The interviews will be coded using inductive coding methodology and an analysis of code frequency will be completed to determine perspectives on these issues by respondent type. A preliminary report is expected to be released in spring 2015.

Updating the North Pacific Fishing Community Profiles

Amber Himes-Cornell

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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. To meet this requirement, over the past year and a half, social scientists in AFSC's Economic and Social Sciences Research Program have been working on revisions to the *Community Profiles for North Pacific Fisheries – Alaska.* The updated profiles provide significant detail on 195 fishing communities in Alaska with information on social, economic and fisheries characteristics. These profiles serve as a consolidated source of baseline information for assessing community impacts in Alaska.

The community profiles include, but are not limited to, information on demographics, annual population fluctuation, fisheries-related infrastructure, community finances, natural resources, educational opportunities, fisheries revenue, shore-based processing plant narratives, landings and permits by species, and subsistence and recreational fishing participation. The profiles also include information collected from communities in the Alaska Community Survey, a questionnaire designed to collect information from communities about their specific infrastructure available, revenue sources, their needs and concerns related to their dependence on fishing, and other characteristics not available in other databases. In addition to individual community profiles, 11 regional profiles were compiled and written using data aggregated at the regional level.

ESSRP staff also worked with AFSC GIS specialists to develop an interactive website where the user can view high level commercial, recreational and subsistence data through a web mapping tool. The user is also able to download each community's provide and non-confidential data associated with it. The final versions of the regional profiles and community profiles, and access to the interactive webmaps, are available on the AFSC website: http://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 analysis (PCA), 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 is to compare the qualitative fieldwork data to the quantitative indices. As a first step, a rapid assessment will be done in fall 2014. For each quantitative component, a ranking of "high", "medium", or "low" will be given according to the score created from the PCA. Members of the research team then will provide subjective rankings for each component based on ethnographic data, and the two ranking schemes will be tested for inter-rater agreement. Cohen's Kappa will be used to test for perfect matches of rankings, which is the more conservative of two tests. The second test, Spearman's rho, will provide a coefficient of "agreement", and will not omit instances where there was not a perfect match. Together, these tests will provide a well-rounded picture of agreement between the qualitative and quantitative sets of ranks, and thus a general assessment of construct overlap. Reports documenting this phase of the project will be released in 2015.

Groundtruthing the results 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.

References

Colburn, L.L. and M. Jepson. 2012. "Social Indicators of Gentrification Pressure in Fishing Communities: A Context for Social Impact Assessment." *Coastal Management* 40:289-300.

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.

Using Indicators to Assess the Vulnerability and Resiliency of Alaskan Communities to Climate Change

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Communities in Alaska are experiencing impacts of 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.

We develop a framework of indicators to assess three basic forms of community vulnerability to climate change: exposure to the bio-physical effects of climate change, dependence on resources that will be affected by climate change, and a community's adaptive capacity to offset negative impacts of climate change. We conduct a principal components analysis on each of the three forms of vulnerability, and then combine all three forms of vulnerability together to determine each community's overall vulnerability to climate change. The principal components analysis, which is a variable reduction strategy, allows us to separate the most important factors determining the vulnerability of each community to each type of risk factor in a robust and consistent statistical framework. For the 392 communities in Alaska with data, the 105 variables included in the principal components analysis break down into 21 different principal components which explain a total of 78.4% of the variation across all variables. The components with the most explanatory power include poverty and demographics, subsistence halibut and commercial participation, latitude of catch, sportfishing, and employment diversification.

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.

A manuscript summarizing this research has been published in *Fisheries Research* (Himes-Cornell and Kasperski 2015).

References

Himes-Cornell, A., and S. Kasperski. 2015. "Assessing climate change vulnerability in Alaska's fishing communities." *Fisheries Research* 162: 1-11.

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 is forthcoming in *Marine Policy.*

Reference:

Call, I., and D.K. Lew. 2014. "Tradable permit programs: What are the lessons for the new Alaska Halibut Catch Sharing Plan?" Forthcoming in *Marine Policy.*

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. 2014).

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 has developed a survey that will collect 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). The survey is currently being reviewed by OMB under the Paperwork Reduction Act. Assuming a timely approval, it will be implemented in early 2015.

References:

Kroetz, K., J.N. Sanchirico, and D.K. Lew (2014). "Efficiency Costs of Social Objectives in Tradable Permit Programs." Working paper.

U.S. Catch Share Markets: A Review of Characteristics and Data Availability

Daniel Holland, Eric Thunberg, Juan Agar, Scott Crosson, Chad Demarest, Stephen Kasperski*, Larry Perruso, Erin Steiner, Jessica Stephen, Andy Strelcheck, and Mike Travis

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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.

References:

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), 2013-2014

2014

Abbott, J., **A. Haynie,** and M. Reimer. 2014. "Hidden Flexibility: Institutions, Incentives and the Margins of Selectivity in Fishing." In press at *Land Economics*.

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.

Call, I., and **D. Lew.** 2014. "Tradable Permit Programs: What are the Lessons for the New Alaska Halibut Catch Sharing Plan?" Forthcoming in *Marine Policy.*

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.

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.

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". *NOAA Technical Memorandum* NMFS-F/SPO-145, 67 p. U.S. Department of Commerce.

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**. 2014. "Characterizing Large Scale Spatial Pattern in Nonuse Willingness to Pay: An Application to Threatened and Endangered Marine Species." Forthcoming in *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. 2014. "Optimal Multi-species Harvesting in Ecologically and Economically Interdependent Fisheries". In press at *Environmental and Resource Economics.*

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.

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., **A. Himes-Cornell**, and **J. Lee**. 2014. "Weighting and Data Imputation for Missing Data in Fisheries Economic and Social Survey." Forthcoming in *Marine Resource Economics.*

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. 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.

Pienaar, E., **D. Lew**, and K. Wallmo. 2014. "The Importance of Survey Content: Testing for the Context Dependency of the New Ecological Paradigm Scale." In press at *Social Science Research.*

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.

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.

Submitted in FY14

Dalton, M., D. Squires, J. Terry, and D. Tomberlin. 2014. "Economic considerations in the implementation of National Standard 1." Under review as a NOAA Tech Memo.

This paper describes economic concepts and analyses related to the implementation of National Standard 1 (NS1) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and assesses the state of economic modeling and data in relation to the requirements of NS1. The discussion focuses on: (1) optimum yield (OY); (2) optimum sustainable catch (OSC), a long-run, steady-state equilibrium concept that complements maximum sustainable yield (MSY); (3) the importance of the dynamic optimization concept of optimum catch trajectory (OCT) for fisheries in which long-run, steady-state equilibrium concepts are not realistic; and (4) the implications for OY, MSY, OSC, and OCT of factors such as uncertainty, technological change, and multi-stock considerations in fisheries management. OSC and OCT are the long-run equilibrium catch that would provide the greatest overall net benefit to the Nation and the catch trajectory that would provide the greatest discounted present value of the overall net benefit to the Nation, while preventing overfishing, protecting the marine environment, and rebuilding overfished fisheries, respectively. The term OSC is used instead of the more commonly used term maximum economic yield (MEY) because the latter term has often referred to the sustainable catch level that maximizes only harvesting sector profit. For the same reason and also to maintain the critical distinction between the long-run equilibrium and the dynamic optimization concepts, the term OCT is used instead of dynamic MEY. OSC and OCT can be useful approximations of the equilibrium and dynamic concepts of OY and important benchmarks for management success, because they provide direct approaches to assessing management performance in relation to the MSA goal to "provide the greatest overall benefit to the Nation." Although OSC and OCT cannot in practice capture the full range of factors that determine the overall net benefit to the Nation from a fishery, they can capture many of these factors that MSY and MSY-based measures are not designed to address. In addition to exploring issues in the estimation of OCS and OCT, we describe economic data and research needs relevant to both concepts and NS1 more generally. This paper emphasizes the need to go beyond the use of single species long-run equilibrium biological concepts and models to effectively manage dynamic fisheries in which there are significant ecological and technical interactions among stocks. These interactions result in tradeoffs that cannot be assessed fully without economic analyses that can go well beyond measuring tradeoffs simply in terms of differences in catch weight or stock conditions. The paper is intended to be useful to a broad audience as NOAA Fisheries reviews and revises the NS1 Guidelines and considers amendments to the MSA.

Dalton, M. and J. Lee. 2014. "Alaska fisheries and global trade: King crab, sockeye salmon, and walleye pollock." Under review at *Marine Fisheries Review*.

Wholesale revenues for seafood products from Alaska king crab (*Paralithodes camtschaticus*), sockeye salmon (*Oncorhynchus nerka*), and walleye pollock (*Gadus chalcogrammus*) fisheries in Alaska were greater than $2 billion dollars in 2012, and more than half of this amount came from exports. Globally, Alaska king crab competes with Russian king crab, and market prices are highly variable. Alaska pollock producers also compete with Russia, though prices are less variable than king crab. The U.S imports large amounts of farmed Atlantic salmon (*Salmo salar*) from Canada. In exchange, Canada was the top export destination for Alaska sockeye salmon in 2012, and number two (after Japan) for Alaska king crab. Wholesale prices for Alaska sockeye salmon closely tracked imports of farmed Atlantic salmon until 2008, and then increased relative to imports. Based on an increasing share of exports in production, only Alaska pollock exhibited a clear trend towards greater globalization.

Himes-Cornell, A. and K. Hoelting. 2014.“Resilience strategies in the face of short and long term change: Outmigration and fisheries regulation in Alaska fishing communities.” Under review at *Ecology and Society.*

Historically, communities persisted in remote, isolated areas of Alaska in large part due to the abundance of marine and terrestrial resources, and 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 Alaska 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. Here, resilience theory is used to explore drivers of change affecting Alaska fishing communities. Emphasis is placed on two primary change drivers – the regulatory environment and rural out-migration – their interconnections, and their impacts on ndividuals, communities, and the larger social-ecological system. We summarize several government programs that have been implemented to support the continued participation of communities in Alaska fisheries. In addition, we review informal and private sector efforts to generate new 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 global market and climate changes.

Kasperski, S. 2014. “Optimal Multispecies Harvesting in the Presence of a Nuisance Species.” Under review at *Marine Policy*.

Current knowledge of the complex relationships within ecological and economic systems make operationalizing ecosystem approaches within fisheries management difficult. As these approaches are developed, it is important to include non-target species that affect the productivity (as prey) and availability (as predators) of targeted species. This study develops a multispecies bioeconomic model that incorporates ecological and economic interactions to determine the optimal harvest of each species in the presence of a “nuisance” species, which 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.

The populations of walleye pollock, Pacific cod, and arrowtooth flounder (a nuisance species) in the Bering Sea/Aleutian Islands region of Alaska are used as a case study. Vessel-and gear-specific profit functions with multi-output production technologies are used, along with estimated multispecies stock dynamics equations, to determine the optimal multispecies quotas and subsidy on the harvest of the nuisance species to maximize the value of this fishery. Ignoring the nuisance species results in a substantially less productive and lower value fishery than optimal joint management. This study highlights the importance of incorporating the impact of non-targeted species in ecosystem-based fisheries management.

Kroetz, K., J. Sanchirico, and **D. Lew**. 2014. “Efficiency Costs of Social Objectives in Tradable Permit Programs.” Under revision at the *Journal of the Association of Environmental and Resource Economists*.

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.

Melnikov, N., B.C. O'Neill, **M. Dalton**, and B.J. van Ruijven. 2014. "Modeling heterogeneous household outcomes in dynamic CGE models for energy-economic analysis." Under review at *Energy Economics.*

A hierarchy of micro-simulation methods for dynamic CGE models is developed and analyzed. The methods produce outcomes for a variety of different household types by downscaling the aggregate quantities from an economic growth model with a representative household. This approach combines general equilibrium effects with detailed household survey data and long-term population projections for different household types. The performance of the proposed methods is compared vs. a general equilibrium model with heterogeneous household groups under a variety of conditions, including demographic change, technological change, and a carbon tax. All three downscaling methods produce results that approximate a multiple household model run. The method that is based on forward-looking dynamic optimization leads to results that are most in line with a multiple household model than the ones of recursive dynamics.

Rose, K., **A. Haynie**, et al. 2014. "Demonstration of a Fully-Coupled End-to-End Model for Small Pelagic Fish Using Sardine and Anchovy in the California Current." Under review at *Progress in Oceanography.*

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. 2014. "Economic Impacts of Changes in an Alaska Crab Fishery from Ocean Acidification." Under review at *Ecological 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. and J. Ianelli. 2014. "Assessing Economic Impacts of Climate Change for Eastern Bering Sea Walleye Pollock Fishery" Under review at *Environmental and Resource Economics.*

Studies aimed at evaluating potential impacts of climate change on ecosystems often stop short of considering economic consequences. Fisheries depend heavily on ecosystem conditions and changes can have cascading ecological and economic effects. The present study couples a stochastic stock-yield projection model for eastern Bering Sea (EBS) walleye pollock with a regional dynamic computable general equilibrium (CGE) model to calculate the temporal and cumulative impacts of the climate change-induced changes in pollock yields on the Alaska economy. Results indicate that (i) increases in pollock price partially offset the effects of reduction in pollock harvest, and (ii) the economic and welfare effects of decreased pollock catches depend not only on the magnitude of the harvest changes (i.e., supply) from climate change but also on fuel costs and the world demand for the pollock. Impacts on economic variables are sensitive to the uncertainties associated with the pollock yield projections and as such, are also highly uncertain.

Seung, C. 2014. "Untangling Economic Impacts for Alaska Fisheries: A Structural Path Analysis" Under review at *Marine Resource Economics.*

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 paper uses a structural path analysis (SPA) to illustrate how an initial shock to a fishery sector generates the 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 Southeast region of Alaska.

Szymkowiak, M., and **A. Himes-Cornell**. 2014. "Active participation requirements in the Alaska halibut ITQ program." Under review at *Marine Policy.*

This paper presents an assessment of the impacts of active participation measures in the Alaskan halibut and sablefish individual fishing quota (IFQ) program. These measures include a prohibition on IFQ leasing, limitations on the acquisition of quota shares by non-individual entities (corporations, partnerships, etc.), and restrictions on the use of hired skippers. The goals of these measures were to limit the entrance of investment speculators and to provide for an ultimate transition to wholly individual-owned and owner-operated fleets. In an effort to maintain a historically owner-operated fleet and to facilitate entry into the fisheries, in area 2C and the Southeast Outside regulatory area of the halibut and sablefish fisheries, respectively (herein referred to together as the Southeast regulatory areas), the use of hired skippers was limited to non-individual entities and quota share acquisition was limited to individuals. This paper examines the impacts of both the program-wide and the Southeast-specific measures. With regards to the program-wide measures, despite the migration of quota shares from non-individual entities to individuals, the transition to wholly owner-operated fleets has been slowed by the consolidation of quota shares by individual initial recipients, who are increasingly using hired skippers. With regards to the Southeast-specific provisions, the use of hired skippers is significantly lower than in the other areas; however, entry into the fisheries for second-generation quota shareholders is on par with other regulatory areas. The experience with the active participation measures in the IFQ program demonstrates the need for management to be amendable in order to address potential loopholes in regulations. Furthermore, these regulations would be more effective if they addressed the underlying economic incentives for inactive fishermen to retain their shares and hire skippers to fish their IFQ rather than to sell their quota.

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." Under review as a NOAA Tech Memo.

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.

2013

Felthoven, R. and S. Kasperski. 2013. "Socioeconomic Indicators for United States Fisheries and Fishing Communities." *PICES Press* 21(2): 20-23.

This article describes NOAA's recent efforts to develop indicators to track economic performance in selected fisheries, and vulnerability and resilience of communities engaged in, or dependent upon, fisheries. We discuss the specific metrics being developed and discuss the tiering system used, which sorts groups of potential metrics based upon varying degrees of information and modeling complexity required to compute them. We also describe NOAA's plans for extending these metrics to a greater number of fisheries.

Fissel, B., B. Gilbert, J. LaRiviere. 2013. "Technology Adoption and Diffusion with Uncertainty in a Commons" *Economics Letters* 120(2): 297-301.

We model adoption and diffusion in a commons under uncertainty about a technology's value. Technological resource stock externalities make technology less valuable with depleted stocks, but transmit information about a new technology's value, causing faster adoption of high-value technologies.

Haynie, A. and L. Pfeiffer. 2013. "Climatic and economic drivers of the Bering Sea pollock (*Theragra chalcogramma*) fishery: Implications for the future." *Canadian Journal of Aquatic and Fisheries Science*. 70(6): 841-853.

This paper illustrates how climate, management, and economic drivers of a fishery interact to affect fishing. Retrospective data from the Bering Sea walleye pollock (*Theragra chalcogramma*) catcher–processer fishery were used to model the impact of climate on spatial and temporal variation in catch and fishing locations and make inferences about harvester behavior in a warmer climate. Models based on Intergovernmental Panel on Climate Change scenarios predict a 40% decrease in sea ice by 2050, resulting in warmer Bering Sea temperatures. We find that differences in the value of catch result in disparate behavior between winter and summer seasons. In winter, warm temperatures and high abundances drive intensive effort early in the season to harvest earlier-maturing roe. In summer, warmer ocean temperatures were associated with lower catch rates and approximately 4% less fishing in the northern fishing grounds, contrary to expectations derived from climate-envelope-type models that suggest fisheries will follow fish poleward. Production-related spatial price differences affected the effort distribution by a similar magnitude. However, warm, low-abundance years have not been historically observed, increasing uncertainty about future fishing conditions. Overall, annual variation in ocean temperatures and economic factors has thus far been more significant than long-term climate change-related shifts in the fishery's distribution of effort.

Jennifer Howard, Eleanora Babij, Roger Griffis, Brian Helmuth, **Amber Himes-Cornell,** Paul Niemier1, Michael Orbach, Laura Petes, Stewart Allen, Guillermo Auad, Russell Beard, Mary Boatman, Nicholas Bond, Timothy Boyer, David Brown, Patricia Clay, Katherine Crane, Scott

Cross, **Michael Dalton**, Jordan Diamond, Robert Diaz, Quay Dortch, Emmett Duffy, Deborah Fauquier, William Fisher, Michael Graham, Benjamin Halpern, Lara Hansen, Bryan Hayum, Samuel Herrick, Anne Hollowed, David Hutchins, Elizabeth Jewett, Di Jin, Nancy Knowlton, Dawn Kotowicz, Trond Kristiansen, **Peter Little**, Cary Lopez, Philip Loring, Rick Lumpkin, Amber Mace, Kathryn Mengerink, J. Ru Morrison, Jason Murray, Karma Norman, James O'donnell, James Overland, Rost Parsons, Neal Pettigrew, **Lisa Pfeiffer**, Emily Pidgeon, Mark Plummer, Jeffrey Polovina, Josie Quintrell, Teressa Rowles, Jeffrey Runge, Michael Rust, Eric Sanford, Uwe Send, Merrill Singer, Cameron Speir, Diane Stanitski, Carol Thornber, Cara Wilson, and Yan Xue. 2013. Oceans and Marine Resources in a Changing Climate. *Oceanography and Marine Biology: An Annual Review,* 51: 71-192.

The United States is an ocean nation—our past, present, and future are inextricably connected to and dependent on oceans and marine resources. Marine ecosystems provide many important services, including jobs, food, transportation routes, recreational opportunities, health benefits, climate regulation, and cultural heritage that affect people, communities, and economies across the United States and internationally every day. There is a wealth of information documenting the strong linkages between the planet's climate and ocean systems, as well as how changes in the climate system can produce changes in the physical, chemical, and biological characteristics of ocean ecosystems on a variety of spatial and temporal scales. There is relatively little information on how these climate-driven changes in ocean ecosystems may have an impact on ocean services and uses, although it is predicted that ocean- dependent users, communities, and economies will likely become increasingly vulnerable in a changing climate. Based on our current understanding and future projections of the planet's ocean systems, it is likely that marine ecosystems will continue to be affected by anthropogenic- driven climate change into the future. This review describes how these impacts are set in motion through a suite of changes in ocean physical, chemical, and biological components and processes in U.S. waters and the significant implications of these changes for ocean users and the communities and economies that depend on healthy oceans. U.S. international partnerships, management challenges, opportunities, and knowledge gaps are also discussed. Effectively preparing for and responding to climate- driven changes in the ocean will require both limiting future change through reductions of greenhouse gases and adapting to the changes that we can no longer avoid.

Himes-Cornell, A. and M. Orbach. 2013. Impacts of Climate Change on Human Uses of the Ocean. *In*: Oceans and Marine Resources in a Changing Climate: Technical Input to the 2013 National Climate Assessment, R. Griffis and J. Howard (eds.). Washington, D.C.: Island Press.

The impacts of climate change on oceans include effects on humans and human systems. In addition, climate change is interacting with other anthropogenic impacts such as pollution, habitat destruction, and over-fishing that are currently negatively affecting the marine environment. Each of these factors may adversely interact with the effects of climate change. Although not well-documented across all marine regions of the U.S., substantial socio-economic impacts to marine resource-dependent communities and economies worldwide are very likely to result from climate change. Extensive efforts are underway to understand the socio-economic drivers of and effects from climate change. To date, case studies in which the effects of climate change on ocean services have been documented are few. However, data are available regarding the extent of human uses of marine resources, as well as the biophysical effects of climate change on marine resources upon which those uses depend. Using these data and available case studies, this section provides greater understanding and assesses the likelihood and potential consequences of impacts that may occur given certain climate-related changes in specific marine resources and environments for the following sectors:

commercial, recreational and subsistence fisheries, offshore energy development, tourism, human health, maritime security, transportation and governance.

Kasperski, S. and D. Holland. 2013. "Income Diversification and Risk for Fishermen." *Proceedings of the National Academies of Science* 110(6): 2076-2081.

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 may be mitigated in some cases if individuals participate in several different fisheries, particularly if revenues from those fisheries are uncorrelated or vary asynchronously. We construct indices of gross income diversification from fisheries at the level of individual vessels and find that the income of the current fleet of vessels on the US West Coast and in Alaska is less diverse than at any point in the past 30 years. We also find a dome-shaped relationship between the variability of individuals' income and income diversification which implies that a small amount of diversification does not reduce income risk, but higher levels of diversification can substantially reduce the variability of income from fishing. Moving from a single fishery strategy to a 50-25-25 split in revenues reduces the expected coefficient of variation of gross revenues between 24% and 65% for the vessels included in this study.

Larson, D., and **D**. **Lew**. 2013. "How Do Harvest Rates Affect Angler Trip Patterns?" *Marine Resource Economics* 28(2): 155-173.

Incorporating catch or harvest rate information in repeated-choice recreation fishing demand models is challenging, since multiple sources of information may be available and detail on how harvest rates change within a season is often lacking. This paper develops a theoretically-consistent catch expectations-repeated mixed logit angling demand model that can be used to evaluate the contributions made by different sources of information in predicting observed patterns of fishery participation and trip frequency. In an application to saltwater salmon fishing in Alaska, we find that both of the two available harvest rate information sources contribute to better predictions and should be used. In addition, information on whether a species is being targeted makes a significant improvement to model performance. Model tests indicate that (a) non-targeted species have a significant marginal utility; and (b) it is different from the marginal utility of targeted species. The median value of a fishing choice occasion is approximately $50 per angler, which translates to a season of fishing being valued at approximately $2,500 on average.

Lo, Nancy C.H, **B. Fissel**, 2013, "Sardine and Anchovy Stock Assessment through Egg Production Methods", in press in K. Ganias (Ed.) *Biology and Ecology of Anchovies and Sardines*, CRC Press/Taylor & Francis Group.

Spawning biomass (SB) based on the daily egg production methods (DEPM) is among the early fisheries-independent time series used in the stock assessment, and continues to serve as a benchmark to evaluate other time series. DEPM has been used extensively in the stock assessment of Pacific sardine (*Sardinops sagax*) and northern anchovy (*Engraulis mordax*) to inform the annual U.S. harvest quota. Both species are distributed off the west coast of North America from Baja California, Mexico, to British Columbia, Canada and have been among important commercial species off the west coast of the U.S. This chapter describes the development of DEPM within the context of these species. For northern anchovy, the time series of DEPM SB in 1980-85 was the best time series with low CV, however, this is not true for sardine, partially because sardine is a migratory species while anchovy is not. Even though DEPM has demonstrated to be a very robust method for SB estimation, new equipment and new methodologies are needed to further improve the precision of biomass estimates and understand the biological structure of fish populations.

Pienaar, E., **D. Lew**, and K. Wallmo. 2013. "Are Environmental Attitudes Influenced by Survey Context?" *Social Science Research* 42(6): 1542-1554.

General environmental attitudes are often measured with questions added to surveys about specific environmental or non-environmental issues. Using results from a large-scale national survey on the protection of threatened and endangered marine species, we examine whether the context of the survey in which New Ecological Paradigm (NEP) Scale items are asked influence measured environmental concern. In this application the role that specific threatened or endangered species play in affecting responses to NEP Scale items is explored using a combination of non-parametric and parametric approaches. The results in this case suggest that context does influence stated general environmental attitudes, though the effects of context differ across NEP items.

Sanchirico, J., **D. Lew**, **A. Haynie,** D. Kling and D. Layton. 2013. "Conservation Values in Marine Ecosystem-Based Management." *Marine Policy* 38: 523-530.

Proactive ecosystem-based management represents a turning point in ocean management, because it formally recognizes the need to balance the potentially competing uses of the ocean, including aquaculture, energy production, conservation, fishing, and recreation. A significant challenge in implementing this balancing act arises from explicitly incorporating conservation in a decision-making framework that embraces assessments of trade-offs between benefits from conservation and conventional commercial uses of marine resources. An economic efficiency-based framework for evaluating trade-offs is utilized, and, for illustration, applied to assess the relative benefits and costs of conservation actions for the endangered western stock of the Steller Sea Lion (wSSL) in Alaska, USA. The example highlights many scientific and political challenges of using empirical estimates of the benefits and costs to evaluate conservation actions in the decision process, particularly given the public's large conservation values for the wSSL. The example also highlights the need to engage in stakeholder discussions on how to incorporate conservation into ecosystem-based management, and more specifically, coastal and marine spatial planning(CMSP). Without explicit consideration of these issues, it is unclear whether CMSP will better conserve and utilize ocean resources than the status quo.

Schnier, K. and **R. Felthoven**. 2013. "Production Efficiency and Exit in Rights-Based Fisheries." *Land Economics* 89(3): 538-557.

Economic theory predicts that the least efficient vessels are more likely to exit a fishery following the transition from an open-access fishery to an individual transferable quota (ITQ) management regime. Tools are needed to help analysts predict the likely degree and distribution of consolidation prior to implementing ITQ programs. Previous research analyzing efficiency in ITQ fisheries has either relied upon data before and after the program was implemented and/or used a two-step procedure to model vessel efficiency, wherein the decision to be active following the transition is assumed to be independent from one's prior production practices. This research utilizes a one-stage estimation procedure to determine the degree to which one's technical inefficiency preceding an ITQ regime influences the likelihood of them exiting after the transition, which can be used for ex-ante predictions regarding the changes in composition after a transition to ITQs. Using pre-ITQ data on fishermen participating in the North Pacific crab fisheries, our results indicate that a vessel's measure of technical inefficiency is a significant and positive factor in explaining whether it exits the fishery following the implementation of ITQs.

Seung, C. 2014, "Measuring Spillover Effects of Shocks to Alaska Economy: An Interregional Social Accounting Matrix (IRSAM) Model Approach" *Economic Systems Research* 26 (2): 224-238.

An interregional social accounting matrix (IRSAM) model is used to estimate the spillover effects occurring between economies of two US regions – (i) Alaska, which depends heavily on imports of commodities and factors of production from outside the region, and (ii) the rest of the US (RUS). Multiplier decomposition is used to calculate intra-regional multipliers and spillover effects between the two regions. Results show that a significant percentage (46.3-70.8%) of the total secondary impacts of a shock to Alaskan industries leaks out of Alaska and flows to RUS. An analysis of household multipliers indicates that over 60% of the total secondary effects of an increase in Alaska household income accrues to RUS households. Policymakers are concerned with identifying the magnitude, nature, and geographic distribution of economic impacts from the policies they implement. The IRSAM model provides the framework for a better understanding of the intra-regional and spillover effects of policies.

Seung, C. K., and **D. K. Lew**. 2013. "Accounting for Variation in Exogenous Shocks in Economic Impact Modeling." *The Annals of Regional Science* 51(3):711–30.

This paper estimates confidence intervals for regional economic impacts resulting from recreational fishing restrictions using a regional computable general equilibrium (CGE) model for Alaska and a stated preference model of recreation participation. In doing so, this study investigates the effects of two important sources of variation driving economic impact results: sample variation in recreational fishing-related expenditures and stochastic variation from model parameters in the recreation demand model. Results show that confidence bounds on total economic impacts (i.e., change in the total regional output) calculated while only accounting for the first type of variation (sample variation of expenditure data) are much narrower than the confidence bounds on total economic impacts when we account for both sample and stochastic variation in model inputs. Sensitivity analysis for trade-related elasticities in the CGE model indicates that the confidence intervals are also very sensitive to assumptions of the elasticity values.