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, 2012

by

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January 10, 2014

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/2013/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/documents.php`

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1. INTRODUCTION*

The domestic groundfish fishery off Alaska is an important segment of the U.S. fishing industry. With a total catch of 2.12 million metric tons (t), a retained catch of 2.05 million t, and an ex-vessel value of $1,051 million in 2012, it accounted for 47.4% of the weight and 19.9% of the ex-vessel value of total U.S. domestic landings as reported in Fisheries of the United States, 2011 (FUS 2012 was not yet available at the time of this draft). The value of the 2012 groundfish catch after primary processing was $2,540 million (F.O.B. Alaska).

All but a small part of the commercial groundfish catch off Alaska occurs in the groundfish fisheries managed by the National Marine Fisheries Service (NMFS) under the Fishery Management Plans (FMP) for the Gulf of Alaska (GOA) and the Bering Sea/Aleutian Islands area (BSAI) groundfish fisheries. In 2012, other fisheries accounted for only about 33,000 t of the catch reported above. 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 at best 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.

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

* All revenue and pricing data referenced in this section were calculated using the COAR based pricing method which correspond to the **A** Tables in Section 4

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.

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). A new section on catch share metrics provides a consistent set of metrics to evaluate the North Pacific catch share programs in various dimensions.

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. 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 2003-2012 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.

A variety of external factors influence the economic status of the fisheries. Therefore, links to information concerning the following factors are included in this report (see External Factors, page 11): foreign exchange rates, the prices and price indices of products that compete with products from these fisheries, Producer Price Indices, fishery imports, and estimates of per-capita consumption of fisheries products. This report updates last year's report (Fissel *et al.* 2012) 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.

Following the data tables is a section examining the economic performance in groundfish fisheries off Alaska through economic indices. Changes in value, price, and quantity, across species, product and gear types are represented in aggregate indices, allowing for a concise view of the relative performance across different sectors of the North Pacific fisheries.

Another component of this report is a set of market profiles for pollock, Pacific cod, sablefish, and flatfish (yellowfin and rock sole, and arrowtooth flounder). The goal of these profiles is to discuss and, where possible, explain the market trends observed in pricing, volume, supply, and demand for each of these groundfish species.

Specifically, the market profiles provide information on the relatively recent trends in the prices and product choices for first-wholesale production of a given species, and the volumes and prices of exports, as well as changes in the volume of exports to different trading partners. For example, some groundfish caught off Alaska have a large share of the world market and observed changes may be tied to changes in the Alaskan supply (TAC), while in other cases the Alaskan share for that product may be relatively low and changes in the market could be driven by other countries' actions. Changes in consumer demand or the emergence of substitute products can also drive the market for a product or species. Thus, these reports discuss the way in which the particular species or product fits into the world market and how this fit is changing over time (e.g., the market share for the Alaska product may be growing or declining).

One fact that becomes evident when reading these profiles is that the type of information available for explaining the historical trends in a market varies greatly by species. Generally speaking, the amount of information available for each species is related to its value or market share.

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. OVERVIEW OF FEDERALLY MANAGED FISHERIES OFF ALASKA, 2012*

The commercial groundfish catch off Alaska totaled 2.12 million t in 2012. This amount was up about 2% from the 2011 catch (Fig. 1 and Table 1), and is roughly five times larger than the catch off Alaska of all other commercial species combined (Table 1A). The real ex-vessel value of the catch, including the imputed value of fish caught almost exclusively by catcher/processors decreased from $2,118 million in 2011 to $1,944 million in 2012 (Fig. 4 and Table 16). The gross value of the 2012 catch after primary processing was approximately $2,540 million (F.O.B. Alaska) (Table 25), an increase of 1.1% from 2011. The groundfish fisheries accounted for the largest share (54%) of the ex-vessel value of all commercial fisheries off Alaska in 2012 (Figures 3 and 4; Tables 16 and 17), while the Pacific salmon (*Oncorhynchus spp.*) fishery was second with $441.3 million or 23% of the total Alaska ex-vessel value. The value of the shellfish fishery amounted to $284.2 million or 15% of the total for Alaska and exceeded the value of Pacific halibut (*Hippoglossus stenolepis*) by about $139.4 million.

2.1. Catch Data

During the last 10 years, estimated total catch in the commercial groundfish fisheries off Alaska varied between 1,521 and 2,191 million t (Fig. 1 and Table 1; these estimates include catch from both federal and state fisheries). The rapid displacement of the foreign and joint-venture fisheries by the domestic fishery between 1984 and 1991 can be seen by comparing Figures 1 and 2. By 1991, the domestic fishery accounted for all of the commercial groundfish catch off Alaska.

Walleye (Alaska) pollock (*Theragra chalcogramma*) has been the dominant species in the commercial groundfish catch off Alaska. The 2012 pollock catch of 1,310,400 t accounted for 61.9% of the total groundfish catch of 2,117 million t (Table 1), an increase of about 2.2% from 2011. The 2012 catch of flatfish, which includes yellowfin sole (*Pleuronectes asper*), rock sole (Pleuronectes bilineatus), and arrowtooth flounder (*Atheresthes stomias*), was 321,500 t or 15.2% of the total 2012 groundfish catch, a change of about -1.8% from 2011. The Pacific cod (*Gadus macrocephalus*) catch in 2012 accounted for 329,000 t or 15.5% of the total 2012 groundfish catch, up about 7.9% from a year earlier. Pollock, Pacific cod, and flatfish comprised 92.6% of the total 2012 groundfish catch. Other important species are sablefish (*Anoplopoma fimbria*), rockfish (*Sebastes* and *Sebastolobus spp.*), and Atka mackerel (*Pleurogrammus monopterygius*). The contributions of the major groundfish species or species groups to the total catch in the domestic groundfish fisheries off Alaska are depicted in Figure 2.

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

* All revenue and pricing data referenced in this section were calculated using the COAR based pricing method which correspond to the **A** Tables in Section 4

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.

Over the last five years, the trawl catch averaged about 88.4% of the total catch, while the catch with hook-and-line gear accounted for 9.3%. Most species are harvested predominately with one type of gear, which typically accounts for 90% or more of the catch. The one exception is Pacific cod, of which 35% (106,000 t) was taken by trawls in 2012, 48.5% (147,000 t) by hook-and-line gear, and 16.5% (50,000 t) by pot gear. In each of the years since 2006, catcher vessels took 41.3 - 44.4% of the total groundfish catch and catcher/processors took the remainder. The increase in catcher vessel catch from the years prior to 1999 (not shown in Table 2) is explained in part by the AFA, which among other things increased the share of the BSAI pollock TAC allocated to catcher vessels delivering to shoreside processors. The distribution of catch between catcher vessels and catcher/processor vessels differed substantially by species and area.

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 targeted 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 is 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 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, 84.2% of the 2012 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 where Alaskan vessels accounted for the majority of the Pacific cod catch. 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.

2.2. 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 2008-2012. 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.

For the BSAI and GOA fisheries as a whole the annual discard rate for groundfish was about 3%-6% for the years 2008-2012. The overall discard rate in 2008 represents a two-thirds reduction from the 1997 rate of 14.5% (not shown in Table 6), a result of prohibiting pollock and Pacific cod discards in all BSAI and GOA groundfish fisheries beginning in 1998. Total discards decreased by about 60% from 1997 to 2006 due to the reduction in the discard rate, while the total catch increased by about 6%. Amendment 80, implemented in 2008, also required a large decrease in discards for the BSAI non-pollock catcher processor fleet. The prohibitions on pollock and Pacific cod discards were so effective in decreasing the overall discard rate because the discards of these two species had accounted for 43% of the overall discards in 1997. The benefits and costs of the reduction in discards since 1997 have not been determined. In 2012, the overall discard rates were about 6% and 3%, respectively, for the GOA and the BSAI compared to 16% and 14% in 1997.

Although the fixed gear fisheries accounted for a small part of both total catch or total discards in 1998 and later years, the overall discard rates were substantially higher for fixed gear (10% in 2012) than for trawl gear (3% in 2012). Prior to 1998, the overall discard rates had been similar for these two gear groups. This change occurred because the prohibition on pollock and Pacific cod discards had a much larger effect on trawl discards than on fixed gear discards. In the BSAI, the 2012 discard rates were 6% and 6% for fixed and trawl gear, respectively. In the GOA, however, the corresponding discard rates were 11% and 2%. One explanation for the relatively low discard rates for the BSAI trawl fishery is the dominance of the pollock fishery with very low discard rates. The mortality rates of groundfish that are discarded are thought to differ by gear or species; however, estimates of groundfish discard mortality are not available.

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.

2.3. 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 2008-2012 are summarized by area and gear in Table 11. More detailed estimates of prohibited species catch (PSC) and of PSC rates for 2011 and 2012 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.

There was a very large increase of other king crab PSC in 2007, mostly in the BSAI Pacific cod and sablefish pot fisheries. The "other king crab" category includes blue king crab (*Paralithodes platypus*) and golden king crab (*Lithodes aequispina*). The total other-king-crab PSC in 2007 was about 10 times the average annual PSC for the years 1994-2006; other-king-crab PSC declined in 2008 and then again in 2009, but still remained at roughly three times the long-term average. In recent years (2010-2012) the other king-crab PSC declined to a little more than one and a half times the 1994-2006 average. The increase in blue king crab PSC in 2007 is partly explained by the expansion of effort in the Pacific cod pot fishery northward to NMFS reporting area 524 in the vicinity of St. Matthew Island, where a floating processor was stationed to accept deliveries of Pacific cod (the processor was not present in 2006, 2008 or 2009). The rest of the 2007 increase is likely due to the lack of observer coverage in the sablefish and Pacific cod pot fisheries (pot vessels over 60 feet in length are required to have observer coverage for only 30% of their fishing days), so that a few observed pot lifts with large crab PSC resulted in high calculated PSC rates that were then applied to the rest of the fishery. The decline of other-king-crab PSC in 2008 is explained in part by the reduction of effort in area 524 (no Pacific cod pot harvest occurred in area 524 in 2008, and only about 540 t occurred in 2009, compared to over 2,000 t in 2007), but also possibly due to a change in fishing patterns after managers informed the industry that high PSC was occurring in certain areas. The total number of observed pot vessels in area 524 in 2008 and 2009 combined was 90% fewer than the number observed in 2007 alone.

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).

2.4. 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. 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.

The ex-vessel value of the domestic landings in the FMP fisheries, excluding the value added by at-sea processing, decreased from $979.8 million in 2008 to $688.9 million in 2009, decreased further to $661.2 million in 2010, then increased to $992.5 million in 2011, and increased again to $1050.7 million in 2012. The substantial decrease in 2010 results mostly from significant decreases in ex-vessel prices, particularly for Pacific cod, due in part to the economic recession that deepened at the end of 2008. The increase in subsequent years was largely a result of increasing value from sablefish, pacific cod and flatfish while the value from pollock has leveled off. The distribution of ex-vessel value by type of vessel differed by area, gear and species. In 2012, catcher vessels accounted for 48.2% of the ex-vessel value of the groundfish landings compared to 44.4% of the total catch because catcher vessels take larger percentages of higher-priced species such as sablefish, which was $5.28 per pound in 2011 and $4.18 per pound in 2012. Similarly, trawl gear accounted for only 73% of the total ex-vessel value compared to 88.2% of the catch because much of the trawl catch is of lower-priced species such as pollock, which was about $0.17 per pound in 2012.

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. The relative dominance of each of the three vessel size classes differs by area and by gear.

Table 22 provides estimates of ex-vessel value by residency of vessel owners, area, and species. For the BSAI and GOA combined, 78% of the 2012 ex-vessel value was accounted for by vessels with owners who indicated that they were not residents of Alaska. Vessels with owners who indicated that they were residents of Alaska accounted for about 22% of the total. The vessels owned by residents of Alaska accounted for a larger share of the ex-vessel value than of catch (22% compared to 84.2%) because these vessels accounted for relatively large shares of the higher-priced species such as sablefish. Notice 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. 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 footnote to the tables.

This 2013 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.

2.5. First Wholesale Production, Prices and Value

Estimates of weight and value 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. As for ex-vessel value, there were significant declines in the product value of Pacific cod between 2008 and 2009, and most of the change appears to have been driven by declines in prices resulting from the economic downturn that deepened at the end of 2008 and continued through 2009. Since then, the first wholesale value of Pacific cod products has rebounded and in 2012 and were 108.4% of the 2008 levels.

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. The total first-wholesale value of just the pollock and Pacific cod groundfish fisheries typically exceeds that of all non-groundfish fisheries combined. 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.

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

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

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.

2.6. 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, not dominant in its field of operation (including its affiliated operations worldwide). Historically the SBA defined the small business threshold in the finfish fishing industry to be entities that had combined annual receipts of no greater than $4 million. 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 current version of this report has maintained the use of the $4 million threshold for the data presented in Tables 36-39 for the sake of continuity, however future versions may apply the new $19 million threshold.

The information necessary to determine if a vessel is independently owned and operated and had gross earnings no greater than $4.0 million is not available. For example, vessel earnings can include tendering income, which is not tracked, and revenue from fishing activities outside of Alaska, to which we have limited access. By using estimates of vessels' revenue from the catch or processing of Alaska groundfish and other species, however, it is possible to identify vessels that clearly are not small entities.

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 37, respectively. Estimates of the average revenue per vessel for the vessels in Tables 36 and 37, respectively, are presented in Tables 38 and 39. 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.

Tables 36-39 provide vessel counts and average revenues with entity size by individual vessel revenue and are determined without regard to affiliation. When revenues are calculated to account for group affiliation and ownership, some of the vessels included in Tables 36-39 would be determined to be large entities. This 2013 version of the Economic Status Report presents an alternative set of tables on small entity vessel counts and revenue that account for these affiliations in Appendix A.2. These alternative tables utilize information on cooperative affiliations in the AFA pollock, Amendment 80 non-pollock trawl, Central Gulf of Alaska rockfish, Bering Sea & Aleutian Islands crab, and the freezer longliner BSAI Pacific cod fisheries, in addition to known corporate affiliations. For vessels in these affiliations, group revenues totaling over $4 million confers large entity status on all member vessels.

2.7. 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 are summarized in Table 50 by month and area. The data indicate that in 2012, the crew weeks (defined as the number of crew aboard each vessel in a week summed over the entire year) totaled 107,195 with the majority of them (103,745) occurring in the BSAI groundfish fishery. In 2012, the maximum monthly employment (16,404) occurred in July. Much of this was accounted for by the BSAI pollock fishery.

2.8. Observer Coverage and Costs

The information provided by the FMA division of the AFSC has had a key role in the success of the groundfish management regime. For example, it would not be possible to monitor total allowable catches (TACs) in terms of total catch without observer data from the FMA. Similarly, the PSC limits, which have been a key factor in controlling the catch of prohibited species, could not be used without such data. In recent years, the reliance on observer data for individual vessel accounting is of particular importance 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. 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`.

2.9. External Factors

There are a variety of partially external factors that affect the economic performance of the BSAI and GOA groundfish fisheries. They include landing market prices in Japan, wholesale prices in Japan, U.S. imports of groundfish products, U.S. per capita consumption of seafood, U.S. consumer and producer price indices, and foreign exchange rates. We have discontinued publishing these data, presented in Tables 52 - 60 in previous years, either because the data are no longer available or because they are readily available online, often in a more useful format.

In particular, the Japanese Ministry of Agriculture, Forestry & Fisheries has discontinued reporting landing market prices and wholesale prices for all but one of the species previously reported in Tables 52 and 53. Without a continuous time series of prices for a variety of commodities, we believe these data are no longer useful.

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 2012 FUS is available at: http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus11/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. Instead of the gross domestic product (GDP) implicit price deflators we've used in the past, we now use the Producer Price Index (PPI) for unprocessed and packaged fish 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'.

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.

2.10. Request for Feedback

The 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.

2.11. Citations

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2.12. Acknowledgements

ESSRP wishes to thank the Alaska Fisheries Information Network (AKFIN) for database programming and data management services to support production of the Economic SAFE. Other parties who provided assistance or feedback in the assembly of this report or earlier versions include: Terry Hiatt, Ren Narita; Camille Kohler, RDI; Mike Fey, AKFIN; Jennifer Mondragon, NMFS Alaska Region Office, Sustainable Fisheries Division; David Latchman.

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

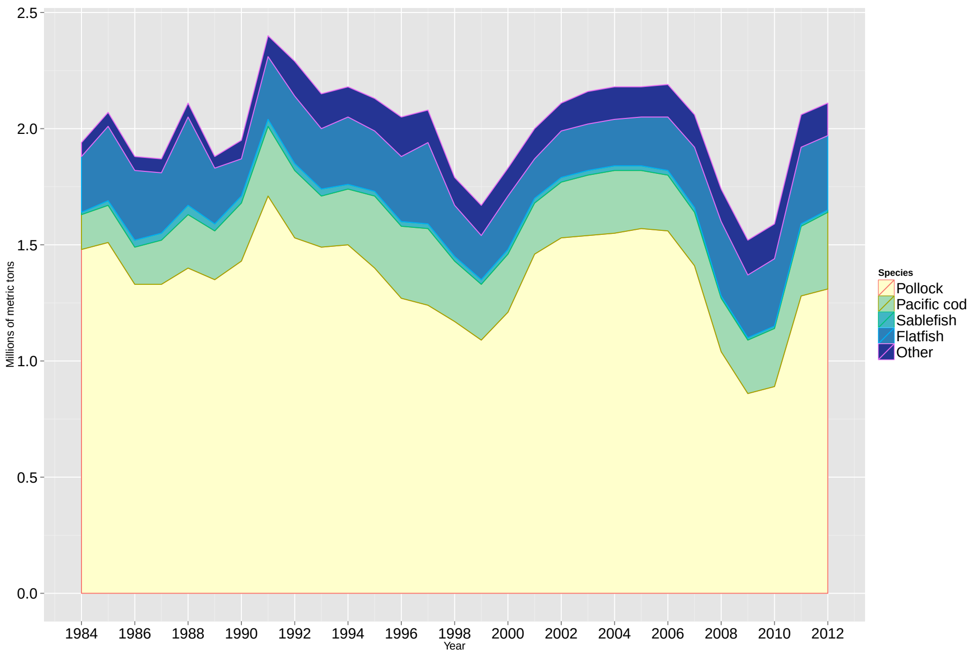

Figure 1: Groundfish catch in the commercial fisheries off Alaska by species, 1984-2012

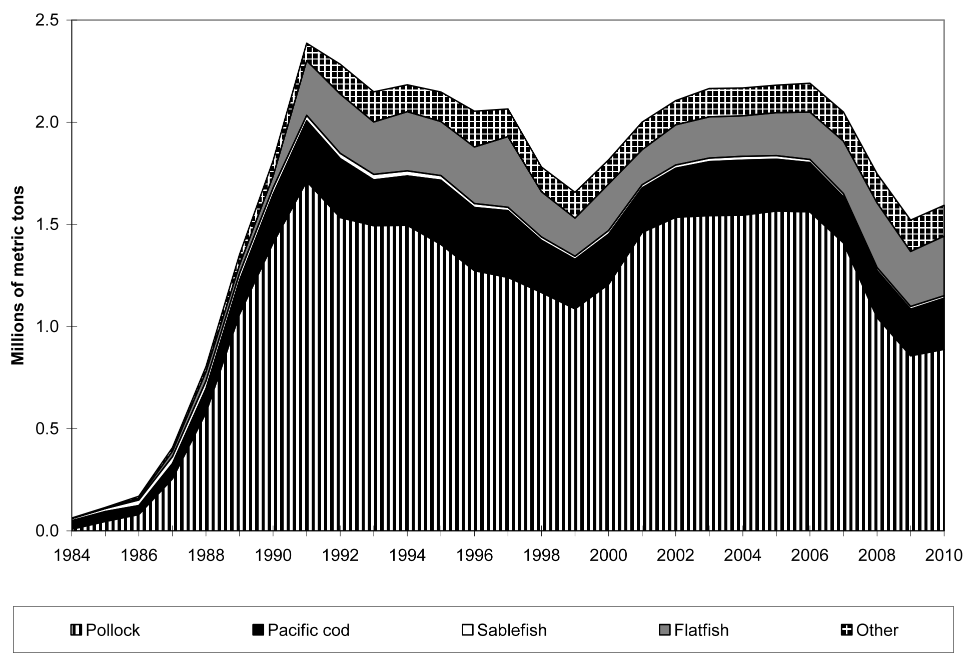

Figure 2: Groundfish catch in the domestic commercial fisheries off Alaska by species, (1984-2010)

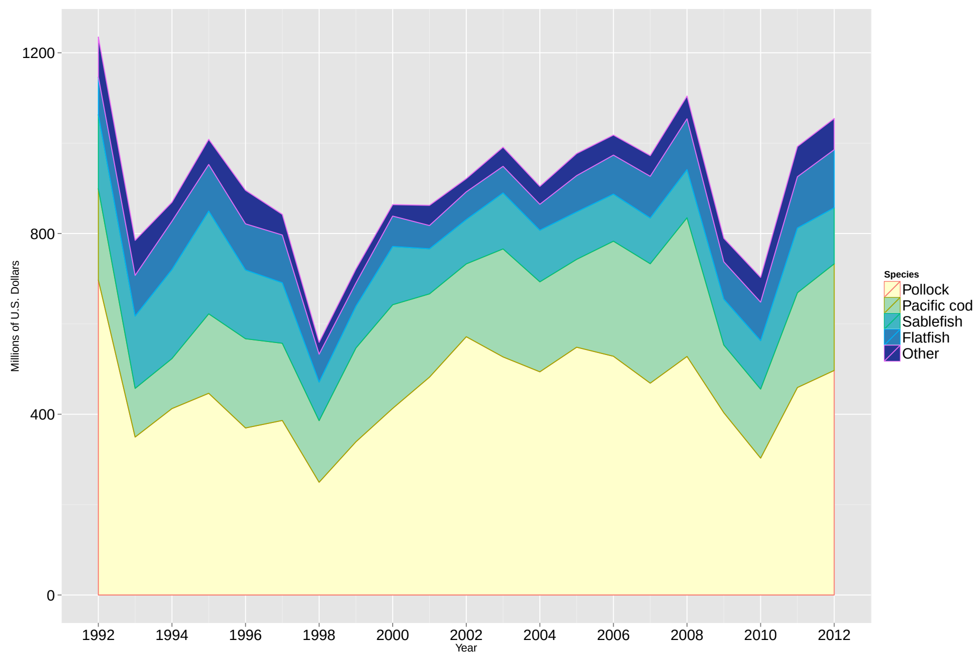

Figure 3: Real ex-vessel value of the groundfish catch in the domestic commercial fisheries off Alaska by species, 1992-2012 (base year = 2012)

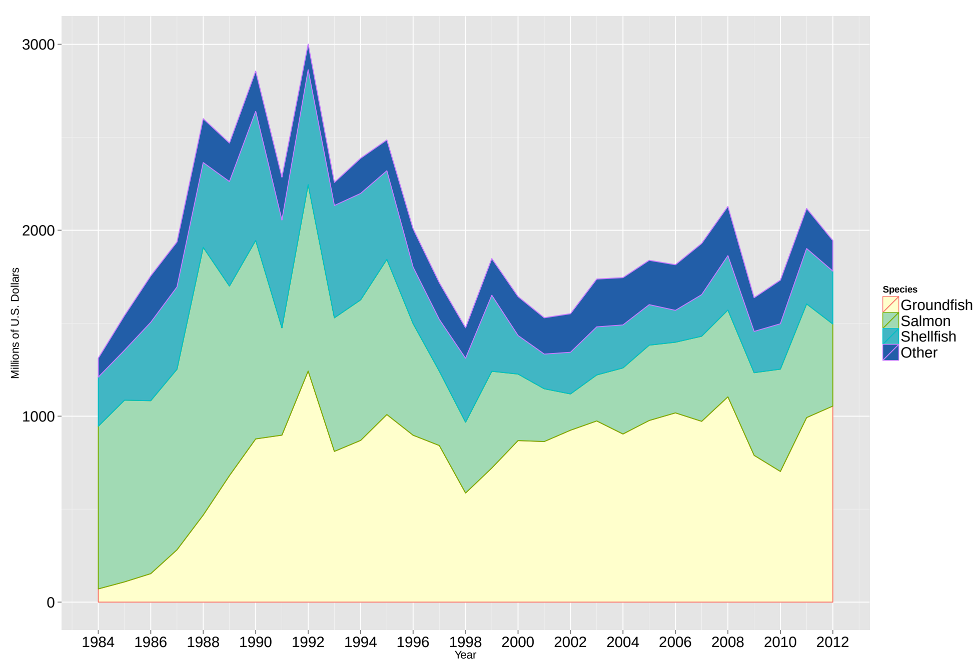

Figure 4: Real ex-vessel value of the domestic fish and shellfish catch off Alaska by species group, 1984-2012 (base year = 2012)

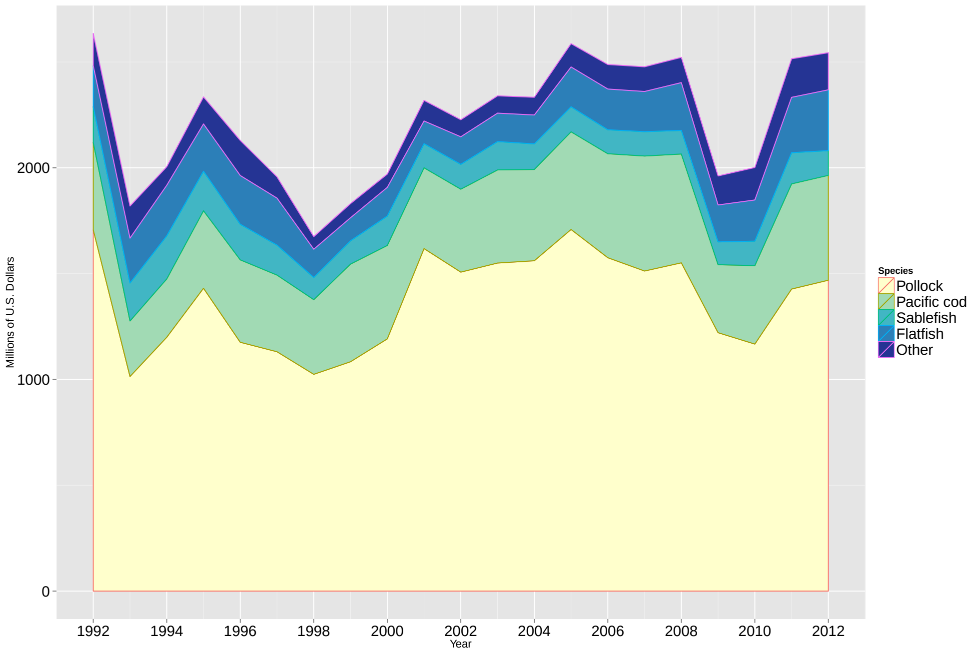

Figure 5: Real gross product value of the groundfish catch off Alaska by species, 1992-2012 (base year = 2012)

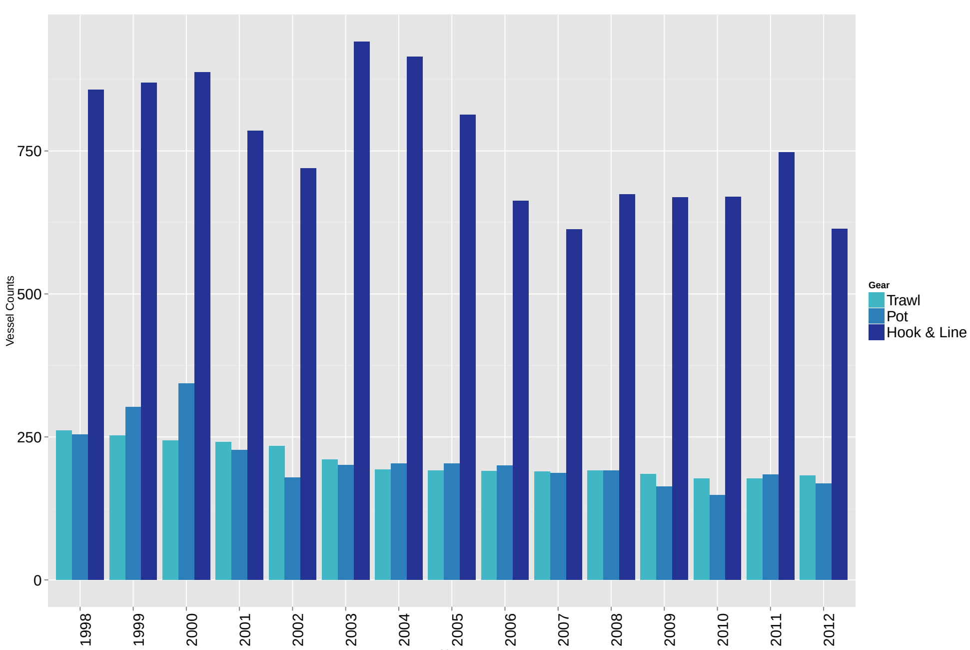

Figure 6: Number of vessels in the domestic fishery off Alaska by gear type, 1998-2012

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, 2003 - 2012 (1,000 metric tons, round weight)

	Year	Pollock	Sablefish	Pacific Cod	Flatfish	Rockfish	Atka Mackerel	Total
Gulf of Alaska	2003	50.7	15.5	52.6	42	23.7	0.6	191.5
	2004	63.8	17	56.6	23.4	22.3	0.8	188.7
	2005	81	15	47.6	30	20.6	0.8	200.3
	2006	72	13.5	47.9	42.2	24.3	0.9	208.8
	2007	52.7	12.8	51.5	40.5	23.4	1.5	189.4
	2008	52.6	12.6	58.9	46.1	23.1	2.1	201.9
	2009	44.2	11	52.9	42.4	22.7	2.2	183.3
	2010	76.9	10.1	78	37.9	25.3	2.4	237.7
	2011	81.3	11.2	84.8	41	23	1.6	249.8
	2012	104	11.9	78	29.6	27.3	1.2	258.2
Bering Sea & Aleutian Islands	2003	1492.6	2.1	211	159.8	20.8	58.1	1973.5
	2004	1481.7	2	212.2	174.7	17.7	60.6	1979.2
	2005	1484.6	2.5	205.6	180.5	15.1	62	1981.1
	2006	1489.4	2.2	193	189.5	17.7	61.9	1982.1
	2007	1357	2.3	174.1	216.2	23.6	58.8	1860.1
	2008	991.9	2	170.9	270.5	21.7	58.1	1546.1
	2009	812.5	2	175.7	226.8	19.5	72.8	1337.6
	2010	811.7	1.8	171.9	253.9	23.5	68.6	1355.2
	2011	1200.5	1.7	220.1	286.4	28.2	51.8	1818.2
	2012	1206.4	1.9	251.1	291.9	28.1	47.8	1858.8
All Alaska	2003	1543.2	17.6	263.5	201.8	44.6	58.7	2165
	2004	1545.5	19	268.8	198.1	40	61.4	2167.8
	2005	1565.6	17.6	253.2	210.5	35.7	62.8	2181.4
	2006	1561.4	15.7	240.9	231.7	42	62.8	2190.9
	2007	1409.7	15.1	225.6	256.7	47	60.2	2049.5
	2008	1044.5	14.7	229.8	316.6	44.8	60.2	1748
	2009	856.8	13	228.7	269.3	42.2	75	1520.8
	2010	888.5	11.9	249.9	291.8	48.8	71.1	1592.9
	2011	1281.8	12.9	304.9	327.3	51.2	53.4	2068
	2012	1310.4	13.9	329	321.5	55.5	49	2117

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, 1998 - 2012 (1,000 metric tons)

Year	Crab	Other Shellfish	Salmon	Halibut	Herring	Total
1998	126.7	4.2	284	30.5	39.4	484.7
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	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	304.6	26.2	39.4	412.8
2010	36.1	1.9	343.3	24.9	49.2	455.4
2011	36.5	1.5	334.8	18.7	44.7	436.3
2012	50.8	1.7	277.2	14.7	34	378.4

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, 2008 - 2012 (1,000 metric tons, round weight)

			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	2008	11	1	12	0	0	1	11	2	13
		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
	Pacific Cod	2008	7	5	12	1	93	95	8	98	107
		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
	Flatfish	2008	1	0	1	0	4	4	1	4	5
		2009	0	0	0	0	5	5	0	5	5
		2010	0	0	1	0	5	5	0	5	6
		2011	0	0	0	0	5	5	0	5	5
		2012	0	0	0	0	6	6	0	6	6
	Rockfish	2008	1	0	1	0	0	0	1	1	2
		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
	All Groundfish	2008	22	7	29	3	118	122	25	126	151
		2009	22	7	30	1	126	127	23	133	156
		2010	20	11	31	2	112	114	22	123	145
		2011	21	10	32	2	147	149	23	157	180
		2012	25	6	31	2	163	164	26	169	195

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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
Pot	Pacific Cod	2008	11	*	11	16	3	19	27	3	30
		2009	11	*	11	11	4	14	22	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
Trawl	Pollock	2008	51	1	52	525	462	987	576	462	1038
		2009	41	2	43	435	373	808	476	375	851
		2010	74	1	75	424	383	807	498	384	882
		2011	78	2	80	633	562	1195	710	564	1275
		2012	100	2	101	635	567	1202	734	568	1303
	Sablefish	2008	0	0	1	0	0	0	0	1	1
		2009	0	0	1	0	0	0	0	1	1
		2010	0	0	1	0	0	0	0	1	1
		2011	1	1	1	0	0	0	1	1	1
		2012	0	0	1	0	0	0	0	1	1
	Pacific Cod	2008	19	1	20	31	22	53	50	23	73
		2009	12	2	14	30	27	57	42	29	71
		2010	21	1	22	28	30	58	49	31	80
		2011	15	1	16	40	33	73	55	35	90
		2012	19	1	20	48	37	85	67	39	106
	Flatfish	2008	32	13	45	10	257	266	41	270	311
		2009	27	15	42	10	212	222	37	227	264
		2010	23	15	37	4	244	249	27	259	286
		2011	23	18	41	10	272	281	33	289	322
		2012	17	12	29	14	272	286	31	284	315

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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	2008	9	13	22	1	20	21	10	33	43
		2009	8	14	21	1	18	19	9	31	40
		2010	9	15	24	1	21	23	11	36	47
		2011	9	13	22	2	26	28	11	39	50
		2012	11	15	26	2	25	28	13	40	54
	Atka Mackerel	2008	0	2	2	1	57	58	2	59	60
		2009	0	2	2	3	69	73	3	72	75
		2010	0	2	2	4	65	69	4	67	71
		2011	0	2	2	5	46	52	5	48	53
		2012	0	1	1	5	43	48	5	44	49
	All Groundfish	2008	115	30	145	572	828	1399	686	858	1544
		2009	91	36	127	483	710	1193	574	746	1320
		2010	130	35	165	464	753	1216	593	788	1381
		2011	128	37	164	691	949	1640	819	985	1804
		2012	149	32	181	706	954	1660	856	986	1841
All Gear	All Groundfish	2008	148	38	186	592	949	1542	740	987	1727
		2009	125	43	168	496	840	1335	621	883	1504
		2010	171	46	217	483	868	1351	653	914	1567
		2011	179	47	226	719	1099	1818	898	1145	2044
		2012	196	38	234	732	1122	1853	927	1160	2087

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: 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, 2011 - 2012 (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
2011	Hook & Line	Pollock, Bottom	*	-	*	-	-	-	-	-	-	-	*
		Sablefish	0	9	0.1	0.3	0	-	0	0	0.7	-	10.5
		Pacific Cod	0.1	0	15.9	0.1	0	*	0	0	0.1	0	17.9
		Rockfish	-	*	0	-	-	-	-	-	0	-	0
		All Targets	0.1	10.1	17.1	0.3	0	*	0	0	1.1	0	31.5
	Pot	Pacific Cod	0	0	29.2	0	*	-	-	0	0	0	30.3
		All Targets	0	0	29.2	0	*	-	-	0	0	0	30.3
	Trawl	Pollock, Bottom	16.8	0	1.3	1.7	0.2	0.1	0	0.3	0.2	0	20.7
		Pollock, Pelagic	59	0	0.2	0.3	0	0	0	0	0.1	0	59.9
		Sablefish	0	0.2	0	0	0	0	0	0	0.1	-	0.3
		Pacific Cod	0.4	0.1	11.5	0.5	0.2	0	0	0.9	0	0	14
		Arrowtooth	2.2	0.3	1.7	23.5	1.5	1.4	0.2	0.8	1.1	0	34.2
		Flathead Sole	0.1	0	0.1	0.8	0.4	0.1	0	0.1	0	0	1.7
		Rex Sole	0.1	0	0.2	1.8	0.2	1.1	0	0	0.4	*	3.9
		Flatfish, Shallow	0.3	0	0.8	1.5	0.3	0.1	0	1.8	0	*	5.2
		Rockfish	0.8	0.4	0.6	0.3	0	0.1	0.1	0	19.9	1.4	23.8
		All Targets	79.6	1.1	16.3	30.5	2.7	2.9	0.4	4	21.7	1.5	163.7

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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
2012	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	-	-	-	-	*
		Sablefish	0	10.3	0	0.3	0	-	0	0	1.1	-	12.3
		Pacific Cod	0.2	0	15	0.1	0	-	*	0	0	*	17
		Rockfish	-	-	0	-	-	-	-	-	0.1	-	0.1
		All Targets	0.2	11.1	15.2	0.4	0	-	0	0	1.5	*	30.8
	Pot	Pacific Cod	0	0	21.2	0	*	-	0	0	0	0	21.9
		All Targets	0	0	21.2	0	*	-	0	0	0	0	21.9
	Trawl	Pollock, Bottom	13.4	0	0.9	0.9	0.1	0	0	0.1	0.1	*	15.8
		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	0.2	0.9	14.3	0.9	1.2	0.1	0.4	1.1	0	21.2
		Flathead Sole	0.2	0	0.1	0.8	0.4	0.2	0	0.2	0	-	2.1
		Rex Sole	0.2	0	0.2	1	0.2	0.8	0.1	0.1	0.1	*	3
		Flatfish, Shallow	0.7	0	1	1.3	0.2	0	0	2.4	0	*	6.3
		Rockfish	0.6	0.5	0.4	0.8	0	0.1	0.1	0.1	24	1.2	27.7
		All Targets	101.2	0.9	20.2	20.3	2.2	2.4	0.3	4	25.8	1.2	181.4
	All Gear	All Targets	101.4	11.9	56.7	20.7	2.2	2.4	0.3	4	27.3	1.2	234.1

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, 2011 - 2012 (1,000 metric tons, round weight)

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2011	Hook & Line	Pollock, Bottom	*	-	*	*	-	*	-	-	-	-	-	*
		Sablefish	0	0.9	0	0	0	*	-	*	*	0.1	-	1.2
		Pacific Cod	5.5	0	118.4	1.3	0	0.3	0	0.7	0.1	0.1	0	144.4
		Arrowtooth	-	*	-	*	-	-	-	-	-	*	-	*
		Turbot	0	0	0.1	0.2	*	0	-	*	*	0	*	2.6
		Rockfish	-	-	-	-	-	-	-	-	-	*	-	*
		All Targets	5.5	1.1	118.6	1.6	0	0.3	0	0.7	0.1	0.3	0	148.4
	Pot	Sablefish	*	0.5	0	0	0	-	-	-	0	0	-	0.6
		Pacific Cod	0	0	28	0	-	0	0	0	0	0	0	28.7
		All Targets	0	0.5	28	0	0	0	0	0	0	0	0	29.3
	Trawl	Pollock, Bottom	110.6	0	3.2	0.6	0	2	5.4	0.7	0.2	0.2	0.8	125.1
		Pollock, Pelagic	1061.3	0	6.8	1	0	2.9	3.1	0.4	0.3	0.5	0.1	1077.9
		Pacific Cod	3.5	*	36.4	0.2	0	0.2	1.5	1.1	0.6	0	0.2	44.5
		Arrowtooth	0.9	0	0.2	10.5	3.4	0.3	0	0	0.5	0.4	0.1	17.7
		Kamchatka Flounder	0.3	0	0	2.5	5.6	0	0	0	0	0.4	0.1	9.9
		Flathead Sole	1.5	-	0.9	0.4	0.1	2.4	0.9	0.9	0.4	0.1	*	7.8
		Rock Sole	7.1	-	7.3	0.4	0	2	39.7	9.8	3.5	0	0	71.6
		Turbot	*	*	-	0	0	*	*	-	*	0	-	0
		Yellowfin	8.7	*	16.3	2.3	0.1	3.2	9.8	136.9	19.9	0	0	201.2
		Other Flatfish	0.1	-	0.2	0	*	0	0.1	0.6	1.2	*	-	2.2
		Rockfish	0.5	0	0.3	0.5	0.4	0.1	0.1	0	0.1	19.9	1.8	24.1
		Atka Mackerel	0.5	0	1.5	0.3	0.2	0	0.1	-	0	6.3	48.7	58.1
		All Targets	1194.9	0.1	73.3	18.9	9.9	13.2	60.6	150.5	26.7	27.9	51.8	1640.1

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Table 4: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	*	1	0	0	0	-	-	-	0	0.1	*	1.3
		Pacific Cod	4.8	0	131.6	1.3	0.1	0.3	0	1	0.1	0.1	0	159.3
		Kamchatka Flounder	-	*	-	*	*	*	-	-	-	*	-	*
		Turbot	0	0	0.1	0.4	0.3	0	-	-	0	0.1	-	3.2
		Rockfish	-	*	*	*	*	*	-	-	*	*	-	*
		All Targets	4.8	1.2	131.8	1.7	0.5	0.3	0	1	0.1	0.3	0	164
	Pot	Sablefish	*	*	*	*	*	*	-	-	*	*	-	*
		Pacific Cod	0	-	28.7	0	0	0	0	0	0	0	0	29
		All Targets	0	*	28.7	0	0	0	0	0	0	0	0	29
	Trawl	Pollock, Bottom	107.3	0	3.9	0.3	0	1.6	3.9	0.9	0.2	0.5	0.2	119.8
		Pollock, Pelagic	1069.5	*	6.2	0.5	0	2.3	2.9	0.6	0.3	0.3	0.1	1084.5
		Pacific Cod	3.7	*	43.9	0.2	0	0.2	1.4	0.8	0.3	0.1	0.4	51.6
		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
		Flathead Sole	0.9	*	0.4	0.4	0.1	3.3	0.6	0.1	0.2	0.1	-	6.2
		Rock Sole	6.8	-	9.8	0.1	0	0.8	58.2	9.6	2.8	0	*	89.6
		Yellowfin	11.2	-	19.2	1	0.1	2.1	9	133.7	14.8	0	-	195.3
		Other Flatfish	0.2	*	0.2	0.1	0	0.1	0	0.6	1	0.1	*	2.2
		Rockfish	0.7	0	0.3	0.5	0.2	0	0	0	0.1	19.7	1.4	23.3
		Atka Mackerel	0.4	0	1.3	0.8	0.7	0	0.1	0	0	6.5	45	56
		All Targets	1201.6	0.2	85.3	21	9.1	11.1	76.1	146.2	20.1	27.8	47.8	1660
	All Gear	All Targets	1206.4	1.4	245.8	22.7	9.6	11.4	76.1	147.2	20.1	28.1	47.8	1853

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, 2008 - 2012 (1,000 metric tons, round weight)

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2008	22	30	183	809	205	839
	2009	19	24	125	687	144	711
	2010	35	41	136	676	170	716
	2011	31	49	182	1019	212	1068
	2012	39	63	172	1034	211	1097
Sablefish	2008	7	6	1	1	7	8
	2009	6	5	1	1	7	6
	2010	5	5	0	1	6	6
	2011	6	5	1	1	6	6
	2012	6	6	1	1	7	7
Pacific Cod	2008	23	21	32	134	55	155
	2009	24	16	35	138	59	154
	2010	34	25	37	131	71	156
	2011	40	23	46	174	86	197
	2012	37	20	51	195	88	215
Flatfish	2008	12	34	60	211	71	245
	2009	13	30	59	168	72	198
	2010	12	26	67	187	78	214
	2011	8	33	21	265	29	298
	2012	6	24	5	287	11	311
Rockfish	2008	5	18	0	21	5	40
	2009	6	17	1	19	6	36
	2010	7	18	1	23	8	41
	2011	4	18	1	28	5	46
	2012	6	22	0	28	6	50
Atka Mackerel	2008	0	2	0	58	0	60
	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
All Groundfish	2008	72	114	281	1260	353	1374
	2009	71	97	226	1110	297	1207
	2010	97	120	245	1106	342	1226
	2011	93	133	255	1563	347	1697
	2012	96	138	234	1620	330	1758

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, 2008 - 2012 (1,000 metric tons, round weight)

			Fixed		Trawl		All Gear	
		Year	Total Discards	Discard Rate	Total Discards	Discard Rate	Total Discards	Discard Rate
Gulf of Alaska	Pollock	2008	0.1	29 %	3.6	7 %	3.7	7 %
		2009	0	4 %	2.5	6 %	2.6	6 %
		2010	0.1	44 %	1.1	1 %	1.2	2 %
		2011	0	20 %	1.9	2 %	2	2 %
		2012	0	20 %	1.9	2 %	2	2 %
	Sablefish	2008	0.7	6 %	0.1	8 %	0.8	6 %
		2009	0.6	6 %	0.1	9 %	0.7	6 %
		2010	0.4	4 %	0	5 %	0.4	4 %
		2011	0.4	4 %	0.2	16 %	0.6	5 %
		2012	0.3	3 %	0.1	8 %	0.4	3 %
	Pacific Cod	2008	0.3	1 %	3	15 %	3.3	8 %
		2009	0.9	3 %	3	21 %	3.8	10 %
		2010	0.4	1 %	2.4	11 %	2.8	5 %
		2011	1.2	3 %	0.6	4 %	1.8	3 %
		2012	0.3	1 %	0.7	3 %	1	2 %
	Flatfish	2008	0.9	93 %	10.2	23 %	11.1	24 %
		2009	0.4	91 %	12.5	30 %	12.9	30 %
		2010	0.5	93 %	10.3	27 %	10.8	28 %
		2011	0.3	91 %	7.5	18 %	7.8	19 %
		2012	0.4	90 %	5.7	19 %	6	20 %
	Rockfish	2008	0.3	22 %	1.3	6 %	1.6	7 %
		2009	0.3	23 %	1.6	8 %	1.9	8 %
		2010	0.4	30 %	1.3	6 %	1.7	7 %
		2011	0.3	26 %	1.6	7 %	1.9	8 %
		2012	0.5	32 %	1.6	6 %	2.1	8 %
	Atka Mackerel	2008	0	99 %	1.3	62 %	1.3	63 %
		2009	0	100 %	0.9	41 %	0.9	41 %
		2010	0.1	100 %	1.2	49 %	1.2	51 %
		2011	0	99 %	0.6	36 %	0.6	36 %
		2012	0	85 %	0.5	42 %	0.5	42 %
	All Groundfish	2008	4.6	11 %	21.2	15 %	25.7	14 %
		2009	5.2	12 %	21.9	17 %	27.1	16 %
		2010	4	8 %	17.8	11 %	21.8	10 %
		2011	4.7	8 %	13.3	8 %	18.1	8 %
		2012	3.3	6 %	11.6	6 %	14.9	6 %

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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	2008	0.9	16 %	6.8	1 %	7.7	1 %
		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 %	4.9	0 %
		2012	0.5	10 %	5.1	0 %	5.6	0 %
	Sablefish	2008	0.1	5 %	0	0 %	0.1	5 %
		2009	0	1 %	0	4 %	0	1 %
		2010	0	2 %	0	3 %	0	2 %
		2011	0	1 %	0	4 %	0	1 %
		2012	0	1 %	0	1 %	0	1 %
	Pacific Cod	2008	1.7	1 %	0.5	1 %	2.2	1 %
		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	1.8	1 %	1.1	1 %	2.9	1 %
	Flatfish	2008	2.8	66 %	30.7	12 %	33.4	12 %
		2009	2.9	62 %	23.7	11 %	26.7	12 %
		2010	2.4	46 %	22.8	9 %	25.1	10 %
		2011	2.5	51 %	22.4	8 %	24.8	9 %
		2012	2.9	51 %	18.9	7 %	21.8	7 %
	Rockfish	2008	0.2	56 %	2.3	11 %	2.6	12 %
		2009	0.2	50 %	2	11 %	2.3	12 %
		2010	0.3	42 %	1.5	7 %	1.8	8 %
		2011	0.1	38 %	1	4 %	1.1	4 %
		2012	0.1	27 %	1.4	5 %	1.5	5 %
	Atka Mackerel	2008	0.1	98 %	1.1	2 %	1.3	2 %
		2009	0.1	84 %	2.9	4 %	2.9	4 %
		2010	0.1	52 %	3.9	6 %	4	6 %
		2011	0	81 %	1.7	3 %	1.8	3 %
		2012	0	55 %	1.3	3 %	1.4	3 %
	All Groundfish	2008	18	13 %	51.2	4 %	69.3	4 %
		2009	16.3	11 %	45.1	4 %	61.4	5 %
		2010	14.9	11 %	40.2	3 %	55.1	4 %
		2011	20.8	12 %	37.6	2 %	58.5	3 %
		2012	20.8	11 %	36.1	2 %	56.9	3 %

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Table 6: Continued

		Year	Fixed Total Discards	Fixed Discard Rate	Trawl Total Discards	Trawl Discard Rate	All Gear Total Discards	All Gear Discard Rate
All Alaska	Pollock	2008	0.9	17 %	10.4	1 %	11.4	1 %
		2009	0.6	13 %	8.3	1 %	8.9	1 %
		2010	1	22 %	4.1	0 %	5.1	1 %
		2011	0.9	16 %	6	0 %	6.8	1 %
		2012	0.5	11 %	7.1	1 %	7.6	1 %
	Sablefish	2008	0.8	6 %	0.1	7 %	0.9	6 %
		2009	0.6	5 %	0.1	8 %	0.7	6 %
		2010	0.4	4 %	0.1	5 %	0.5	4 %
		2011	0.4	3 %	0.2	15 %	0.6	4 %
		2012	0.3	2 %	0.1	6 %	0.4	3 %
	Pacific Cod	2008	2	1 %	3.5	5 %	5.5	3 %
		2009	2.5	2 %	3.6	5 %	6.1	3 %
		2010	2	1 %	3.8	5 %	5.8	3 %
		2011	3.1	2 %	1.2	1 %	4.3	2 %
		2012	2.1	1 %	1.7	2 %	3.9	1 %
	Flatfish	2008	3.7	71 %	40.8	13 %	44.5	14 %
		2009	3.4	64 %	36.2	14 %	39.6	15 %
		2010	2.8	50 %	33.1	12 %	35.9	12 %
		2011	2.8	53 %	29.8	9 %	32.6	10 %
		2012	3.3	53 %	24.6	8 %	27.9	9 %
	Rockfish	2008	0.5	30 %	3.6	8 %	4.1	9 %
		2009	0.5	31 %	3.7	9 %	4.2	10 %
		2010	0.7	34 %	2.8	6 %	3.5	7 %
		2011	0.4	29 %	2.6	5 %	3	6 %
		2012	0.6	31 %	3	6 %	3.5	6 %
	Atka Mackerel	2008	0.1	98 %	2.4	4 %	2.6	4 %
		2009	0.1	87 %	3.8	5 %	3.9	5 %
		2010	0.1	67 %	5.1	7 %	5.2	7 %
		2011	0	84 %	2.3	4 %	2.4	4 %
		2012	0	63 %	1.8	4 %	1.9	4 %
	All Groundfish	2008	22.6	12 %	72.4	5 %	95	5 %
		2009	21.5	12 %	67	5 %	88.5	6 %
		2010	18.9	10 %	58	4 %	76.9	5 %
		2011	25.6	11 %	50.9	3 %	76.5	4 %
		2012	24.1	10 %	47.7	3 %	71.8	3 %

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 only a rough 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.

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, 2011 - 2012 (1,000 metric tons, round weight)

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Flat Shallow	Atka Mackerel	All Species
2011	Hook & Line	Sablefish	0	0.3	0.1	0.2	0	0	-	1.2
		Pacific Cod	0	0	0.1	0.1	0	0	0	1.2
		Rockfish	-	*	0	-	-	-	-	0
		All Targets	0	0.4	1	0.3	0	0	0	3.9
	Pot	Pacific Cod	0	0	0.2	0	*	0	0	0.9
		All Targets	0	0	0.2	0	*	0	0	0.9
	Trawl	Pollock, Bottom	0.2	0	0	0.5	0	0	0	0.9
		Pollock, Pelagic	0.5	0	0	0	0	0	0	0.6
		Sablefish	0	0	0	0	0	0	-	0.1
		Pacific Cod	0	0	0	0.3	0	0.1	0	0.6
		Arrowtooth	0.9	0.2	0.1	2.5	0	0	0	4.8
		Flathead Sole	0	0	0	0.7	0	0	0	0.8
		Rex Sole	0	0	0	1.5	0	0	*	1.9
		Flatfish, Shallow	0.1	0	0.4	1.1	0	0	*	1.8
		Rockfish	0.2	0	0	0.2	0	0	0.5	1.9
		All Targets	1.9	0.2	0.6	6.8	0.1	0.2	0.5	13.2

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Table 7: Continued

		Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Flat Shallow	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	0	0.3	0	0.3	0	0	-	1.6
		Pacific Cod	0	0	0.2	0.1	0	0	*	1.2
		Rockfish	-	-	0	-	-	-	-	0
		All Targets	0	0.3	0.3	0.3	0	0	*	2.9
	Pot	Pacific Cod	0	0	0.1	0	*	0	0	0.4
		All Targets	0	0	0.1	0	*	0	0	0.4
	Trawl	Pollock, Bottom	0.1	0	0	0.1	0	0	*	0.2
		Pollock, Pelagic	0.4	0	0	0	0	0	0	0.7
		Sablefish	0	0	*	0	*	0	-	0.1
		Pacific Cod	0.7	0	0	0.3	0	0.1	0	1.4
		Arrowtooth	0.3	0.1	0.2	2.3	0.1	0	0	3.7
		Flathead Sole	0.1	0	0	0.7	0	0	-	0.8
		Rex Sole	0.1	0	0	0.6	0	0	*	1
		Flatfish, Shallow	0.4	0	0.5	0.9	0	0.1	*	2.1
		Rockfish	0	0	0	0.1	0	0	0.5	1.7
		All Targets	1.9	0.1	0.7	5	0.2	0.2	0.5	11.6
	All Gear	All Targets	2	0.4	1	5.3	0.2	0.2	0.5	14.9

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. 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, 2011 - 2012 (1,000 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
2011	Hook & Line	Sablefish	0	0	0	0	0	*	-	0	*	*	0	-	0.2
		Pacific Cod	0.8	0	1.9	1.1	0	0.3	0	0	0.7	0	0.1	0	19.3
		Arrowtooth	-	*	-	*	-	-	-	*	-	-	*	-	*
		Turbot	0	0	0	0.1	*	0	-	0	*	*	0	*	0.5
		Rockfish	-	-	-	-	-	-	-	-	-	-	*	-	*
		All Targets	0.8	0	1.9	1.2	0	0.3	0	0	0.7	0	0.1	0	20
	Pot	Sablefish	*	0	0	0	0	-	-	0	-	0	0	-	0.1
		Pacific Cod	0	0	0	0	-	0	0	0	0	0	0	0	0.7
		All Targets	0	0	0	0	0	0	0	0	0	0	0	0	0.8
	Trawl	Pollock, Bottom	0	0	0	0.1	0	0.1	0.3	0	0	0	0.1	0.1	1.1
		Pollock, Pelagic	0.5	0	0	0.2	0	1.1	2.2	0	0.3	0	0.2	0	5.5
		Pacific Cod	2	*	0.1	0.2	0	0.2	0.8	0	0	0.2	0	0.1	4.2
		Arrowtooth	0.3	0	0	0.4	0.1	0	0	0	0	0	0.1	0.1	1.3
		Kamchatka Flounder	0	0	0	0	0	0	0	0	0	0	0	0	0.3
		Flathead Sole	0.2	-	0	0.1	0	0	0	0	0	0	0	*	0.6
		Rock Sole	0.5	-	0.1	0.3	0	0	0.7	0	0.3	1.2	0	0	4.5
		Turbot	*	*	-	0	0	*	*	0	-	*	0	-	0
		Yellowfin	0.5	*	0.3	1	0	0.1	0.4	0	3.4	7.6	0	0	16.6
		Other Flatfish	0	-	0	0	*	0	0	*	0	0.1	*	-	0.2
		Rockfish	0	0	0	0.2	0.1	0	0	0	0	0	0.3	0.3	1.2
		Atka Mackerel	0	0	0	0	0	0	0	0	-	0	0.4	1.2	2.1
		All Targets	4	0	0.5	2.7	0.3	1.5	4.5	0	4.1	9.2	1	1.7	37.6

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Table 8: Continued

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2012	Hook & Line	Sablefish	*	0	0	0	0	-	-	0	-	0	0	*	0.1
		Pacific Cod	0.5	0	1.8	1	0.1	0.3	0	0	1	0	0.1	0	19.5
		Kamchatka Flounder	-	*	-	*	*	*	-	*	-	-	*	-	*
		Turbot	0	0	0	0.2	0.1	0	-	0	-	0	0	-	0.7
		Rockfish	-	*	*	*	*	*	-	*	-	*	*	-	*
		All Targets	0.5	0	1.8	1.2	0.3	0.3	0	0	1	0.1	0.1	0	20.4
	Pot	Sablefish	*	*	*	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	0	-	0	0	0	0	0	-	0	0	0	0	0.3
		All Targets	0	*	0	0	0	0	0	*	0	0	0	0	0.3
	Trawl	Pollock, Bottom	0.2	0	0	0	0	0.2	0.5	0	0.1	0	0.1	0	1.6
		Pollock, Pelagic	1.7	*	0	0.1	0	0.8	1.7	0	0.4	0.1	0.1	0	6
		Pacific Cod	1.7	*	0.3	0.2	0	0.1	0.9	0	0	0.1	0.1	0	4.1
		Arrowtooth	0.2	0	0	0.8	0.2	0	0	0	0	0	0.1	0	1.7
		Kamchatka Flounder	0	0	0	0	0.1	*	0	0	0	0	0	0	0.3
		Flathead Sole	0.1	*	0	0.1	0	0	0	0	0	0	0	-	0.3
		Rock Sole	0.3	-	0.2	0.1	0	0.1	1.4	0	0.4	1.9	0	*	5.9
		Yellowfin	0.9	-	0.4	0.5	0.1	0.1	0.5	0	3.1	3.8	0	-	12.8
		Other Flatfish	0	*	0	0	0	0	0	0	0	0	0.1	*	0.1
		Rockfish	0	0	0	0.1	0	0	0	0	0	0	0.3	0.3	1
		Atka Mackerel	0	0	0	0.1	0	0	0	0	0	0	0.6	0.9	2.2
		All Targets	5.1	0	1.1	1.9	0.4	1.4	5.1	0	4	6	1.4	1.3	36.1
	All Gear	All Targets	5.6	0	2.9	3.1	0.7	1.8	5.1	0.1	5.1	6	1.5	1.3	56.8

Notes: Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs. 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, 2011 - 2012 (percent)

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Flathead Sole	Rex Sole	Flat Deep	Flat Shallow	Rockfish	Atka Mackerel	All Species
2011	Hook & Line	Sablefish	79	3	73	90	100	-	100	100	28	-	12
		Pacific Cod	16	87	1	93	98	*	100	97	40	99	7
		Rockfish	-	*	0	-	-	-	-	-	0	-	0
		All Targets	17	4	6	91	98	*	100	98	25	99	12
	Pot	Pacific Cod	47	100	1	99	*	-	-	94	99	99	3
		All Targets	47	100	1	99	*	-	-	94	99	99	3
	Trawl	Pollock, Bottom	1	1	0	32	2	5	9	6	1	0	4
		Pollock, Pelagic	1	2	0	6	2	4	0	45	63	0	1
		Sablefish	81	0	1	97	48	49	86	42	17	-	27
		Pacific Cod	5	0	0	49	10	21	65	13	14	99	4
		Arrowtooth	42	43	7	11	3	2	41	2	49	2	14
		Flathead Sole	42	1	11	85	4	4	89	3	29	1	48
		Rex Sole	17	9	13	81	6	2	93	7	66	*	47
		Flatfish, Shallow	29	0	53	75	1	3	84	0	56	*	35
		Rockfish	20	4	2	70	34	31	81	50	4	35	8
		All Targets	2	16	4	22	3	3	60	5	7	35	8

Continued on next page.

Table 9: Continued

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	3	46	89	100	-	99	100	41	-	13
		Pacific Cod	15	2	2	93	100	-	*	97	27	*	7
		Rockfish	-	-	0	-	-	-	-	-	0	-	0
		All Targets	16	3	2	90	100	-	99	98	32	*	9
	Pot	Pacific Cod	58	100	0	98	*	-	100	98	100	85	2
		All Targets	58	100	0	98	*	-	100	98	100	85	2
	Trawl	Pollock, Bottom	0	13	0	11	1	4	2	0	29	*	1
		Pollock, Pelagic	0	1	1	2	4	2	*	0	80	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	18
		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	25	7	4	74	6	6	42	6
	All Gear	All Targets	2	3	2	26	8	4	75	6	8	42	6

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, 2011 - 2012 (percent)

Year	Gear	Target	Pollock	Sablefish	Pacific Cod	Arrowtooth	Kamchatka Flounder	Flathead Sole	Rock Sole	Turbot	Yellowfin	Flat Other	Rockfish	Atka Mackerel	All Species
2011	Hook & Line	Sablefish	42	1	21	57	73	*	-	3	*	*	31	-	15
		Pacific Cod	15	10	2	81	85	100	98	5	99	66	63	83	13
		Arrowtooth	-	*	-	*	-	-	-	*	-	-	*	-	*
		Turbot	27	2	0	41	*	100	-	0	*	*	15	*	19
		Rockfish	-	-	-	-	-	-	-	-	-	-	*	-	*
		All Targets	15	2	2	74	84	100	98	2	99	73	37	83	13
	Pot	Sablefish	*	1	100	100	100	-	-	100	-	100	80	-	11
		Pacific Cod	84	2	0	100	-	9	96	100	97	100	100	80	2
		All Targets	84	1	0	100	100	9	96	100	97	100	91	80	3
	Trawl	Pollock, Bottom	0	0	0	21	8	3	6	3	5	23	28	12	1
		Pollock, Pelagic	0	6	0	21	42	37	71	27	76	13	47	12	1
		Pacific Cod	57	*	0	90	69	69	55	15	2	29	39	42	9
		Arrowtooth	35	3	1	4	2	5	3	1	57	2	22	45	7
		Kamchatka Flounder	13	5	10	1	1	5	50	2	91	12	5	4	3
		Flathead Sole	15	-	0	28	33	1	1	18	0	9	1	*	8
		Rock Sole	7	-	1	65	79	1	2	86	3	35	18	68	6
		Turbot	*	*	-	18	15	*	*	2	-	*	1	-	7
		Yellowfin	5	*	2	44	49	4	4	62	2	38	43	78	8
		Other Flatfish	2	-	2	75	*	5	7	*	2	9	*	-	9
		Rockfish	3	1	6	48	19	4	3	4	69	8	1	17	5
		Atka Mackerel	1	5	1	18	10	76	24	5	-	34	6	2	4
		All Targets	0	4	1	14	3	11	7	2	3	34	4	3	2

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Table 10: Continued

		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	71	96	-	-	24	-	100	11	*	10
		Pacific Cod	10	25	1	79	71	99	100	6	100	90	51	47	12
		Kamchatka Flounder	-	*	-	*	*	*	-	*	-	-	*	-	*
		Turbot	18	7	5	39	38	100	-	1	-	100	11	-	21
		Rockfish	-	*	*	*	*	*	-	*	-	*	*	-	*
		All Targets	10	1	1	70	51	99	100	2	100	92	26	47	12
	Pot	Sablefish	*	*	*	*	*	*	-	*	-	*	*	-	*
		Pacific Cod	55	-	0	100	100	17	91	-	100	86	98	71	1
		All Targets	55	*	0	100	100	17	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	46	*	1	89	88	58	69	85	4	44	54	9	8
		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	55	75	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	19	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
	All Gear	All Targets	0	1	1	14	7	15	7	2	3	30	5	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, 2008 - 2012 (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	2008	-	-	-	0	0	0	2	0
		2009	-	-	-	0	-	0	1	0
		2010	-	-	-	0	-	-	2	0
		2011	-	-	-	0	-	0	6	-
		2012	-	-	-	0	-	0	3	0
	Pot	2008	21	-	-	-	-	-	107	0
		2009	5	-	-	-	-	-	17	-
		2010	24	-	-	-	-	-	142	-
		2011	39	-	-	-	-	-	12	-
		2012	34	-	-	-	-	-	93	-
	Trawl	2008	1953	1	16	2	-	0	134	2
		2009	1831	9	8	2	-	3	229	1
		2010	1640	2	55	2	-	3	92	*
		2011	1856	11	22	3	-	0	102	-
		2012	1713	1	23	1	-	0	87	-
	All Gear	2008	1974	1	16	2	0	0	243	2
		2009	1836	9	8	2	-	3	247	1
		2010	1664	2	55	2	-	3	236	0
		2011	1895	11	22	3	-	0	120	-
		2012	1747	1	23	1	-	0	183	0
Bering Sea & Aleutian Islands	Hook & Line	2008	718	0	0	0	8	10	33	97
		2009	723	*	0	0	7	15	34	67
		2010	627	-	0	0	2	2	26	61
		2011	551	*	0	0	4	2	20	58
		2012	612	*	0	0	4	2	16	30
	Pot	2008	7	-	-	-	41	189	1493	671
		2009	1	-	-	-	2	168	400	551
		2010	5	-	-	-	2	72	379	288
		2011	6	-	-	-	17	196	286	132
		2012	6	-	-	-	7	16	98	16
	Trawl	2008	2837	215	24	17	90	31	678	795
		2009	2885	88	14	48	76	18	481	527
		2010	2822	356	12	15	60	13	508	1721
		2011	2619	397	27	195	46	53	902	763
		2012	3118	2376	13	24	34	26	428	625
	All Gear	2008	3562	215	24	17	140	230	2203	1563
		2009	3609	88	14	48	85	200	916	1145
		2010	3454	356	12	15	64	88	913	2070
		2011	3176	397	27	195	67	251	1208	953
		2012	3736	2376	13	24	45	43	542	671
All Alaska	All Gear	2008	5536	216	40	20	140	230	2446	1565
		2009	5445	97	23	50	85	204	1163	1146
		2010	5118	358	67	17	64	91	1149	2070
		2011	5071	408	48	198	67	251	1328	953
		2012	5483	2377	35	26	45	43	725	671

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, 2011 - 2012 (Metric tons (t) or number in 1,000s)

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other salmon (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)
2011	Hook & Line	Sablefish	-	-	-	0.3	0.1	-	-
		Pacific Cod	-	-	-	-	-	5.5	-
		All Targets	-	-	-	0.3	0.1	5.5	-
	Pot	Pacific Cod	38.5	-	-	-	-	12.3	-
	Trawl	Pollock, Bottom	103.9	-	4.3	0.4	-	10	-
		Pollock, Pelagic	11.8	10.7	10.5	0.8	-	-	-
		Sablefish	4	-	-	-	0.1	-	-
		Pacific Cod	455.4	-	1.4	-	*	0.2	-
		Arrowtooth	793	-	3	0.4	0	75.3	-
		Flathead Sole	59.7	-	0	-	-	5.2	-
		Rex Sole	109.8	-	1.4	0.2	-	6.1	-
		Flatfish, Shallow	245.8	-	*	0.6	-	5.1	-
		Rockfish	72.5	-	1	0.2	*	*	-
		Atka Mackerel	*	-	*	-	-	-	-
		All Targets	1855.9	10.7	21.6	2.6	0.1	101.9	-

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Table 12: Continued

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other salmon (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)
2012	Hook & Line	Sablefish	-	-	-	0.2	0	-	-
		Pacific Cod	-	-	-	-	-	3.1	0.1
		All Targets	-	-	-	0.2	0	3.1	0.1
	Pot	Pacific Cod	34.2	-	-	-	-	93.1	-
	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	-	-	-	*	-	-
		Pacific Cod	527.5	*	0.5	0	-	5.6	-
		Arrowtooth	591.1	*	0.3	0.1	-	73.3	-
		Flathead Sole	123.2	-	*	-	-	*	-
		Rex Sole	78.1	-	1	*	-	-	-
		Flatfish, Shallow	259.5	-	0.2	0.2	-	3.8	-
		Rockfish	73.3	-	1.6	0.3	0.1	0.1	-
		Other Ground-fish	*	-	-	-	-	-	-
		All Targets	1713	1.3	22.5	0.9	0.1	83.5	-
	All Gear	All Targets	1747.2	1.3	22.5	1.2	0.1	179.6	0.1

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, 2011 - 2012 (Metric tons (t) or number in 1,000s)

Year	Gear	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)
2011	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	-	-
		Sablefish	-	-	-	-	0	0.5	-	0
		Pacific Cod	546.7	*	0	0.1	4.4	1.2	19.9	57.7
		Arrowtooth	-	-	-	-	-	*	-	-
		Turbot	4.4	-	-	0.1	-	0.1	-	0
		Other Groundfish	*	-	-	-	-	-	-	-
		All Targets	551.1	*	0	0.2	4.5	1.8	19.9	57.8
	Pot	Sablefish	1.4	-	-	-	0.4	195.2	0.9	0.3
		Pacific Cod	5.1	-	-	-	16.5	1	285.5	131.9
		All Targets	6.4	-	-	-	16.9	196.2	286.4	132.3
	Trawl	Pollock, Bottom	146.6	31.6	1.4	9	0.6	-	7.5	2
		Pollock, Pelagic	235	345.6	24.1	184.5	*	*	2.9	4.3
		Pacific Cod	260.1	*	0.4	0.1	2.3	0.1	14.7	9.9
		Arrowtooth	180.8	0.2	-	*	*	2.9	2.9	2
		Kamchatka Flounder	92.7	-	-	-	-	10.5	*	*
		Flathead Sole	69.1	*	-	*	1.9	-	33.6	53.8
		Rock Sole	504.6	0.2	*	*	29.4	*	73.5	13.5
		Turbot	1	-	-	-	-	-	-	-
		Yellowfin	906.3	19	-	0.4	9.7	*	763.5	675.3
		Other Flatfish	8.4	-	-	-	*	-	2.3	1.6
		Rockfish	97.4	-	*	-	*	5.3	0.4	*
		Atka Mackerel	115.1	-	0.3	0.2	1.8	33.5	*	-
		Other Groundfish	*	-	-	-	-	-	-	-
		All Targets	2617.2	396.7	26.2	194.3	45.5	52.2	901.1	762.5

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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)
2012	Hook & Line	Sablefish	-	-	-	-	0	0.5	-	-
		Pacific Cod	606.5	*	0	0.1	3.9	1.4	15.6	29.6
		Kamchatka Flounder	*	-	*	-	-	-	-	-
		Turbot	5.5	-	-	0.1	-	0	0	0
		Rockfish	*	-	-	-	-	-	-	*
		All Targets	612	*	0	0.3	4	1.9	15.6	29.7
	Pot	Sablefish	*	-	-	-	-	*	-	*
		Pacific Cod	4.7	-	-	-	6.9	-	98.2	16
		All Targets	5.7	-	-	-	6.9	15.7	98.2	16
	Trawl	Pollock, Bottom	105.4	186	1.5	2.3	0.3	-	4.4	3.3
		Pollock, Pelagic	280.4	2166.5	9.9	20.1	*	-	1	2.8
		Pacific Cod	479.1	5.9	0.9	0	0.3	0.2	10	6.6
		Arrowtooth	425.3	0.1	*	*	*	5.1	1.8	3
		Kamchatka Flounder	97.2	-	-	-	*	6.2	*	-
		Flathead Sole	85.4	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	2.2
		Rockfish	76.5	-	0.3	*	*	7.3	*	-
		Atka Mackerel	177.9	0	*	1.2	1.8	6.4	-	*
		All Targets	3118.3	2375.6	12.5	23.9	33.6	25.5	427.8	624.9
	All Gear	All Targets	3735.9	2375.6	12.6	24.2	44.4	43.1	541.6	670.6

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, 2011 - 2012 (Metric tons per metric ton or numbers per metric ton)

		Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other salmon (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)
2011	Hook & Line	Sablefish	-	-	-	0.028	0.013	-	-
		Pacific Cod	-	-	-	-	-	0.31	-
		All Targets	-	-	-	0.009	0.004	0.176	-
	Pot	Pacific Cod	0.001	-	-	-	-	0.405	-
	Trawl	Pollock, Bottom	0.005	-	0.206	0.019	-	0.484	-
		Pollock, Pelagic	0	0	0.176	0.014	-	-	-
		Sablefish	0.013	-	-	-	0.428	-	-
		Pacific Cod	0.033	-	0.097	-	*	0.015	-
		Arrowtooth	0.023	-	0.088	0.011	0	2.199	-
		Flathead Sole	0.035	-	0.021	-	-	3.068	-
		Rex Sole	0.028	-	0.344	0.051	-	1.549	-
		Flatfish, Shallow	0.047	-	*	0.115	-	0.978	-
		Rockfish	0.003	-	0.043	0.009	*	*	-
		Atka Mackerel	*	-	*	-	-	-	-
		All Targets	0.011	0	0.131	0.016	0.001	0.621	-

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Table 14: Continued

Year	Gear	Target	Halibut (t)	Herring (t)	Chinook (1,000s)	Other salmon (1,000s)	Other King Crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)
2012	Hook & Line	Sablefish	-	-	-	0.02	0.002	-	-
		Pacific Cod	-	-	-	-	-	0.182	0.006
		All Targets	-	-	-	0.008	0.001	0.1	0.003
	Pot	Pacific Cod	0.002	-	-	-	-	4.256	-
	Trawl	Pollock, Bottom	0.003	0	0.427	0.003	-	0.023	-
		Pollock, Pelagic	0	0	0.143	0.003	-	0.004	-
		Sablefish	0.01	-	-	-	*	-	-
		Pacific Cod	0.026	*	0.026	0.001	-	0.275	-
		Arrowtooth	0.028	*	0.015	0.005	-	3.457	-
		Flathead Sole	0.06	-	*	-	-	*	-
		Rex Sole	0.026	-	0.332	*	-	-	-
		Flatfish, Shallow	0.041	-	0.038	0.033	-	0.602	-
		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	0.46	-
	All Gear	All Targets	0.007	0	0.096	0.005	0.001	0.767	0

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, determined by AKR staff, is based on processor, trip, processing mode, NMFS area and gear. The estimates of halibut PSC mortality are based on the International Pacific Halibut Commission discard mortality rates that were used for in-season management. The halibut 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, 2011 - 2012 (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)
2011	Hook & Line	Pollock, Bottom	*	-	-	-	-	-	-	-
		Sablefish	-	-	-	-	0.014	0.396	-	0.012
		Pacific Cod	0.004	*	0	0.001	0.031	0.008	0.138	0.4
		Arrowtooth	-	-	-	-	-	*	-	-
		Turbot	0.002	-	-	0.029	-	0.039	-	0.005
		Other Ground-fish	*	-	-	-	-	-	-	-
		All Targets	0.004	*	0	0.001	0.03	0.012	0.134	0.389
	Pot	Sablefish	0.002	-	-	-	0.671	319.363	1.536	0.549
		Pacific Cod	0	-	-	-	0.576	0.034	9.95	4.599
		All Targets	0	-	-	-	0.578	6.697	9.775	4.515
	Trawl	Pollock, Bottom	0.001	0	0.011	0.072	0.005	-	0.06	0.016
		Pollock, Pelagic	0	0	0.022	0.171	*	*	0.003	0.004
		Pacific Cod	0.006	*	0.01	0.003	0.051	0.002	0.33	0.222
		Arrowtooth	0.01	0	-	*	*	0.164	0.164	0.116
		Kamchatka Flounder	0.009	-	-	-	-	1.065	*	*
		Flathead Sole	0.009	*	-	*	0.242	-	4.308	6.911
		Rock Sole	0.007	0	*	*	0.41	*	1.026	0.188
		Turbot	0.118	-	-	-	-	-	-	-
		Yellowfin	0.005	0	-	0.002	0.048	*	3.794	3.356
		Other Flatfish	0.004	-	-	-	*	-	1.043	0.71
		Rockfish	0.004	-	*	-	*	0.22	0.018	*
		Atka Mackerel	0.002	-	0.005	0.003	0.031	0.576	*	-
		Other Ground-fish	*	-	-	-	-	-	-	-
		All Targets	0.002	0	0.016	0.118	0.028	0.032	0.549	0.465

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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)
2012	Hook & Line	Sablefish	-	-	-	-	0.005	0.346	-	-
		Pacific Cod	0.004	*	0	0.001	0.025	0.009	0.098	0.186
		Kamchatka Flounder	*	-	*	-	-	-	-	-
		Turbot	0.002	-	-	0.04	-	0.008	0.005	0.013
		Rockfish	*	-	-	-	-	-	-	*
		All Targets	0.004	*	0	0.002	0.024	0.011	0.095	0.181
	Pot	Sablefish	*	-	-	-	-	*	-	*
		Pacific Cod	0	-	-	-	0.237	-	3.389	0.551
		All Targets	0	-	-	-	0.232	0.533	3.327	0.541
	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	0.004	0.195	0.128
		Arrowtooth	0.02	0	*	*	*	0.239	0.086	0.142
		Kamchatka Flounder	0.01	-	-	-	*	0.616	*	-
		Flathead Sole	0.014	0	*	*	0.072	*	4.19	4.159
		Rock Sole	0.005	0	*	-	0.253	*	0.821	0.14
		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	0.115	-	*
		All Targets	0.002	0.001	0.008	0.014	0.02	0.015	0.258	0.376
	All Gear	All Targets	0.002	0.001	0.007	0.013	0.024	0.023	0.292	0.362

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 - 2012 ; calculations based on COAR ($ millions, base year = 2012)

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
1984	263.8	875	52	50	71.2	1312
1985	268.2	977.4	92.6	94.1	108.9	1541.1
1986	421.2	930.2	88.4	161.4	153.3	1754.5
1987	441.9	971.3	85.6	156.7	281.5	1937.1
1988	455.5	1440.2	108.3	127.8	468.3	2600.1
1989	561.7	1019.4	37.6	169.8	680.6	2469.2
1990	693.6	1067.8	46.9	169.7	877.9	2855.9
1991	579	577.1	55	176.2	898.1	2285.4
1992	617.2	1002.8	49.7	88.4	1243	3001.2
1993	603.5	718.5	25.9	98.5	810.7	2257
1994	572.1	756	38.5	150.9	869.8	2387.3
1995	476.2	834.7	65.8	100.2	1008.9	2485.8
1996	303.6	600.5	77.6	128.6	897.7	2008
1997	277.8	400	25.7	171.9	842.3	1717.7
1998	343.2	380.9	16.9	147.7	586.9	1475.6
1999	408.4	520.6	21.4	176.1	721.2	1847.7
2000	207	357.9	13.9	195.6	868.9	1643.3
2001	186.1	284	15.7	179.8	863.7	1529.3
2002	223.7	195.3	13.7	193.8	924.6	1551.2
2003	258.2	247.5	13.1	244.2	974.5	1737.5
2004	230.9	355.4	19.5	235.1	904.3	1745.2
2005	217.5	405.3	19	219.7	976.9	1838.4
2006	171	380.1	12	233.6	1017.9	1814.6
2007	223.2	457.8	18.2	257.4	972.4	1929
2008	292.2	466.9	28.9	235.8	1104.2	2128.1
2009	221.5	444.7	27.4	154.2	789.5	1637.3
2010	243.7	550.3	23.3	211.6	702.9	1731.9
2011	297.6	611.5	10.8	205.1	992.5	2117.5
2012	284.2	441.3	19.4	144.8	1054.6	1944.3

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2012 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 - 2012 ; calculations based on COAR.

Year	Shellfish	Salmon	Herring	Halibut	Groundfish
1984	20.1 %	66.7 %	4 %	3.8 %	5.4 %
1985	17.4 %	63.4 %	6 %	6.1 %	7.1 %
1986	24 %	53 %	5 %	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 %
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 %	31.7 %	1.6 %	6.3 %	36.4 %
1995	19.2 %	33.6 %	2.6 %	4 %	40.6 %
1996	15.1 %	29.9 %	3.9 %	6.4 %	44.7 %
1997	16.2 %	23.3 %	1.5 %	10 %	49 %
1998	23.3 %	25.8 %	1.1 %	10 %	39.8 %
1999	22.1 %	28.2 %	1.2 %	9.5 %	39 %
2000	12.6 %	21.8 %	0.8 %	11.9 %	52.9 %
2001	12.2 %	18.6 %	1 %	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	13.2 %	20.4 %	1.1 %	13.5 %	51.8 %
2005	11.8 %	22 %	1 %	12 %	53.1 %
2006	9.4 %	20.9 %	0.7 %	12.9 %	56.1 %
2007	11.6 %	23.7 %	0.9 %	13.3 %	50.4 %
2008	13.7 %	21.9 %	1.4 %	11.1 %	51.9 %
2009	13.5 %	27.2 %	1.7 %	9.4 %	48.2 %
2010	14.1 %	31.8 %	1.3 %	12.2 %	40.6 %
2011	14.1 %	28.9 %	0.5 %	9.7 %	46.9 %
2012	14.6 %	22.7 %	1 %	7.4 %	54.2 %

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, 2008 - 2012 ; calculations based on COAR ($/lb, round weight)

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska
	Year	Fixed	Trawl	Fixed	Trawl	All Gear
Pollock	2008	0.111	0.181	0.015	0.208	0.206
	2009	0.11	0.174	0.097	0.19	0.188
	2010	0.133	0.173	0.145	0.145	0.147
	2011	0.128	0.161	0.178	0.164	0.163
	2012	0.144	0.171	0.108	0.173	0.173
Sablefish	2008	3.276	2.02	2.934	1.162	3.123
	2009	3.452	3.338	2.573	1.281	3.286
	2010	4.077	3.267	4.257	1.604	4.021
	2011	5.463	3.986	5.105	1.79	5.28
	2012	4.421	3.231	3.522	1.014	4.179
Pacific Cod	2008	0.56	0.429	0.571	0.543	0.551
	2009	0.299	0.265	0.273	0.232	0.267
	2010	0.269	0.231	0.299	0.224	0.269
	2011	0.339	0.309	0.33	0.27	0.317
	2012	0.361	0.326	0.327	0.314	0.329
Flatfish	2008	0.279	0.142	0.045	0.171	0.166
	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	0.11	0.174	0.183	0.175
	2012	0.223	0.137	0.204	0.204	0.198
Rockfish	2008	0.605	0.169	0.628	0.171	0.184
	2009	0.572	0.091	0.596	0.175	0.144
	2010	0.536	0.123	0.642	0.228	0.186
	2011	0.531	0.156	0.537	0.348	0.271
	2012	0.665	0.265	0.49	0.289	0.286
Atka Mackerel	2008	*	0.195	0.015	0.17	0.17
	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	0.27
	2012	0.109	0.388	0.18	0.292	0.293

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, 2008 - 2012 ; 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	2008	70.8	8.9	79.7	1.9	3	4.9	72.7	11.8	84.6
		2009	64.9	7.2	72.1	3.2	3.5	6.6	68.1	10.7	78.7
		2010	73.4	5.9	79.3	5.8	5.3	11.1	79.2	11.1	90.4
		2011	107.8	9	116.9	7.3	4.7	11.9	115.1	13.7	128.8
		2012	98.1	6.8	105	5.5	3.7	9.1	103.6	10.5	114.1
	Pacific Cod	2008	10.9	6	16.9	1.7	115.8	117.5	12.6	121.8	134.4
		2009	7.2	3.6	10.8	0.4	60.2	60.6	7.6	63.8	71.4
		2010	7.6	4.9	12.5	0.5	57.7	58.2	8.1	62.6	70.7
		2011	10	6.1	16.1	0.8	84.2	85	10.8	90.4	101.1
		2012	12.5	3.7	16.2	0.6	93.1	93.7	13.1	96.8	109.9
	Flatfish	2008	0	0	0	*	0.1	0.1	0	0.2	0.2
		2009	0	0	0	*	0.1	0.1	0	0.1	0.1
		2010	0	0.1	0.1	*	0.1	0.1	0	0.2	0.2
		2011	0	0	0	*	0.9	0.9	0	1	1
		2012	0	0	0	*	1.3	1.3	0	1.3	1.3
	Rockfish	2008	1.3	0.2	1.5	0	0.2	0.2	1.3	0.4	1.7
		2009	1.1	0.1	1.2	0	0.3	0.3	1.2	0.4	1.6
		2010	1	0.1	1.1	0.1	0.5	0.6	1.1	0.6	1.7
		2011	0.9	0.1	1	0.1	0.2	0.2	1	0.3	1.2
		2012	1.4	0.2	1.6	0.1	0.2	0.3	1.4	0.4	1.8
	All Species	2008	83.6	15.2	98.8	3.6	123	126.6	87.2	138.3	225.5
		2009	73.7	11	84.8	3.7	66.3	69.9	77.4	77.3	154.7
		2010	82.6	11.1	93.8	6.4	65.3	71.7	89	76.4	165.4
		2011	119.4	15.6	135	8.1	95.9	104	127.5	111.5	239
		2012	113	10.8	123.8	6.2	101.5	107.7	119.1	112.4	231.5

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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
Pot	Pacific Cod	2008	29.5	*	29.5	19.9	5.9	25.8	49.5	5.9	55.4
		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	31.7	3.4	35.1
		2011	34.1	*	34.1	18.1	2.4	20.5	52.2	2.4	54.6
		2012	29.5	*	29.5	18.7	3.9	22.6	48.2	3.9	52
Trawl	Pollock	2008	19.3	0.2	19.5	238.5	210.9	449.4	257.8	211.1	468.9
		2009	15.4	0.5	15.9	180.8	154.5	335.3	196.2	155	351.2
		2010	28.4	0.4	28.8	135.1	122	257.1	163.5	122.4	285.9
		2011	27.7	0.4	28.1	227.1	202.3	429.4	254.9	202.6	457.5
		2012	38	0.4	38.4	241.4	216.2	457.5	279.4	216.6	495.9
	Sablefish	2008	1.9	1.6	3.5	0	0.7	0.7	1.9	2.3	4.2
		2009	3.3	2.6	5.9	0	0.5	0.5	3.3	3.1	6.4
		2010	3.3	2.9	6.1	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
	Pacific Cod	2008	15.4	1	16.4	34.2	31.4	65.6	49.6	32.4	82
		2009	5.6	0.8	6.4	12.5	16.8	29.2	18.1	17.6	35.7
		2010	9.3	0.6	9.9	12	17.1	29.1	21.3	17.7	38.9
		2011	9.9	0.8	10.7	18.3	25	43.3	28.2	25.8	54
		2012	13.1	0.9	14	29	31	60	42.1	31.9	74
	Flatfish	2008	8.3	2.7	11	1.7	87	88.7	9.9	89.7	99.6
		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	73.1	74.1	5.8	74.7	80.5
		2011	5	3.1	8.1	1.6	102.8	104.4	6.6	105.9	112.5
		2012	4.2	2.9	7.1	1.7	118.3	119.9	5.9	121.2	127.1

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Table 19: Continued

		Year	Gulf of Alaska Catcher Vessel	Gulf of Alaska Catcher Processor	Gulf of Alaska All Sectors	Bering Sea & Aleutian Islands Catcher Vessel	Bering Sea & Aleutian Islands Catcher Processor	Bering Sea & Aleutian Islands All Sectors	All Alaska Catcher Vessel	All Alaska Catcher Processor	All Alaska All Sectors
Trawl	Rockfish	2008	3.1	4.5	7.6	0.2	7	7.2	3.2	11.5	14.8
		2009	1.5	2.5	4	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	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
	Atka Mackerel	2008	0	0.3	0.3	0	21.3	21.3	0	21.6	21.6
		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	29.5	0.6	29.8	30.4
		2012	0	0.6	0.6	0.1	29.8	29.9	0.2	30.3	30.5
	All Species	2008	49.1	10.6	59.7	274.6	358.5	633.2	323.8	369.1	692.9
		2009	33.6	9.4	42.9	196	267.8	463.8	229.5	277.2	506.7
		2010	49.3	10.1	59.4	148.3	252.8	401.1	197.6	262.8	460.5
		2011	51.8	12.9	64.7	247.8	380.1	627.9	299.6	393	692.6
		2012	66	15.8	81.7	272.5	412.6	685.1	338.5	428.4	766.9
All Gear	Pollock	2008	19.3	0.2	19.5	238.5	211.1	449.5	257.8	211.3	469
		2009	15.4	0.5	15.9	180.8	155.3	336.2	196.2	155.9	352.1
		2010	28.4	0.4	28.8	135.1	123.1	258.2	163.5	123.5	287
		2011	27.8	0.4	28.1	227.1	204.1	431.2	254.9	204.5	459.3
		2012	38	0.4	38.5	241.4	217.2	458.6	279.4	217.6	497
	Sablefish	2008	72.7	10.5	83.2	7.7	3.6	11.3	80.4	14.1	94.5
		2009	68.2	9.8	78.1	6.8	3.9	10.7	75	13.7	88.7
		2010	76.7	8.7	85.4	5.8	5.6	11.4	82.5	14.3	96.9
		2011	112.4	12.5	124.9	13.2	5	18.2	125.6	17.5	143.1
		2012	101.1	9.5	110.6	5.5	4.2	9.7	106.6	13.7	120.3

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Table 19: Continued

		Year	Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
			Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
All Gear	Pacific Cod	2008	55.9	6.9	62.8	55.8	153.1	208.9	111.6	160.1	271.7
		2009	27	4.5	31.5	19.4	79.8	99.2	46.4	84.2	130.7
		2010	37.5	5.5	43	23.7	78.1	101.8	61.1	83.6	144.8
		2011	54	7	60.9	37.2	111.6	148.8	91.2	118.6	209.8
		2012	55.1	4.6	59.7	48.3	127.9	176.3	103.5	132.5	235.9
	Flatfish	2008	8.3	2.7	11	1.7	87.1	88.8	9.9	89.9	99.8
		2009	6.7	1.9	8.7	2.4	60.8	63.2	9.1	62.7	71.9
		2010	4.7	1.7	6.5	1	73.2	74.2	5.8	74.9	80.7
		2011	5	3.1	8.1	1.6	103.7	105.3	6.6	106.8	113.4
		2012	4.2	2.9	7.1	1.7	119.5	121.2	5.9	122.5	128.4
	Rockfish	2008	4.4	4.7	9.1	0.2	7.2	7.4	4.6	11.9	16.5
		2009	2.6	2.6	5.2	0.2	6.6	6.9	2.9	9.2	12.1
		2010	3.6	3.7	7.3	0.1	11.1	11.3	3.7	14.9	18.6
		2011	3.8	4.1	7.9	0.2	20.6	20.8	4.1	24.7	28.8
		2012	7.6	8.1	15.7	0.3	16.8	17.1	7.9	24.9	32.8
	Atka Mackerel	2008	0	0.3	0.3	0	21.3	21.3	0	21.6	21.6
		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	29.5	0.6	29.8	30.4
		2012	0	0.6	0.6	0.1	29.8	29.9	0.2	30.3	30.5
	All Species	2008	162.5	25.8	188.3	304	487.5	791.5	466.6	513.3	979.8
		2009	121.7	20.4	142.2	209.7	337	546.7	331.5	357.4	688.9
		2010	152.7	21.2	173.9	165.9	321.5	487.3	318.6	342.7	661.2
		2011	205.5	28.5	234.1	280	478.4	758.4	485.5	506.9	992.5
		2012	208.7	26.6	235.3	297.4	518	815.4	506.1	544.6	1050.7

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. Ex-vessel value is calculated using prices on Table 18a. Please refer to Table 18a 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, 2003 - 2012 ; 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	2003	62.5	20.2	0.5	6.2	11.3	2.4	68.6	31.5	2.9
	2004	61.5	23	0.1	3.7	8.2	1.8	65.3	31.2	2
	2005	55.1	25.3	0.3	3.9	11.5	1.9	59.1	36.7	2.2
	2006	59.9	31.4	0.2	6.3	14	3.8	66.1	45.4	4.1
	2007	66.7	29.9	0	5.3	16	2.5	72	45.8	2.5
	2008	78.9	34.2	0.3	9.1	16.7	3.6	88	50.9	3.9
	2009	62.3	25.9	*	4.9	7.3	1.6	67.2	33.2	1.6
	2010	73.1	30.2	*	7.6	11.5	3.2	80.7	41.6	3.2
	2011	109	44.8	*	12.2	15.8	4.1	121.3	60.6	4.1
	2012	101.7	41	*	14.4	10.8	3.6	116.1	51.7	3.6
Trawl	2003	3.2	22.8	-	2.8	84.4	91.8	6	107.2	91.8
	2004	4.4	23.7	-	*	80.4	87	4.4	104.1	87
	2005	8.1	28.9	-	*	89.5	106.7	8.1	118.4	106.7
	2006	7.7	33.4	-	*	95.3	114.3	7.7	128.7	114.3
	2007	8.7	34.2	-	*	93	100.4	8.7	127.2	100.4
	2008	10.8	38.1	*	*	109.1	122.2	10.8	147.3	122.2
	2009	6.5	27.1	-	*	74.4	86.4	6.5	101.5	86.4
	2010	10.3	39	-	*	58.7	66.1	10.3	97.8	66.1
	2011	8.2	43.6	-	*	100.8	106.7	8.2	144.4	106.7
	2012	15.4	50.6	-	*	111.3	119.8	15.4	161.9	119.8
All Gear	2003	65.7	43	0.5	8.9	95.7	94.2	74.6	138.7	94.6
	2004	65.9	46.7	0.1	3.7	88.6	88.8	69.7	135.3	89
	2005	63.2	54.1	0.3	3.9	101	108.6	67.1	155.1	108.9
	2006	67.5	64.8	0.2	6.3	109.3	118.1	73.8	174.1	118.3
	2007	75.4	64	0	5.3	108.9	102.9	80.7	173	103
	2008	89.6	72.4	0.3	9.1	125.8	125.8	98.7	198.2	126.1
	2009	68.7	53	*	4.9	81.7	88	73.6	134.7	88
	2010	83.4	69.2	*	7.6	70.2	69.3	91	139.4	69.3
	2011	117.2	88.4	*	12.2	116.5	110.8	129.4	204.9	110.8
	2012	117.1	91.6	*	14.4	122	123.4	131.5	213.6	123.4

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, 2003 - 2012 ; calculations based on COAR ($ thousands)

		Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
	Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	2003	66	169	96	92	140	160	72	199	169
	2004	63	177	31	69	110	102	66	194	103
	2005	61	212	60	60	179	128	64	243	148
	2006	65	253	57	103	222	350	71	307	371
	2007	68	274	9	74	275	209	72	330	211
	2008	74	335	74	117	274	359	81	395	353
	2009	63	273	*	72	155	200	66	284	178
	2010	73	321	*	112	239	358	79	365	323
	2011	101	487	*	170	282	514	111	518	457
	2012	94	500	*	228	234	404	106	488	363
Trawl	2003	95	380	-	162	1125	3529	158	1041	3529
	2004	193	439	-	*	1072	3223	177	1084	3223
	2005	299	566	-	*	1261	4103	299	1287	4103
	2006	307	695	-	*	1324	4395	307	1369	4395
	2007	336	743	-	*	1291	3863	336	1429	3863
	2008	399	867	*	*	1559	4365	399	1655	4365
	2009	239	616	-	*	1111	3199	239	1194	3199
	2010	428	908	-	*	947	2448	411	1222	2448
	2011	355	969	-	*	1460	3953	355	1760	3953
	2012	670	1076	-	*	1712	4277	670	1974	4277
All Gear	2003	69	251	96	111	617	2296	77	550	2201
	2004	67	267	31	61	599	1974	70	550	1934
	2005	70	336	60	56	754	2648	72	666	2656
	2006	73	402	57	98	816	3192	79	757	3198
	2007	77	427	9	68	845	2709	81	779	2710
	2008	84	513	59	110	968	3311	91	935	3233
	2009	69	396	*	65	723	2513	72	687	2444
	2010	82	524	*	106	638	1925	88	738	1873
	2011	108	664	*	168	932	3167	118	1051	3079
	2012	108	727	*	211	1099	3335	119	1155	3247

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, 2008 - 2012 ; calculations based on COAR ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2008	8.2	11.3	83.1	366.4	91.3	377.7
	2009	7	8.9	51.8	284.4	58.8	293.3
	2010	13.2	15.7	43.1	215.1	56.3	230.7
	2011	11.1	17	65.2	366	76.3	383
	2012	15	23.5	65.4	393.2	80.4	416.7
Sablefish	2008	43	40.2	3.3	8.2	46.3	48.5
	2009	41.2	36.9	3.2	7.4	44.5	44.3
	2010	44.3	41.1	4.5	11.7	48.8	52.8
	2011	65.5	59.4	7.7	10.7	73.2	70.1
	2012	57.2	53.4	4.9	8.6	62.2	62
Pacific Cod	2008	39.9	23.9	40.6	168.4	80.4	192.2
	2009	21.5	10	20.5	78.7	42	88.7
	2010	28.7	14.2	23.4	78.4	52.1	92.6
	2011	43.2	17.8	32.9	115.9	76.2	133.7
	2012	43.5	16.2	37.8	138.5	81.3	154.7
Flatfish	2008	2.9	8.1	20.2	68.6	23.1	76.7
	2009	3	5.7	16.6	46.6	19.6	52.2
	2010	2.3	4.2	20.4	53.8	22.7	58
	2011	1.7	6.4	8.1	97.3	9.8	103.6
	2012	1.3	5.8	1.4	119.8	2.8	125.6
Rockfish	2008	2.4	6.7	0.1	7.3	2.5	14
	2009	1.8	3.4	0.2	6.7	1.9	10.2
	2010	2.4	4.9	0.3	11	2.7	15.9
	2011	1.9	6.1	0.5	20.3	2.4	26.4
	2012	3.7	12	0.1	17	3.7	29
Atka Mackerel	2008	0	0.3	0	21.3	0	21.6
	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	29.9	0	30.5
All Groundfish	2008	97.6	91.6	147.8	643.9	245.4	735.6
	2009	75.7	66.5	92.6	454.2	168.3	520.7
	2010	92.2	81.7	91.9	400.2	184.1	481.9
	2011	125.1	109.1	115.3	643.3	240.4	752.4
	2012	122.2	113.1	110.2	709.1	232.4	822.2

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, 2007 - 2012 ; calculations based on COAR ($ millions)

Region	2007	2008	2009	2010	2011	2012
Bering Sea Pollock	211	260.1	172.5	168.1	254.4	225.1
AK Peninsula/Aleutians	27.9	24.2	11.3	5.5	12	19.6
Kodiak	56.1	67	41.7	59.9	77.4	87.7
South Central	24.6	26	25.5	27	44.8	37
Southeastern	30	36.3	30.8	33.6	44.8	43.3
All Regions	349.6	413.6	281.8	294.2	433.5	412.6

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, 2007 - 2012 ; calculations based on COAR (percent)

Region	2007	2008	2009	2010	2011	2012
Bering Sea Pollock	62.8	62	58.9	57.5	58.7	60.1
AK Peninsula/Aleutians	15.6	11.8	6.1	2.4	4.6	7.1
Kodiak	41.9	44	35.1	42.9	41.9	47.9
South Central	12.3	12.4	15.8	9.3	17.7	15.6
Southeastern	13.7	15	15.9	13.4	13.9	15.7
All Regions	32.8	33.6	29.5	24.5	29.8	30.6

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, 2008 - 2012 (1,000 metric tons product weight and million dollars)

		2008		2009		2010		2011		2012	
	Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pollock	Whole Fish	1.7	$ 1.3	2.04	$ 2.3	1.24	$ 1.6	2.01	$ 3.2	2.19	$ 2.2
	Head And Gut	24.3	$ 42.1	57.27	$ 85.7	60.81	$ 97	59.6	$ 115.4	48.15	$ 71.2
	Roe	20.79	$ 240.4	18.49	$ 162.9	16.45	$ 98	19.29	$ 152.9	18.16	$ 169.2
	Deep-Skin Fillets	42.39	$ 155.9	41.28	$ 166.6	40.28	$ 158.5	46.19	$ 171	55.49	$ 206.5
	Other Fillets	79.67	$ 301.2	76.57	$ 295	71.17	$ 263.8	120.72	$ 399.1	96.96	$ 314
	Surimi	125.7	$ 526.3	87.12	$ 249.8	103.59	$ 357.2	148.07	$ 415.2	167.04	$ 523.6
	Minced Fish	20.36	$ 40.2	22.1	$ 42.2	21.59	$ 41.6	30.99	$ 50.8	31.59	$ 54.3
	Fish Meal	43.89	$ 48.7	34.9	$ 42	38.32	$ 60.3	52.92	$ 82.5	52.52	$ 78.8
	Other Products	19.45	$ 21.2	22.91	$ 18.7	26.25	$ 26.3	33.97	$ 37.3	38.79	$ 48.6
	All Products	378.24	$ 1377.4	362.68	$ 1065.1	379.72	$ 1104.3	513.75	$ 1427.5	510.89	$ 1468.3
Sablefish	Head And Gut	7.32	$ 90.4	6.79	$ 87	6.7	$ 104.3	6.86	$ 138.3	7.52	$ 113.4
	Other Products	0.99	$ 8.6	0.68	$ 7.1	0.49	$ 5.2	0.81	$ 9.1	0.63	$ 3.4
	All Products	8.32	$ 99	7.47	$ 94	7.18	$ 109.5	7.67	$ 147.4	8.16	$ 116.8

Continued on next page.

Table 25: Continued

		2008		2009		2010		2011		2012	
	Product	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pacific Cod	Whole Fish	3.28	$ 4.7	4.58	$ 5.5	3.01	$ 2.9	2.47	$ 3.7	3.27	$ 4.8
	Head And Gut	82	$ 334.5	72.28	$ 186.7	80.32	$ 232.4	106.07	$ 348.8	119.6	$ 354.3
	Salted/Split	1.58	$ 5	0.02	$ 0	*	$ *	*	$ *	*	$ *
	Roe	3.81	$ 11.4	2.98	$ 4.6	5.05	$ 6.6	3.17	$ 4.9	3.86	$ 7.1
	Fillets	9.47	$ 82.9	11.48	$ 67.1	14.8	$ 86.8	15.79	$ 106.2	15.84	$ 103.8
	Other Products	10.51	$ 18.3	8.96	$ 16.3	12.29	$ 22.6	15.06	$ 33.2	14.17	$ 25.2
	All Products	110.65	$ 456.8	100.29	$ 280.1	115.47	$ 351.3	142.56	$ 496.9	156.75	$ 495.3
Flatfish	Whole Fish	16.99	$ 22.3	17.26	$ 22.7	18.51	$ 20.6	20.47	$ 28.8	25.07	$ 37.9
	Head And Gut	117.12	$ 169.8	101.13	$ 121.9	119.38	$ 152.3	141.36	$ 222.1	141.56	$ 240.5
	Kirimi	*	$ *	*	$ *	*	$ *	*	$ *	*	$ *
	Fillets	0.12	$ 0.5	0.04	$ 0.2	0.02	$ 0.1	0.03	$ 0.1	0.02	$ 0.1
	Fish Meal	-	$ -	-	$ -	-	$ -	0	$ 0	0	$ 0
	Other Products	2.32	$ 3.5	4	$ 6.5	4.28	$ 9.2	3.46	$ 8.1	3.12	$ 6.4
	All Products	136.54	$ 196	122.43	$ 151.3	142.19	$ 182.2	165.32	$ 259.1	169.77	$ 284.9
Rockfish	Whole Fish	1.73	$ 3.8	2.28	$ 4.3	3.44	$ 6.8	3.61	$ 8.5	3.24	$ 7
	Head And Gut	17.79	$ 34.1	16.14	$ 31.6	20.17	$ 50.5	22.32	$ 84	22.66	$ 72.6
	Other Products	0.82	$ 2.6	0.49	$ 2.4	0.54	$ 2.2	0.43	$ 2.4	0.69	$ 5.2
	All Products	20.35	$ 40.5	18.91	$ 38.4	24.15	$ 59.4	26.35	$ 94.9	26.59	$ 84.7
Atka Mackerel	Whole Fish	2.89	$ 2	3.66	$ 3.3	2.15	$ 1.7	5.33	$ 5.3	5.63	$ 7.7
	Head And Gut	30.04	$ 47	37.34	$ 64.3	37.84	$ 72.7	27.41	$ 69.6	24.51	$ 67
	Other Products	0	$ 0	0	$ 0	0	$ 0	0	$ 0	0.03	$ 0
	All Products	32.94	$ 49.1	41.01	$ 67.7	39.99	$ 74.4	32.74	$ 74.9	30.17	$ 74.7
All Species	Total	694.32	$ 2233.7	658.91	$ 1708.6	713.7	$ 1890.5	893.19	$ 2511.9	907.8	$ 2539.9

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, 2008 - 2012 (dollars)

		2008		2009		2010		2011		2012	
	Product	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Pollock	Whole Fish	$ 0.31	$ 0.36	$ 0.82	$ 0.34	$ 0.44	$ 0.58	$ 0.66	$ 0.73	$ 0.54	$ 0.45
	Head And Gut	$ 0.78	$ 0.8	$ 0.51	$ 0.8	$ 0.74	$ 0.72	$ 1	$ 0.65	$ 0.73	$ 0.6
	Roe	$ 6.01	$ 4.28	$ 4.83	$ 3.15	$ 3.51	$ 2	$ 3.94	$ 3.07	$ 5.03	$ 3.38
	Deep-Skin Fillets	$ 1.76	$ 1.51	$ 1.98	$ 1.55	$ 1.89	$ 1.57	$ 1.75	$ 1.52	$ 1.7	$ 1.67
	Other Fillets	$ 1.78	$ 1.65	$ 1.7	$ 1.79	$ 1.64	$ 1.72	$ 1.46	$ 1.53	$ 1.42	$ 1.52
	Surimi	$ 2	$ 1.79	$ 1.37	$ 1.23	$ 1.75	$ 1.37	$ 1.39	$ 1.16	$ 1.61	$ 1.26
	Minced Fish	$ 0.91	$ 0.87	$ 0.85	$ 0.98	$ 0.87	$ 0.89	$ 0.76	$ 0.7	$ 0.79	$ 0.74
	Fish Meal	$ 0.65	$ 0.43	$ 0.67	$ 0.48	$ 0.86	$ 0.63	$ 0.79	$ 0.65	$ 0.86	$ 0.56
	Other Products	$ 0.61	$ 0.46	$ 0.47	$ 0.31	$ 0.58	$ 0.37	$ 0.6	$ 0.44	$ 0.67	$ 0.53
	All Products	$ 1.83	$ 1.46	$ 1.45	$ 1.22	$ 1.49	$ 1.16	$ 1.36	$ 1.15	$ 1.44	$ 1.17
Pacific Cod	Whole Fish	$ 0.56	$ 0.7	$ 0.54	$ 0.54	$ 0.41	$ 0.45	$ 0.49	$ 0.73	$ 0.57	$ 0.73
	Head And Gut	$ 1.92	$ 1.68	$ 1.21	$ 0.92	$ 1.4	$ 1.01	$ 1.56	$ 1.31	$ 1.41	$ 1.18
	Salted/Split	$ -	$ 1.43	$ -	$ 1.19	$ -	$ *	$ -	$ *	$ -	$ *
	Roe	$ 1.27	$ 1.39	$ 0.64	$ 0.72	$ 0.58	$ 0.6	$ 0.76	$ 0.7	$ 0.81	$ 0.84
	Fillets	$ 3.71	$ 3.99	$ 2.9	$ 2.63	$ 2.41	$ 2.67	$ 2.43	$ 3.08	$ 2.49	$ 2.98
	Other Products	$ 0.8	$ 0.79	$ 0.82	$ 0.82	$ 1.03	$ 0.77	$ 1.25	$ 0.89	$ 0.9	$ 0.78
	All Products	$ 1.86	$ 1.89	$ 1.19	$ 1.43	$ 1.38	$ 1.38	$ 1.54	$ 1.65	$ 1.38	$ 1.51
Sablefish	Head And Gut	$ 5.16	$ 5.71	$ 5.4	$ 5.91	$ 6.4	$ 7.19	$ 7.85	$ 9.38	$ 5.32	$ 7.09
	Other Products	$ 1.58	$ 4.09	$ 1.27	$ 5.13	$ 1.94	$ 5.51	$ 1.2	$ 6.06	$ 1.29	$ 2.58
	All Products	$ 4.98	$ 5.49	$ 5.17	$ 5.83	$ 6.04	$ 7.08	$ 6.96	$ 9.04	$ 5.04	$ 6.74

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Table 26: Continued

	Product	2008 At-sea	2008 Shoreside	2009 At-sea	2009 Shoreside	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside
Deep-Water Flatfish	Whole Fish	$ *	$ *	$ -	$ 0.47	$ -	$ 0.4	$ -	$ 0.42	$ *	$ *
	Head And Gut	$ *	$ 0.59	$ *	$ *	$ -	$ 0.53	$ -	$ 0.62	$ 0.9	$ 0.64
	Kirimi	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ -
	Fillets	$ -	$ 2.19	$ -	$ 2.03	$ -	$ 1.51	$ -	$ 2.01	$ -	$ *
	Other Products	$ -	$ -	$ -	$ *	$ -	$ -	$ *	$ -	$ -	$ -
	All Products	$ *	$ 0.72	$ *	$ 1.12	$ -	$ 0.63	$ *	$ 0.58	$ 0.9	$ 0.64
Shallow-Water Flatfish	Whole Fish	$ *	$ 0.57	$ *	$ 0.39	$ *	$ 0.51	$ *	$ 0.63	$ *	$ 0.63
	Head And Gut	$ 0.64	$ 0.6	$ 0.51	$ 0.78	$ 0.63	$ 0.56	$ 0.64	$ 0.68	$ 0.77	$ 0.7
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ 2.54	$ -	$ 2.72	$ -	$ 1.58	$ -	$ 2.06	$ -	$ 2.15
	Other Products	$ -	$ *	$ -	$ *	$ -	$ 0.81	$ -	$ 0.14	$ -	$ *
	All Products	$ 0.64	$ 1.05	$ 0.51	$ 0.98	$ 0.63	$ 0.66	$ 0.64	$ 0.78	$ 0.77	$ 0.82
Arrowtooth	Whole Fish	$ *	$ 0.62	$ *	$ 0.81	$ *	$ 0.41	$ -	$ 0.65	$ *	$ 0.47
	Head And Gut	$ 0.61	$ 0.48	$ 0.47	$ 0.45	$ 0.47	$ 0.37	$ 0.69	$ 0.54	$ 0.81	$ 0.57
	Kirimi	$ *	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ -	$ *	$ -	$ *	$ -	$ *	$ *	$ *	$ -	$ *
	Other Products	$ 0.74	$ 0.05	$ 0.58	$ 0.37	$ 0.82	$ 0.71	$ 0.77	$ 0.85	$ 0.75	$ 0.46
	All Products	$ 0.61	$ 0.46	$ 0.47	$ 0.45	$ 0.47	$ 0.48	$ 0.69	$ 0.57	$ 0.81	$ 0.56
Flathead Sole	Whole Fish	$ 0.45	$ 0.49	$ 0.4	$ 0.39	$ 0.46	$ 0.49	$ 0.59	$ 0.53	$ 0.76	$ 0.62
	Head And Gut	$ 0.79	$ 0.55	$ 0.61	$ 0.66	$ 0.7	$ 0.55	$ 0.89	$ 0.53	$ 0.93	$ 0.61
	Kirimi	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ *
	Fillets	$ *	$ 2.07	$ -	$ 2.45	$ -	$ 1.9	$ *	$ 2.15	$ *	$ 2
	Other Products	$ 0.7	$ 0.06	$ 0.56	$ 0.37	$ 0.88	$ 0.56	$ 0.82	$ 0.73	$ 0.75	$ 0.37
	All Products	$ 0.79	$ 0.54	$ 0.6	$ 0.53	$ 0.69	$ 0.56	$ 0.89	$ 0.6	$ 0.91	$ 0.59

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Table 26: Continued

	Product	2008 At-sea	2008 Shoreside	2009 At-sea	2009 Shoreside	2010 At-sea	2010 Shoreside	2011 At-sea	2011 Shoreside	2012 At-sea	2012 Shoreside
Rex Sole	Whole Fish	$ 1	$ 0.91	$ 0.86	$ 0.9	$ 0.91	$ 0.91	$ 1.12	$ 1.02	$ 1.17	$ 1.12
	Head And Gut	$ *	$ 0.61	$ *	$ *	$ *	$ *	$ *	$ *	$ *	$ *
	Kirimi	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ *
	Fillets	$ -	$ 1.76	$ -	$ *	$ -	$ *	$ -	$ 1.83	$ -	$ *
	Other Products	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ 0.74	$ -	$ *
	All Products	$ 1	$ 0.97	$ 0.86	$ 0.9	$ 0.91	$ 0.91	$ 1.12	$ 1.03	$ 1.17	$ 1.12
Rock Sole	Whole Fish	$ 0.41	$ *	$ 0.38	$ *	$ 0.35	$ 0.43	$ 0.53	$ *	$ 0.66	$ *
	Head And Gut	$ 0.62	$ -	$ 0.51	$ -	$ 0.56	$ -	$ 0.69	$ -	$ 0.8	$ -
	Head And Gut With Roe	$ 1.23	$ -	$ 0.89	$ -	$ 0.84	$ -	$ 1.05	$ -	$ 1.28	$ -
	Fillets	$ -	$ -	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -
	Other Products	$ 0.7	$ 0.05	$ 0.59	$ 0.37	$ 0.87	$ 0.56	$ 0.84	$ 0.74	$ 0.71	$ 0.37
	All Products	$ 0.77	$ 0.05	$ 0.61	$ 0.37	$ 0.61	$ 0.55	$ 0.77	$ 0.74	$ 0.91	$ 0.37
Turbot	Whole Fish	$ *	$ -	$ *	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Head And Gut	$ 1.44	$ *	$ 1.4	$ -	$ 1.8	$ -	$ 2.64	$ *	$ 2.09	$ -
	Other Products	$ 1.54	$ 0.05	$ 1.5	$ 0.37	$ 1.6	$ 0.56	$ 1.89	$ 0.7	$ 1.59	$ 0.37
	All Products	$ 1.46	$ 0.05	$ 1.43	$ 0.37	$ 1.74	$ 0.56	$ 2.44	$ 0.68	$ 1.96	$ 0.37
Yellowfin	Whole Fish	$ 0.51	$ *	$ 0.48	$ *	$ 0.41	$ -	$ 0.55	$ -	$ 0.63	$ *
	Head And Gut	$ 0.61	$ -	$ 0.5	$ -	$ 0.54	$ -	$ 0.65	$ -	$ 0.63	$ -
	Kirimi	$ *	$ -	$ *	$ -	$ *	$ -	$ *	$ -	$ -	$ -
	Fillets	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ *	$ -
	Other Products	$ 0.7	$ 0.05	$ 0.7	$ 0.37	$ 0.96	$ 0.96	$ 0.85	$ 0.85	$ 0.87	$ 0.88
	All Products	$ 0.59	$ 0.05	$ 0.5	$ 0.37	$ 0.52	$ 0.96	$ 0.63	$ 0.85	$ 0.63	$ 0.88

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Table 26: Continued

		2008		2009		2010		2011		2012	
	Product	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Flat Other	Whole Fish	$ 1.05	$ *	$ 0.99	$ 0.7	$ 0.86	$ *	$ 1.05	$ 1.4	$ 0.81	$ *
	Head And Gut	$ 0.43	$ *	$ 0.44	$ -	$ 0.46	$ *	$ 0.51	$ *	$ 0.58	$ -
	Fillets	$ -	$ *	$ -	$ -	$ -	$ -	$ *	$ -	$ -	$ -
	Other Products	$ 0.7	$ 0.05	$ 0.67	$ 0.38	$ 0.97	$ 0.56	$ 0.84	$ 0.74	$ 0.87	$ 0.37
	All Products	$ 0.55	$ 0.05	$ 0.55	$ 0.53	$ 0.52	$ 0.56	$ 0.56	$ 1.34	$ 0.64	$ 0.37
Rockfish	Whole Fish	$ 1.57	$ 0.82	$ 1.1	$ 0.77	$ 1.26	$ 0.74	$ 1.49	$ 0.94	$ 0.96	$ 0.98
	Head And Gut	$ 0.83	$ 1.11	$ 0.85	$ 1.14	$ 1.11	$ 1.32	$ 1.7	$ 1.74	$ 1.4	$ 1.75
	Other Products	$ 1.12	$ 1.47	$ 1.07	$ 2.27	$ 1.09	$ 1.83	$ 1.24	$ 2.76	$ 1.19	$ 3.48
	All Products	$ 0.85	$ 1.09	$ 0.86	$ 1.13	$ 1.12	$ 1.11	$ 1.69	$ 1.42	$ 1.38	$ 1.67
Atka Mackerel	Whole Fish	$ 0.32	$ -	$ 0.41	$ *	$ 0.37	$ *	$ 0.45	$ 0.54	$ 0.62	$ 0.7
	Head And Gut	$ 0.71	$ -	$ 0.78	$ -	$ 0.87	$ -	$ 1.15	$ *	$ 1.24	$ -
	Other Products	$ 0.05	$ 0.05	$ 0.45	$ 0.16	$ 0.56	$ 0.56	$ 0.64	$ 0.47	$ 0.73	$ 0.36
	All Products	$ 0.68	$ 0.05	$ 0.75	$ 0.16	$ 0.84	$ 0.56	$ 1.04	$ 0.54	$ 1.13	$ 0.66

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, 2006-10, 2008 - 2012 (dollars)

		Bering Sea & Aleutian Islands					Gulf of Alaska				
	Species	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Motherships	Pollock	1354	1034	-	1219	1153	-	-	-	-	-
	Pacific Cod	1389	666	-	404	950	-	-	-	-	-
Catcher processors	Pollock	1442	1330	1321	1196	1206	649	614	661	882	668
	Sablefish	6911	7583	8676	10176	7855	6934	7264	8727	11318	6793
	Pacific Cod	2033	1246	1494	1688	1506	2059	1289	1425	1622	1479
	Flatfish	775	703	745	915	1002	998	1190	1063	992	1084
	Rockfish	963	959	1308	1967	1572	964	963	1300	2058	1568
	Atka Mackerel	851	949	1131	1484	1581	919	1090	1135	1694	1855
	Other	404	278	460	483	680	1295	1048	1082	1592	2085
Shoreside processors	Pollock	1254	1279	1256	1047	1089	973	852	882	920	865
	Sablefish	5514	5786	12133	11392	9208	7451	7994	9387	12221	8850
	Pacific Cod	2109	1137	1458	1682	1632	1971	1414	1334	1573	1465
	Flatfish	228	239	541	815	741	408	324	346	513	549
	Rockfish	350	893	1641	1745	1668	1146	1227	1330	1879	1840
	Other	297	195	708	424	888	5752	3773	2762	2836	3464

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, 2008 - 2012 (1,000 metric tons product weight)

		Bering Sea & Aleutian Islands					Gulf of Alaska				
	Product	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Pollock	Whole Fish	1	1.4	0.7	1.5	1.7	0.7	0.7	0.5	0.5	0.5
	Head And Gut	18.6	51.3	49.2	44.8	29.1	5.7	6	11.6	14.8	19
	Roe	19.7	17.9	15.3	18	16.5	1.1	0.6	1.1	1.3	1.7
	Deep-Skin Fillets	42.4	41.3	40.3	46.2	55.5	-	*	*	*	*
	Other Fillets	77.3	74	66.5	115	91.1	2.3	2.6	4.7	5.7	5.9
	Surimi	121.3	84.6	97.1	141	157.1	4.4	2.5	6.5	7.1	9.9
	Minced Fish	20.4	22.1	21.6	30.4	31	*	*	*	0.5	0.6
	Fish Meal	43.9	34.9	38.3	52.8	52.5	*	*	*	0.1	*
	Other Products	19	22.6	25.4	33.3	38.2	0.4	0.4	0.8	0.6	0.6
Sablefish	Head And Gut	1	1	1.2	1	1.2	6.4	5.8	5.5	5.9	6.3
	Other Products	0	0	0	0	0.1	1	0.6	0.4	0.8	0.6
Pacific Cod	Whole Fish	1.4	2.7	0.9	1.2	1.5	1.9	1.9	2.1	1.3	1.8
	Head And Gut	69.9	65.2	66.4	88.8	104.2	12.1	7.1	13.9	17.3	15.4
	Salted/Split	1.1	*	*	*	*	0.5	0	*	*	-
	Roe	2.6	2.2	3.9	1.8	2.4	1.2	0.7	1.2	1.3	1.5
	Fillets	3.6	4.7	5.6	6.6	6.8	5.9	6.7	9.2	9.2	9.1
	Other Products	5.7	5	7	9	7.9	4.8	3.9	5.2	6	6.3
Flatfish	Whole Fish	14	12.5	14.9	17.4	22.5	3	4.8	3.6	3.1	2.5
	Head And Gut	109	95.6	114.2	130.1	133.8	8.1	5.5	5.2	11.3	7.8
	Kirimi	*	*	*	*	-	*	*	*	*	*
	Fillets	*	-	-	*	*	0.1	0	0	0	0
	Fish Meal	-	-	-	0	0	-	-	-	-	-
	Other Products	2.3	4	3.4	3.1	3.1	0	*	0.9	0.3	0.1
Rockfish	Whole Fish	0.2	0.2	0.2	0.7	1.3	1.6	2.1	3.2	3	1.9
	Head And Gut	9.4	8	10.9	13.4	12.3	8.4	8.1	9.3	8.9	10.4
	Other Products	0	0	0	0	0.1	0.8	0.5	0.5	0.4	0.6
Atka Mackerel	Whole Fish	2.9	3.7	2.2	5.3	5.6	-	*	-	-	*
	Head And Gut	29.6	36.8	37.3	26.9	24.2	0.4	0.6	0.5	0.5	0.4
	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, 2008 - 2012 (1,000 metric tons product weight)

		At-sea					Shoreside				
	Product	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Pollock	Whole Fish	0.09	0.7	0.04	0.11	0.24	1.61	1.35	1.2	1.9	1.95
	Head And Gut	17.42	23.81	19.8	38.83	26.05	6.88	33.46	41.01	20.77	22.1
	Roe	11.65	9.3	7.64	11.66	9.3	9.14	9.2	8.81	7.63	8.86
	Deep-Skin Fillets	27.32	26.65	27.51	32.25	36.84	15.07	14.63	12.78	13.94	18.65
	Other Fillets	40.68	37.75	31.29	58.32	47.55	38.99	38.82	39.88	62.4	49.41
	Surimi	64.93	44.03	52.78	70.8	77.93	60.77	43.08	50.81	77.27	89.11
	Minced Fish	14.8	19.34	17.75	23.49	25.06	5.56	2.76	3.83	7.5	6.53
	Fish Meal	15.35	12.3	14.64	22.58	21.08	28.54	22.6	23.67	30.34	31.44
	Other Products	4.3	8.59	10.63	12.26	10.57	15.15	14.32	15.62	21.71	28.22
Sablefish	Head And Gut	1.4	1.27	1.03	1.03	1.08	5.92	5.52	5.67	5.83	6.44
	Other Products	0.07	0.07	0.09	0.16	0.08	0.92	0.61	0.4	0.65	0.55
Pacific Cod	Whole Fish	1.14	2.76	0.84	0.63	1.28	2.14	1.82	2.17	1.84	1.99
	Head And Gut	59.41	62.23	61.53	78.5	86.91	22.59	10.05	18.79	27.57	32.69
	Salted/Split	-	-	-	-	-	1.58	0.02	*	*	*
	Roe	1.15	0.89	0.57	0.46	0.62	2.66	2.09	4.48	2.71	3.24
	Fillets	0.72	0.96	0.85	0.71	0.32	8.75	10.52	13.95	15.08	15.52
	Other Products	2.13	2.04	3.02	4.62	3.11	8.38	6.92	9.26	10.44	11.06
Flatfish	Whole Fish	16.01	15.59	17.32	18.86	23.86	0.98	1.67	1.19	1.62	1.2
	Head And Gut	112.28	97.07	116.5	136.15	138.21	4.83	4.06	2.88	5.21	3.35
	Kirimi	*	*	*	*	-	*	*	*	*	*
	Fillets	*	-	-	*	*	0.12	0.04	0.02	0.03	0.02
	Fish Meal	-	-	-	0	0	-	-	-	-	*
	Other Products	1.66	2.3	2.45	2.46	2.23	0.66	1.69	1.83	1	0.89
Rockfish	Whole Fish	0.38	0.63	1.01	0.82	1.17	1.36	1.65	2.43	2.78	2.07
	Head And Gut	15.49	14.05	17.54	19.73	19.42	2.31	2.08	2.63	2.59	3.23
	Other Products	0.01	0.01	0.02	0.06	0.03	0.81	0.49	0.52	0.37	0.66
Atka Mackerel	Whole Fish	2.89	3.66	2.15	5.07	5.43	-	*	*	0.25	0.2
	Head And Gut	30.04	37.34	37.84	27.41	24.51	-	-	-	*	-
	Other Products	0	0	0	0	0	0	0	0	0	0.03

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, 2008 - 2012 (1,000 metric tons product weight and $ millions, base year = 2012)

		Bering Sea & Aleutian Islands		Gulf of Alaska		All Alaska	
	Species	Quantity	Value	Quantity	Value	Quantity	Value
2008	Salmon	54.8	$ 355.5	153.6	$ 848.1	208.4	$ 1203.5
	Halibut	2.9	$ 37.8	16.2	$ 224.5	19.1	$ 262.3
	Herring	16.8	$ 22.1	17.5	$ 38.7	34.3	$ 60.7
	Crab	20	$ 284.7	4.7	$ 66.1	24.8	$ 350.8
	Other	*	$ *	2.8	$ 18.8	2.8	$ 18.8
	All Species	94.5	$ 700	194.8	$ 1196.1	289.4	$ 1896.1
2009	Salmon	58.1	$ 391.1	152	$ 754.5	210.1	$ 1145.6
	Halibut	2.7	$ 27.8	16.1	$ 179.6	18.8	$ 207.4
	Herring	18.5	$ 26.7	17.1	$ 39.2	35.6	$ 65.9
	Crab	20.6	$ 244.2	5.2	$ 60.4	25.9	$ 304.7
	Other	*	$ *	1.4	$ 21.4	1.4	$ 21.4
	All Species	99.9	$ 689.8	191.9	$ 1055.1	291.8	$ 1744.9
2010	Salmon	63.3	$ 474.7	187.1	$ 955.9	250.4	$ 1430.6
	Halibut	2.5	$ 45.7	13.5	$ 201.4	16	$ 247.1
	Herring	24.9	$ 28.1	22.2	$ 34.7	47.2	$ 62.8
	Crab	18.6	$ 249.5	4.2	$ 59.1	22.9	$ 308.6
	Other	0.2	$ 1.2	1.5	$ 26.8	1.8	$ 28
	All Species	109.5	$ 799.2	228.6	$ 1278	338.1	$ 2077.2
2011	Salmon	48.6	$ 400.8	198.7	$ 1038.4	247.3	$ 1439.2
	Halibut	2.8	$ 53.6	8.2	$ 140.8	11	$ 194.4
	Herring	20.4	$ 21.3	21	$ 22.1	41.4	$ 43.4
	Crab	19.5	$ 321.5	4.6	$ 74.9	24.1	$ 396.4
	Other	*	$ *	1.3	$ 22.7	1.3	$ 22.7
	All Species	91.3	$ 797.3	233.8	$ 1298.8	325.1	$ 2096.1
2012	Salmon	39.8	$ 323.1	168.3	$ 964.7	208.1	$ 1287.8
	Halibut	2	$ 33.6	8.5	$ 129.1	10.5	$ 162.7
	Herring	12.9	$ 16.8	15.4	$ 29.3	28.3	$ 46.1
	Crab	29	$ 366.2	4.5	$ 66.9	33.5	$ 433.1
	Other	0	$ 0	1.7	$ 32.6	1.7	$ 33.3
	All Species	83.6	$ 740.3	198.5	$ 1222.6	282.1	$ 1963

Notes: These estimates include production resulting from catch in both federal and state of Alaska fisheries. The data have been adjusted to 2012 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 - 2012 ($ 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	1431.5
1993	585.1	195.5	45.7	170.3	996.6
1994	640.1	267.2	37.1	186	1130.4
1995	784.7	349.3	46	212.1	1392.1
1996	706	296.1	48.5	181.1	1231.7
1997	706.3	293.2	30.2	200.9	1230.5
1998	599.4	258.3	28.3	184.4	1070.4
1999	639	325.3	43	209.5	1216.7
2000	691.9	416.1	41.5	209.5	1359
2001	877.6	464.5	31	167.1	1540.1
2002	810.3	477.5	36.5	157.6	1482
2003	850.5	520.8	39.4	148.1	1558.9
2004	955	519	32.6	167.6	1674.2
2005	1128.4	625.9	36.6	211.9	2002.8
2006	1174.7	610.2	48.3	221.3	2054.5
2007	1204.7	614.8	46.2	226.4	2092.1
2008	1298.2	641	47.3	253.6	2240.2
2009	978.4	498.3	41.1	194.1	1711.8
2010	1064.9	518.7	50.3	262.4	1896.3
2011	1451.7	656.1	69	339.2	2515.9
2012	1470.3	699.4	51.8	322.4	2543.9

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, 2007 - 2012 ($ millions)

		Bering Sea & Aleutian Islands			Gulf of Alaska	
	Year	125-165	<125	>165	<125	>=125
Fixed Gear	2007	91.3	44.5	57	13.1	8
	2008	102.2	58.7	60.5	10	11
	2009	75.4	40.7	37.7	8.7	7.1
	2010	80.3	44.1	44.9	7.5	11.4
	2011	117.7	58.3	62.3	11.7	11.8
	2012	111.8	64.9	57.5	6.9	6.2
Fillet Trawl	2007	-	-	*	-	-
	2008	-	-	*	-	-
	2009	-	-	56.8	-	-
	2010	-	-	*	-	-
	2011	-	-	76.8	-	-
Head And Gut Trawl	2007	37.9	39.1	178.2	7.9	16.8
	2008	45.2	40.3	193.7	9.4	16.3
	2009	38.7	28	173.8	9.1	16.2
	2010	48.9	33.7	207.9	7.6	23.8
	2011	64.4	47.9	288.5	8.4	37.1
	2012	74.2	48.4	306.4	9.5	28.4
Surimi Trawl	2007	-	-	633.7	-	-
	2008	-	-	625.7	-	-
	2009	-	-	442.3	-	-
	2010	-	-	479.5	-	-
	2011	-	-	601.4	-	-
	2012	-	-	685.5	-	-
All Trawl	2007	37.9	39.1	811.9	7.9	16.8
	2008	45.2	40.3	819.4	9.4	16.3
	2009	38.7	28	672.8	9.1	16.2
	2010	48.9	33.7	687.4	7.6	23.8
	2011	64.4	47.9	966.7	8.4	37.1
	2012	74.2	48.4	991.9	9.5	28.4

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 2007 - 2012 ($ millions)

		Bering Sea & Aleutian Islands			Gulf of Alaska	
	Year	125-165	<125	>165	<125	>=125
Fixed Gear	2007	5.1	3.7	5.2	1.2	0.7
	2008	5.7	3.9	5.5	0.9	0.8
	2009	4.2	3.1	3.4	0.9	0.5
	2010	4.7	2.9	4.5	0.8	1
	2011	7.8	4.2	7.8	1.5	1.1
	2012	7.5	5	6.4	1	0.8
Fillet Trawl	2007	-	-	*	-	-
	2008	-	-	*	-	-
	2009	-	-	18.9	-	-
	2010	-	-	*	-	-
	2011	-	-	25.6	-	-
Head And Gut Trawl	2007	9.5	6.5	14.9	2	1.5
	2008	11.3	6.7	16.1	2.4	1.6
	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	2.1	2.9
	2012	18.6	9.7	23.6	2.4	2.2
Surimi Trawl	2007	-	-	39.6	-	-
	2008	-	-	41.7	-	-
	2009	-	-	36.9	-	-
	2010	-	-	36.9	-	-
	2011	-	-	50.1	-	-
	2012	-	-	49	-	-
All Trawl	2007	9.5	6.5	28	2	1.5
	2008	11.3	6.7	28.3	2.4	1.6
	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	35.8	2.1	2.9
	2012	18.6	9.7	36.7	2.4	2.2

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, 2007 - 2012 ($ millions)

Region	2007	2008	2009	2010	2011	2012
Bering Sea Pollock	561.1	650.3	453.1	510.1	675.8	699.4
AK Peninsula/Aleutians	69.1	53.7	20.6	20.5	44.2	61.1
Kodiak	118	131.1	90	128.5	161.7	168.5
South Central	33.6	37.8	31.7	36.2	58.3	48.5
Southeastern	37.2	44.3	33.1	41.5	51.2	51
All Regions	819	917.2	628.5	736.9	991.1	1028.6

Table 35: Groundfish gross product value as a percentage of all-species gross product value by shoreside processor group, 2007 - 2012 (percent)

Region	2007	2008	2009	2010	2011	2012
Bering Sea Pollock	73.9	74.2	69.4	72.8	72.8	75.7
AK Peninsula/Aleutians	17.7	14	5.7	4.5	8.8	11.9
Kodiak	40.9	45.4	34.5	42.9	46.4	46
South Central	9.5	10.2	12.2	7.2	13.8	10.2
Southeastern	9.1	10.6	8.8	8.8	8.3	9.8
All Regions	37.2	39.2	32.9	30.3	35.2	36.8

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 $4.0 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2008 - 2012 .

		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
2008	Hook & Line	-	18	18	-	33	33	-	33	33
	Pot	4	1	5	4	3	7	5	4	9
	Trawl	1	13	14	20	38	58	20	39	59
	All Gear	5	32	37	24	73	97	25	74	99
2009	Hook & Line	-	16	16	-	26	26	-	26	26
	Pot	-	1	1	-	1	1	-	2	2
	Trawl	-	16	16	6	34	40	6	35	41
	All Gear	-	33	33	6	61	67	6	62	68
2010	Hook & Line	-	13	13	-	25	25	-	25	25
	Pot	1	-	1	2	3	5	2	3	5
	Trawl	-	16	16	3	34	37	3	35	38
	All Gear	1	29	30	5	60	65	5	61	66
2011	Hook & Line	-	14	14	-	27	27	-	27	27
	Pot	2	1	3	6	2	8	6	2	8
	Trawl	2	15	17	17	34	51	17	35	52
	All Gear	4	30	34	23	62	85	23	63	86
2012	Hook & Line	-	11	11	1	28	29	1	28	29
	Pot	2	-	2	5	1	6	6	1	7
	Trawl	1	16	17	11	35	46	11	35	46
	All Gear	3	27	30	16	64	80	17	64	81

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel was below the $4.0 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 37: Number of groundfish vessels that caught or caught and processed less than $4.0 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2008 - 2012 .

		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
2008	Hook & Line	609	4	613	46	8	54	632	9	641
	Pot	139	-	139	61	4	65	178	4	182
	Trawl	72	1	73	89	2	91	130	2	132
	All Gear	785	5	790	190	12	202	898	13	911
2009	Hook & Line	609	6	615	39	15	54	626	17	643
	Pot	122	1	123	51	3	54	158	3	161
	Trawl	71	2	73	104	2	106	142	2	144
	All Gear	760	9	769	189	18	207	879	20	899
2010	Hook & Line	616	9	625	41	14	55	630	15	645
	Pot	110	-	110	45	4	49	139	4	143
	Trawl	67	1	68	100	1	101	138	1	139
	All Gear	761	10	771	184	18	202	874	19	893
2011	Hook & Line	692	6	698	45	9	54	710	11	721
	Pot	141	-	141	47	3	50	173	3	176
	Trawl	66	2	68	88	2	90	123	2	125
	All Gear	857	8	865	178	12	190	958	14	972
2012	Hook & Line	561	4	565	30	6	36	575	10	585
	Pot	122	1	123	47	4	51	157	4	161
	Trawl	69	1	70	99	1	100	134	2	136
	All Gear	713	6	719	172	9	181	822	14	836

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel was below the $4.0 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 38: Average revenue of groundfish vessels that caught or caught and processed more than $4.0 million ex-vessel value or product value of groundfish and other species, by area, vessel type, and gear, 2008 - 2012 ; ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2008	Hook & Line	-	7.36	-	6.97	-	6.97
	Pot	4.4	*	4.41	*	4.4	*
	Trawl	*	15.83	5.43	26.44	5.43	25.87
2009	Hook & Line	-	5.36	-	5.26	-	5.26
	Pot	-	*	-	*	-	*
	Trawl	-	14.03	5.43	22.43	5.43	21.94
2010	Hook & Line	-	6.15	-	6.35	-	6.35
	Pot	*	-	*	*	*	*
	Trawl	-	17.9	*	25.17	*	24.59
2011	Hook & Line	-	9.18	-	9.42	-	9.42
	Pot	*	*	5.04	*	5.04	*
	Trawl	*	23.57	5.58	34.02	5.58	33.21
2012	Hook & Line	-	8.38	*	8.36	*	8.36
	Pot	*	-	4.66	*	4.66	*
	Trawl	*	23.83	5.17	33.67	5.17	33.67

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 39: Average revenue of groundfish vessels that caught or caught and processed less than $4.0 million ex-vessel value or product value of groundfish and other species, by area, vessel type and gear, 2008 - 2012 ; ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2008	Hook & Line	0.46	1.51	0.59	2.31	0.46	2.29
	Pot	0.85	-	1.76	1.8	1.07	1.8
	Trawl	1.59	*	2.34	*	2.04	*
2009	Hook & Line	0.36	2.5	0.6	2.5	0.36	2.39
	Pot	0.58	*	1.41	*	0.79	*
	Trawl	1.02	*	1.76	*	1.52	*
2010	Hook & Line	0.46	1.98	0.88	2.31	0.47	2.16
	Pot	0.76	-	1.93	2.7	1.04	2.7
	Trawl	1.31	*	1.9	*	1.68	*
2011	Hook & Line	0.51	1.52	0.91	2.05	0.52	1.78
	Pot	0.92	-	2.25	*	1.19	*
	Trawl	1.65	*	2.45	*	2.17	*
2012	Hook & Line	0.48	1.28	0.87	2.12	0.48	1.78
	Pot	0.75	*	1.9	2.23	1.03	2.23
	Trawl	1.63	*	2.28	*	2.04	*

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 40: Number and total registered net tons of vessels that caught groundfish off Alaska by area and gear, 2005 - 2012

		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	2005	766	26643	96	15079	813	35274
	2006	624	25431	87	14670	663	31852
	2007	582	22426	74	13237	613	29078
	2008	631	22905	87	13865	674	30241
	2009	631	23641	80	14020	669	30578
	2010	638	22997	80	13083	670	29289
	2011	712	23444	81	11182	748	28785
	2012	576	19337	65	10555	614	26295
Pot	2005	152	9154	74	9441	203	16385
	2006	146	9044	74	9009	200	15784
	2007	137	8288	73	8500	187	14963
	2008	144	8462	72	8406	191	14533
	2009	124	7072	55	6479	163	12145
	2010	111	6345	54	6797	148	11586
	2011	144	7889	58	7140	184	13187
	2012	125	6993	57	6850	168	12586
Trawl	2005	94	14732	148	52249	191	55786
	2006	90	13506	144	52032	190	55684
	2007	87	12265	152	52929	189	55881
	2008	87	13333	149	52796	191	56201
	2009	89	14041	146	47840	185	51147
	2010	84	13708	138	48953	177	52309
	2011	85	13692	141	49822	177	52795
	2012	87	13941	146	50590	182	53681
All Gear	2005	951	46580	308	75882	1137	102665
	2006	815	45133	293	74581	995	99266
	2007	771	40723	297	74482	951	97386
	2008	827	42514	299	74242	1010	97696
	2009	802	42190	274	67625	967	90464
	2010	801	40817	267	68134	959	90353
	2011	899	42378	275	67560	1058	91258
	2012	749	37787	261	67298	917	89335

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, 2008 - 2012

			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	2008	280	11	291	12	11	23	285	17	302
		2009	265	13	278	19	10	29	273	19	292
		2010	279	9	288	19	9	28	287	14	301
		2011	273	10	283	24	9	33	287	14	301
		2012	281	7	288	21	5	26	292	10	302
	Pacific Cod	2008	240	18	258	33	39	72	258	41	299
		2009	219	16	235	16	38	54	230	39	269
		2010	219	19	238	16	36	52	227	39	266
		2011	296	15	311	18	32	50	304	36	340
		2012	181	9	190	11	32	43	189	35	224
	Flatfish	2008	-	-	-	-	7	7	-	7	7
		2009	-	-	-	-	9	9	-	9	9
		2010	-	-	-	-	12	12	-	12	12
		2011	-	-	-	-	8	8	-	8	8
		2012	-	-	-	-	7	7	-	7	7
	Rockfish	2008	129	1	130	-	-	-	129	1	130
		2009	133	1	134	-	2	2	133	2	135
		2010	135	-	135	-	3	3	135	3	138
		2011	141	-	141	1	-	1	141	-	141
		2012	159	-	159	-	2	2	159	2	161
	All Groundfish	2008	574	22	596	40	41	81	592	42	634
		2009	565	22	587	34	41	75	578	43	621
		2010	576	22	598	33	39	72	584	40	624
		2011	652	20	672	42	36	78	667	38	705
		2012	561	15	576	31	34	65	576	38	614

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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	2008	143	1	144	56	7	63	174	8	182
		2009	122	2	124	43	4	47	151	5	156
		2010	111	-	111	43	7	50	137	7	144
		2011	143	1	144	47	5	52	173	5	178
		2012	124	1	125	49	5	54	160	5	165
Trawl	Pollock	2008	61	-	61	89	33	122	130	33	163
		2009	62	1	63	89	33	122	130	33	163
		2010	63	-	63	90	30	120	134	30	164
		2011	62	3	65	86	30	116	129	30	159
		2012	67	1	68	90	32	122	135	32	167
	Sablefish	2008	13	-	13	-	3	3	13	3	16
		2009	15	1	16	-	1	1	15	2	17
		2010	12	1	13	-	-	-	12	1	13
		2011	13	-	13	-	-	-	13	-	13
		2012	12	-	12	-	-	-	12	-	12
	Pacific Cod	2008	64	3	67	66	14	80	113	14	127
		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	60	18	78	101	18	119
	Flatfish	2008	33	6	39	3	34	37	35	35	70
		2009	33	6	39	1	29	30	34	30	64
		2010	27	6	33	-	29	29	27	30	57
		2011	31	6	37	3	29	32	33	30	63
		2012	32	5	37	4	30	34	36	31	67

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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	2008	28	11	39	2	12	14	29	15	44
		2009	26	15	41	2	11	13	28	15	43
		2010	27	15	42	2	15	17	29	19	48
		2011	25	12	37	2	16	18	27	18	45
		2012	30	16	46	2	17	19	32	20	52
	Atka Mackerel	2008	-	-	-	2	9	11	2	9	11
		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
	All Groundfish	2008	73	14	87	109	40	149	150	41	191
		2009	71	18	89	110	36	146	148	37	185
		2010	67	17	84	103	35	138	141	36	177
		2011	68	17	85	105	36	141	140	37	177
		2012	70	17	87	110	36	146	145	37	182
All Gear	All Groundfish	2008	755	37	792	208	85	293	883	87	970
		2009	716	42	758	190	79	269	837	82	919
		2010	722	39	761	181	78	259	833	80	913
		2011	821	38	859	198	74	272	938	77	1015
		2012	716	33	749	188	73	261	839	78	917

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, 2008 - 2012 (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	2008	552	57	-	42	4	-	574	58	-
		2009	548	61	-	31	8	-	562	64	-
		2010	559	57	-	32	9	-	570	60	-
		2011	636	56	-	40	5	-	652	58	-
		2012	516	45	-	30	1	-	530	46	-
	Pot	2008	108	32	3	19	36	10	116	57	10
		2009	97	25	-	19	24	8	105	45	8
		2010	86	24	1	13	25	9	90	42	9
		2011	117	26	-	15	30	8	123	48	8
		2012	101	23	-	20	23	9	111	43	9
	Trawl	2008	27	44	2	5	76	28	27	95	28
		2009	27	44	-	7	75	28	27	93	28
		2010	24	43	-	5	70	28	25	88	28
		2011	23	45	-	1	76	28	23	89	28
		2012	23	47	-	6	74	30	24	91	30
Mean vessel length (feet)	Hook & Line	2008	45	72	-	47	76	-	45	73	-
		2009	45	73	-	48	84	-	45	74	-
		2010	45	73	-	48	81	-	45	74	-
		2011	43	74	-	47	78	-	44	74	-
		2012	45	72	-	48	98	-	45	73	-
	Pot	2008	54	92	132	54	106	129	54	99	129
		2009	54	87	-	56	105	134	54	96	134
		2010	54	91	133	56	105	134	55	98	134
		2011	53	92	-	57	107	135	53	100	135
		2012	54	91	-	57	108	134	54	100	134

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Table 42: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Mean vessel length (feet)	Trawl	2008	58	93	137	58	106	155	58	102	154
		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
Mean Registered net tons	Hook & Line	2008	26	61	-	30	91	-	26	63	-
		2009	26	61	-	36	95	-	26	65	-
		2010	25	65	-	36	106	-	26	70	-
		2011	25	64	-	33	100	-	25	67	-
		2012	26	64	-	38	156	-	27	66	-
	Pot	2008	44	100	121	51	125	125	45	113	124
		2009	46	96	-	61	129	128	48	112	128
		2010	46	96	97	66	119	145	49	107	140
		2011	43	103	-	67	120	147	46	112	147
		2012	44	104	-	68	123	145	48	114	145
	Trawl	2008	65	105	204	68	116	238	66	112	235
		2009	66	103	-	67	115	238	66	111	238
		2010	71	103	-	67	116	238	70	111	238
		2011	69	101	-	75	114	238	69	109	238
		2012	69	102	-	59	114	244	67	110	244

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), 2008 - 2012 (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	2008	15	10	62	82	108	95	65	115	57
		2009	18	9	67	71	113	86	64	120	61
		2010	16	9	71	72	108	98	62	123	57
		2011	34	18	90	82	122	102	67	121	56
		2012	12	10	60	60	109	83	60	122	45
	Bering Sea & Aleutian Islands	2008	1	-	5	7	4	4	6	15	4
		2009	1	-	3	3	3	5	5	11	8
		2010	1	-	3	4	3	4	5	12	9
		2011	1	-	5	5	3	7	6	13	5
		2012	-	-	3	6	1	5	4	11	1
	All Alaska	2008	15	10	67	86	111	95	68	122	58
		2009	19	9	69	72	114	89	66	124	64
		2010	17	9	72	74	109	99	63	127	60
		2011	35	18	92	85	122	103	69	128	58
		2012	12	10	61	65	110	84	61	127	46

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, 2008 - 2012

			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	2008	11	6	5	-	-	14	17	10	-	-	15	17	10	-	-
		2009	9	7	6	-	-	14	17	10	-	-	16	17	10	-	-
		2010	11	6	5	-	-	14	16	9	-	-	15	16	9	-	-
		2011	10	5	5	-	-	15	14	7	-	-	17	14	7	-	-
		2012	8	5	2	-	-	12	14	8	-	-	16	14	8	-	-
	Pot	2008	-	1	-	-	-	5	1	1	-	-	5	2	1	-	-
		2009	1	1	-	-	-	2	1	1	-	-	2	2	1	-	-
		2010	-	-	-	-	-	4	2	1	-	-	4	2	1	-	-
		2011	-	1	-	-	-	2	2	1	-	-	2	2	1	-	-
		2012	-	1	-	-	-	2	2	1	-	-	2	2	1	-	-
	Trawl	2008	4	1	7	1	1	7	4	11	3	15	8	4	11	3	15
		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
Mean vessel length (feet)	Hook & Line	2008	103	140	176	-	-	109	144	178	-	-	106	143	177	-	-
		2009	102	139	175	-	-	108	144	178	-	-	106	143	177	-	-
		2010	100	140	176	-	-	106	144	176	-	-	103	143	176	-	-
		2011	90	136	176	-	-	104	144	175	-	-	98	142	176	-	-
		2012	90	136	177	-	-	108	144	176	-	-	101	142	176	-	-
	Pot	2008	-	165	-	-	-	105	165	166	-	-	105	165	166	-	-
		2009	104	165	-	-	-	106	165	166	-	-	105	165	166	-	-
		2010	-	-	-	-	-	98	165	166	-	-	98	165	166	-	-
		2011	-	165	-	-	-	101	165	166	-	-	101	165	166	-	-
		2012	-	165	-	-	-	114	165	166	-	-	114	165	166	-	-

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Table 44: Continued

			Gulf of Alaska					Bering Sea & Aleutian Islands					All Alaska				
		Year	<125	125-165	166-235	236-260	>260	<125	125-165	166-235	236-260	>260	<125	125-165	166-235	236-260	>260
Mean vessel length (feet)	Trawl	2008	109	160	212	238	295	115	148	203	245	303	113	150	207	243	303
		2009	108	144	209	238	295	113	148	204	245	308	111	146	206	243	307
		2010	112	144	204	238	295	115	148	204	245	305	114	146	204	243	305
		2011	111	146	204	238	295	116	148	204	245	305	114	147	204	243	305
		2012	115	150	204	238	295	116	148	204	245	305	115	148	204	243	305
Mean Registered net tons	Hook & Line	2008	119	273	562	-	-	128	297	546	-	-	124	291	552	-	-
		2009	121	277	555	-	-	119	297	546	-	-	120	292	550	-	-
		2010	126	225	562	-	-	129	308	471	-	-	128	286	504	-	-
		2011	98	242	562	-	-	117	291	513	-	-	109	278	534	-	-
		2012	104	241	652	-	-	114	291	478	-	-	110	278	513	-	-
	Pot	2008	-	135	-	-	-	143	793	192	-	-	143	464	192	-	-
		2009	111	135	-	-	-	105	793	192	-	-	107	464	192	-	-
		2010	-	-	-	-	-	136	464	192	-	-	136	464	192	-	-
		2011	-	135	-	-	-	123	464	192	-	-	123	354	192	-	-
		2012	-	135	-	-	-	123	464	192	-	-	123	354	192	-	-
	Trawl	2008	129	380	623	611	693	153	254	640	985	1659	144	279	633	892	1599
		2009	130	214	641	611	693	138	254	588	985	1647	134	237	611	892	1579
		2010	121	214	584	611	693	138	254	584	985	1711	132	237	584	892	1643
		2011	125	256	584	611	693	134	254	588	985	1711	130	254	586	892	1643
		2012	123	255	584	611	693	134	254	588	985	1711	129	254	586	892	1643

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, 2005 - 2012

		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	2005	306	257	203	17	25	54	323	276	233
	2006	224	200	200	12	23	52	236	218	224
	2007	195	174	213	11	19	44	204	190	234
	2008	223	202	206	10	24	53	232	225	233
	2009	209	218	204	10	16	54	219	231	232
	2010	206	213	219	7	27	46	213	239	244
	2011	250	241	221	11	23	47	260	262	250
	2012	187	171	218	7	14	44	194	185	249
Pot	2005	40	22	90	6	5	63	46	27	133
	2006	41	15	90	4	13	57	45	28	129
	2007	23	20	94	3	4	66	25	24	146
	2008	24	31	89	4	4	64	28	35	138
	2009	33	15	76	1	7	47	34	22	112
	2010	13	9	89	1	5	48	14	14	121
	2011	38	6	100	1	1	56	39	7	141
	2012	26	16	83	1	-	56	27	16	128
Trawl	2005	-	4	90	-	1	147	-	5	189
	2006	-	-	90	-	2	142	-	2	190
	2007	-	2	85	-	1	151	-	3	189
	2008	-	1	86	-	3	146	-	4	191
	2009	1	2	86	-	1	145	1	3	183
	2010	-	-	84	1	-	137	1	-	176
	2011	-	5	80	-	1	140	-	6	173
	2012	-	1	86	-	5	141	-	6	182
All Gear	2005	342	280	363	22	31	262	364	303	532
	2006	263	213	364	15	37	248	278	245	522
	2007	217	196	374	14	24	259	228	217	548
	2008	246	232	360	14	29	260	259	259	534
	2009	241	234	348	11	24	241	252	255	502
	2010	219	221	368	9	32	228	228	252	515
	2011	287	252	376	12	25	238	298	275	532
	2012	213	188	367	8	19	237	221	207	533

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, 2008 - 2012

			Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
		Year	Alaska	Other	Alaska	Other	Alaska	Other
Hook & Line	Pollock	2008	-	-	-	1	-	1
		2009	1	-	-	-	1	-
		2010	1	-	-	-	1	-
		2011	5	-	1	-	6	-
		2012	1	-	-	-	1	-
	Sablefish	2008	202	89	7	16	206	96
		2009	193	85	16	13	201	91
		2010	206	82	16	12	212	89
		2011	198	85	19	14	210	91
		2012	205	83	16	10	214	88
	Pacific Cod	2008	220	38	33	39	237	62
		2009	206	29	23	31	219	50
		2010	208	30	20	32	217	49
		2011	277	34	22	28	286	54
		2012	171	19	19	24	184	40
	Flatfish	2008	-	-	-	7	-	7
		2009	-	-	-	9	-	9
		2010	-	-	2	10	2	10
		2011	-	-	2	6	2	6
		2012	-	-	-	7	-	7
	Rockfish	2008	114	16	-	-	114	16
		2009	121	13	-	2	121	14
		2010	121	14	-	3	121	17
		2011	127	14	-	1	127	14
		2012	144	15	-	2	144	17
	All Groundfish	2008	498	133	42	45	519	155
		2009	506	125	43	37	524	145
		2010	516	122	40	40	526	144
		2011	581	131	42	39	596	152
		2012	464	112	34	31	482	132
Pot	Pacific Cod	2008	116	28	23	40	126	56
		2009	107	17	18	29	114	42
		2010	94	17	21	29	103	41
		2011	124	20	19	33	132	46
		2012	107	18	21	33	118	47
Trawl	Pollock	2008	23	38	14	108	31	132
		2009	26	37	14	108	33	130
		2010	29	34	14	106	37	127
		2011	25	40	9	107	29	130
		2012	26	42	8	114	29	138

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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	2008	4	9	-	3	4	12
		2009	7	9	1	-	8	9
		2010	4	9	-	-	4	9
		2011	6	7	-	-	6	7
		2012	5	7	-	-	5	7
	Pacific Cod	2008	28	39	5	75	30	97
		2009	30	33	8	62	36	84
		2010	24	29	5	59	27	80
		2011	18	35	7	59	19	83
		2012	25	39	9	69	27	92
	Flatfish	2008	12	27	6	31	18	52
		2009	16	23	7	23	22	42
		2010	14	19	8	21	21	36
		2011	12	25	3	29	15	48
		2012	11	26	2	32	13	54
	Rockfish	2008	14	25	3	11	17	27
		2009	16	25	2	11	16	27
		2010	18	24	3	14	19	29
		2011	12	25	1	17	13	32
		2012	13	33	-	19	13	39
	Atka Mackerel	2008	-	-	-	11	-	11
		2009	-	-	1	12	1	12
		2010	-	1	-	9	-	10
		2011	-	1	-	14	-	14
		2012	-	-	-	14	-	14
	All Groundfish	2008	31	56	16	133	39	152
		2009	36	53	16	130	40	145
		2010	34	50	15	123	38	139
		2011	26	59	11	130	30	147
		2012	27	60	11	135	31	151
All Gear	All Groundfish	2008	621	206	82	217	659	351
		2009	616	186	78	196	645	322
		2010	621	180	77	190	646	313
		2011	701	198	74	201	727	331
		2012	570	179	64	197	601	316

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, 2008 - 2012

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	2008	86	96	126	156	214	169	148	156	147	76	34	10	609
			2009	102	65	77	192	262	127	111	115	150	112	23	6	609
			2010	83	73	99	188	241	130	135	123	169	84	26	15	616
			2011	89	80	142	251	186	138	117	95	181	134	35	60	692
			2012	87	121	176	144	184	180	116	130	181	118	49	34	561
		Pot	2008	82	88	97	29	-	-	-	-	26	28	26	5	143
			2009	71	79	52	32	1	-	-	-	21	27	12	-	122
			2010	69	88	43	8	2	1	-	-	45	23	1	2	111
			2011	72	107	77	-	-	-	-	1	56	51	4	25	143
			2012	64	91	90	1	-	-	-	-	42	39	27	19	124
		Trawl	2008	40	50	61	37	22	11	19	34	40	42	21	4	73
			2009	46	50	49	22	19	18	10	34	39	50	13	6	71
			2010	52	53	48	37	24	16	14	36	53	50	12	3	67
			2011	39	42	51	29	19	13	8	20	50	54	8	1	68
			2012	33	57	53	27	20	16	13	22	59	57	20	4	70
		All Gear	2008	206	230	275	220	236	180	167	190	212	145	81	19	790
			2009	217	192	173	244	282	145	121	149	208	181	48	12	760
			2010	202	205	186	233	267	147	149	159	260	155	39	20	762
			2011	198	226	258	279	205	151	125	116	285	237	47	86	861
			2012	184	262	313	171	204	196	129	151	282	211	96	57	716
	Catcher Processors	Hook & Line	2008	1	14	15	9	4	2	2	3	4	4	-	-	22
			2009	2	14	3	7	10	1	2	3	2	5	4	-	22
			2010	3	17	5	3	4	3	2	3	11	6	-	-	22
			2011	10	8	1	5	4	2	2	2	7	5	2	3	20
			2012	7	4	4	7	4	3	2	1	2	4	2	1	15
		Pot	2008	-	1	1	-	-	-	-	-	-	-	-	-	1
			2009	-	2	-	-	-	-	-	-	-	-	-	-	2
			2011	1	1	-	-	-	-	-	-	-	-	-	-	1
			2012	1	-	-	-	-	-	-	-	-	-	-	-	1
		Trawl	2008	2	3	4	6	2	-	13	3	2	4	1	-	14
			2009	-	2	1	5	2	-	17	4	3	3	1	1	18
			2010	-	1	4	5	2	-	16	1	1	2	2	2	17
			2011	-	1	3	6	1	4	14	3	2	3	2	-	17
			2012	2	1	-	5	1	1	17	6	1	2	1	1	17
		All Gear	2008	3	18	20	15	6	2	15	6	6	8	1	-	37
			2009	2	18	4	12	12	1	19	7	5	8	5	1	42
			2010	3	18	9	8	6	3	18	4	12	8	2	2	39
			2011	11	10	4	11	5	6	16	5	9	8	4	3	38
			2012	10	5	4	12	5	4	19	7	3	6	3	2	33

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Table 47: Continued

			Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Bering Sea & Aleutian Islands	Catcher Vessels	Hook & Line	2008	5	8	10	2	10	14	11	22	12	6	2	1	46
			2009	7	8	9	2	3	11	10	13	11	7	2	1	39
			2010	2	4	2	2	11	15	15	17	18	8	4	-	41
			2011	4	4	4	4	14	14	20	18	18	9	2	-	45
			2012	3	4	4	3	11	9	15	12	8	6	3	-	31
		Pot	2008	42	7	13	6	13	8	6	4	25	28	9	1	65
			2009	28	14	15	7	12	8	6	4	6	11	6	5	51
			2010	27	8	14	5	5	3	2	2	10	17	11	-	47
			2011	35	12	16	6	9	6	3	3	29	31	3	-	53
			2012	38	18	8	9	3	2	1	1	22	16	5	7	52
		Trawl	2008	84	101	104	50	3	59	68	62	61	30	5	-	109
			2009	65	96	103	49	-	68	71	66	30	10	1	-	110
			2010	47	89	99	58	-	59	67	64	29	12	-	-	103
			2011	53	94	91	74	1	69	72	69	56	49	4	-	105
			2012	66	88	100	51	2	71	74	74	55	25	14	-	110
		All Gear	2008	131	116	127	58	26	81	85	87	98	64	16	2	214
			2009	100	118	127	58	15	86	87	83	47	28	9	6	195
			2010	76	101	115	65	16	77	84	83	57	37	15	-	189
			2011	92	110	111	84	23	89	95	90	103	89	9	-	201
			2012	107	110	112	63	16	82	90	87	85	47	22	7	188
	Catcher Processors	Hook & Line	2008	36	36	15	6	3	8	15	39	38	37	34	17	41
			2009	37	37	14	8	5	9	16	36	37	36	34	32	41
			2010	36	36	13	7	7	9	15	25	27	28	26	20	39
			2011	24	28	29	24	15	15	23	27	30	31	28	24	36
			2012	24	27	29	25	14	22	30	30	31	28	27	29	34
		Pot	2008	6	-	2	2	2	1	2	1	5	4	1	-	7
			2009	3	2	1	1	2	2	-	-	3	3	3	3	4
			2010	3	4	3	3	3	3	-	2	5	4	3	1	7
			2011	5	-	1	2	1	-	-	-	2	3	1	1	5
			2012	5	2	1	1	1	1	1	1	3	3	3	-	5
		Trawl	2008	34	38	39	24	20	23	31	34	34	29	19	3	40
			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	33	28	30	33	20	14	4	36
		All Gear	2008	76	74	56	32	25	32	47	74	76	69	54	20	85
			2009	71	73	49	35	21	29	45	68	69	61	45	35	79
			2010	67	72	48	32	29	36	43	56	57	52	41	23	78
			2011	56	62	63	57	37	47	55	58	65	65	54	31	74
			2012	57	62	63	45	35	56	59	61	67	51	44	33	73

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Table 47: Continued

			Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
All Alaska	Catcher Vessels	Hook & Line	2008	91	100	135	158	221	183	158	177	156	82	36	11	632
			2009	109	71	85	194	265	136	120	128	159	119	25	7	626
			2010	85	75	101	189	250	144	145	139	182	91	30	15	630
			2011	91	83	146	255	199	151	135	112	193	141	37	60	710
			2012	90	125	180	147	194	187	130	139	188	124	52	34	576
		Pot	2008	112	92	105	35	13	8	6	4	51	55	34	6	183
			2009	96	90	62	39	13	8	6	4	27	38	18	5	158
			2010	94	94	55	13	7	4	2	2	55	38	12	2	141
			2011	101	115	89	6	9	6	3	4	84	82	7	25	179
			2012	99	105	98	10	3	2	1	1	63	54	31	26	163
		Trawl	2008	124	145	147	83	25	69	83	95	97	72	26	4	150
			2009	111	145	140	70	19	79	81	99	68	60	14	6	148
			2010	99	135	134	91	24	71	78	97	82	60	12	3	141
			2011	92	124	134	99	20	77	78	87	105	102	12	1	140
			2012	99	140	137	74	22	83	86	95	111	81	34	4	145
		All Gear	2008	325	333	378	273	259	260	247	275	303	208	96	21	923
			2009	314	304	282	301	295	222	207	231	252	209	57	18	885
			2010	276	295	286	293	281	219	225	238	312	187	54	20	879
			2011	282	319	357	359	227	234	216	203	380	323	56	86	981
			2012	288	363	409	230	218	272	217	234	362	255	117	64	839
	Catcher Processors	Hook & Line	2008	37	37	23	13	6	10	17	40	41	40	34	17	42
			2009	38	38	16	12	12	10	18	37	39	38	36	32	43
			2010	38	38	17	8	10	10	16	27	32	31	26	20	40
			2011	30	32	29	26	17	17	25	28	35	33	28	25	38
			2012	27	29	31	29	17	24	31	31	33	31	29	30	38
		Pot	2008	6	1	3	2	2	1	2	1	5	4	1	-	8
			2009	3	4	1	1	2	2	-	-	3	3	3	3	5
			2010	3	4	3	3	3	3	-	2	5	4	3	1	7
			2011	5	1	1	2	1	-	-	-	2	3	1	1	5
			2012	5	2	1	1	1	1	1	1	3	3	3	-	5
		Trawl	2008	36	40	41	27	22	23	35	36	35	30	19	3	41
			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	34	34	33	33	21	15	5	37
		All Gear	2008	79	77	67	42	30	34	53	77	80	73	54	20	87
			2009	72	76	52	42	30	30	52	71	72	65	48	36	82
			2010	69	75	53	36	33	37	47	59	63	56	42	25	80
			2011	62	67	64	62	40	50	60	61	71	68	56	32	77
			2012	61	64	65	50	39	59	66	65	69	55	47	35	78

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, 2008 - 2012

			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	2008	642	193	-	28	3	-	671	196	-
		2009	613	170	-	36	16	-	649	186	-
		2010	690	187	-	58	14	-	748	201	-
		2011	705	176	-	65	11	-	770	187	-
		2012	916	213	-	74	9	-	990	222	-
	Pacific Cod	2008	1068	47	-	136	0	-	1204	47	-
		2009	1103	47	-	60	-	-	1164	47	-
		2010	972	25	-	71	0	-	1044	25	-
		2011	1185	43	-	106	1	-	1291	44	-
		2012	1163	32	-	54	-	-	1217	32	-
	Rockfish	2008	325	5	-	-	-	-	325	5	-
		2009	331	6	-	-	-	-	331	6	-
		2010	411	4	-	-	-	-	411	4	-
		2011	422	1	-	1	-	-	423	1	-
		2012	529	3	-	-	-	-	529	3	-
	All Groundfish	2008	2035	245	-	165	3	-	2199	248	-
		2009	2058	225	-	96	16	-	2155	241	-
		2010	2087	217	-	130	14	-	2217	231	-
		2011	2319	220	-	172	12	-	2491	232	-
		2012	2610	248	-	128	9	-	2738	257	-
Pot	Pacific Cod	2008	741	236	5	98	176	56	839	412	61
		2009	617	146	-	114	65	21	732	211	21
		2010	585	140	2	82	129	32	667	269	34
		2011	826	181	-	123	152	35	949	333	35
		2012	665	270	-	175	103	37	840	373	37

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Table 48: Continued

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Trawl	Pollock	2008	92	227	1	-	849	528	92	1077	529
		2009	95	131	-	-	783	450	95	913	450
		2010	194	324	-	1	713	433	195	1037	433
		2011	169	289	-	-	996	603	169	1284	603
		2012	183	360	-	-	897	606	183	1258	606
	Sablefish	2008	-	12	-	-	-	-	-	12	-
		2009	-	15	-	-	-	-	-	15	-
		2010	-	9	-	-	-	-	-	9	-
		2011	-	12	-	-	-	-	-	12	-
		2012	-	8	-	-	-	-	-	8	-
	Pacific Cod	2008	119	166	1	15	300	44	134	466	45
		2009	102	71	-	28	222	22	130	293	22
		2010	37	128	-	18	197	25	55	325	25
		2011	29	122	-	1	255	36	30	377	36
		2012	85	130	-	18	266	47	103	396	47
	Flatfish	2008	19	268	4	-	5	15	19	273	19
		2009	16	323	-	-	-	4	16	323	4
		2010	16	194	-	-	-	-	16	194	-
		2011	2	188	-	-	0	16	2	189	16
		2012	6	128	-	-	1	28	6	129	28
	Rockfish	2008	1	86	1	-	6	3	1	92	4
		2009	2	79	-	-	-	9	2	79	9
		2010	2	90	-	-	-	5	2	90	5
		2011	-	78	-	-	-	6	-	78	6
		2012	9	103	-	-	-	6	9	103	6

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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	2008	-	-	-	-	0	7	-	0	7
		2009	-	-	-	-	-	14	-	-	14
		2010	-	-	-	-	1	13	-	1	13
		2011	-	-	-	-	3	15	-	3	15
		2012	-	-	-	-	-	22	-	-	22
	All Groundfish	2008	231	760	7	15	1160	597	246	1920	604
		2009	215	622	-	28	1005	499	243	1627	499
		2010	249	746	-	19	911	476	268	1657	476
		2011	200	691	-	1	1254	675	201	1945	675
		2012	284	731	-	18	1164	708	302	1895	708
All Gear	All Groundfish	2008	3008	1240	12	298	1400	653	3306	2640	665
		2009	2891	994	-	251	1155	538	3142	2149	538
		2010	2926	1102	2	230	1103	530	3156	2205	532
		2011	3345	1091	-	296	1478	727	3641	2569	727
		2012	3559	1249	-	321	1305	755	3880	2554	755

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, 2008 - 2012

			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	2008	11	26	24	-	1	25	15	-	12	51	39	-
		2009	5	24	24	-	12	38	22	-	17	62	45	-
		2010	6	5	26	-	-	36	18	-	6	41	44	-
		2011	9	3	29	-	2	67	9	-	11	70	38	-
		2012	8	-	25	-	-	75	6	-	8	75	31	-
	Pacific Cod	2008	10	32	21	-	5	236	591	-	15	268	612	-
		2009	2	47	17	-	6	245	606	-	8	292	624	-
		2010	15	45	30	-	12	198	528	-	27	243	558	-
		2011	13	63	23	-	2	252	696	-	15	315	719	-
		2012	11	45	9	-	10	319	732	-	21	364	742	-
	Flatfish	2008	-	-	-	-	-	-	29	-	-	-	29	-
		2009	-	-	-	-	-	-	51	-	-	-	51	-
		2010	-	-	-	-	3	4	70	-	3	4	70	-
		2011	-	-	-	-	2	2	47	-	2	2	47	-
		2012	-	-	-	-	-	7	45	-	-	7	45	-
	Rockfish	2008	1	-	-	-	-	-	-	-	1	-	-	-
		2009	-	-	2	-	-	-	1	-	-	-	3	-
		2010	-	-	-	-	-	-	0	-	-	-	0	-
		2012	-	-	-	-	-	1	0	-	-	1	0	-
	All Groundfish	2008	22	58	45	-	6	261	636	-	28	319	681	-
		2009	7	71	43	-	18	283	682	-	25	354	725	-
		2010	21	50	56	-	15	238	617	-	36	288	673	-
		2011	22	66	52	-	6	321	752	-	28	387	804	-
		2012	19	45	34	-	10	402	784	-	29	447	818	-

Continued on next page.

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	2008	-	-	2	-	-	37	21	-	-	37	23	-
		2009	-	4	2	-	-	32	37	-	-	36	39	-
		2010	-	-	-	-	21	67	25	-	21	67	25	-
		2011	-	-	3	-	-	15	29	-	-	15	32	-
		2012	-	-	0	-	-	22	38	-	-	22	38	-
Trawl	Pollock	2008	-	-	-	-	-	1	36	289	-	1	36	289
		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
	Sablefish	2008	-	-	-	-	-	0	0	-	-	0	0	-
		2009	-	-	0	-	-	-	0	-	-	-	0	-
		2010	-	-	0	-	-	-	-	-	-	-	0	-
	Pacific Cod	2008	-	6	0	-	-	6	9	8	-	12	9	8
		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
	Flatfish	2008	-	53	8	-	-	190	389	74	-	243	397	74
		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	403	69	-	164	412	69

Continued on next page.

Table 49: Continued

		Year	Gulf of Alaska <60	Gulf of Alaska 60-124	Gulf of Alaska 125-230	Gulf of Alaska >230	Bering Sea & Aleutian Islands <60	Bering Sea & Aleutian Islands 60-124	Bering Sea & Aleutian Islands 125-230	Bering Sea & Aleutian Islands >230	All Alaska <60	All Alaska 60-124	All Alaska 125-230	All Alaska >230
Trawl	Rockfish	2008	-	7	23	2	-	0	15	8	-	8	38	9
		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	26	1	-	5	25	10	-	8	51	11
	Atka Mackerel	2008	-	-	-	-	-	2	62	23	-	2	62	23
		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
	All Groundfish	2008	-	67	31	2	-	198	511	401	-	265	542	403
		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	498	422	-	186	534	423
All Gear	All Groundfish	2008	22	125	78	2	6	509	1168	401	28	634	1246	403
		2009	7	147	82	2	18	487	1164	339	25	634	1246	341
		2010	21	103	99	3	36	462	1109	335	57	565	1208	338
		2011	22	116	102	2	6	495	1292	504	28	611	1394	506
		2012	19	91	71	1	10	576	1319	422	29	667	1390	423

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, 2008 - 2012

	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	2008	77	635	700	835	116	*	1275	252	118	216	*	-	4224
	2009	*	718	138	610	405	*	1571	311	132	440	180	*	4505
	2010	67	630	237	544	265	55	1629	102	462	446	*	*	4437
	2011	498	267	112	635	251	196	1404	323	376	483	167	175	4887
	2012	370	186	86	471	220	144	1161	396	128	178	110	*	3450
Bering Sea & Aleutian Islands	2008	6328	14865	12884	3377	3536	3524	8946	14262	12968	9477	3990	977	95134
	2009	8129	12326	10323	4557	2686	4792	9660	13086	9789	7016	3137	1081	86582
	2010	7796	12775	10917	4412	3899	5642	10889	9459	7091	6079	3380	1326	83665
	2011	6507	13905	14206	8407	3882	7895	13796	12261	12658	14698	5131	2105	115451
	2012	6630	14147	16318	4383	3621	10977	12092	12300	11670	5207	3683	2717	103745
All Alaska	2008	6405	15500	13584	4212	3652	3524	10221	14514	13086	9693	3990	977	99358
	2009	8129	13044	10461	5167	3091	4792	11231	13397	9921	7456	3317	1081	91087
	2010	7863	13405	11154	4956	4164	5697	12518	9561	7553	6525	3380	1326	88102
	2011	7005	14172	14318	9042	4133	8091	15200	12584	13034	15181	5298	2280	120338
	2012	7000	14333	16404	4854	3841	11121	13253	12696	11798	5385	3793	2717	107195

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.

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. The 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. The 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 done 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. The first is that the more "important" variables should be weighted more heavily in the index. The 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. This intuitive understanding 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 will be given in the forthcoming NOAA Technical memorandum (Fissel 2013).

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: $P_{2009}(2010) = \sum_{i=1}^{N} \frac{p^1(2010)}{p^1(2009)} * \omega^i_{2009}(2010)$. 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 $s \in \{\text{fillet}, \text{head \& gut}, \text{surimi}, \ldots\}$ 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.

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 2006 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.

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. Aggregate

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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)

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.

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 is largely concentrated in pollock (upper-right panel Figure 5.2), which makes up roughly 56% of the value share in 2012. While pollock remains without a doubt the primary source of value in this region, it's value share has been slowly shrinking over the past decade. Pacific cod and the flatfish species complex (primarily yellowfin sole) make up most of the balance of the value share. Flatfish in particular, whose value share has increased substantially over the last ten years, are an increasingly important species complex. This trend continued through 2012, as the share of value from flatfish (18%) is now the same as the share from cod. The products headed-and-gutted fish (H&G), surimi and fillets (standard and deep-skin) are the primary products from this sector (upper-right panel Figure 5.3). The value share from H&G products dropped slightly to 44% of total value in 2012 but remains the largest product type from this sector. The share of value from surimi rebounded to 19% after dipping slightly last year. Standard and deep-skin fillets retained a combined 19% of the value share. Roe, historically a significant source of value accounted for approximately 30% of the value share in 2001, has steadily been declining in significance and currently accounts for 7% of total value. The production composition plots (lower-right panels of Figures 5.2 and 5.3) show that most non-pollock species are made into head-and-gut products with a fraction of flatfish being sold as whole fish.

Quantity indices track production of wholesale market goods over time. The aggregate quantity index shows that in 2012 total production in this sector in was basically unchanged from 2011. Across species, the quantity indices for flatfish and cod increased while pollock and the remaining species dropped (lower-left panel of Figure 5.2). Some of the drop in the pollock quantity index could be the result of shifts in the composition of products such as deep-skin and surimi which have low product recovery rate relative to other product types (lower-left panel of 5.3). Deep-skin and surimi indices increased relative to other product types. Despite increases in cod and flatfish quantity indices the H&G quantity index remained flat over 2012, in part because of a reduction in pollock H&G production (lower-right panel of 5.3). The fillet and roe quantity indices decreased significantly, by -19% and -20%, respectively.

The aggregate price index increased a modest 2% in 2012 reflecting a year in which the prices of different species and products were up and down. While the cod price index decreased by -10%, the price indices of other key species, flatfish and pollock, increased 8% and 5% receptively (Figure 5.2). The 28% increase in the roe and 16% increase in the surimi price indices (Figure 5.3) were particularly important in supporting the pollock price, as price indices for fillets and deep-skin fell slightly. Similarly, the H&G price index, which is also the primary product form for flatfish and cod, decreased by -5%. The flatfish price index was buoyed somewhat by the 13% increase in the whole fish price index.

The aggregate value index increased only slightly (1%) in 2012. This marginal change can be attributed to prices as the quantity index was unchanged. Examination of the value across species shows that flatfish was the only area where value grew substantially in 2012 with a 13% increase. The pollock price increase offset the decrease in quantity resulting in no net change in the value. Similarly, the growth in cod value from increased quantity was stifled by decreased price for this species. Given the significance of pollock and cod in this sector aggregate value in this sector is unlikely to increase much if value isn't increasing for at least one of these species. The product decomposition of aggregate value (Figure 5.3) shows that surimi was the product type that performed strongest in 2012. The coinciding rise in surimi price and quantity resulted in a 27% increase in the surimi value index. The 11% growth in deep-skin value was likely the result (in part) of a production shift from fillets, whose value decreased -21%. The value from H&G products also fell with the prices for this product, and though the drop was small (-4%) the aggregate impact was significant because of its value share.

Indices indicate that the BSAI at-sea sector was economically healthy in 2012. There were no significant shocks or changes in 2012 to cause dramatic shifts in the economics of this sector. There were many offsetting price and quantity changes across species and products all of which are characteristic of a healthy sector. While the increase was modest the value index remains the highest it has been over the last decade. The sector appears to have recovered fully from the reduced production quantities in 2008-2010 that were the result of conservation reductions in the TAC of key species. Aside from 2008-2010, value increases over the last decade have been driven primarily by rising prices as displayed by the aggregate price index. With production quantities in 2011 and 2012 the highest they've been in the last decade, future growth in this sector seems unlikely to come from increased quantities. While early and mid-decade value increases were driven by pollock and

Pacific cod, value growth in the last part of the decade has started to come from other species such as flatfish.

5.3. Economic Performance of the BSAI Shoreside Sector

BSAI Shoreside Wholesale Market

Value in the BSAI shoreside wholesale market is highly concentrated in pollock, which in 2012 comprised 82% of the total value (upper-right panel of Figure 5.4). The remainder of the sector is divided between cod at 16% and sablefish which brought in 2% of the total value. Pollock processing is less focused on H&G products and derives value from many different product forms (upper-right panel of Figure 5.5). Much of the value comes from the production of surimi which accounted for about 31% of value. Fillets are another critical product with 27% of the value; the share from deep-skin was 10%. As with the at-sea sector, the significance in value share of roe has been steadily decreasing over time, and in 2012 only 8% of this sector's value came from roe. In contrast to the BSAI at-sea sector, the 10% share of value from H&G products is small.

With an increase of 4% to 98 in 2012 in the aggregate quantity index is at roughly the level observed in the early to mid-2000s . The quantity index for pollock, the most important species in the region, rose only 1% (Figure 5.4). The 22% increase in cod quantities was a source of significant and positive production growth in the region. Sablefish production also increased as indicated by the 25% rise in the quantity index, though total catch of this species is comparatively small. The growth in cod and sablefish production went into H&G, whose quantity index increased 23%. While there was little change in pollock production as a whole, there were shifts in the product mix particularly between deep-skin, fillet and surimi (Figure 5.5). The -17% decrease in the fillet quantity index is likely the linked to the 34% increase in deep-skin and the 13% increase in surimi. These shifts in the production mix are were also observed in the at-sea sector. Shoreside roe production also increased marginally.

Aggregate prices in the shoreside sector were up slightly in 2012 as shown by the 2% rise in the index. As the primary species in this sector the slight 4% rise in the pollock price had more of an impact on the aggregate price index in this sector than the changes seen in cod and sablefish (Figure 5.4). Though sablefish is not a large share of the shoreside sector but the -33% drop in the price index is notable because of its size. The drop in the H&G price index coincides with the price drops in cod and sablefish which are primarily processed into this product type (Figure 5.5). Pollock in contrast is processed into all products types, and most of these product price indices increased in 2012. The exception is the fillet price index which saw no change. The roughly 10% increases in the roe and surimi price indices are similar to those observed in the at-sea sector. The shoreside deep-skin price also increased 10% while the corresponding at-sea price decreased; it's unclear why this might have occurred.

The increase in the quantity index and the stable price index resulted in a net 7% gain in the aggregate value index. The growth in shoreside wholesale value came from the 18% increase in cod and the 5% increase in pollock value (Figure 5.4). The value increases in cod and pollock came about in different ways: pollock value increased because of prices, while for cod, the value increase was driven by production. The decline in the sablefish value index was small relative to the drop in

The base year of the index is 2006. The index is set to 100 in the base year.

the sablefish price because of the increased production. Surimi, deep-skin, and to a lesser extent roe, were the leading products forms creating positive value in this sector, all of which had increasing price and quantity indices (Figure 5.5). The value from H&G products also grew as the increase in the quantity was larger that the decrease in the price index. The fillet value index was the only product seeing a significant decrease, however the drop was more of a shift in value into other product types like deep-skin and surimi.

Examining the indices over the past decade, the shoreside wholesale sector is performing at level that is on par with performance prior to 2007. Aggregate value is above levels seen in mid-2000s and is significantly above the level of the index a decade earlier in 2003. Production, which had fallen in 2008-2010, has rebounded and the stable price index (despite the 2008 jump) have both played a significant role in maintaining value for the BSAI shoreside sector. The conservation measures that reduced the pollock and cod TACs in 2008-2010 were comparatively more disruptive to the revenues of the shoreside sector than the at-sea sector because of the concentration in pollock. Flatfish, which at-sea producers have incorporated into their production portfolio, tend to be concentrated farther offshore. Current levels of pollock and sablefish production are not as high as they were in the early 2000s thus there seems some potential for future growth in production when the TAC allows. 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. Generally, when pollock does well, as it did in 2012, 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, mirrors the wholesale distribution (upper-right panel of Figure 5.6). Analysis of the ex-vessel market provides additional insight into the gear types (Figure 5.7) used to harvest delivered catch. Comparison of 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 73% of the value coming from pollock alone (Figure 5.6). This share decreased slightly as cod's value share increased from 16% in 2011 to 23% in 2012. Sablefish makes up small fraction of the value in this sector (4%). Almost all of the catch in the sector and consequent value in this sector comes from trawl gear (86%). Trawl gear is used to harvest pollock and a portion of the cod harvest (lower-right panels of Figures 5.7 and 5.7). The remaining harvest of cod is largely carried out using pot gear, which accounted for 11% of the value share. Hook-and-line gear, which primarily targets sablefish, accounted for 3% of value. The share of value across gear types has remained essentially constant over the last few years.

The aggregate quantity index, which is an index of catch deliveries to shoreside processors, increased 5% to 90 in 2012. Quantity indices show that catches are still somewhat below their levels prior to 2007. From the standpoint of catch growth, the strongest species in this sector was cod whose quantity index increased 20% (Figure 5.6). Pollock and sablefish deliveries remained stable increasing only 1% and 4% respectively. The gear-type quantity indices show that delivered catch was at least as large as last year for all gear types (Figure 5.7). While the increased cod catch came from both pot and trawl gear types, proportionally more came from trawl gear whose index increased 5%. A similar trend was observed in the GOA shoreside ex-vessel sector.

The aggregate ex-vessel price index decreased -14% to 103 in 2012. The decrease was primarily the result of a drop in the pollock price index which fell -18% (Figure 5.6). The ex-vessel pollock price index fell in spite of the slight increase in the wholesale pollock price index. Much of the aggregate price increase in the wholesale market came from value added products like surimi, roe and deep-skin. This suggests that part of the rise in the wholesale pollock price could have been an increase in the value added premium, which may not have passed through to the ex-vessel price. There was also a difference in cod price changes between the sectors, where the ex-vessel cod price increased 9% while the corresponding wholesale price index remained unchanged. Another interesting feature of cod prices come from examining the gear-type price indices (Figure 5.7). Pot gear catches are focused largely in cod, and while the cod species price index increased, the pot gear price index decreased -6%, suggesting a rise in the price of trawl caught cod. Though the price for trawl caught fish (pollock) generally decreased -14%. Sablefish makes up a comparatively small share of the sector but the -33% drop in the ex-vessel sablefish price was large.

The aggregate value index in the BSAI shoreside ex-vessel market for 2012 is down -10%, going from 103 to 93. The decrease in aggregate in ex-vessel value was a result of the drop in pollock value which was in turn the linked to the drop in the ex-vessel pollock price. The cod value index did increase significantly as both price and quantity indices rose. The sablefish value index however decreased as prices fell for this species. 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. From 2007 to 2009, the price spiked 51% in 2008 and then fell 19% in 2009 to roughly current levels. As noted in the wholesale section, the current levels of pollock and sablefish production are below there peak over the last decade thus there seems some potential for future growth in production when the TAC allows.

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 wholesale 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 (upper-right panel Figure 5.8). Flatfish and rockfish increased their relative proportion of the value share to 21% and 41% in 2012, while cod's relative share of value decreased to 18%, and sablefish fell to 14%. While diversified in species, value from the product types in this region is concentrated in head-and-gut products (91%) with a small percentage going to whole fish (7%) (Figure 5.9). This concentration in H&G has risen in recent years. Because of this there is no substantive difference between the H&G and aggregate indices and there will be little discussion of the product indices for this sector.

The -12% drop in the aggregate quantity index to 97 in 2012 indicates that aggregate production was weak in this sector relative to last year. While the level of the index is close to the average over the last decade it is the lowest it has been since 2005. Quantity indices show that production fell for multiple species (Figure 5.8). Most notably, the flatfish quantity index fell -23%, cod -32% and sablefish -9%. The only key species showing positive production growth was rockfish which rose 10%. The drop in cod and sablefish production was unique to the GOA at-sea sector; in other sectors production growth in 2012 for these species was either positive or flat.

The shoreside sector also experienced a decrease in the aggregate price which fell -15% to 111 in 2012. The decrease in the price indices for rockfish and sablefish were particularly troublesome for this sector as they were steep and these two species made a combined 55% of the value share in the sector (Figure 5.8). The rockfish price index fell by -19% and the sablefish price index fell by -38%. The cod price index also decreased by -10%. Flatfish is the only key species where prices increased as shown by the 12% rise in the price index.

Decreasing value in all four key species contributed to the -25% drop in the aggregate value index (Figure 5.8). While the decrease in aggregate value for the sector was marked relative to 2011, the value index (107) is still above the level seen in just 2010 (104), and is well above levels observed earlier in the decade. A variety of negative quantity and price shocks occurring in different species contributed to the decrease in value. Given the 37% growth in value in 2011, much of the drop in 2012 could reflect a reversion of economic factors which had become untenably high in 2011. This is likely the case with sablefish prices.

A broader look at the indices since the early 2000s shows that in aggregate the GOA shoreside market appears to be robust. In general, variation in the price index has been driving much of the change in aggregate value, as aggregate quantities have been relatively stable. While the index for any individual species may have been somewhat volatile, diversification across species has generally helped to maintain fairly stable value, price and quantity indices, even when negative shocks to abundance of a species or price have occurred. 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 (upper-right panel Figure 5.10). These three species account for roughly equal proportions of total value, and in 2012 pollock had a value share of 27%, cod 32%, and sablefish 29%. Composition bar graphs show that cod and pollock output is distributed across a multiple of product forms (lower-right panel of Figures 5.10 and 5.11). This is the only sector where cod is processed into multiple product forms in substantial quantities. Sablefish in contrast is processed almost exclusively as H&G. Because of this H&G products make up the largest share of total value (50%) (upper-right panel Figure 5.11). Fillets are the second most important product type in this sector with a 24% value share. Surimi is an important product form for pollock and makes up 8% of the total value. Similar to other sectors roe was significant a decade ago but now has only a 4% value share. This is the only sector for which the "other" product type is meaningful with a value share of 9%. The remaining value comes from a variety of other product types.

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

The aggregate quantity index was up 7% in 2012. The decomposition of the index across species shows increase came from pollock and sablefish, while the cod quantity index remained high but unchanged (Figure 5.10). Though the sablefish quantity index rose only 7%, its impact was significant because of its value. The 25% increase in the pollock quantity index was also substantial, both in an absolute sense and in terms of its impact in the sector. Composition bar graphs show that the pollock production increases in 2012 went primarily into surimi and H&G product forms (Figure 5.11). Product quantity indices reflect this showing that surimi increased 40% and H&G increased by 8% while fillet production remained unchanged. A similar shift in the relative mix was observed in BSAI pollock production. Production is the highest it has been over the last decade with peak levels in cod and pollock. GOA shoreside is the only sector showing significant increases in production over 2012.

The aggregate price index is down from its peak in 2011, falling -11% in 2012. Prices remain generally strong as the index was above its level throughout much of the decade. None of the price indices of this sector's three key species increased (Figure 5.10). The -25% drop in the sablefish price was particularly difficult for this region because of the magnitude of the price change, and its importance in the region (29%). While the decrease in 2012 was 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 stable level. The -9% decrease in cod price also has a significant impact. The price index of the other key species in the region, pollock, was basically unchanged falling only slightly by -3%. The H&G price index decrease of -17% was most prominent in the sector (Figure 5.11). The 'Other' product type price index fell -11% following a significant increase in 2011, and the fillet price index dropped by -6%. Interestingly, the surimi price index, which was a source of positive price movement in the BSAI, was unchanged in the GOA.

Though production was up in this sector the decrease in aggregate prices was large enough to cause aggregate value to shrink by -5% in 2012. Pollock was the only key species in which value grew, with a 21% 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 -10% and sablefish fell -20%. The drop in cod and sablefish value indices were in turn the result of a decrease in their price indices. Commensurate with its significance in the sector, the -11% decrease in the H&G value index was the most influential product component of the aggregate value change (Figure 5.11). The fillet value index was also down by -6%. The decreases in both of these value indices were in turn driven by decreases in their associated price indices. Surimi and roe were two product types generating positive value with indices showing growth of 40% and 41% respectively.

Looking at the GOA shoreside wholesale sector over a longer time horizon, we see that despite the drop in 2012, 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 mirrored in the ex-vessel market. Value from deliveries is largely concentrated in three key species: sablefish, cod and pollock (upper-right panel of Figures 5.12 and 5.13). Sablefish has a much larger value share in the ex-vessel market, where it accounted for

47% of 2012 value, than in the wholesale market, where it accounted for only 29% of 2012 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. Hook-and-line gear, because it is used in the harvest of sablefish, accounts for half of the value share. Value share decreased -6 percentage points for sablefish in 2012 and increased for pollock and rockfish. It remained relatively constant for the remaining species. As sablefish catches come largely from hook-and-line, the share of value coming from this gear type decreased as well. Deliveries of fish caught using hook-and-line gear account for 54% of the value, and trawl gear accounts for 31% of the value. 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 increased 8% with much of the gain attributable to the increase in the pollock quantity index which rose 29% (Figure 5.12). Correspondingly, the trawl quantity index, which is largely made up of pollock catch, saw the largest gains increasing 17% (Figure 5.13). The sablefish quantity index increased 29% and along with it the hook-and-line quantity index also increased (13%). The cod quantity index decreased marginally but was basically unchanged. 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 making up about one quarter of the catch apiece. Despite the fact that cod catch quantities fell only slightly, the gear quantity index shows that pot caught cod decreased significantly (-19%) while hook-and-line and trawl caught cod increased. The decrease comes after three years in which pot gear had become increasingly important. The reason for the shift in catch across gear types is unclear.

The aggregate ex-vessel price index, which peaked in 2011, fell -8% in 2012 (Figure 5.12). The most significant change in the species prices came from sablefish (-19%) which fell in tandem with the wholesale sablefish price index. The price index also decreased by -16% for the hook-and-line gear type, which targets sablefish (Figure 5.13). The ex-vessel pollock price index also fell slightly (-5%). The change in the cod price index was also marginal, increasing only 4%. The increase in the ex-vessel cod price stands in contrast to the corresponding price in the wholesale market where the cod price index actually decreased. The price indices for pot caught and trawl caught fish increased only slightly.

Until 2012 steady sablefish price increases were a stalwart component of aggregate value and prices in the region. Changes in the cod price index have also contributed significantly to the observed aggregate price variation; in particular, the 2008 drop in the aggregate price came mostly from a drop in the cod price index. The generally high correspondence between the price index for the wholesale market and the ex-vessel price index indicates an efficient market in the sense that wholesale prices effectively pass through from one market to the other.

The aggregate value index was unchanged in 2012 as the increase in aggregate quantity offset the decrease in aggregate price. There were, however, significant changes in value across species. Owing to its share of the total value in the sector, the -11% decrease in the sablefish value index had a large impact on aggregate value. This decrease in value was largely offset by the increase in the pollock value index (23%). Considering this sector's dependence on sablefish whose price dropped dramatically, the fact that aggregate value remained unchanged is largely an artifact of the increased quantity of pollock. Though rockfish makes up a comparatively small share of the sector, the large increase in the rockfish value also helped to offset the decrease. Pollock and cod catches in the region are as high as they have been in the last 10 years and future increases in value are unlikely to come from increased quantities of these species. Across gear types the increase in the value from trawl caught species (19%) offset the decreases from hook-and-line gear (-5%) and pot caught fish (-14%). Because the pot-gear price index did not change significantly it is unclear why cod catch shifted out of this gear type.

Over the last decade the steady rise in the price index and low volatility in the quantity index have translated to an upward-trending value index. Subsequent increases in the aggregate value have resulted in the index reaching a new maximum in 2011 which was maintained through 2012. 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. A strength of this sector is that value is diversified across species which helps support the sector when negative shocks like the sablefish price reduction occur.

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5.6. Economic Indices of the Groundfish Fisheries off Alaska

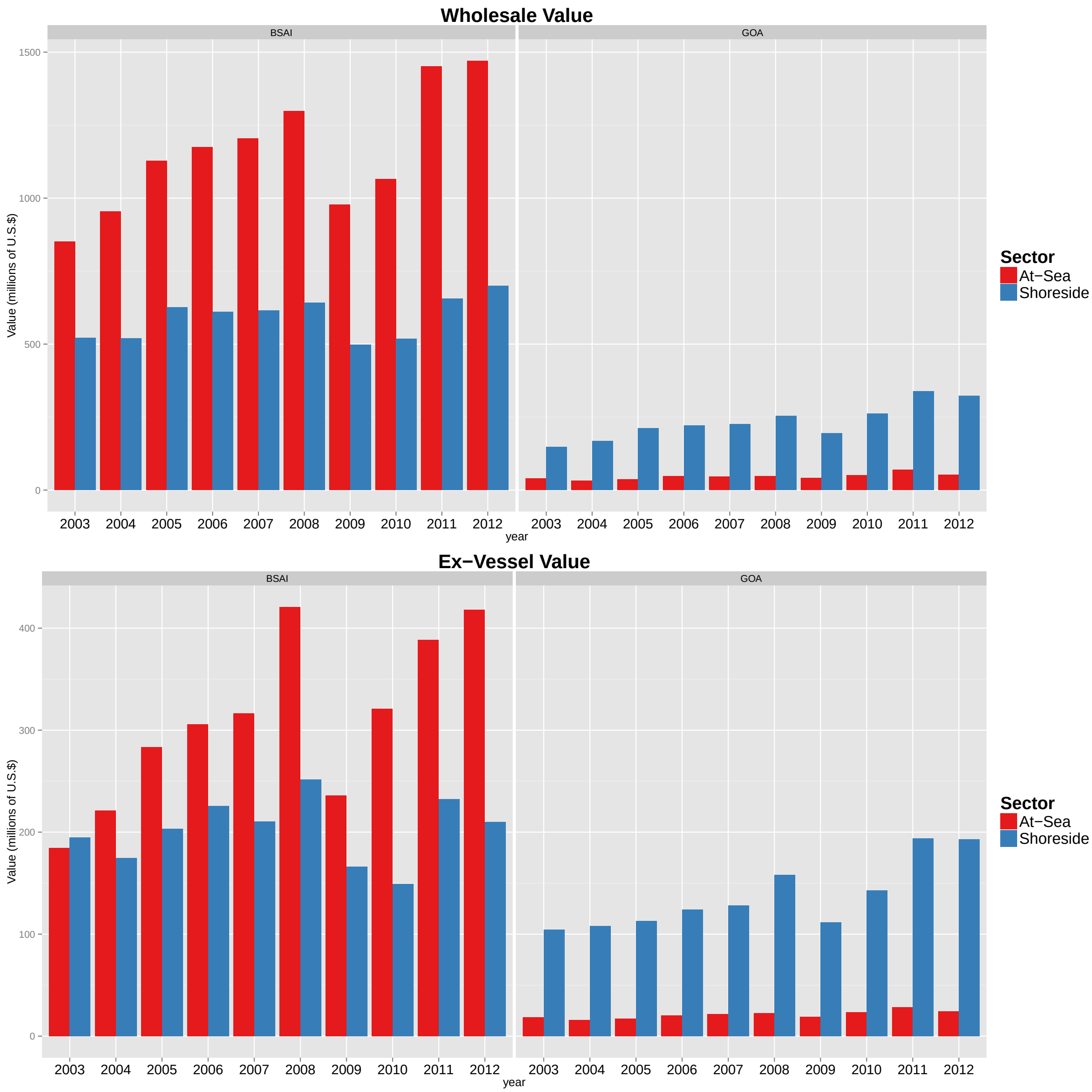


Figure 5.1: Wholesale and ex-vessel value by region and sector 2003-2012.
Source: NMFS Alaska Region's Catch-accounting system (CAS) and Weekly Production Report (WPR) estimates; Alaska Department of Fish and Game (ADF&G) Commercial Operator's Annual Report (COAR), National Marine Fisheries Services, P.O. Box 15700, Seattle, WA 98115-0070.

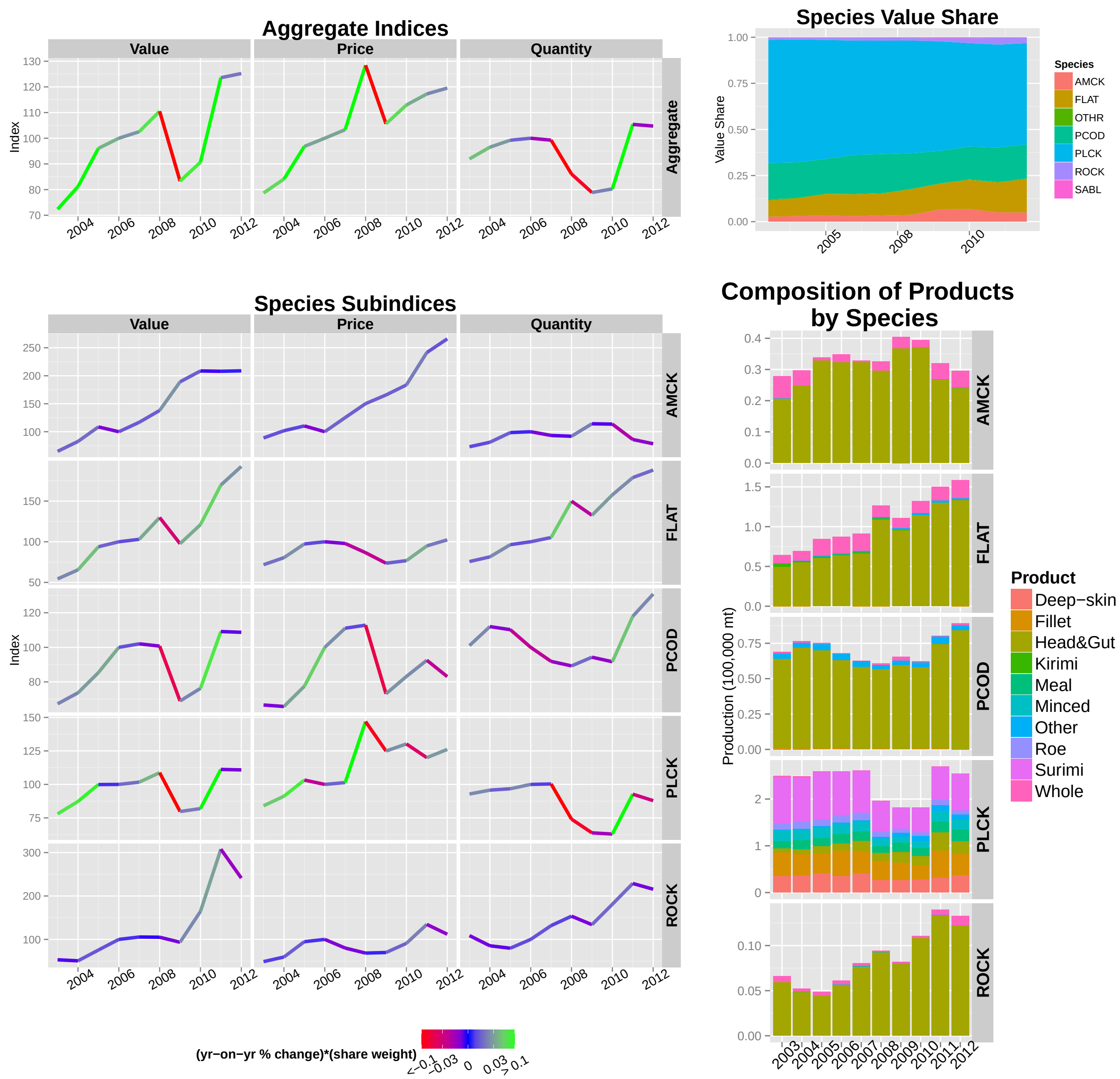


Figure 5.2: BSAI at-sea wholesale market: species decomposition 2003-2012 (Index 2006 = 100). **Notes:** Index values for 2007-2012, notes and source information for the indices are on Table 5.1. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

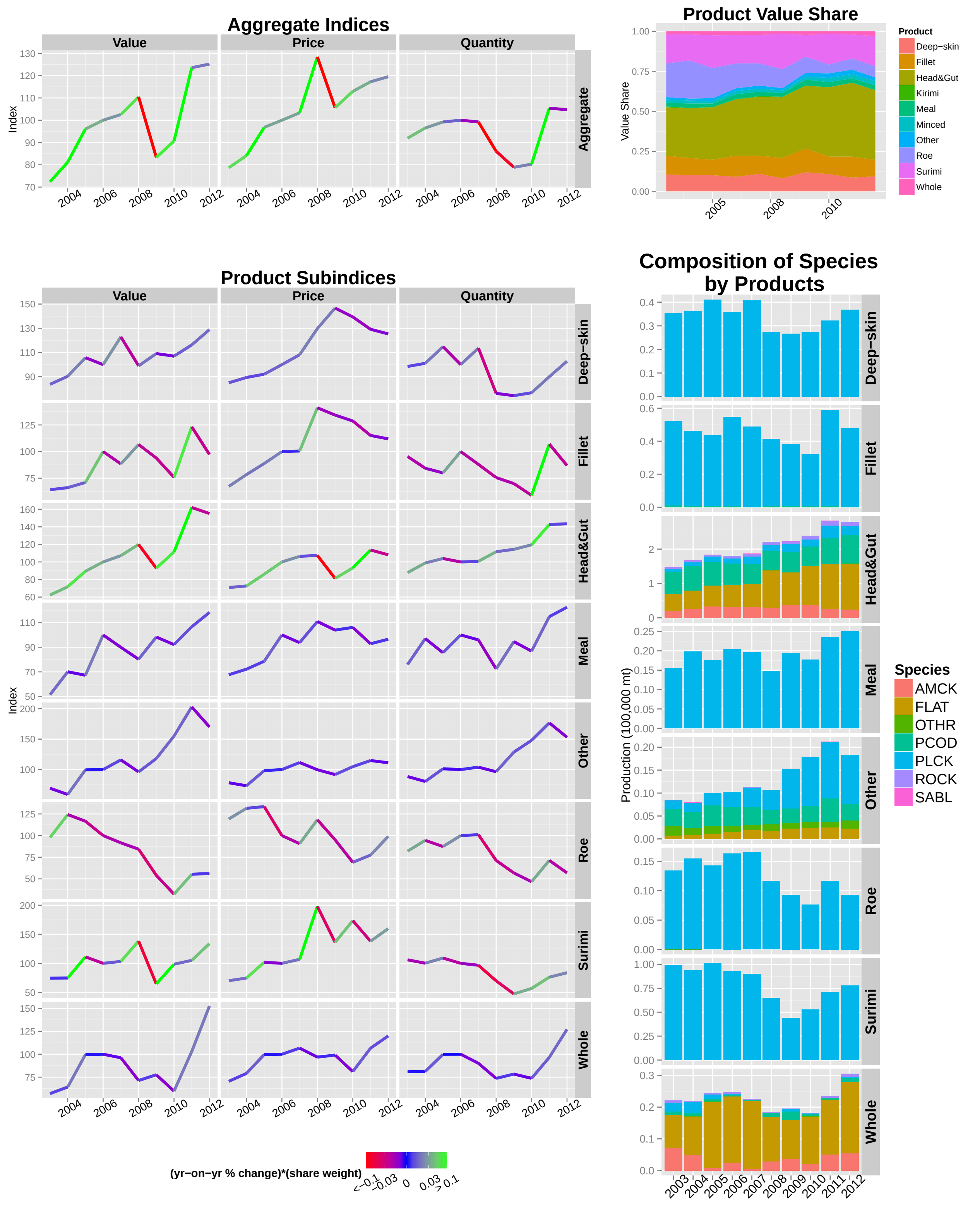


Figure 5.3: BSAI at-sea wholesale market indices: product decomposition 2003-2012 (Index 2006 = 100).
Notes: Index values for 2007-2012, notes and source information for the indices are on Table 5.2. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

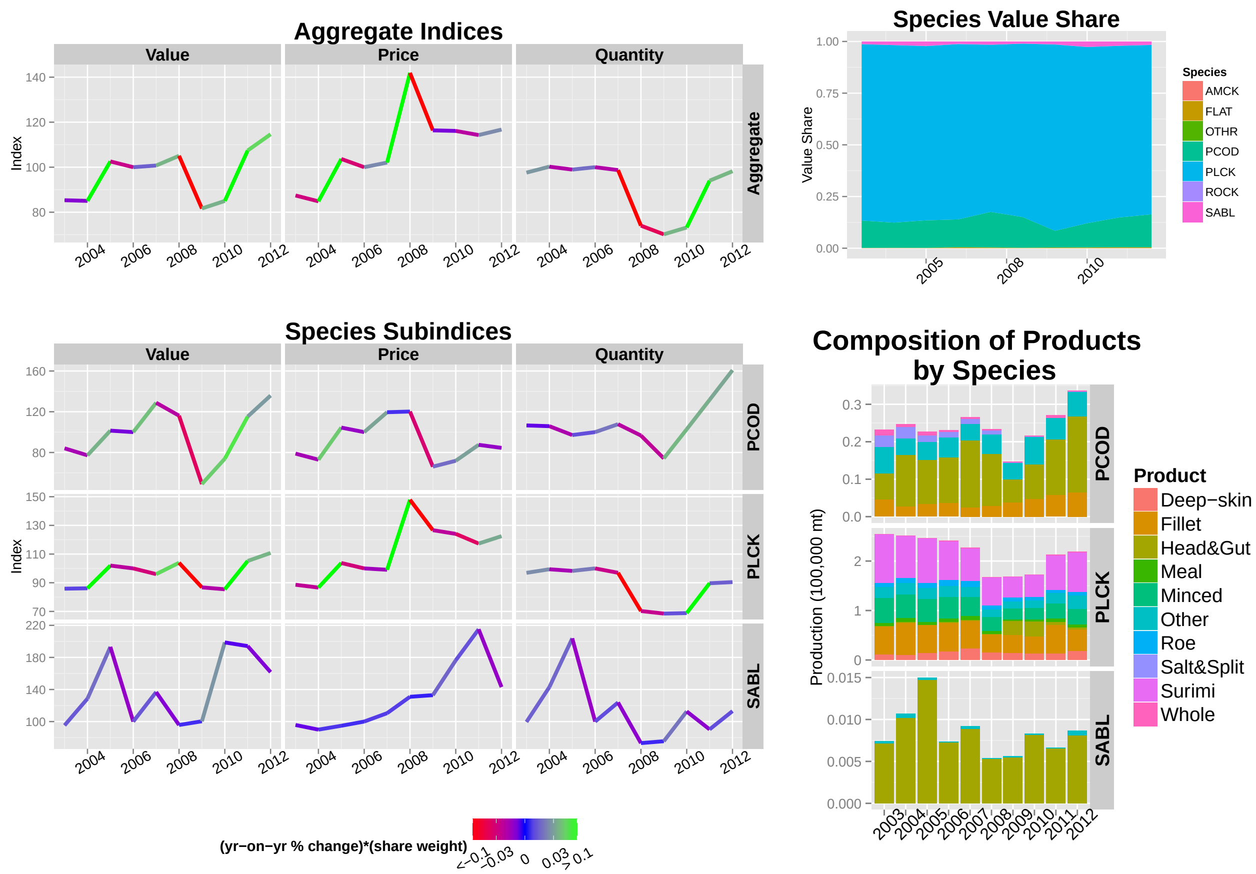


Figure 5.4: BSAI shoreside wholesale market: species decomposition 2003-2012 (Index 2006 = 100). **Notes:** Index values for 2007-2012, notes and source information for the indices are on Table 5.3. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

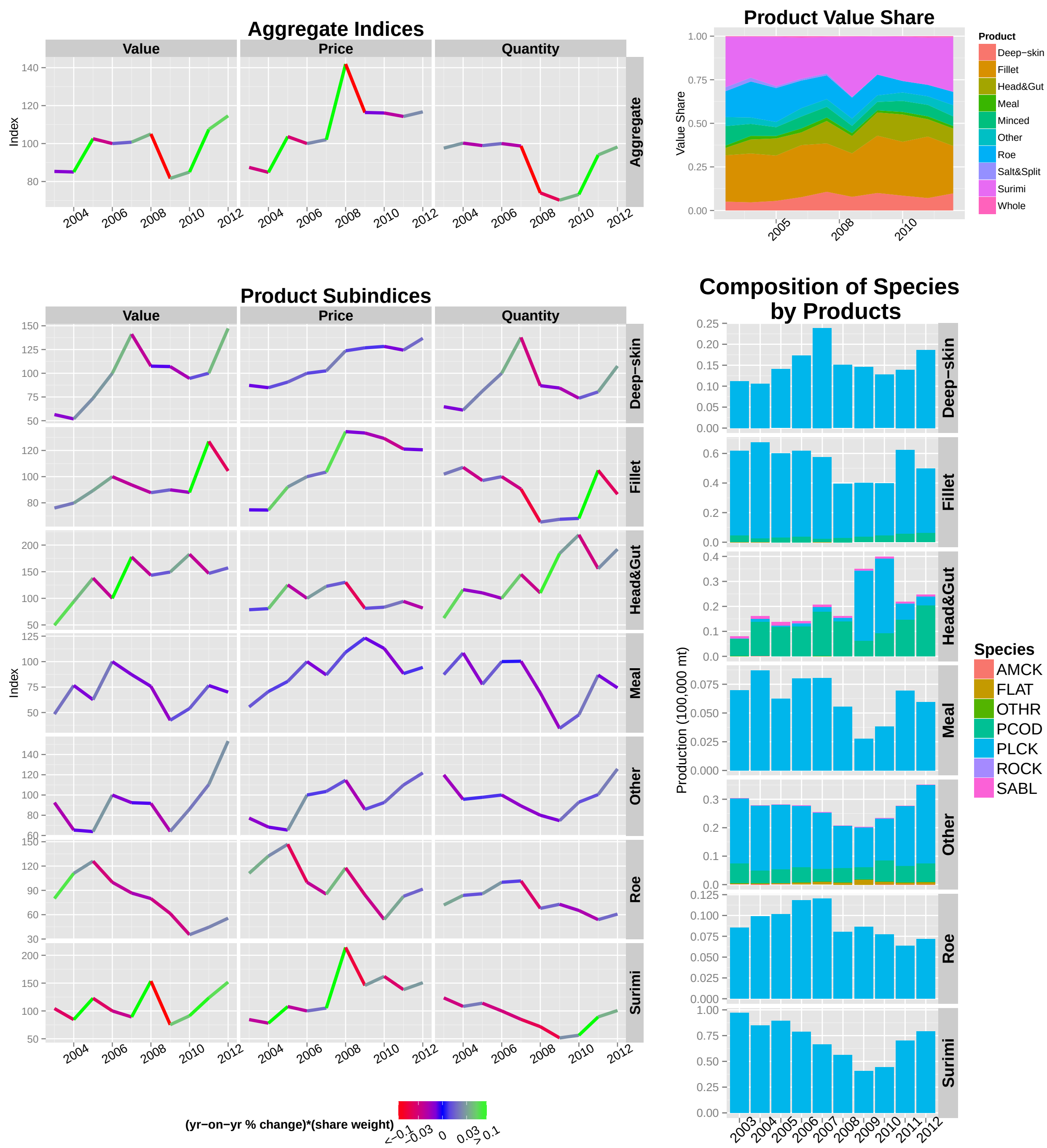


Figure 5.5: BSAI shoreside wholesale market: product decomposition 2003-2012 (Index 2006 = 100). **Notes:** Index values for 2007-2012, notes and source information for the indices are on Table 5.4. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

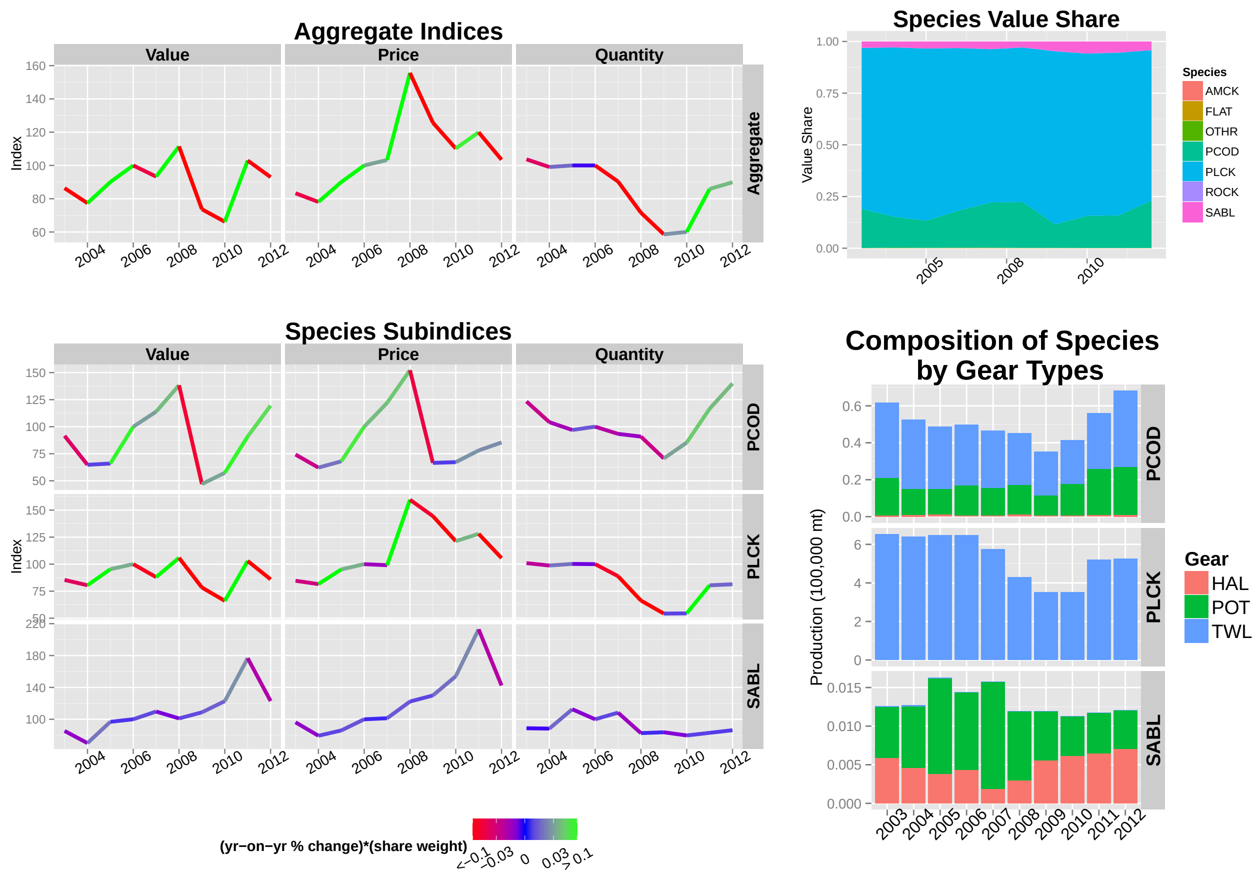


Figure 5.6: BSAI shoreside ex-vessel market: species decomposition 2003-2012 (Index 2006 = 100). **Notes:** Index values for 2007-2012, notes and source information for the indices are on Table 5.5. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

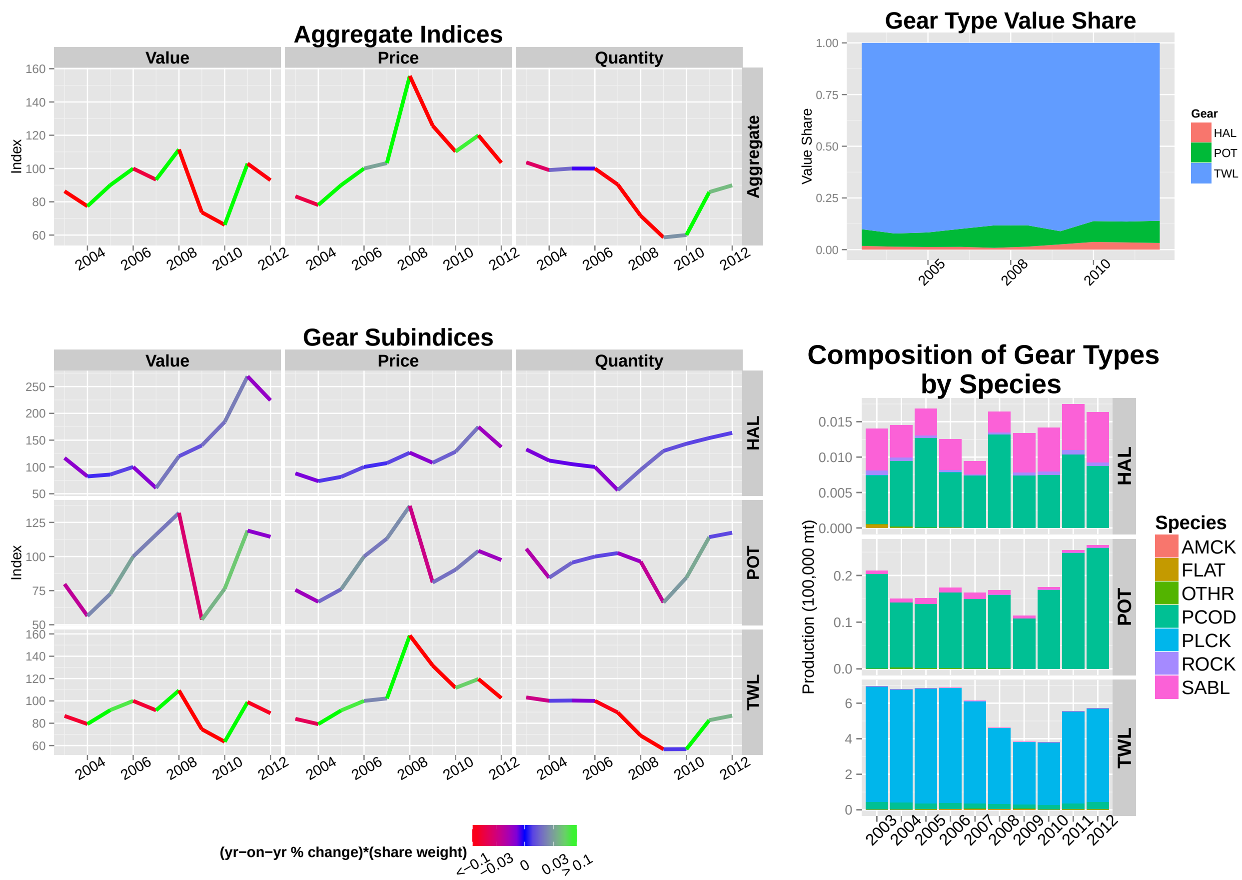


Figure 5.7: BSAI shoreside ex-vessel market: gear decomposition 2003-2012.
Notes: Index values for 2007-2012, notes and source information for the indices are on Table 5.6. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

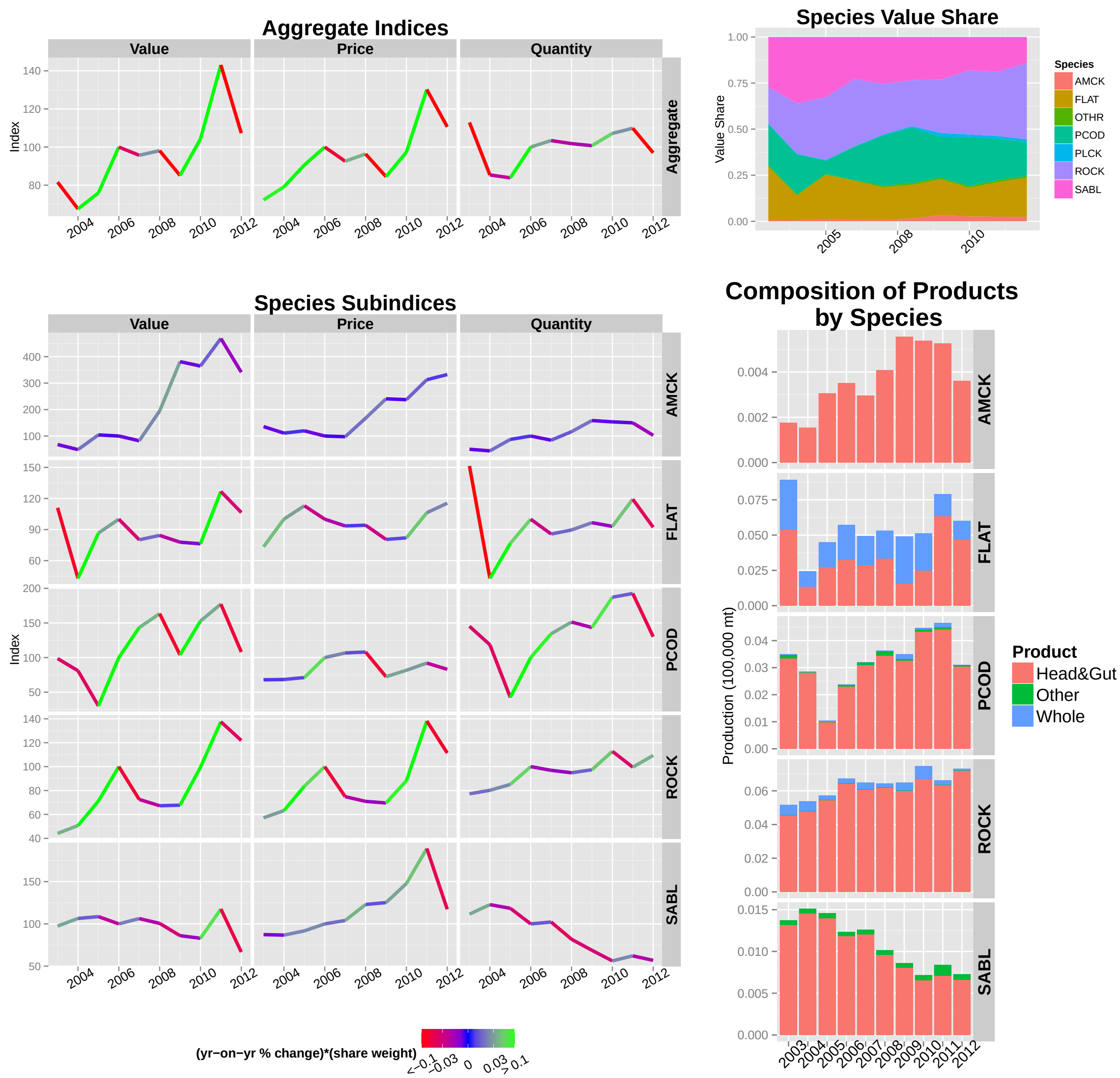


Figure 5.8: GOA at-sea wholesale market: species decomposition 2003-2012.
Notes: Index values for 2007-2012, notes and source information for the indices are on Table 5.7. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

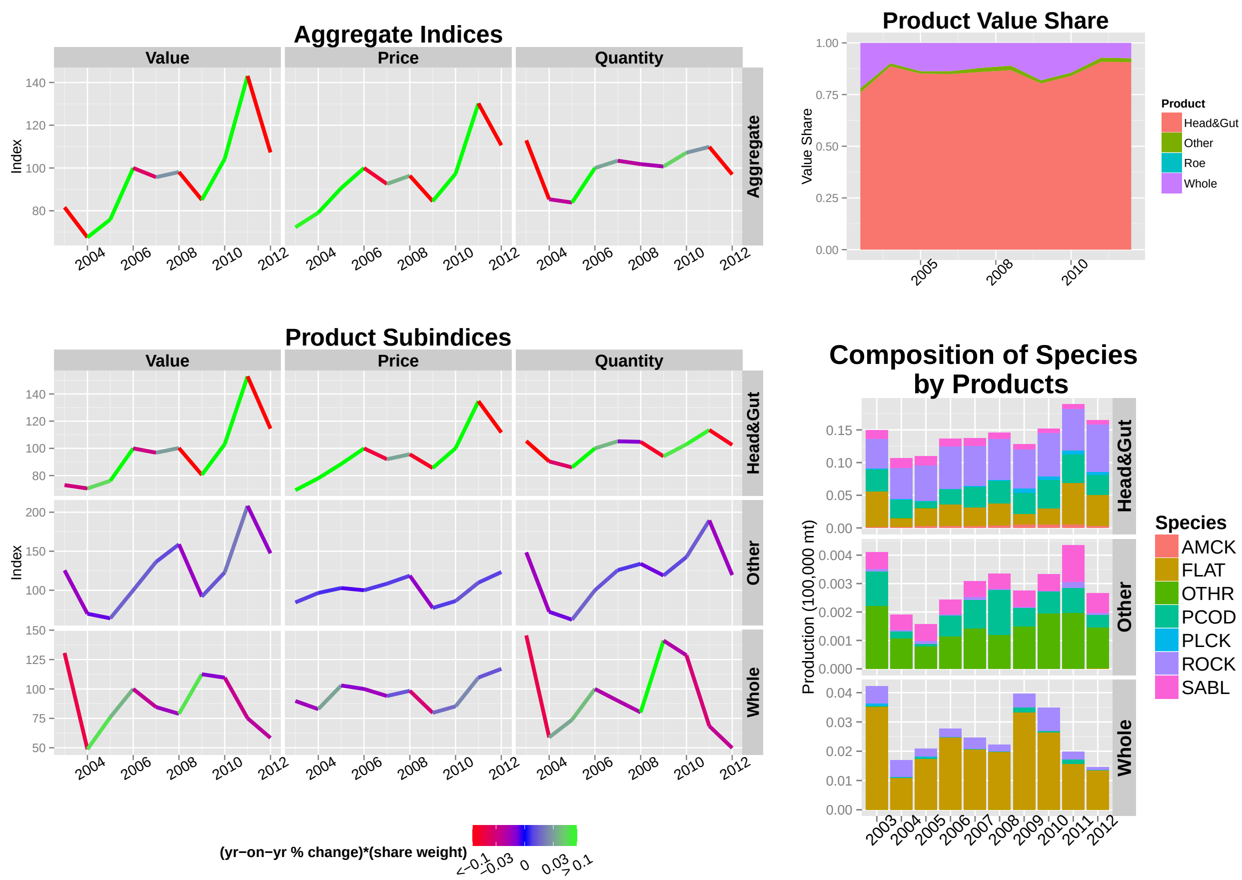


Figure 5.9: GOA at-sea wholesale market: product decomposition 2003-2012.

Notes: Index values for 2007-2012, 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.

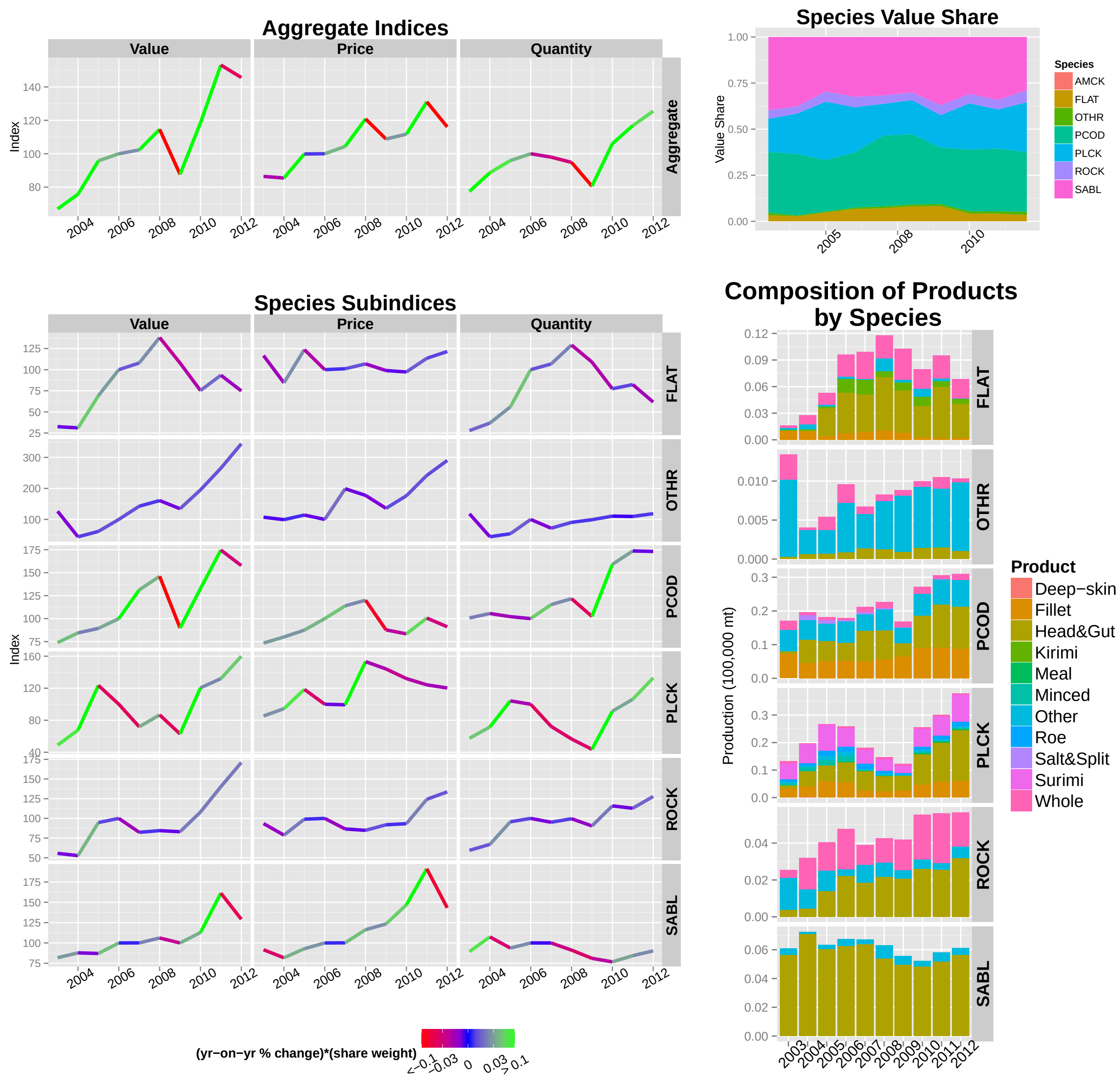


Figure 5.10: GOA shoreside wholesale market: species decomposition 2003-2012.
Notes: Index values for 2007-2012, notes and source information for the indices are on Table 5.9. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

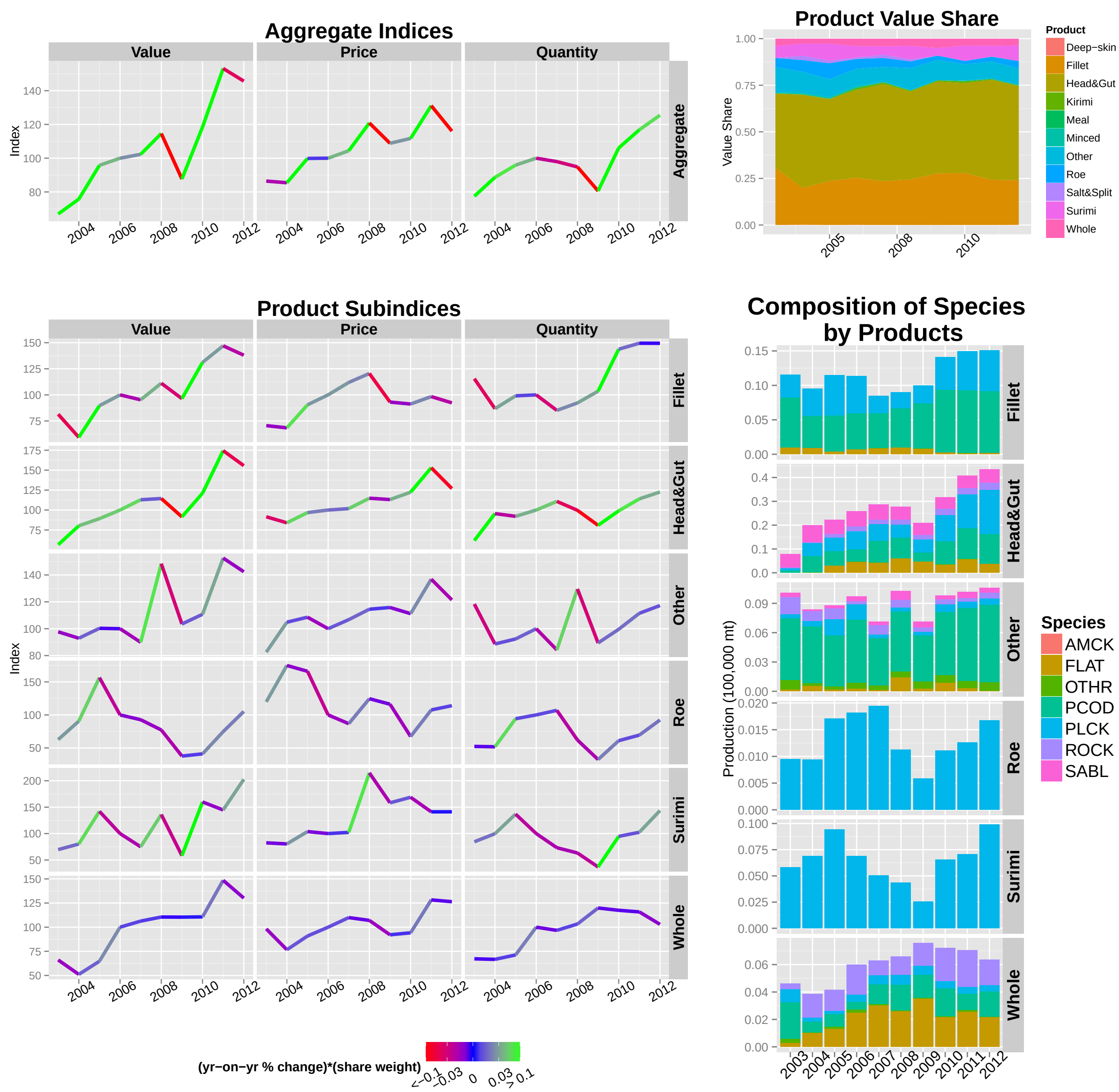


Figure 5.11: GOA shoreside wholesale market: product decomposition 2003-2012.

Notes: Index values for 2007-2012, 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.

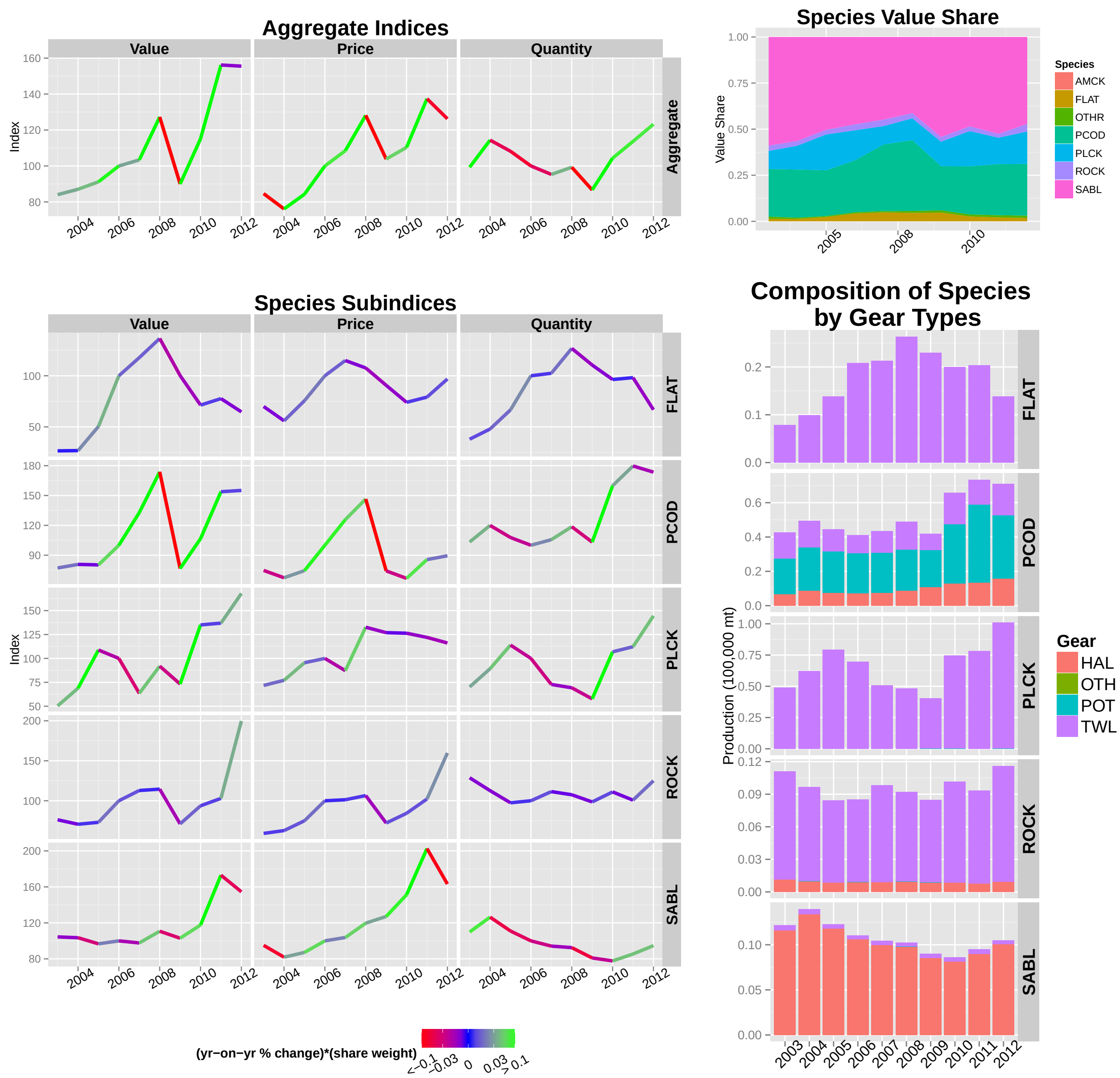


Figure 5.12: GOA shoreside ex-vessel market: species decomposition 2003-2012.
Notes: Index values for 2007-2012, notes and source information for the indices are on Table 5.11. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

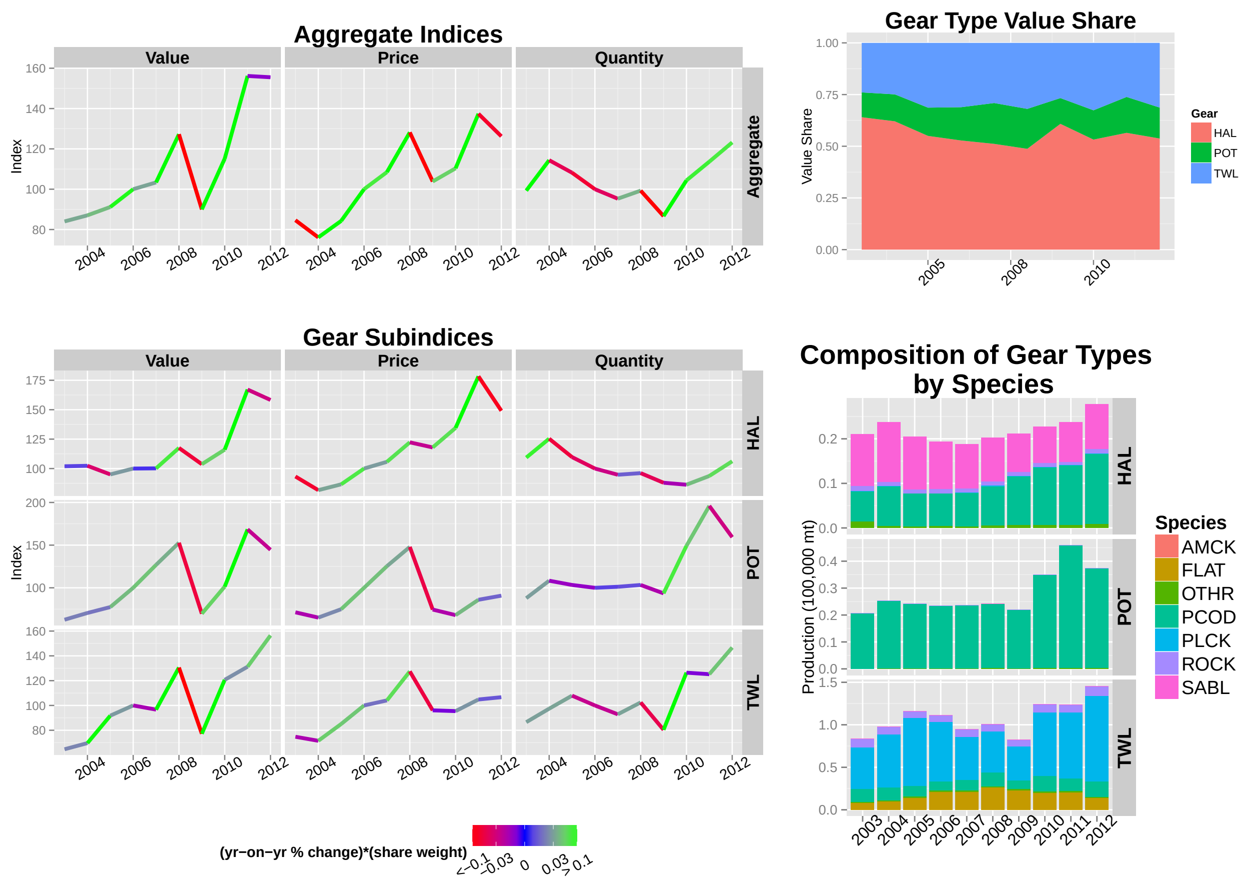


Figure 5.13: GOA shoreside ex-vessel market: gear decomposition 2003-2012 (Index 2006 = 100). **Notes:** Index values for 2007-2012, notes and source information for the indices are on Table 5.12. Index coloring indicates its influence on aggregate index movements, see Section 5.1.1 for details.

Table 5.1: Species Indicies and Value Share for the BSAI At-Sea First-Wholesale Market 2007 - 2012

Species	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	102.56	110.52	83.29	90.65	123.58	125.21
Aggregate	Price	103.34	128.42	105.61	112.94	117.25	119.53
Aggregate	Quantity	99.24	86.06	78.86	80.27	105.39	104.74
AMCK	Value	116.88	138.03	189.16	208.58	207.98	208.79
AMCK	Price	125.25	150.18	165.65	183.61	241.50	265.89
AMCK	Quantity	93.32	91.91	114.19	113.60	86.12	78.53
AMCK	Value Share	0.03	0.04	0.07	0.07	0.05	0.05
FLAT	Value	103.02	129.83	97.60	121.03	169.74	192.58
FLAT	Price	97.89	86.60	73.62	76.77	94.90	102.36
FLAT	Quantity	105.24	149.92	132.57	157.65	178.86	188.13
FLAT	Value Share	0.12	0.14	0.14	0.16	0.16	0.18
PCOD	Value	102.03	100.72	68.94	76.24	109.15	108.71
PCOD	Price	111.07	112.83	73.12	83.16	92.55	83.08
PCOD	Quantity	91.86	89.26	94.29	91.68	117.94	130.85
PCOD	Value Share	0.21	0.19	0.18	0.18	0.19	0.18
PLCK	Value	101.69	108.76	79.76	81.95	111.19	110.83
PLCK	Price	101.36	146.86	124.91	130.19	119.94	126.11
PLCK	Quantity	100.33	74.06	63.85	62.95	92.70	87.88
PLCK	Value Share	0.62	0.61	0.59	0.56	0.56	0.55
ROCK	Value	105.48	104.99	93.42	164.48	307.85	241.23
ROCK	Price	80.07	68.41	69.76	90.90	134.53	111.91
ROCK	Quantity	131.73	153.46	133.91	180.94	228.84	215.56
ROCK	Value Share	0.02	0.01	0.02	0.03	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 WPR; ADF&G COAR, National Marine Fisheries Serivces, P.O. Box 15700, Seattle, WA 98115-0070

Table 5.2: Product Indicies and Value Share for the BSAI At-Sea First-Wholesale Market 2007 - 2012

Product	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	102.56	110.52	83.29	90.65	123.58	125.21
Aggregate	Price	103.34	128.42	105.61	112.94	117.25	119.53
Aggregate	Quantity	99.24	86.06	78.86	80.27	105.39	104.74
Deep-skin	Value	122.93	98.95	109.12	107.00	116.26	128.90
Deep-skin	Price	108.16	129.76	146.69	139.37	129.18	125.35
Deep-skin	Quantity	113.65	76.26	74.39	76.78	90.00	102.83
Deep-skin	Value Share	0.11	0.08	0.12	0.11	0.09	0.09
Fillet	Value	88.38	106.64	93.91	75.77	123.26	97.25
Fillet	Price	100.49	141.14	134.28	128.73	115.12	111.93
Fillet	Quantity	87.95	75.56	69.94	58.86	107.07	86.88
Fillet	Value Share	0.11	0.13	0.15	0.11	0.13	0.10
Head&Gut	Value	107.14	119.97	92.86	111.42	162.04	155.16
Head&Gut	Price	106.37	107.46	81.21	93.20	113.63	108.12
Head&Gut	Quantity	100.73	111.64	114.34	119.55	142.60	143.50
Head&Gut	Value Share	0.37	0.38	0.39	0.43	0.46	0.44
Meal	Value	89.96	80.26	98.28	92.17	106.63	118.30
Meal	Price	93.74	110.91	103.93	106.15	92.83	96.53
Meal	Quantity	95.97	72.36	94.57	86.83	114.86	122.54
Meal	Value Share	0.03	0.02	0.04	0.03	0.03	0.03
Other	Value	115.91	96.16	118.12	155.01	202.89	170.11
Other	Price	111.54	99.69	91.81	104.78	114.79	111.19
Other	Quantity	103.92	96.47	128.65	147.94	176.74	152.99
Other	Value Share	0.02	0.01	0.02	0.03	0.03	0.02
Roe	Value	91.64	84.29	54.12	32.31	55.30	56.39
Roe	Price	90.69	118.28	95.17	69.14	77.48	99.07
Roe	Quantity	101.05	71.27	56.87	46.73	71.37	56.92
Roe	Value Share	0.14	0.12	0.10	0.06	0.07	0.07
Surimi	Value	103.26	138.33	64.47	98.51	105.10	133.87
Surimi	Price	106.84	198.10	136.15	173.53	138.03	159.72
Surimi	Quantity	96.65	69.83	47.35	56.76	76.14	83.81
Surimi	Value Share	0.18	0.22	0.14	0.19	0.15	0.19
Whole	Value	96.16	71.34	77.61	59.76	102.94	152.59
Whole	Price	106.68	96.89	99.04	81.09	106.59	120.00
Whole	Quantity	90.14	73.63	78.35	73.69	96.57	127.17
Whole	Value Share	0.02	0.02	0.02	0.02	0.02	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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070

Table 5.3: Species Indicies and Value Share for the BSAI Shoreside First-Wholesale Market 2007 - 2012

Species	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	100.74	105.05	81.66	85.01	107.43	114.62
Aggregate	Price	102.06	141.90	116.36	116.12	114.28	116.72
Aggregate	Quantity	98.71	74.03	70.17	73.21	94.00	98.20
PCOD	Value	128.85	116.16	49.04	73.89	115.26	135.91
PCOD	Price	119.54	120.20	66.10	71.88	87.52	84.53
PCOD	Quantity	107.79	96.64	74.19	102.80	131.70	160.79
PCOD	Value Share	0.17	0.15	0.08	0.12	0.14	0.16
PLCK	Value	96.02	103.94	86.78	85.45	105.19	110.78
PLCK	Price	99.05	147.88	126.66	124.10	117.33	122.49
PLCK	Quantity	96.94	70.29	68.51	68.85	89.65	90.44
PLCK	Value Share	0.81	0.84	0.90	0.85	0.83	0.82
SABL	Value	136.76	95.73	100.35	198.72	194.11	161.68
SABL	Price	110.45	130.90	132.92	176.42	215.07	143.05
SABL	Quantity	123.82	73.13	75.49	112.64	90.26	113.02
SABL	Value Share	0.02	0.01	0.01	0.03	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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070

Table 5.4: Product Indicies and Value Share for the BSAI Shoreside First-Wholesale Market 2007 - 2012

Product	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	100.74	105.05	81.66	85.01	107.43	114.62
Aggregate	Price	102.06	141.90	116.36	116.12	114.28	116.72
Aggregate	Quantity	98.71	74.03	70.17	73.21	94.00	98.20
Deep-skin	Value	141.19	107.49	107.03	94.56	100.06	147.19
Deep-skin	Price	102.52	123.65	126.78	128.26	124.39	136.81
Deep-skin	Quantity	137.72	86.94	84.42	73.72	80.44	107.59
Deep-skin	Value Share	0.11	0.08	0.10	0.09	0.07	0.10
Fillet	Value	93.69	87.76	89.92	87.98	126.91	104.37
Fillet	Price	103.52	134.40	133.35	129.18	121.09	120.51
Fillet	Quantity	90.51	65.30	67.43	68.10	104.81	86.61
Fillet	Value Share	0.28	0.25	0.33	0.31	0.35	0.27
Head&Gut	Value	177.64	143.24	149.39	182.84	146.76	157.15
Head&Gut	Price	122.53	130.13	81.15	83.36	94.25	81.77
Head&Gut	Quantity	144.97	110.08	184.09	219.33	155.72	192.18
Head&Gut	Value Share	0.13	0.10	0.13	0.16	0.10	0.10
Meal	Value	87.25	75.67	42.40	53.93	76.54	70.02
Meal	Price	86.94	109.19	123.23	112.88	88.21	94.33
Meal	Quantity	100.35	69.30	34.41	47.77	86.77	74.23
Meal	Value Share	0.02	0.02	0.01	0.01	0.02	0.01
Other	Value	92.39	91.73	64.05	86.06	110.40	153.27
Other	Price	103.53	114.64	85.79	92.59	109.89	121.85
Other	Quantity	89.25	80.02	74.66	92.95	100.47	125.78
Other	Value Share	0.04	0.04	0.04	0.05	0.05	0.06
Roe	Value	86.70	79.87	61.48	35.28	44.53	55.63
Roe	Price	85.30	117.81	84.41	54.11	82.65	91.56
Roe	Quantity	101.64	67.80	72.84	65.20	53.88	60.76
Roe	Value Share	0.14	0.12	0.12	0.07	0.07	0.08
Surimi	Value	89.19	153.59	75.22	91.27	123.46	151.87
Surimi	Price	105.15	214.11	145.87	162.07	138.27	150.74
Surimi	Quantity	84.82	71.74	51.56	56.31	89.29	100.75
Surimi	Value Share	0.21	0.35	0.22	0.25	0.27	0.31

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.5: Species Indicies and Value Share for the BSAI Shoreside Ex-Vessel Market 2006 - 2012

Species	Index Type	2006	2007	2008	2009	2010	2011	2012
Aggregate	Value	100.00	93.31	111.44	73.68	66.16	102.96	92.99
Aggregate	Price	100.00	103.28	155.63	125.73	110.19	119.92	103.45
Aggregate	Quantity	100.00	90.34	71.61	58.61	60.04	85.86	89.89
PCOD	Value	100.00	113.93	138.31	47.02	57.38	90.95	119.49
PCOD	Price	100.00	122.01	152.21	66.54	67.23	78.03	85.41
PCOD	Quantity	100.00	93.37	90.87	70.66	85.34	116.55	139.90
PCOD	Value Share	0.18	0.22	0.22	0.11	0.15	0.16	0.23
PLCK	Value	100.00	87.97	105.83	78.37	66.01	102.94	85.95
PLCK	Price	100.00	99.00	159.58	144.44	121.28	128.05	105.62
PLCK	Quantity	100.00	88.86	66.32	54.26	54.43	80.39	81.37
PLCK	Value Share	0.79	0.74	0.75	0.84	0.79	0.79	0.73
SABL	Value	100.00	109.73	101.05	108.73	122.76	176.70	122.88
SABL	Price	100.00	101.31	122.28	129.91	154.01	212.93	142.41
SABL	Quantity	100.00	108.31	82.64	83.70	79.71	82.98	86.29
SABL	Value Share	0.03	0.04	0.03	0.05	0.06	0.05	0.04

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

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

Table 5.6: Gear Indicies and Value Share for the BSAI Shoreside Ex-Vessel Market 2006 - 2012

Gear	Index Type	2006	2007	2008	2009	2010	2011	2012
Aggregate	Value	100.00	93.31	111.44	73.68	66.16	102.96	92.99
Aggregate	Price	100.00	103.28	155.63	125.73	110.19	119.92	103.45
Aggregate	Quantity	100.00	90.34	71.61	58.61	60.04	85.86	89.89
HAL	Value	100.00	60.77	119.92	140.15	184.06	269.05	224.33
HAL	Price	100.00	107.19	126.66	107.82	128.45	174.69	137.09
HAL	Quantity	100.00	56.70	94.68	129.98	143.29	154.02	163.64
HAL	Value Share	0.01	0.01	0.01	0.03	0.04	0.03	0.03
POT	Value	100.00	116.04	131.99	53.69	76.44	119.01	114.49
POT	Price	100.00	113.18	137.12	80.98	90.39	104.16	97.47
POT	Quantity	100.00	102.53	96.26	66.31	84.57	114.26	117.46
POT	Value Share	0.09	0.11	0.10	0.06	0.10	0.10	0.11
TWL	Value	100.00	91.59	109.32	74.64	63.42	98.94	88.96
TWL	Price	100.00	102.21	158.63	131.64	111.66	119.58	102.52
TWL	Quantity	100.00	89.60	68.92	56.70	56.79	82.74	86.77
TWL	Value Share	0.90	0.88	0.88	0.91	0.86	0.86	0.86

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.7: Species Indicies and Value Share for the GOA At-Sea First-Wholesale Market 2007 - 2012

Species	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	95.70	98.11	85.08	104.25	143.05	107.30
Aggregate	Price	92.55	96.37	84.48	97.29	130.20	110.63
Aggregate	Quantity	103.41	101.80	100.72	107.15	109.87	96.99
AMCK	Value	81.98	194.60	381.13	364.45	468.66	341.06
AMCK	Price	97.33	167.32	240.52	237.39	312.87	332.23
AMCK	Quantity	84.23	116.30	158.46	153.52	149.80	102.66
AMCK	Value Share	0.01	0.02	0.03	0.03	0.03	0.02
FLAT	Value	80.10	84.39	77.77	76.29	126.75	106.46
FLAT	Price	93.49	94.20	80.46	81.96	106.23	115.44
FLAT	Quantity	85.68	89.58	96.66	93.08	119.32	92.22
FLAT	Value Share	0.18	0.18	0.19	0.16	0.19	0.21
PCOD	Value	143.38	163.46	103.79	152.81	177.28	108.06
PCOD	Price	106.69	108.02	72.36	81.64	92.05	83.01
PCOD	Quantity	134.39	151.33	143.44	187.17	192.59	130.18
PCOD	Value Share	0.27	0.30	0.22	0.27	0.22	0.18
ROCK	Value	72.56	67.28	67.75	99.48	137.51	121.89
ROCK	Price	74.88	70.93	69.58	88.19	138.15	111.43
ROCK	Quantity	96.90	94.86	97.37	112.81	99.53	109.39
ROCK	Value Share	0.28	0.25	0.29	0.35	0.35	0.41
SABL	Value	106.29	100.57	86.03	83.00	117.62	66.67
SABL	Price	104.00	122.93	125.19	147.73	189.21	117.34
SABL	Quantity	102.20	81.81	68.72	56.18	62.16	56.82
SABL	Value Share	0.25	0.23	0.23	0.18	0.19	0.14

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.8: Product Indicies and Value Share for the GOA At-Sea First-Wholesale Market 2007 - 2012

Product	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	95.70	98.11	85.08	104.25	143.05	107.30
Aggregate	Price	92.55	96.37	84.48	97.29	130.20	110.63
Aggregate	Quantity	103.41	101.80	100.72	107.15	109.87	96.99
Head&Gut	Value	96.81	100.22	80.53	103.07	152.95	114.53
Head&Gut	Price	92.03	95.65	85.56	100.08	134.71	111.69
Head&Gut	Quantity	105.20	104.79	94.11	102.99	113.54	102.54
Head&Gut	Value Share	0.86	0.87	0.80	0.84	0.91	0.91
Other	Value	136.36	158.85	91.93	122.89	208.10	147.37
Other	Price	108.41	118.65	77.31	86.16	109.80	123.29
Other	Quantity	125.78	133.88	118.91	142.62	189.52	119.53
Other	Value Share	0.02	0.02	0.01	0.02	0.02	0.02
Whole	Value	84.61	78.87	112.52	109.63	75.09	58.37
Whole	Price	94.01	98.44	79.71	85.24	109.71	117.09
Whole	Quantity	90.00	80.12	141.15	128.62	68.45	49.85
Whole	Value Share	0.12	0.11	0.18	0.14	0.07	0.07

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.9: Species Indicies and Value Share for the GOA Shoreside First-Wholesale Market 2007 - 2012

Species	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	102.29	114.61	87.67	118.48	153.16	145.66
Aggregate	Price	104.41	120.87	108.80	111.72	131.11	116.08
Aggregate	Quantity	97.97	94.82	80.57	106.05	116.81	125.48
FLAT	Value	107.90	138.06	107.85	75.28	93.44	74.88
FLAT	Price	101.10	106.86	98.93	97.31	113.48	121.48
FLAT	Quantity	106.73	129.21	109.02	77.36	82.34	61.64
FLAT	Value Share	0.07	0.08	0.08	0.04	0.04	0.03
OTHR	Value	142.64	160.79	134.45	195.13	265.07	343.98
OTHR	Price	198.96	177.52	135.78	176.35	241.99	290.15
OTHR	Quantity	71.69	90.57	99.02	110.65	109.54	118.55
OTHR	Value Share	0.01	0.01	0.01	0.01	0.01	0.02
PCOD	Value	131.26	146.09	89.83	132.65	174.67	157.75
PCOD	Price	113.90	120.04	87.73	83.39	100.59	91.12
PCOD	Quantity	115.24	121.71	102.39	159.08	173.65	173.13
PCOD	Value Share	0.38	0.38	0.31	0.33	0.34	0.32
PLCK	Value	71.79	86.71	62.86	120.50	131.97	159.90
PLCK	Price	99.30	153.24	144.07	132.03	124.22	120.30
PLCK	Quantity	72.29	56.58	43.63	91.26	106.24	132.92
PLCK	Value Share	0.17	0.19	0.18	0.25	0.21	0.27
ROCK	Value	82.31	84.48	83.06	108.08	140.25	170.90
ROCK	Price	86.54	84.83	91.89	93.28	124.26	133.68
ROCK	Quantity	95.11	99.59	90.39	115.87	112.87	127.85
ROCK	Value Share	0.05	0.04	0.05	0.05	0.05	0.07
SABL	Value	100.08	106.09	100.00	112.75	161.30	129.17
SABL	Price	100.13	116.35	123.35	146.96	191.23	143.17
SABL	Quantity	99.96	91.18	81.08	76.73	84.35	90.22
SABL	Value Share	0.32	0.30	0.37	0.31	0.34	0.29

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.10: Product Indicies and Value Share for the GOA Shoreside First-Wholesale Market 2007 - 2012

Product	Index Type	2007	2008	2009	2010	2011	2012
Aggregate	Value	102.29	114.61	87.67	118.48	153.16	145.66
Aggregate	Price	104.41	120.87	108.80	111.72	131.11	116.08
Aggregate	Quantity	97.97	94.82	80.57	106.05	116.81	125.48
Fillet	Value	95.27	111.18	96.38	131.12	147.03	138.00
Fillet	Price	111.92	120.48	93.10	91.21	98.36	92.35
Fillet	Quantity	85.12	92.28	103.52	143.75	149.48	149.43
Fillet	Value Share	0.24	0.24	0.28	0.28	0.24	0.24
Head&Gut	Value	112.89	114.43	91.46	121.13	174.45	155.63
Head&Gut	Price	101.82	114.82	113.14	122.38	153.06	126.94
Head&Gut	Quantity	110.87	99.66	80.85	98.99	113.98	122.61
Head&Gut	Value Share	0.52	0.47	0.49	0.48	0.54	0.50
Other	Value	89.91	148.35	103.51	110.75	152.57	142.38
Other	Price	106.75	114.52	115.80	111.22	136.87	121.44
Other	Quantity	84.23	129.55	89.39	99.58	111.47	117.25
Other	Value Share	0.08	0.12	0.11	0.09	0.09	0.09
Roe	Value	92.75	77.22	37.68	41.07	74.66	105.23
Roe	Price	86.74	124.56	116.20	67.32	107.54	114.03
Roe	Quantity	106.93	61.99	32.42	61.00	69.43	92.28
Roe	Value Share	0.05	0.04	0.02	0.02	0.03	0.04
Surimi	Value	75.02	136.07	58.30	159.87	144.70	202.63
Surimi	Price	102.34	214.84	158.21	168.71	141.18	141.24
Surimi	Quantity	73.30	63.33	36.85	94.76	102.49	143.46
Surimi	Value Share	0.04	0.07	0.04	0.08	0.06	0.08
Whole	Value	106.30	110.53	110.41	110.67	148.55	130.14
Whole	Price	109.92	107.01	92.10	94.20	128.25	126.40
Whole	Quantity	96.70	103.29	119.88	117.48	115.83	102.96
Whole	Value Share	0.04	0.04	0.05	0.04	0.04	0.04

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

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

Table 5.11: Species Indicies and Value Share for the GOA Shoreside Ex-Vessel Market 2006 - 2012

Species	Index Type	2006	2007	2008	2009	2010	2011	2012
Aggregate	Value	100.00	103.37	127.25	89.98	115.15	156.16	155.52
Aggregate	Price	100.00	108.48	128.17	103.84	110.35	137.40	126.24
Aggregate	Quantity	100.00	95.29	99.28	86.66	104.34	113.65	123.19
FLAT	Value	100.00	117.74	136.49	100.20	71.31	77.67	64.68
FLAT	Price	100.00	114.95	107.65	90.67	74.01	79.12	96.85
FLAT	Quantity	100.00	102.43	126.79	110.50	96.35	98.16	66.78
FLAT	Value Share	0.04	0.05	0.05	0.05	0.03	0.02	0.02
PCOD	Value	100.00	132.82	173.79	76.62	106.64	153.83	155.11
PCOD	Price	100.00	125.75	146.51	74.26	66.71	85.61	89.39
PCOD	Quantity	100.00	105.62	118.62	103.18	159.85	179.69	173.52
PCOD	Value Share	0.28	0.36	0.38	0.24	0.26	0.28	0.28
PLCK	Value	100.00	63.44	91.96	73.21	135.07	136.92	167.92
PLCK	Price	100.00	87.17	132.67	126.93	126.37	122.00	116.15
PLCK	Quantity	100.00	72.78	69.31	57.67	106.89	112.23	144.57
PLCK	Value Share	0.16	0.10	0.12	0.13	0.19	0.14	0.18
ROCK	Value	100.00	112.86	114.52	71.09	93.68	103.01	199.75
ROCK	Price	100.00	101.27	106.50	72.13	84.34	102.22	159.77
ROCK	Quantity	100.00	111.45	107.54	98.55	111.07	100.77	125.02
ROCK	Value Share	0.03	0.03	0.03	0.03	0.03	0.02	0.04
SABL	Value	100.00	97.69	110.73	102.97	117.59	173.03	154.53
SABL	Price	100.00	103.74	119.70	127.10	151.26	202.65	163.19
SABL	Quantity	100.00	94.17	92.51	81.01	77.74	85.38	94.70
SABL	Value Share	0.47	0.45	0.41	0.54	0.48	0.53	0.47

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5.12: Gear Indicies and Value Share for the GOA Shoreside Ex-Vessel Market 2006 - 2012

Gear	Index Type	2006	2007	2008	2009	2010	2011	2012
Aggregate	Value	100.00	103.37	127.25	89.98	115.15	156.16	155.52
Aggregate	Price	100.00	108.48	128.17	103.84	110.35	137.40	126.24
Aggregate	Quantity	100.00	95.29	99.28	86.66	104.34	113.65	123.19
HAL	Value	100.00	100.16	117.52	103.70	116.08	167.10	158.29
HAL	Price	100.00	105.72	122.28	117.94	134.54	178.33	149.11
HAL	Quantity	100.00	94.74	96.11	87.93	86.28	93.70	106.16
HAL	Value Share	0.53	0.51	0.49	0.61	0.53	0.56	0.54
POT	Value	100.00	126.86	152.77	69.66	101.41	168.47	144.60
POT	Price	100.00	125.37	147.89	74.51	68.00	85.97	90.78
POT	Quantity	100.00	101.19	103.30	93.49	149.14	195.98	159.29
POT	Value Share	0.16	0.20	0.19	0.12	0.14	0.17	0.15
TWL	Value	100.00	96.65	130.56	77.20	120.67	131.23	156.47
TWL	Price	100.00	104.07	127.47	96.06	95.44	104.82	106.65
TWL	Quantity	100.00	92.87	102.43	80.37	126.44	125.20	146.71
TWL	Value Share	0.31	0.29	0.32	0.27	0.33	0.26	0.31

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 Serivces, P.O. Box 15700, Seattle, WA 98115-0070.

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

6.1. 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 six 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). These programs account for approximately 75% of all North Pacific groundfish landings.

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 sablefish IFQ program (excluding halibut, as it is managed by the International Pacific Halibut Commission), 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 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 revenue concentration among the active vessels).

6.2. North Pacific Sablefish IFQ Program

6.2.1 Management Context

The North Pacific Sablefish IFQ program was implemented simultaneously with the North Pacific Halibut IFQ Program, but since halibut are not a federally managed groundfish species, this report focuses only on the Sablefish IFQ Program. 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, pot, and trawl gear, but the IFQ program only applies to longline and pot gears. There is not a substantial recreational sector for sablefish in the North Pacific. Twenty percent of the Bering Sea and Aleutian Islands (BSAI) sablefish IFQ quota is allocated to the Community Development Quota (CDQ) program.

The Sablefish IFQ Program is managed by the North Pacific Fishery Management Council (NPFMC), which is responsible for establishing Annual Catch Limits (ACLs) for sablefish and allocating the U.S. catch limits among various user groups. It is through this authority that the fixed gear sablefish IFQ program was developed by the NPFMC and implemented by NOAA Fisheries in 1995. Prior to the IFQ program, the fisheries operated as a derby fishery which often lasted a few days per year (depending on the area). Quota Share (QS) was initially issued to persons based on both historic and recent participation of persons who, in 1988, 1989, or 1990, owned vessels with qualifying landings. QS 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 Sablefish IFQ program is one of only two North Pacific groundfish catch share species 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 and has ranged from $0.75 million to $2.23 million and 1.3% to 2.1% of ex-vessel value.

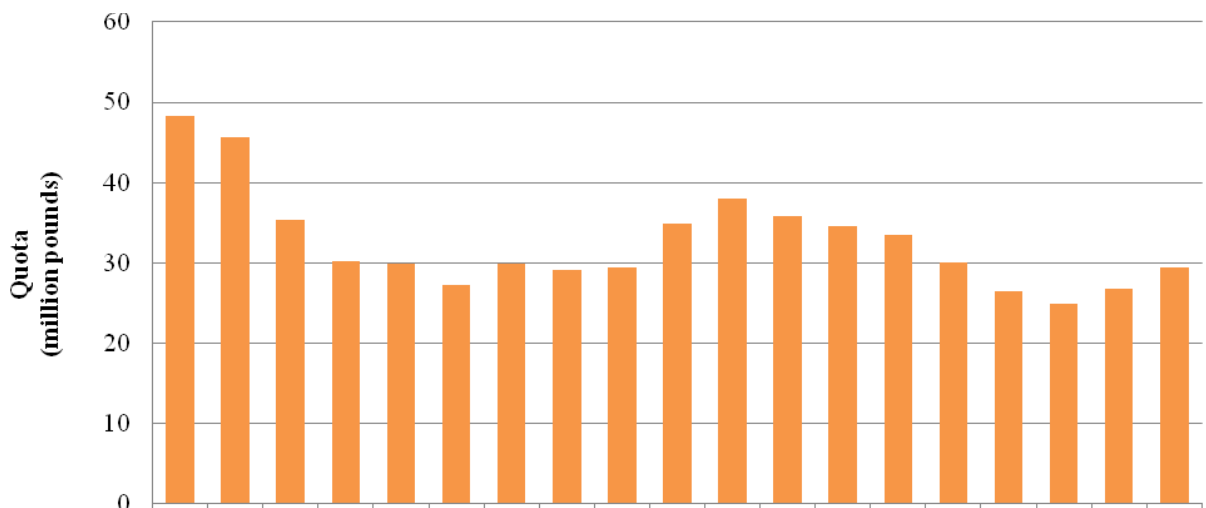
6.2.2 Catch Share Privilege Characteristics

There are two forms of quota in the sablefish fishery, QS and annual IFQ derived therefrom. Quota share holders can be individuals or non-individuals (such as a corporation). At the beginning of each calendar year, 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 which is based on the distribution of fish from recent surveys. QS are a revocable, indefinite privilege that entitles the holder to a share of the total area-, vessel class-specific, blocked or unblocked-, and fishdownable- (where fishdownable means that it can be harvested by smaller vessels, but not larger vessels) IFQ allocated each year. 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 14 species and area specific quota allocations with a total of 30 unique types of sablefish quota due to blocking and fishdownability.

Quota share can be sold with or without IFQ derived therefrom (plus adjustments from prior year QS used). QS is transferable to other initial issuees or to those who have become transfer-eligible through obtaining NMFS' approval by submitting an Application for Eligibility to Receive QS/IFQ. To be eligible, potential QS/IFQ recipients must have 150 or more days of experience working as part of a harvesting crew in any U.S. commercial fishery. IFQ can be leased annually to other eligible permit holders 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), and the transfer of catcher vessel QS and IFQ is very restricted. There are caps on both individuals as well as entities. No individual can hold/control more than 0.5%-1.5% of sablefish shares in combinations of areas. Entity caps are 1% on QS share holdings and percent of TAC caps for annual vessels landings. Communities with CDQ are not subject to excessive share provisions. There are also owner on board requirements for catcher vessel QS and IFQ and limits on 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 which is funded through the cost recovery fees collected.

6.2.3 Catch and Landings Performance Metrics

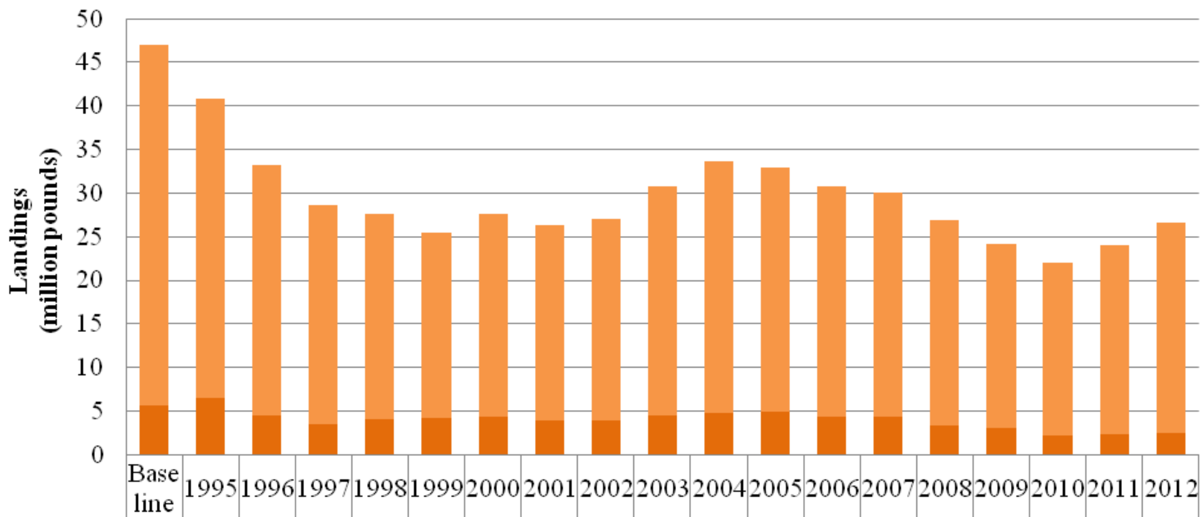
The catch and landings performance metrics include the amount of quota allocated to the program, the landings of IFQ sablefish, and the percentage of the quota allocated that is landed (percent utilization). Annual metrics will be compared with a "baseline" period prior to program implementation, which is the average of the three years prior to program implementation (1992-1994). Between the baseline and 2012, the quota and landings have fallen by 40% and 43%, respectively, while the percent utilization fell from 98.3% during the baseline to 90.5% in 2012. The quota and landings have followed a cyclical pattern since the baseline with quota and landings falling initially after program implementation to 2000, followed by an increase from 2001 to 2004, another decline between 2005 and 2010, and both have recently been increasing in 2011 and 2012 (Figures 6.1 and 6.2).



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sablefish	48.2	45.6	35.3	30.2	29.8	27.1	29.9	29.1	29.3	34.8	37.9	35.7	34.5	33.4	29.9	26.4	24.8	26.7	29.3

Figure 6.1: Quota allocated to the Sablefish IFQ Program.

Figure 6.2 also separates the landings by catcher vessel (CV) and catcher/processor vessel (CP) for all years of the program. Overall program landings have declined by 42% in 2012 relative to the baseline, but catcher vessel landings have declined by 41% while catcher/processor vessels' catch has declined by 57%. 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.



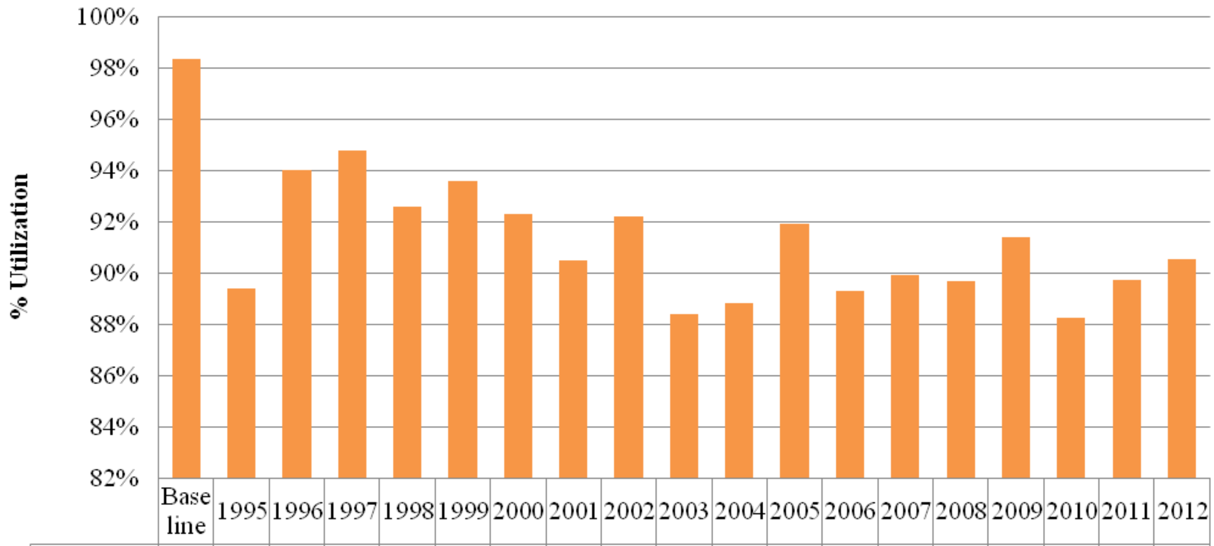
	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	41.4	34.3	28.7	25.1	23.5	21.2	23.3	22.3	23.2	26.2	28.9	27.9	26.5	25.7	23.5	21.1	19.7	21.7	24.1
CP	5.57	6.43	4.43	3.47	4.13	4.13	4.28	3.96	3.88	4.52	4.77	4.91	4.28	4.32	3.33	3.01	2.25	2.32	2.42

Figure 6.2: Landings of sablefish in the Rockfish Program.

Utilization initially fell after implementation, and appears to be slightly counter-cyclical with the quota and landings, always at a lower than baseline level (Figure 6.3). 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 quota, respectively, which skews the utilization rate of the baseline closer to 100% because of the substantial overage in 1993.

6.2.4 Effort Performance Metrics

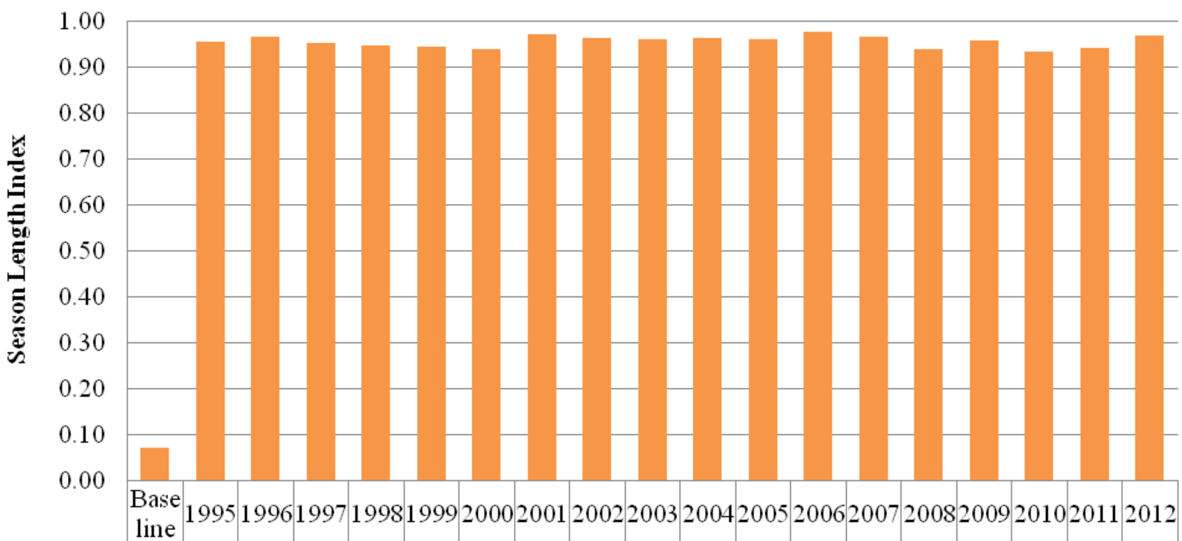
The effort performance metrics include the number of active vessels, the number of entities holding share, and the season length index. The season length index is defined as the number of days in which at least one vessel was fishing divided by the number of days in the regulatory season. This index is necessary to create a single unit-less metric of season length that can be aggregated over all 14 area and vessel class quotas which each have their own fishing season length. This index demonstrates how much of the total time available to catch the quota is actually used to catch the quota of sablefish. During the baseline, some areas were only open to fishing for sablefish for a couple days (for the most demanded areas) while others were open for the entire regulatory length. 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 open period 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



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sablefish	98.3	89.4	93.9	94.7	92.6	93.5	92.3	90.5	92.1	88.3	88.8	91.9	89.2	89.9	89.6	91.3	88.2	89.7	90.5

Figure 6.3: Percent of the allocated quota that is landed in the Sablefish IFQ Program.

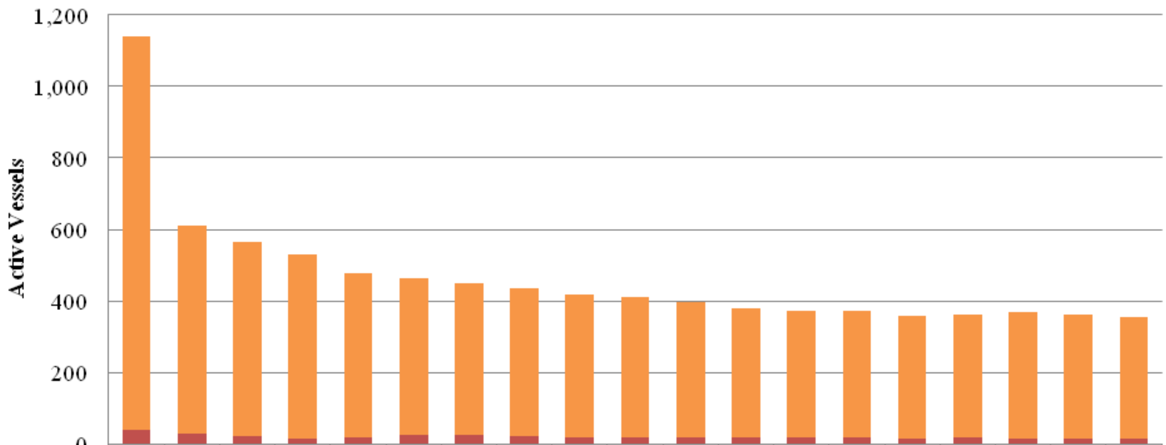
period is 0.07. Upon implementation of the IFQ Program, fishing was allowed for 246 days and the season length index for 1995 was 0.96. The number of active days increased from a baseline average of 17 days to 235 days in 1995. Over the course of the Sablefish IFQ Program, the season length index has fluctuated between 0.93 - 0.97 (Figure 6.4).



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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

Figure 6.4: Sablefish IFQ Program season length index.

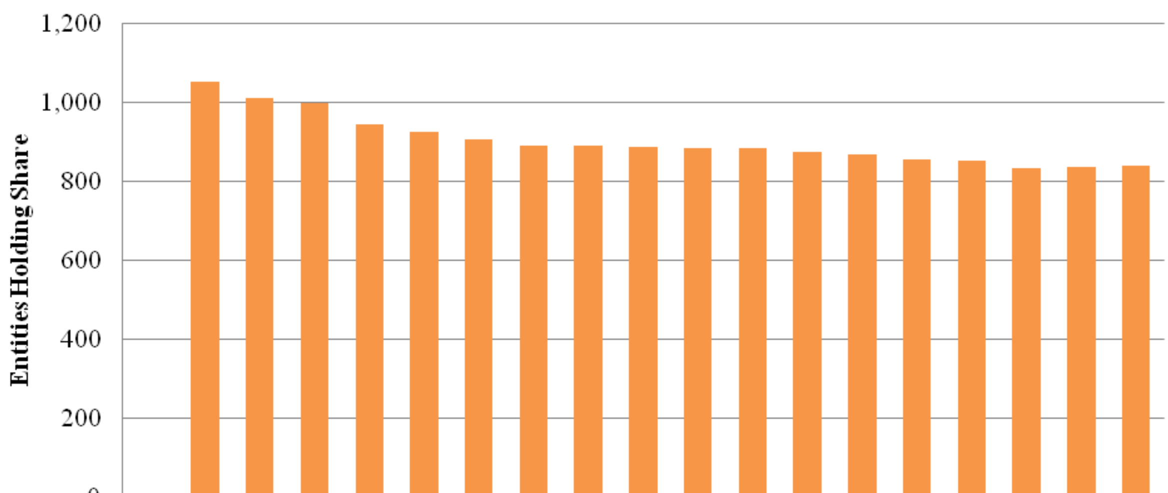
The number of active vessels reflects the number of sablefish catcher and catcher/processor vessels with any commercial landings of IFQ Program sablefish in a given year. The baseline value represents the number of unique vessels with commercial sablefish landings from 1992-1994. After program implementation, 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 6.5). There was only a drop of 23% in the number of active catcher/processors and a 47% decrease in the number of catcher vessels. 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 2012 the rate of decline has slowed to a 2% annual rate for both sectors and overall.



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	1,10	581	545	514	458	438	425	415	399	392	378	359	355	354	343	346	352	346	341
CP	38	29	20	16	19	25	25	21	17	17	18	19	17	19	16	17	16	16	13

Figure 6.5: Number of active vessels in the Sablefish IFQ Program.

There were 1,054 entities holding Sablefish quota share in 1995 and 841, or 20% less, by 2012 (Figure 6.6).

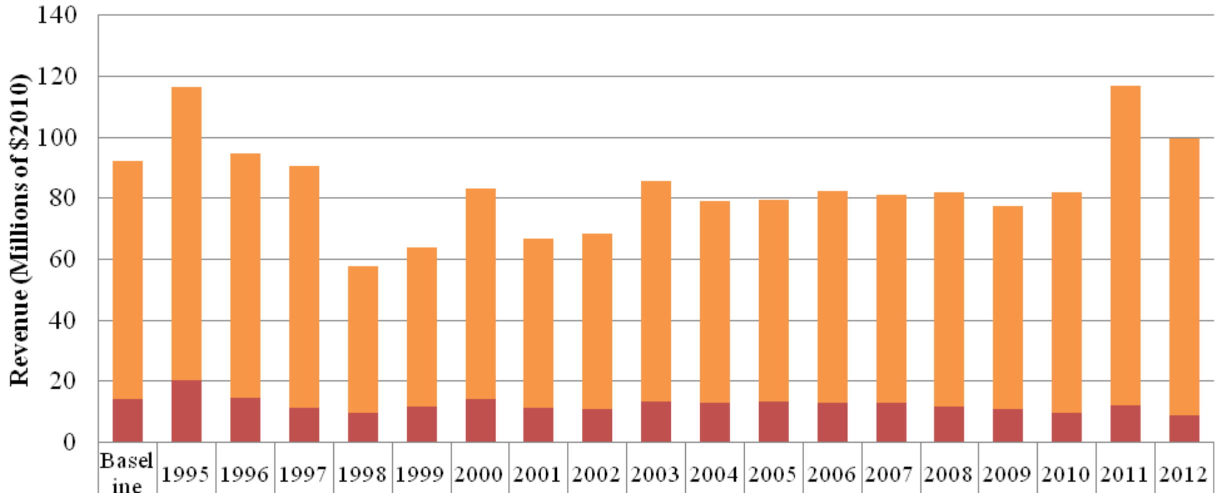


	Basel ine	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Sablefish		1,054	1,012	999	944	925	908	890	890	887	886	885	875	869	857	853	835	838	841

Figure 6.6: Number of entities holding share in the Sablefish IFQ Program.

6.2.5 Revenue Performance Metrics

The revenue performance 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 how concentrated revenues are 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 revenue initially increased by 26% in 1995 to $116 million overall, which was the result of an increase of 45% by catcher/processors and by 23% for catcher vessels compared to the baseline (Figure 6.7). Sablefish revenue declined to a low in 1998 of $58 million and was below the peak in 1995 every year afterwards until 2011 which is a program level high of $117 million.



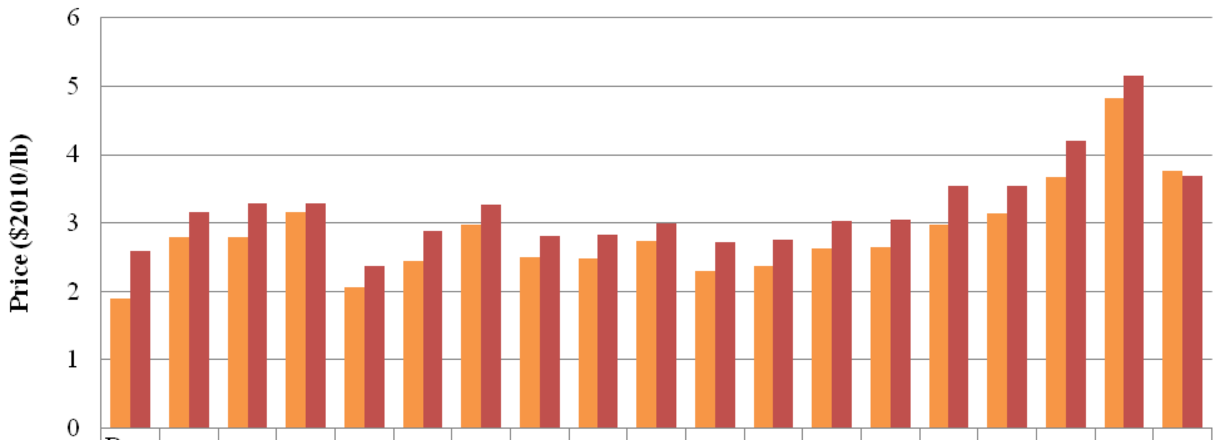
	Baseline	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	78.2	96.1	80.3	79.3	48.1	52.1	69.4	55.8	57.3	72.0	66.4	66.1	69.6	67.9	70.2	66.6	72.4	104.7	90.8
CP	14.0	20.3	14.6	11.4	9.8	11.9	14.0	11.2	11.0	13.5	12.9	13.6	13.0	13.2	11.8	10.7	9.5	12.0	8.9

Figure 6.7: Sablefish IFQ Program revenue.

The average price per pound of sablefish increased for both catcher vessels and catcher/processors since program implementation. Real average prices of sablefish increased by 94% from $1.985/lb during the baseline to $3.75/lb in 2012 with catcher vessels benefiting more than the catcher/processors with prices increasing by 104% and 36%, respectively (Figure 6.8). There is substantial variation in the average prices which varied annually by -34% to 45% over the course of the Sablefish IFQ Program, with catcher/processors receiving higher prices (real average price of $3.22) than catcher vessels (real average price of $2.85), but catcher/processors have a higher coefficient of variation in prices which mean that the catcher/processor prices are more variable than catcher vessel prices.

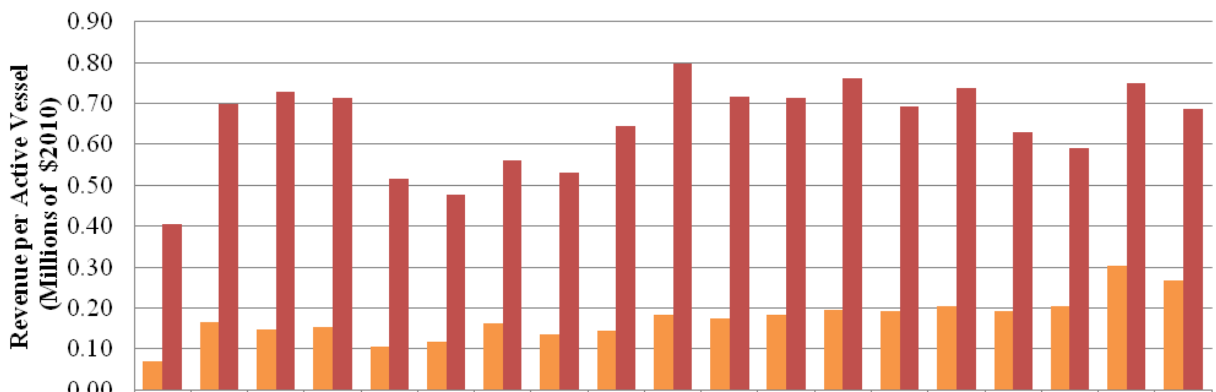
Sablefish revenue per vessel increased by 247% from a baseline of $81,000 to $282,000 in 2012, with the majority of the benefits accruing to the catcher vessel sector which increased by 275% (from $71,000 in the baseline to $266,000) while catcher/processors only increased by 69% (from $406,000 in the baseline to $686,000 in 2012) (Figure 6.9).

The last performance metric reported for the Sablefish IFQ Program is the Gini coefficient of vessel revenues. 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 zero 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, inequality in vessel revenues is increasing in the Gini coefficient. This becomes apparent looking at the difference in Gini coefficient for the baseline period for all vessels (Gini = 0.64) which implies a higher level of inequality in vessel revenues compared with the Gini coefficient for either the catcher vessels only (Gini = 0.62) or for the catcher/processors only (Gini = 0.51) (Figure 6.10). This is because the revenue per vessel among catcher vessels and catcher processors is very different (Figure 6.9) and



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	1.90	2.80	2.79	3.15	2.05	2.45	2.97	2.49	2.47	2.74	2.29	2.36	2.62	2.64	2.98	3.14	3.68	4.82	3.76
CP	2.58	3.15	3.28	3.28	2.37	2.88	3.28	2.82	2.83	2.99	2.71	2.76	3.03	3.04	3.54	3.55	4.20	5.15	3.68

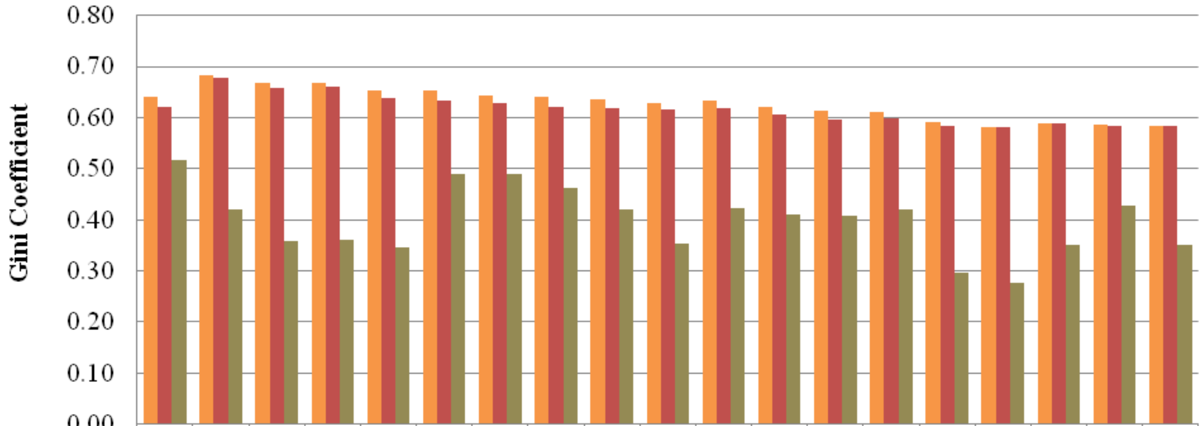
Figure 6.8: Sablefish IFQ Program price per pound.



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	0.07	0.17	0.15	0.15	0.11	0.12	0.16	0.13	0.14	0.18	0.18	0.18	0.20	0.19	0.20	0.19	0.21	0.30	0.27
CP	0.41	0.70	0.73	0.71	0.51	0.48	0.56	0.53	0.65	0.80	0.72	0.71	0.76	0.69	0.74	0.63	0.59	0.75	0.69

Figure 6.9: Sablefish IFQ Program revenue per active vessel.

when all vessels are combined together in the Gini coefficient, it implies a higher level of revenue inequality than examining the within vessel-type revenue inequality. There has been a general decline in vessel revenue inequality in the Sablefish IFQ program overall and for catcher vessels since program implementation, falling from 0.64 and 0.62 to 0.58 and 0.58 in 2012, respectively. The catcher/processor revenue inequality has also declined since program inception from 0.51 in the baseline to 0.35 in 2012, 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 catcher/processor vessels has become more equal compared with the baseline.



	Base line	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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
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
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

Figure 6.10: Sablefish IFQ Program Gini Coefficient.

6.3. American Fisheries Act (AFA) Pollock Cooperatives Program

6.3.1 Management Context

There are three types of vessels that participate in the Bering Sea and Aleutian Islands (BSAI) walleye pollock fishery: catcher vessels that deliver their catch onshore, catcher/processors that catch and process their catch at sea, and motherships that are at-sea processors receiving codends from catcher vessels but do not catch any of their own fish. Pollock in the BSAI region 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 not a substantial 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 catcher/processor sector in 1999 and the catcher vessel and mothership sectors in 2000. The goals of the AFA were to resolve frequent allocation disputes between the inshore (catcher vessels) and offshore (catcher/processors 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 TAC (after the 10% allocation to the CDQ program is deducted), as specified in the AFA, is 50% to the catcher vessel sector, 40% to the catcher/processor 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.

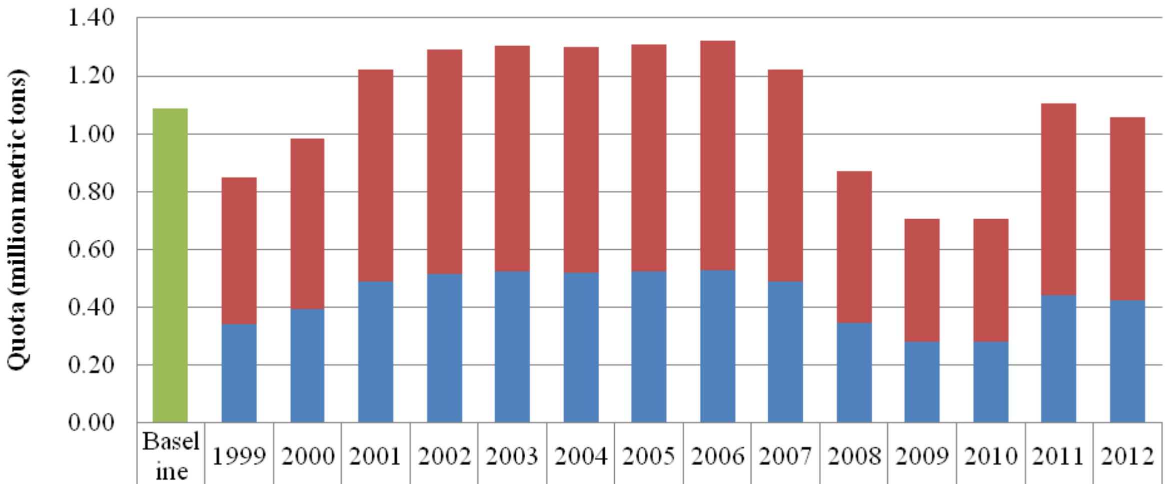
6.3.2 Catch Share Privilege Characteristics

Participation in the AFA pollock fishery is tied to the vessels listed in the American Fisheries Act, and those eligible vessels are authorized to form cooperatives. Seven inshore cooperatives have formed between catcher vessels and eligible shoreside processors which receive exclusive harvest privileges permits from the National Marine Fisheries Service (NMFS), but catcher vessels are required to deliver 90% of their BSAI pollock to a cooperative member processor. The catcher vessel cooperatives are allocated quota based on the catch history of its member vessels. The catcher/processor and mothership sectors have each formed a voluntary cooperative, but they do not receive an exclusive harvest privilege. Only the catcher vessel cooperatives own quota, the other sectors only receive sector allocations. Starting in 2011 with the passage of Amendment 91, incentive plan agreements (IPA) were put in place for industry to self regulate and reduce the number of incidentally caught salmon in the pollock fishery and allowed NMFS to allocate tradable prohibited species catch (PSC) allowance for Chinook salmon to vessels in the pollock fishery.

Catch share privileges are revocable, but were allocated in perpetuity. The catcher/processor and mothership sectors do not receive exclusive harvest privileges, so they do not "own" any quota, and therefore they are not able to transfer it. However, given that there is a single cooperative for each sector, contracts among members of the cooperative have been arranged to optimally allocate their catch across vessels. Catcher vessel cooperatives can exchange quota among their member vessels as they sees fit, but since the catcher vessel cooperative allocations are based on the membership of their vessels, vessels have to transfer cooperatives to exchange quota across cooperatives. When a vessel owner decides to change cooperatives, he/she is required to sit out a year in the limited access fishery and is not allowed to participate in the cooperative system. Catcher vessel cooperatives are also able to contract with non-member AFA eligible vessels to harvest a portion of their allocation which 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 catching and processing sectors which state that no entity can harvest more than 17.5% or process more than 30% of the directed pollock fishery allocation.

6.3.3 Catch and Landings Performance Metrics

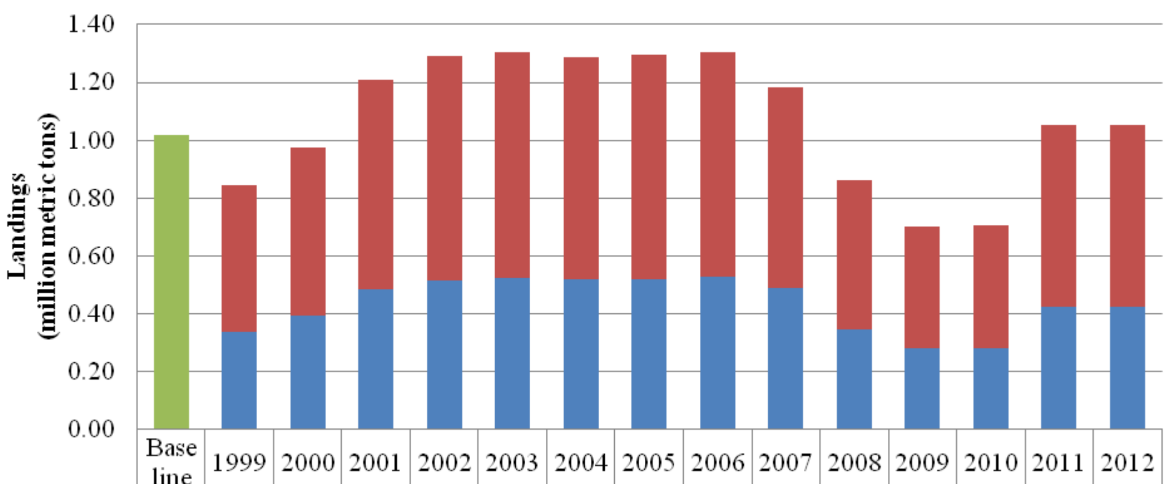
The catch and landings performance metrics include the amount of quota allocated to the program, the landings of AFA pollock, and the percentage of the quota allocated that is landed (percent utilization). These annual metrics will be compared with a "baseline" period prior to program implementation, 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 catcher vessel and mothership sectors are combined into a single CV sector which remains separate from the catcher/processor (CP) sector. Between the baseline and 2012, overall quota has declined by 2.5%, yet landings increased by 3.6% and the percent utilization increased from 93.6% during the baseline to 99.4% in 2012 (Figures 6.11 and 6.12). The quota and landings both fell the year after program implementation, but increased substantially thereafter being 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 which allowed for a slightly larger harvest in 2012 compared with the baseline even with a smaller quota level.



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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
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

Figure 6.11: Quota allocated to the AFA Pollock Program.

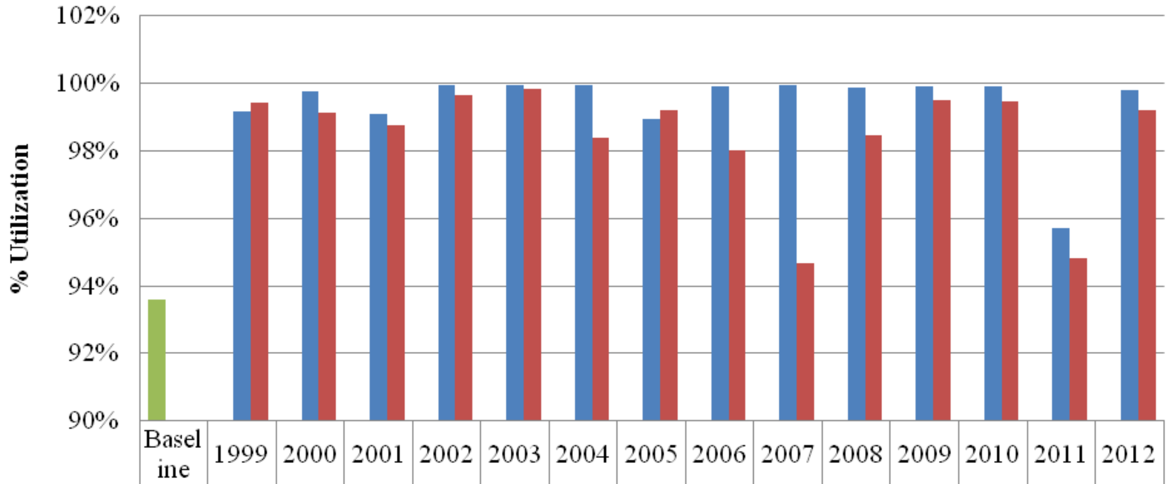
Figure 6.12 also separates the landings by catcher vessel and mothership sectors (CV) and catcher/processor sector (CP) for all years of the program. Overall program landings have increased by 3.6% in 2012 relative to the baseline, but the CP sector landings declined by 14.7% while the catcher vessel landings increased by 21%, which is largely a function of the reallocation of quota under the AFA. Prior to AFA, the offshore sector (motherships and catcher/processors) were allocated 60% of the non-CDQ directed pollock quota, leaving 40% for the inshore sector (catcher vessels). The AFA changed the allocations to 40% for the catcher processors (CP sector), 50% for the catcher vessel sector, and 10% for the mothership sector, and in this report the CV sector includes both catcher vessels and mothership vessel landings.



	Base line	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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
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

Figure 6.12: Landings of AFA pollock.

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



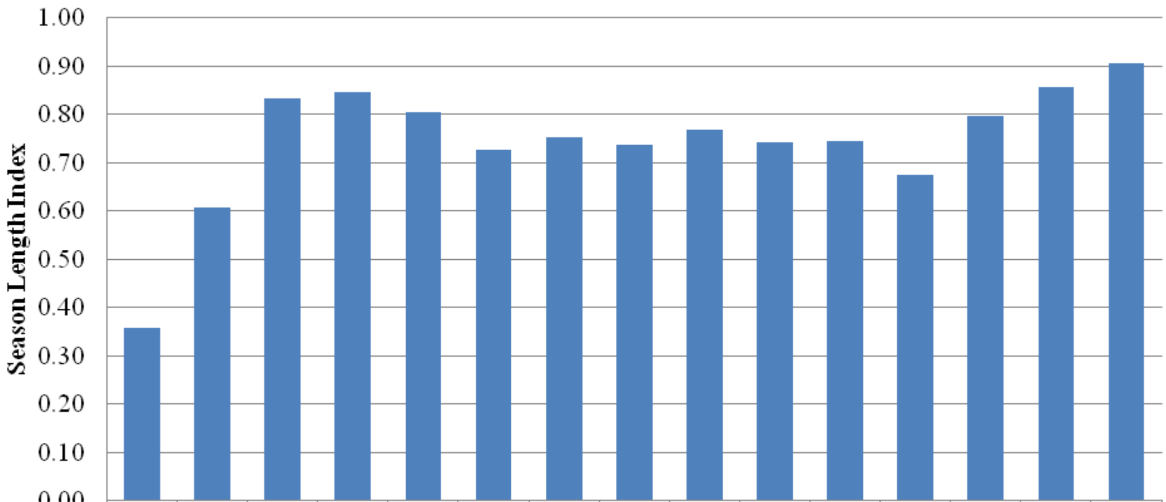
	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Baseline	93.61														
CP		99.18	99.77	99.11	99.95	99.96	99.96	98.93	99.91	99.94	99.89	99.93	99.92	95.73	99.81
CV		99.43	99.13	98.77	99.66	99.86	98.39	99.19	98.01	94.68	98.46	99.50	99.47	94.81	99.20

Figure 6.13: Percent of the allocated quota that is landed in the AFA Pollock Program.

6.3.4 Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of entities holding share, 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 286 days, which would be an opening on January 20th and closure on November 1st. This index demonstrates how much of the total time available to catch the quota is actually used to catch the quota of pollock. For the baseline period, we assume the same 286 day regulatory open period which allows for a constant comparison of the season length pre-AFA with post-AFA. Using these definitions during the baseline, the average number of active days was 103, the maximum regulatory season length is 286, and therefore the season length index in the baseline period is 103/286 = 0.36. Upon implementation of the AFA, vessels increased the amount of time required to catch the quota 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 260 days, which implies that the season length index has fluctuated between 0.67-0.91 (Figure 6.14).

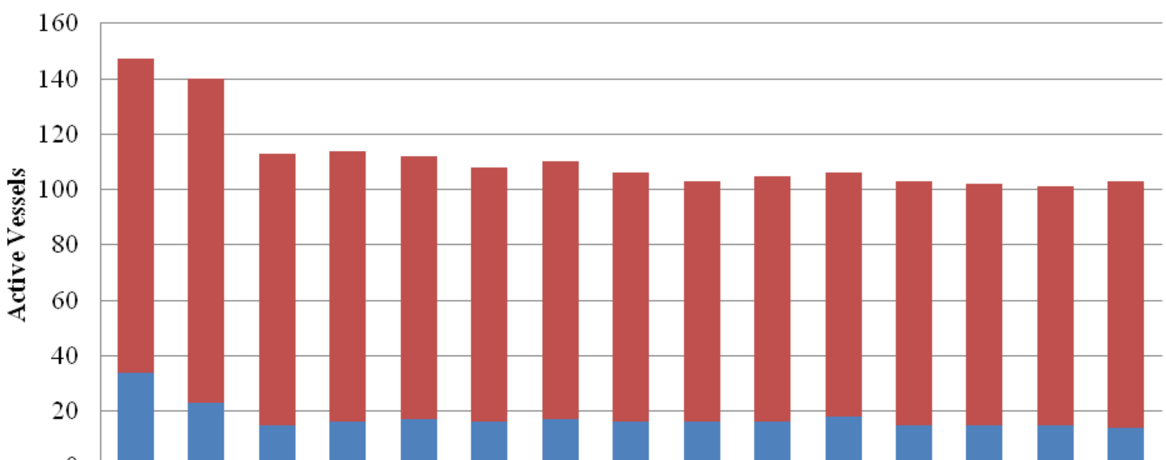
The number of active vessels reflects the number of AFA pollock catcher and catcher/processor vessels with any commercial landings of AFA pollock in a given year. The baseline value represents the number of unique vessels with commercial pollock landings from 1996-1998. After program implementation, the number of active vessels declined from 148 in the baseline to 140 in 1999 and down to 113 in 2000 which represents a decline of 24% between the baseline and 2000 (Figure CS15). There was actually a small increase in the number of CVs in 1999 since AFA had not yet been



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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	0.91

Figure 6.14: AFA Pollock Program season length index.

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 catcher/processors 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
CV	114	117	98	98	95	92	93	90	87	89	88	88	87	86	89
CP	34	23	15	16	17	16	17	16	16	16	18	15	15	15	14

Figure 6.15: Number of active vessels in the AFA Pollock Program.

The number of entities holding share in the AFA Pollock Program, defined as the number of unique AFA permits for catcher/processor and catcher vessels, has remained nearly constant from 2000 through 2012 at 130 and 132 entities, respectively (Figure 6.16).

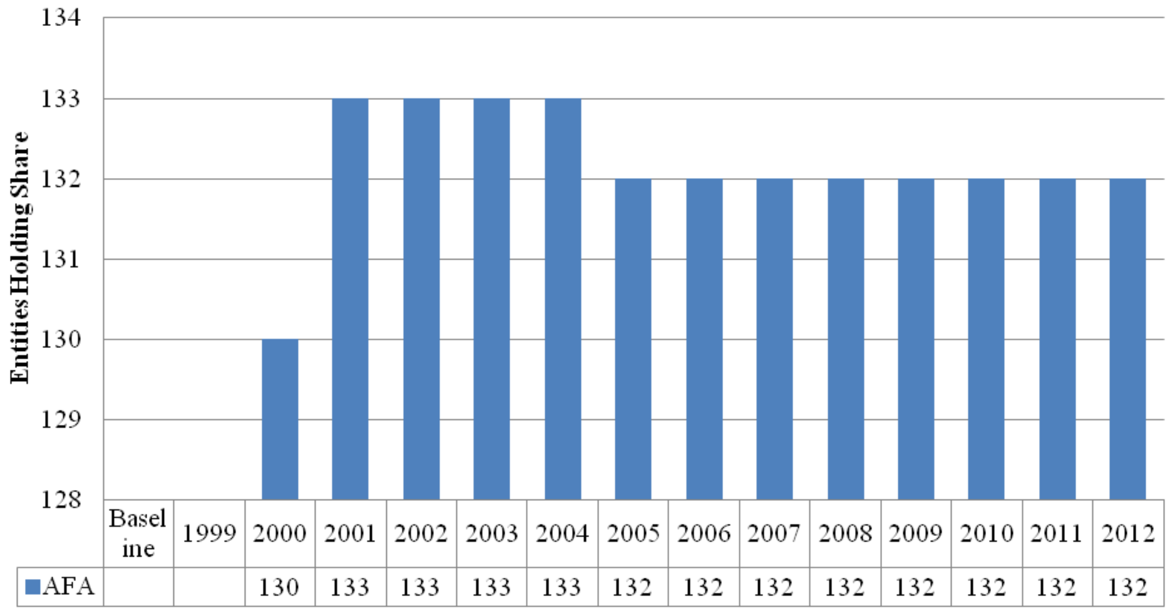


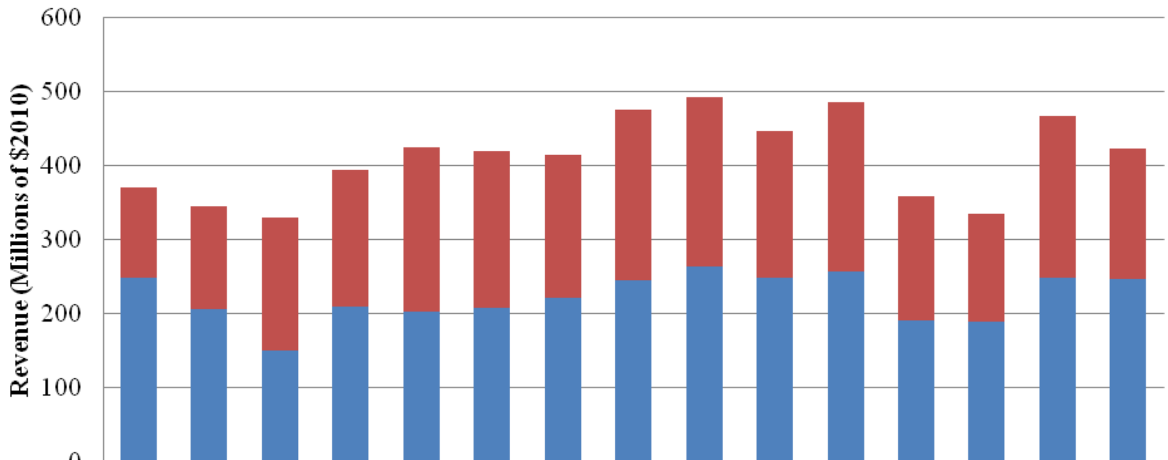
Figure 6.16: Number of entities holding share in the AFA Pollock Program.

6.3.5 Revenue Performance Metrics

The revenue performance 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 how concentrated revenues are 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 reported in their native format, such that the price received by catcher vessels is the weighted annual ex-vessel price while the price received by catcher/processors 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. Revenues declined the first two years of the program from $371 million during the baseline to $345 million and $331 million in 1999 and 2000, respectively (Figure 6.17). Aggregate revenues were above the baseline levels for 10 of the 14 years since program implementation, from 2001-2008 and 2011-2012. The highest annual pollock revenue occurred in 2006 at $493 million.

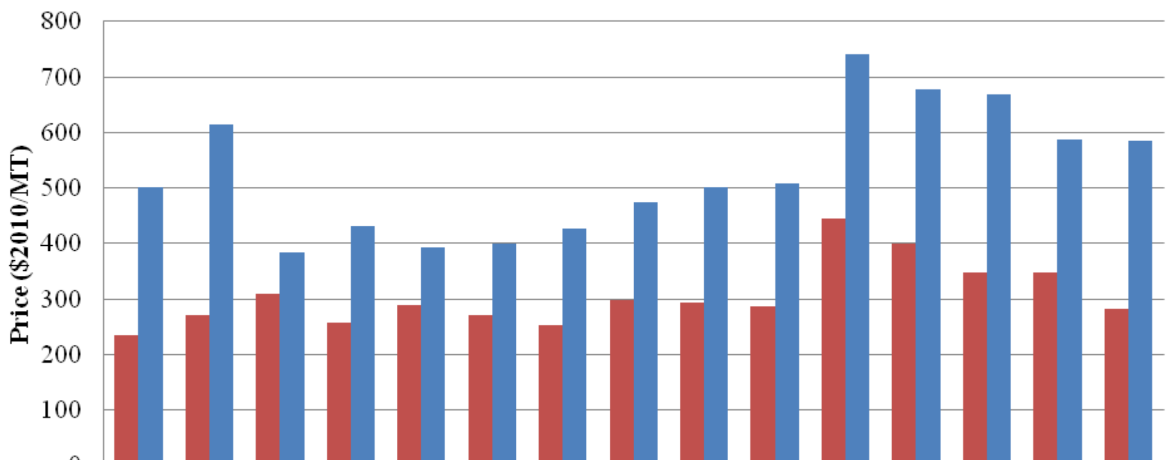
As the CV sector revenues are in ex-vessel value and CP sector revenues are in first wholesale value, the average price per ton of pollock varies by- and is reported separately for each sector. Real average prices of pollock increased between the baseline and 2012 by 19% from $236/ton to $282/ton for CVs and 16% from $502/ton to $584 for CPs (Figure 6.18). The catcher vessel sector experienced a larger increase in price compared with the catcher/processor 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 14 years. There is some variation in the average prices which varied annually from -29% to 28% for CPs and from -35% to 47% for CVs over the course of the AFA Pollock Program, and the catcher/processors have a higher coefficient of variation in prices than the catcher vessels.

The catcher/processor sector experienced a larger increase in revenue per vessel over the course of the AFA Pollock Program, by 138% (from $7.40 million during the baseline to $17.63 million in



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	122	138	180	186	223	211	194	231	229	199	228	168	146	219	177
CP	249	207	150	209	203	208	221	245	265	248	257	191	189	249	247

Figure 6.17: AFA Pollock Program revenue.

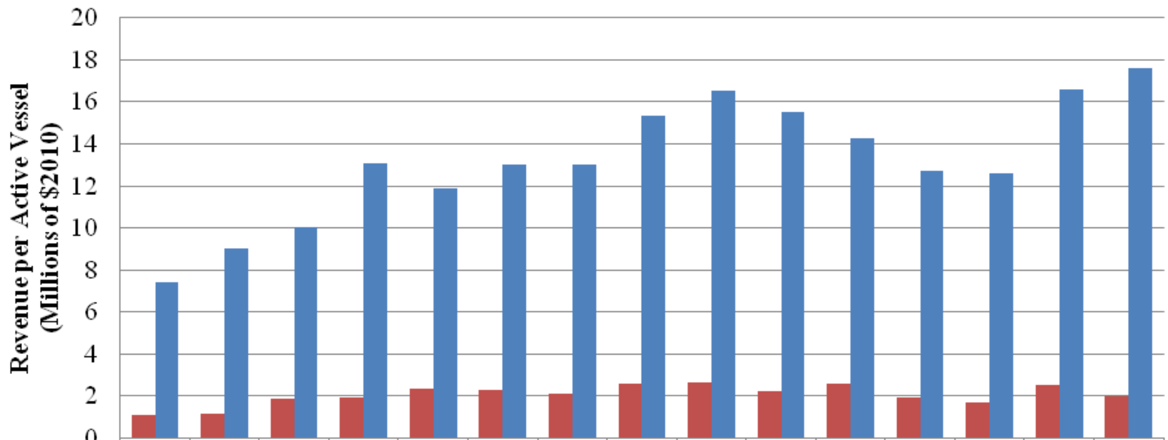


	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	236	271	309	257	289	270	253	297	294	287	445	399	347	348	282
CP	502	614	383	432	392	399	426	474	502	509	741	678	668	587	584

Figure 6.18: AFA Pollock Program price per metric ton.

2012) while catcher vessel revenue per vessel increased by 86% (from $1.07 million in the baseline to $1.99 million in 2012) (Figure 6.19). Both sectors also experienced an increase in real revenue per vessel in all years compared with the baseline value.

The last performance metric reported for the AFA Pollock Program is the Gini coefficient of vessel revenues. Due to a portion of the catch missing harvesting vessel identification, the Gini coefficient for the AFA Pollock Program is presented only for 2003 through 2012. 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 zero indicates that all



	Baseline	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CV	1.07	1.18	1.84	1.90	2.35	2.29	2.09	2.57	2.63	2.24	2.59	1.90	1.68	2.54	1.99
CP	7.40	9.01	10.03	13.07	11.91	13.03	13.01	15.33	16.55	15.53	14.29	12.72	12.58	16.58	17.63

Figure 6.19: AFA Pollock Program revenue per active vessel.

vessels earn exactly the same revenue while a value of 1 indicates that a single vessel had 100% of the revenues. Therefore, inequality in vessel revenues is increasing in the Gini coefficient. This becomes apparent looking at the difference in Gini coefficient for 2003 for all vessels (Gini = 0.52) which implies a higher level of inequality in vessel revenues compared with the Gini coefficient for either the catcher vessels only (Gini = 0.37) or for the catcher/processors only (Gini = 0.15) (Figure CS20). This is because the revenue per vessel among catcher vessels and catcher processors is very different (Figure 6.19) and when all vessels are combined together in the Gini coefficient, it implies a higher level of revenue inequality than examining the within vessel-type revenue inequality. There has been a general increase in vessel revenue inequality since 2003 in the AFA Pollock program overall, but both the catcher vessels and catcher processor sectors experience a decrease in within-sector inequality. The Gini coefficient for the overall AFA program increased from 0.52 to 0.59 between 2003 and 2012 while the CV sector and the CP sector Gini coefficient fell from 0.37 and 0.15 during 2003 to 0.36 and 0.12 in 2012, respectively.

6.4. BSAI non-Pollock Trawl Catcher-Processor Groundfish Cooperatives (Amendment 80) Program

6.4.1 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 did not qualify for the American Fisheries Act (AFA) Pollock Cooperatives Program. 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 outside the BSAI to the 24 eligible trawl CP vessels and authorizes them to form cooperatives. These vessels are typically smaller in size and processing capacity than the AFA catcher/processors. Prior to the Amendment 80 program, they primarily produced head and gutted products, but as the race for fish has been eliminated and

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

Figure 6.20: AFA Pollock Program Gini coefficient.

Amendment 80 initially implemented increased groundfish retention standards, they are increasingly producing other product forms.

The goal of the Amendment 80 program was to improve retention, utilization, and reduce bycatch for the CP trawl sector of the non-pollock groundfish fishery in the BSAI region. The program also includes sideboard allowances in other regions for pollock, Pacific cod, Pacific Ocean perch, northern rockfish, pelagic shelf rockfish and a prohibited species catch allocation for halibut and crab to limit these vessels' participation in other fisheries to their historic levels. Only one cooperative formed in 2008 that included 16 of the 24 eligible vessels while the other vessels participated in the limited access sector until 2011 when those vessels all joined a second cooperative.

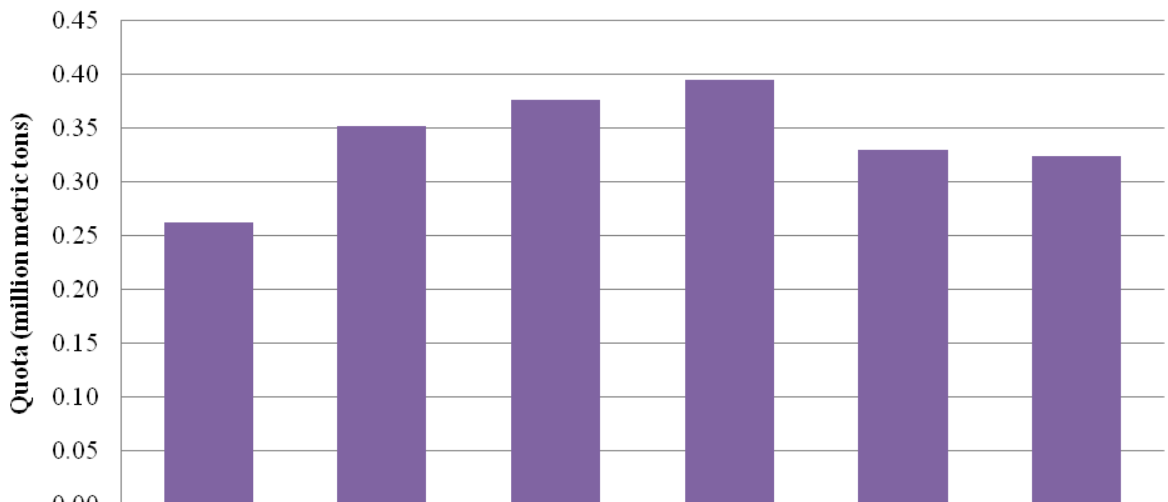
6.4.2 Catch Share Privilege Characteristics

Quota shares (QS) are tied to the participating vessels and are allocated to their cooperative (if participating in a cooperative, otherwise they don't receive an allocation and they fish in the limited access sector) based on the vessel's catch history. Quota share can be transferred by selling the vessel, its permits, and accompanying catch history. It is also possible to sell quota share without selling a vessel, but sellers are required to include all of their Amendment 80 QS for all species simultaneously and therefore have to leave the Amendment 80 fishery. However, entities can transfer quota pounds annually to other eligible vessels within and between cooperatives. Catch share privileges are revocable, but were allocated in perpetuity. There are excessive share and use caps that limit an owner's share to less than 30% of the aggregate Amendment 80 quota and a vessel to less than 20% of the initial catch limit assigned to the non-AFA trawl catcher/processor sector.

NMFS 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.

6.4.3 Catch and Landings Performance Metrics

The catch and landings performance metrics for the Amendment 80 fishery include the amount of quota allocated to the program, the landings of Amendment 80 species, and the percentage of the quota allocated that is landed (percent utilization). Annual metrics will be 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 2012, the quota and landings have increased by 23% and 22%, respectively (Figures CS21 and CS22). Aggregate quota allocated 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 quota allocation process in the BSAI region. The aggregate catch of all federally managed groundfish species is required to be below a 2 million metric ton cap, which is thought to be the maximum amount of catch that can be sustainably harvested from the 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. This means that the total quota available for all Amendment 80 species is not necessarily driven by the biology of those species, but it is largely a function of the biomass of pollock. In fact, most Amendment 80 species total allowable catches (TAC) are well below their allowable biological catch (ABC), but the quota allocated to the Amendment 80 species cannot be increased without reducing the TAC of some other BSAI groundfish species.

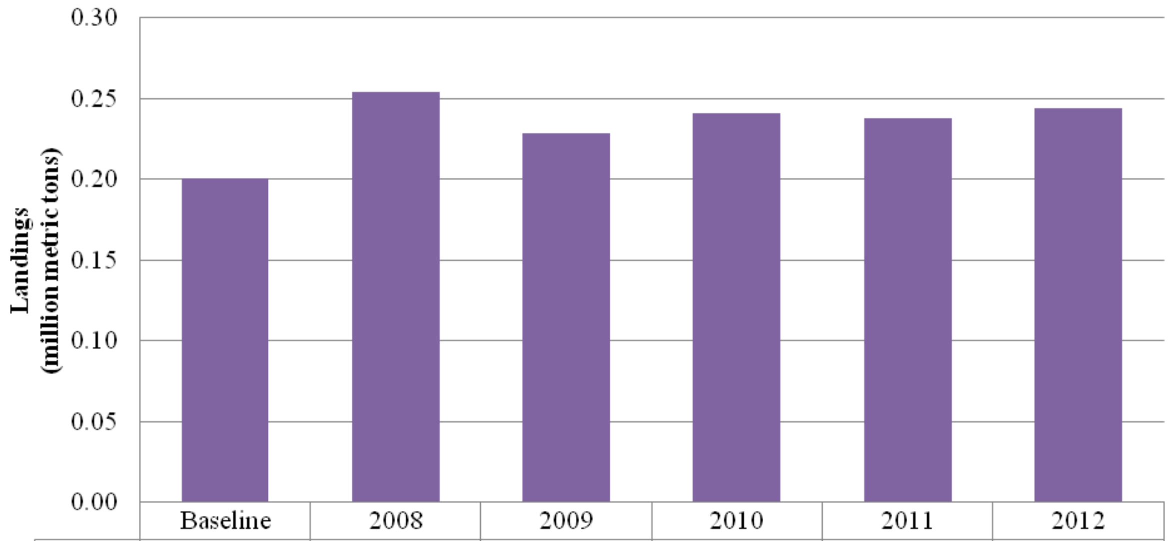


	Baseline	2008	2009	2010	2011	2012
Am 80	0.263	0.352	0.376	0.395	0.330	0.325

Figure 6.21: Aggregate quota allocated to the Amendment 80 Program.

As a result of the historically low AFA pollock quota, the aggregate quota for Amendment 80 species was much larger than during the baseline. Similarly, the landings in the Amendment 80 program were larger than their baseline levels in all years of the program (Figure 6.22).

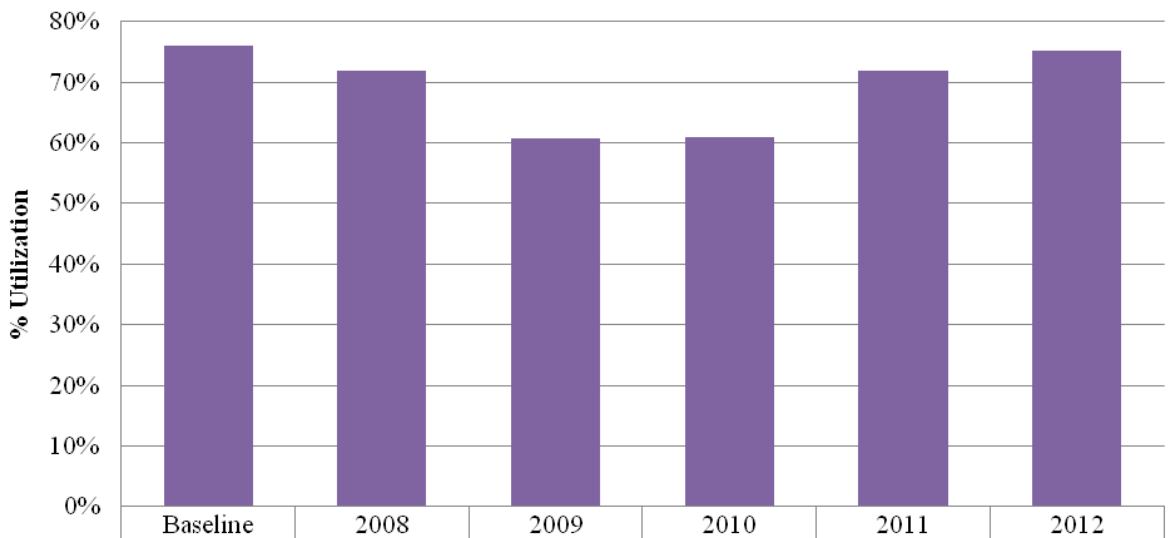
Even as landings have increased in the Amendment 80 program, the percent utilization fell from 76.1% during the baseline to 75.2% in 2012, and has been below the baseline level every year of the program (Figure 6.23). The lowest utilization rate occurred in 2009 at 60.81% in a year when the aggregate 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 PSC, and also increasingly by a reduction in their allocation of Pacific cod quota. The



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

Figure 6.22: Aggregate landings of species within the Amendment 80 Program.

inability of these vessels to catch the entire quota is also a function of the program only applying to between 19 and 22 vessels which are already operating near their maximum capacity.



	Baseline	2008	2009	2010	2011	2012
Am 80	76.14%	72.02%	60.81%	60.96%	72.00%	75.20%

Figure 6.23: Percent of the allocated quota that is landed in the Amendment 80 Program.

6.4.4 Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of entities holding share, 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. This index demonstrates how much of the total time available to catch the Amendment 80 quota is actually used to catch the quota of all Amendment 80 species. 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 the passage of Amendment 80, vessels were better able to allocate their bycatch and PSC allowances and increased their number of active days to an average of 322 days from 2008-2012, which implies an average season length index of 0.93 over that same period (Figure 6.24).

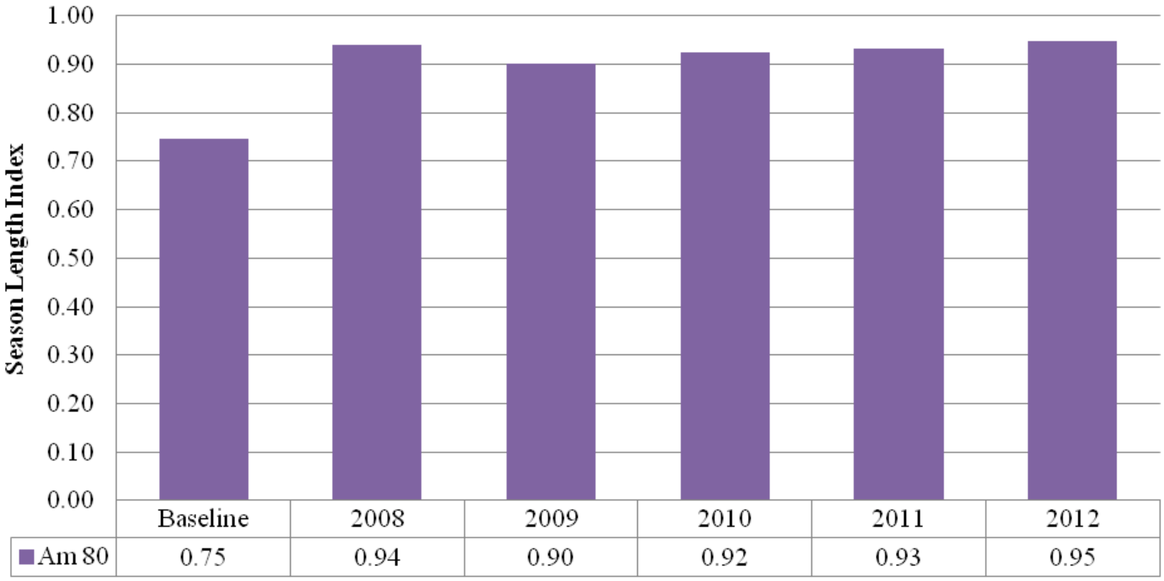


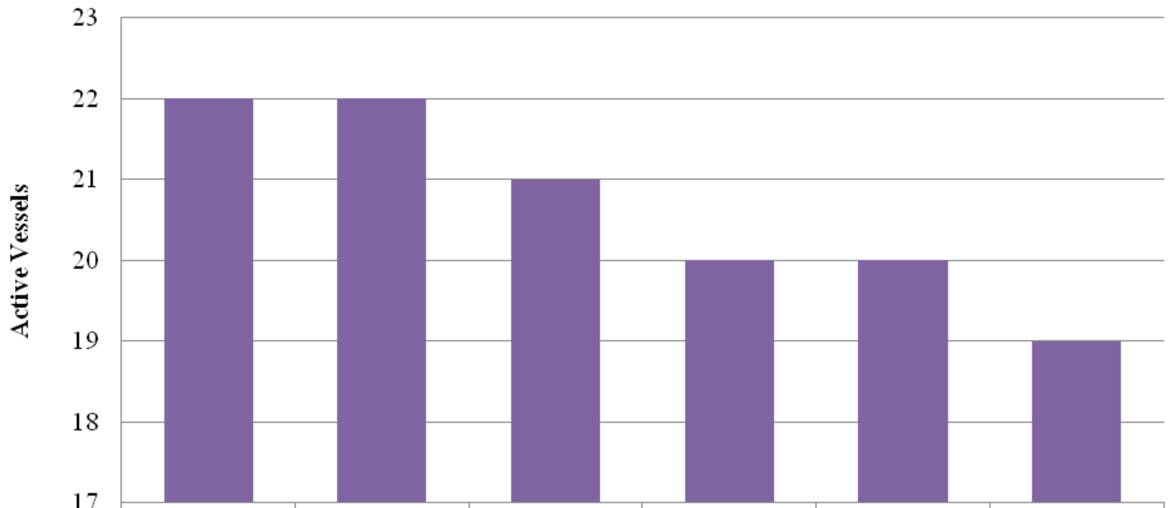
Figure 6.24: Amendment 80 Program season length index.

The number of active vessels reflects the number of Amendment 80 eligible catcher/processor 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 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 was not an objective of the program (Figure 6.25). 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 and 2012, which leaves the total number of active vessels in 2012 at 19.

There were 28 entities (vessels) that were deemed eligible for the Amendment 80 program before implementation of the program, and there has only been a reduction of one entity holding share in the program since implementation which occurred the first year of the program (Figure 6.26).

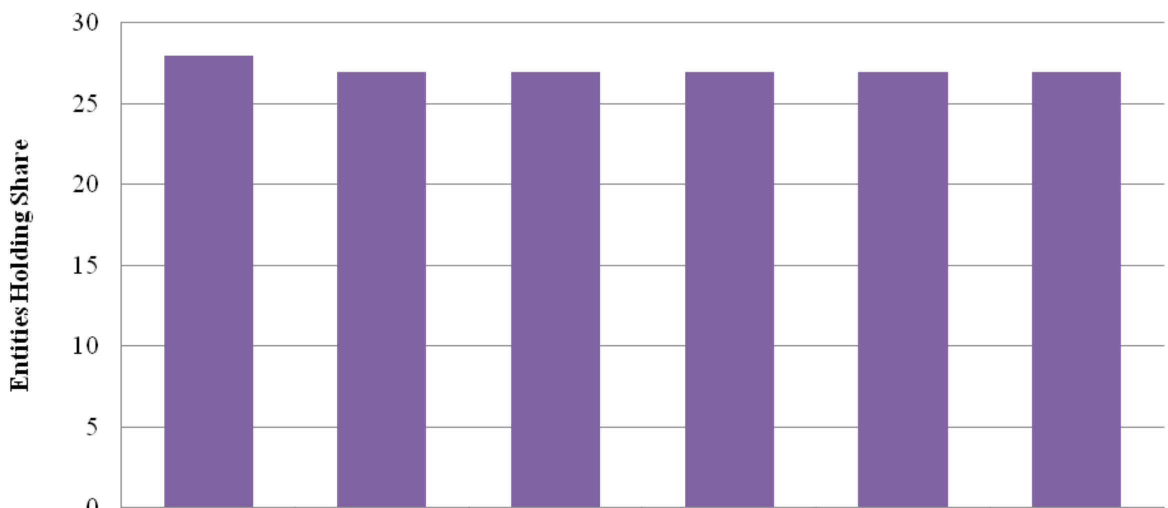
The maximum regulatory season length was 347 days in 2008 and 2012 due to the leap year.

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.fakr.noaa.gov/frules/72fr52668.pdf.



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

Figure 6.25: Number of active vessels in the Amendment 80 Program.



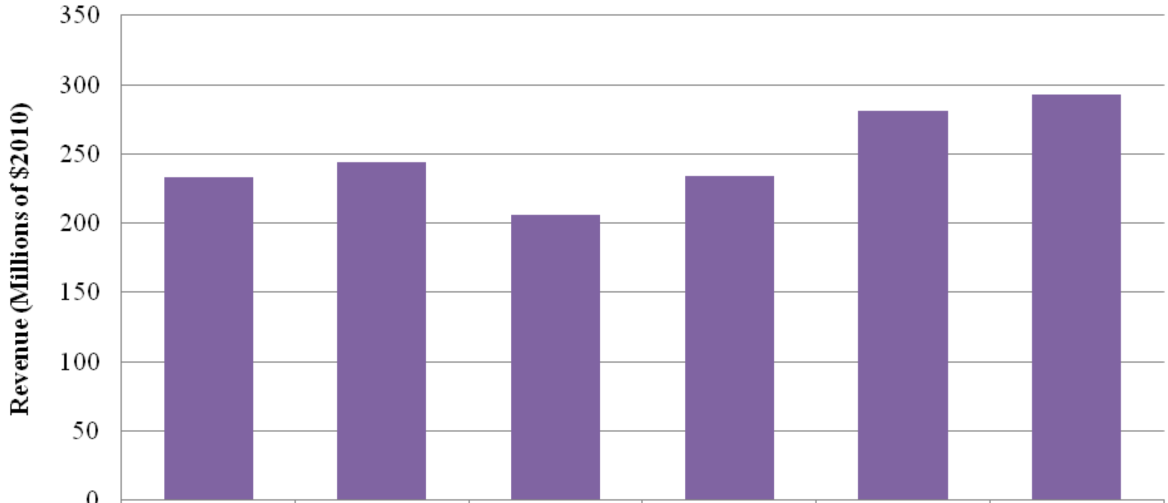
	Baseline	2008	2009	2010	2011	2012
Am 80	28	27	27	27	27	27

Figure 6.26: Number of entities holding share in the Amendment 80 Program.

6.4.5 Revenue Performance Metrics

The revenue performance 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 how concentrated revenues are among the active vessels. As all vessels in the Amendment 80 program are catcher/processors, revenues are reported as first wholesale value of the fish 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 CS27).

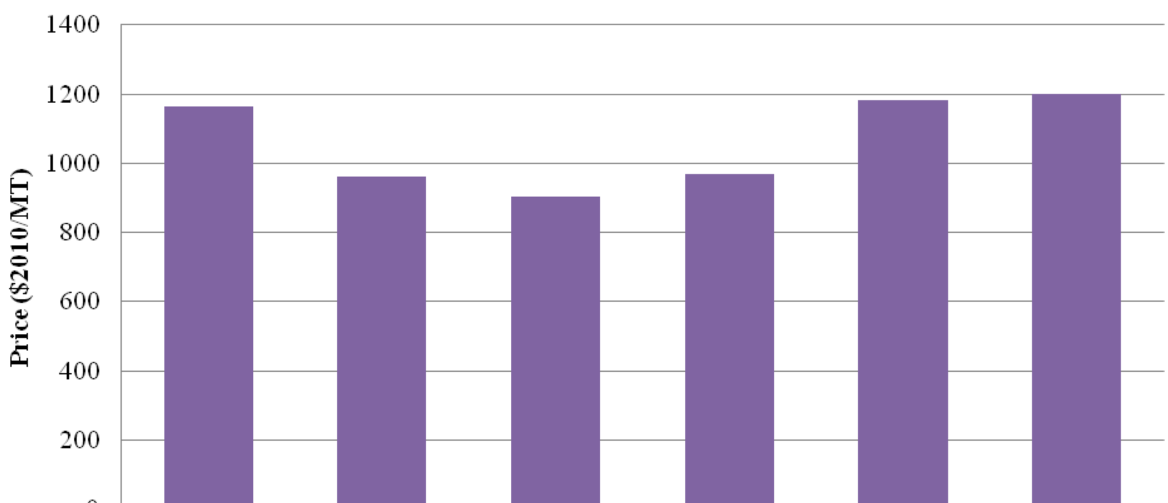
Amendment 80 revenue declined to a low in 2009 of $207 million which is below the baseline revenue, but revenues have been above the baseline levels for all other years after program implementation.



	Baseline	2008	2009	2010	2011	2012
Am 80	233.26	244.14	206.53	233.97	281.15	292.74

Figure 6.27: 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, but increased above baseline price levels during the two most recent years reported (2011-2012). Real average prices of Amendment 80 species increased by 3% from $1,164/ton during the baseline to $1,200/ton in 2012 (Figure 6.28). 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 -17% and 22% over the course of the Amendment 80 Program.



	Baseline	2008	2009	2010	2011	2012
Am 80	1,164	962	903	970	1,182	1,200

Figure 6.28: Amendment 80 Program weighted average price per metric ton across all species.

Amendment 80 first wholesale revenue per vessel increased by 45% from a baseline of $10.60 million to $15.41 in 2012 (Figure 6.29). Revenues per vessel were below their baseline level in 2009, but were above the baseline for all other years of the program.

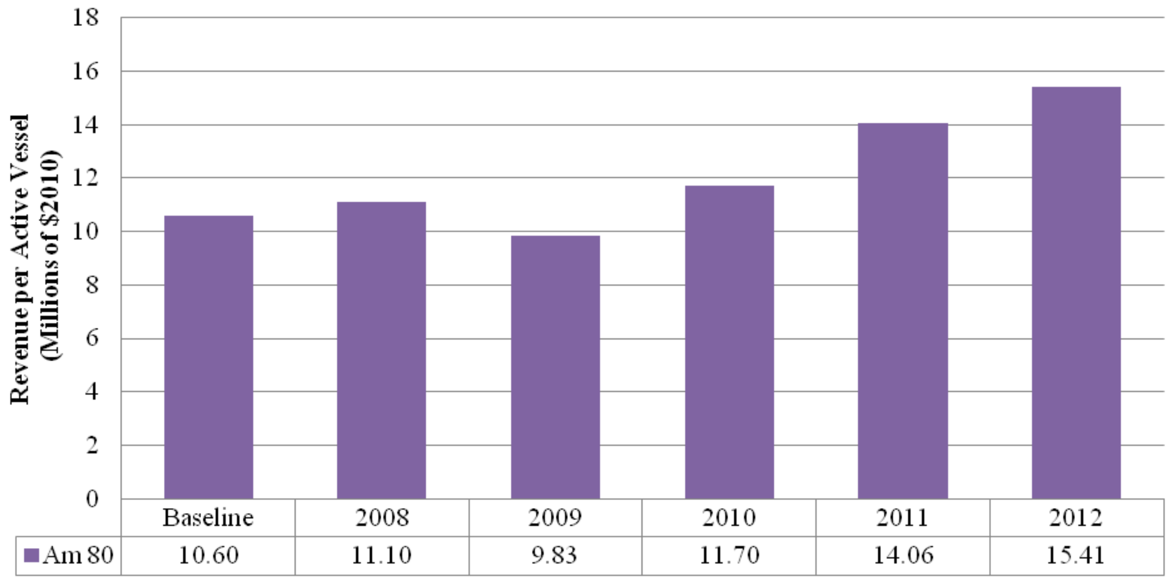


Figure 6.29: Amendment 80 Program revenue per active vessel.

The last performance metric reported for the Amendment 80 Program is the Gini coefficient of vessel revenues. 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 zero 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, inequality in vessel revenues is increasing in the Gini coefficient. There has been an overall decrease in inequality in vessel revenues over the course of the Amendment 80 Program from a baseline level of 0.252 to a level of .189 in 2012 (Figure 6.30). The level of vessel revenue inequality reached its highest level 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.

6.5. Bering Sea/Aleutian Islands Freezer Longline Catcher/Processors (Hook and Line Catcher/Processor Sector Targeting Pacific Cod)

6.5.1 Management Context

The Bering Sea/Aleutian Islands (BSAI) Freezer Longline Catcher/Processors (also known as the Freezer Longliners) are a group of catcher/processor vessels that are eligible to harvest the hook and line catcher/processor sector allocation for BSAI Pacific cod. Since 2003, Freezer Longliners are required to have hook and line Pacific cod catcher/processor 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 catcher/processor sector. From 2000 to 2007, the hook and line catcher/processor sector was allocated 40.8% of the

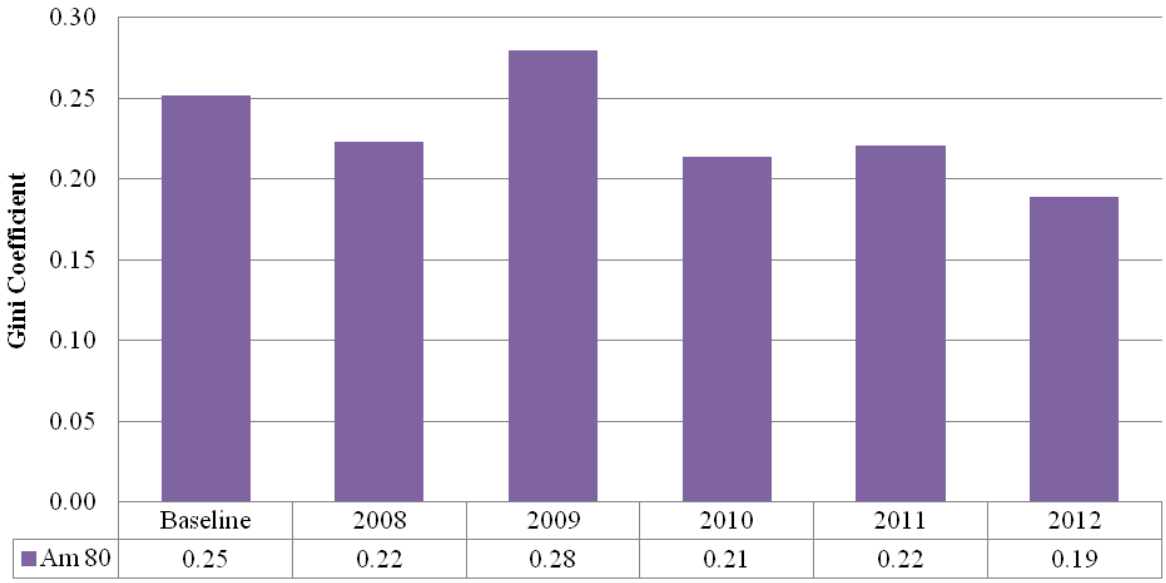


Figure 6.30: Amendment 80 Program Gini coefficient.

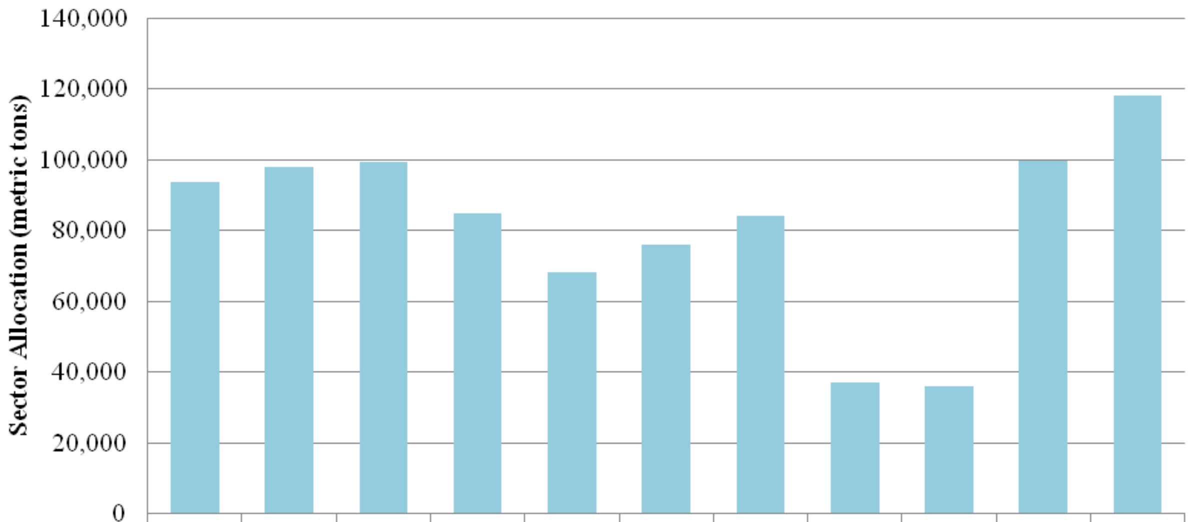
BSAI Pacific cod non-Community Development Quota (CDQ) total allowable catch (TAC). The passage of Amendment 85 increased their share of the BSAI targeted Pacific cod TAC to 48.7% from 2008 to the present. In 2007, the sector voted to obtain a $35 million NOAA Fisheries loan to purchase and retire 4 groundfish LLP licenses with hook and line catcher/processor 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 catcher/processor LLP license holders. However, while the vessels participating in this fishery have formed a voluntary cooperative (the Freezer Longline Coalition or FLC), they have taken steps that would require NOAA Fisheries to write regulations. The voluntary cooperative has been fishing cooperatively 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 a formally recognized catch share program by NOAA Fisheries, they are included in this report because since the second half of 2010, the sector operates similarly to how a catch share program would operate.

6.5.2 Catch Share Privilege Characteristics

Similar to the catcher/processor and mothership sectors in the AFA program which also formed voluntary cooperatives, the FLC does not receive an exclusive harvest privilege for Pacific cod. The hook and line catcher/processor sector is currently allocated 48.7% of the BSAI non-CDQ TAC, therefore these Freezer Longliners (and the voluntary cooperative) do not own quota. There are 8 other sectors fishing for Pacific cod in the BSAI which also receive a sector allocation, but none have formed a cooperative among of all of its member vessels. As seen in the passage of Amendment 85, the allocation of allowable catch across sectors can change, which means that the privileges received by the FLC to harvest Pacific cod are not a secure property right for a specified amount of catch or portion of the TAC. However, the formation of the FLC 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.

6.5.3 Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of the hook and line catcher/processor sector allocation (which can be caught only by the Freezer Longliners), the landings of Pacific cod by the Freezer Longliners, and the percentage of the hook and line catcher/processor Pacific cod sector allocation that is landed (percent utilization). Annual metrics will be reported for the years 2003-2012 and will not include a "baseline" period because this sector is not yet formally defined as a catch share program by NOAA Fisheries. Between 2003 and 2012, the sector allocation and landings have increased by 26% and 21%, respectively, while the percent utilization fell from 99.7% in 2003 to 95.6% in 2012 (Figures 6.31 and 6.32).

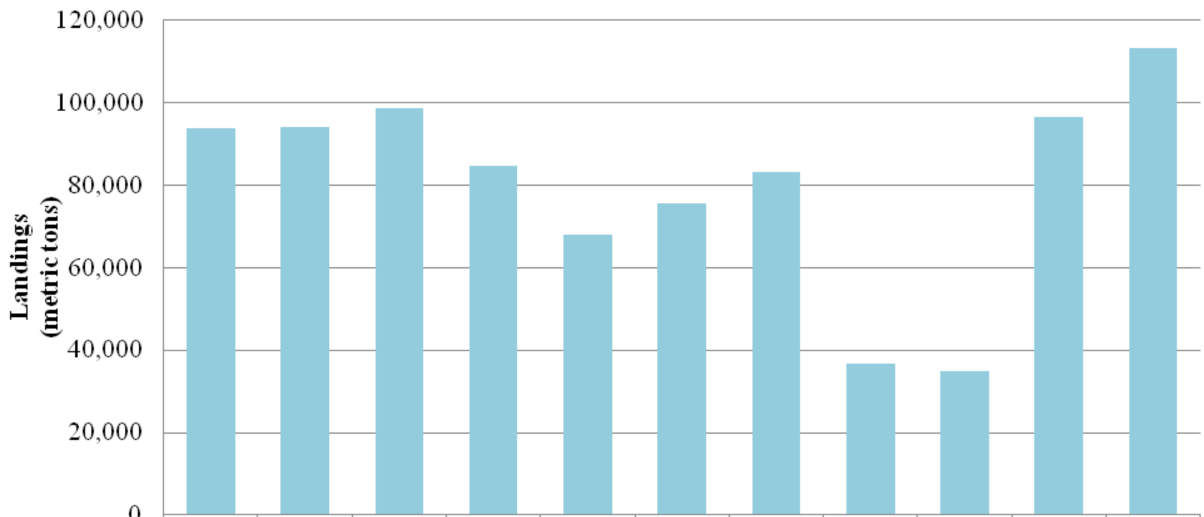


	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	93,843	97,795	99,519	84,709	68,105	76,074	84,075	37,230	35,960	99,853	118,106

Figure 6.31: Hook and line catcher/processor sector allocation for Pacific cod.

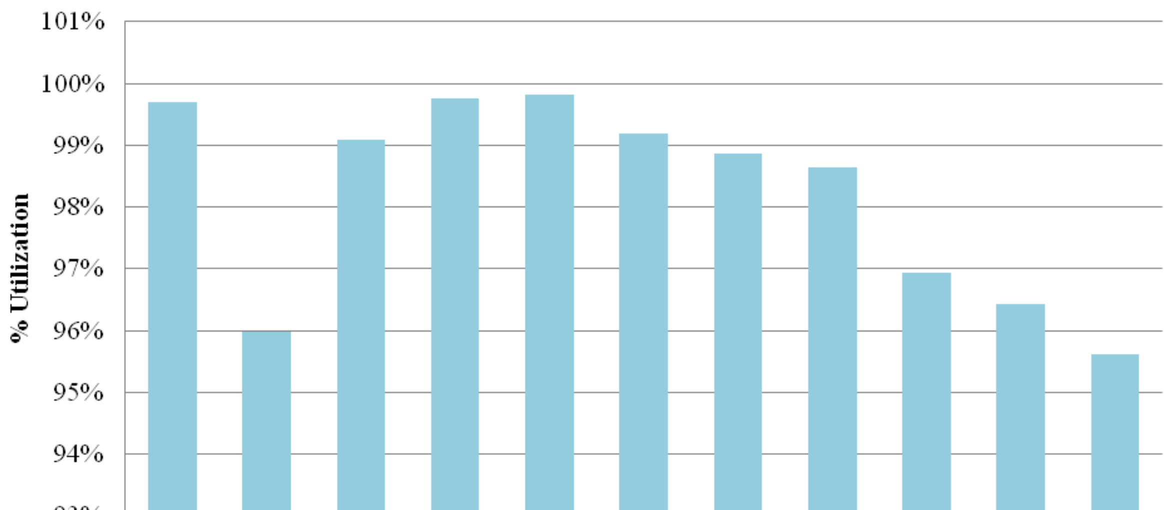
The sector allocation and landings have varied quite a bit between 2007 and 2012, with the two highest sector allocations occurring in 2011 and 2012 and the highest landings occurring in 2012. The sector allocation and landings varied from lows of 68,105 and 67,980 in 2007 to highs of 118,106 and 112,927 in 2012, respectively.

Utilization has been above 95% for all years since 2003, and was above 98% in 2003 and from 2005-2010 in season A (Figure 6.33). However, since the formation of the voluntary cooperative in the 2010 B season, utilization has been declining to a low of 95.61%. The Pacific cod hook and line catcher/processor sector allocation was exceeded in 2003, and from 2005-2009 based on total catch (retained weight plus the estimated weight of discards). As they are only 1 of 9 sectors, the aggregate federal BSAI Pacific cod TAC was only exceeded in 2003, 2007, and 2010. However, since 2006 the federal TAC has been reduced by 3% to account for the small, State-managed fishery inside State of Alaska waters, and the overall target catch (Federal TAC plus State guideline harvest level (GHL)) was not exceeded in 2007 and 2010. The allowable biological catch (ABC) has not been exceeded in any year since 1994.



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	93,563	93,859	98,610	84,504	67,980	75,462	83,131	36,723	34,860	96,294	112,927

Figure 6.32: Landings of Pacific cod by Freezer Longliners.



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	99.70%	95.98%	99.09%	99.76%	99.82%	99.20%	98.88%	98.64%	96.94%	96.44%	95.61%

Figure 6.33: Percent of the sector allocation caught by eligible vessels.

6.5.4 Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of hook and line catcher/processor 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 demonstrates how much of the total time available to catch the hook and line catcher/processor sector allocation is actually used to catch their allocation. Prior to the formation of the FLC (2003-2009), the average number of active days for these vessels was 149 days (season length index = 0.41) while in the first two full years after the formation of the FLC (2011 and 2012) they have used 365 and 366 days (season length index = 1.00) in an attempt to catch their entire allocation (Figure 6.34). 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 FLC.

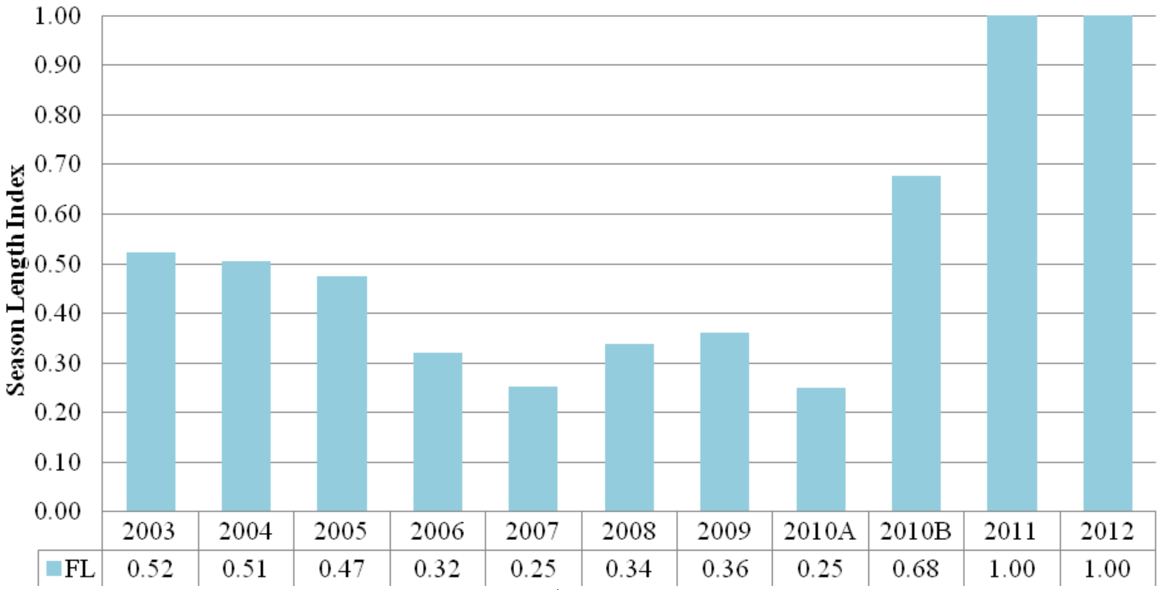


Figure 6.34: Hook and line catcher/processor sector season length index.

The number of active vessels reflects the number of Freezer Longliners with any commercial landings of Pacific cod in a given year. The number of active vessels was quite stable between 2003 and 2009 at an average of 39 vessels, but after the formation of the FLC, only approximately 30 vessels continued to fish in 2011-2012, which is a decrease of 22%.

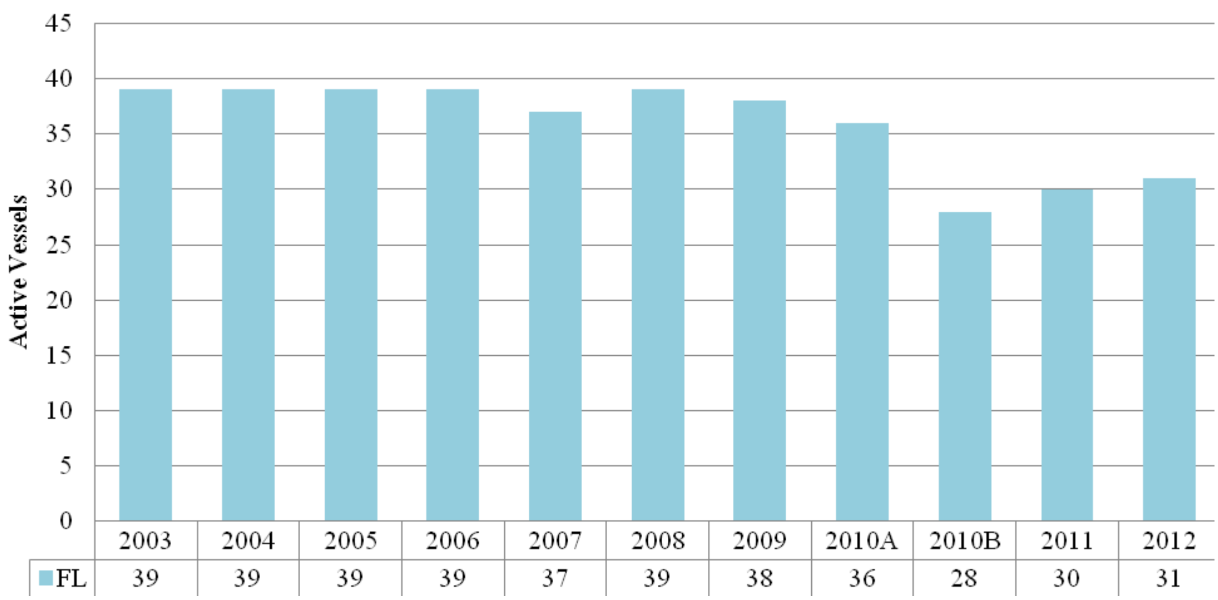
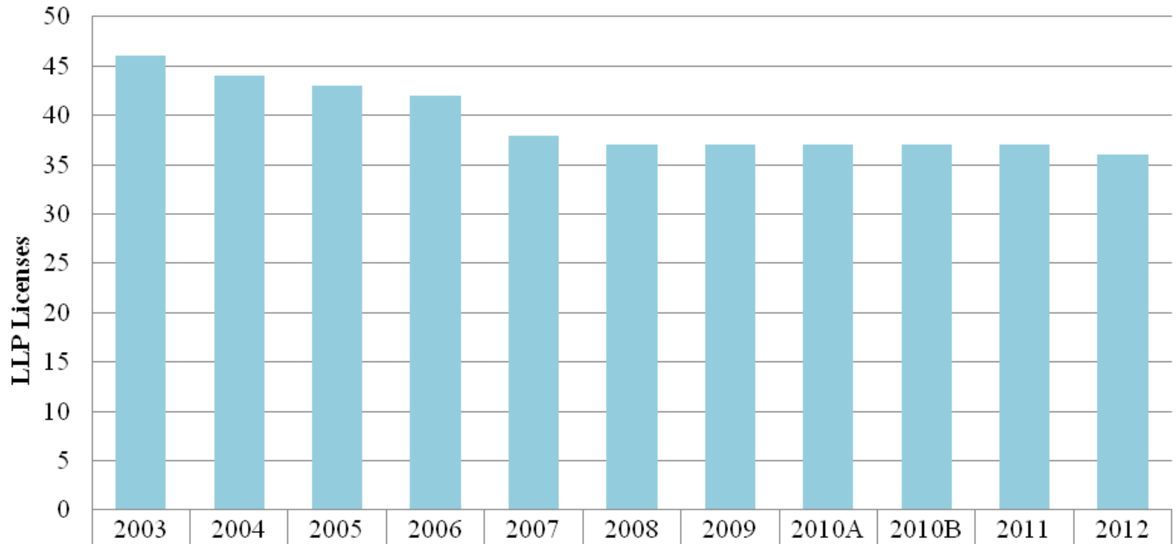


Figure 6.35: Number of active Freezer Longliners.

There were 46 license limitation program (LLP) licenses with endorsements for catcher/processor hook and line gear in the Bering Sea or Aleutian Islands in 2003 and 36, or 22% less, by 2012 (Figure 6.36).



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	46	44	43	42	38	37	37	37	37	37	36

Figure 6.36: Number of LLP licenses with endorsements for catcher/processor hook and line gear in the Bering Sea or Aleutian Islands.

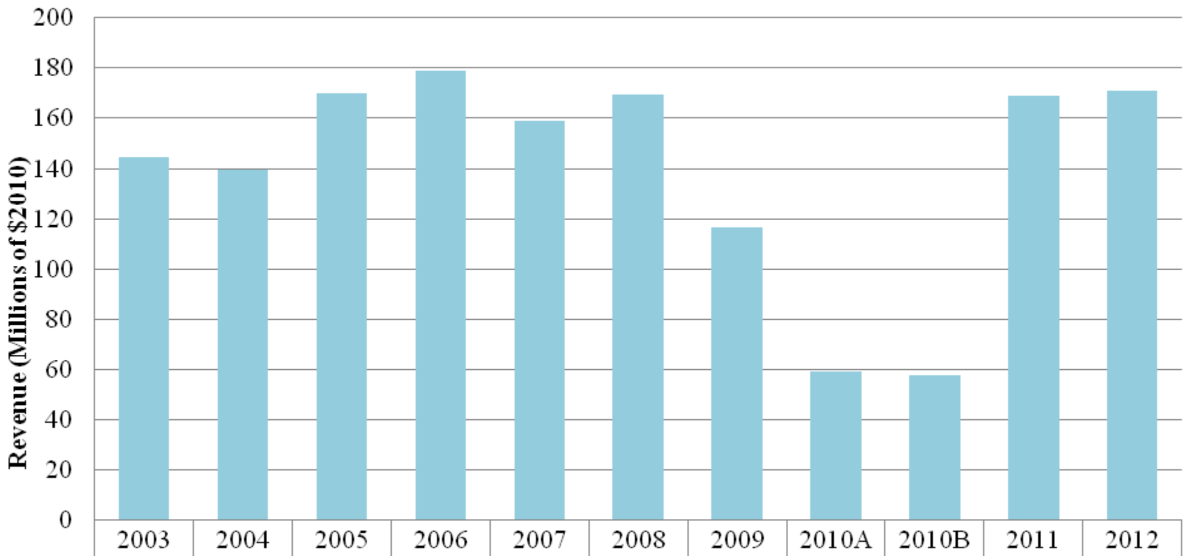
6.5.5 Revenue Performance Metrics

The revenue performance metrics are the aggregate revenue from Pacific cod, average prices of Pacific cod, the revenue per active vessel, and the Gini coefficient which is a measure of how concentrated revenues are 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 increased from \$144 million in 2003 to \$171 million in 2012, which is an increase of 18.5% (Figure 6.37). Even with the two highest sector allocations over the period 2003-2012 in 2011 and 2012 and the highest landings in 2012, first wholesale revenues were higher in 2006 than either 2011 and 2012 which is a result of the substantial decline in Pacific cod prices from 2009-present (Figure 6.38).

The average price per ton of Pacific cod received by Freezer Longliners was on average \$1,535/ton from 2003-2004, increased to a high of \$2,335/ton in 2007, but declined to a low of \$1,401 in 2009, and has averaged \$1,636 from 2010-2012 (Figure 6.38). This price decline is likely the result of increased supply of substitute products for Pacific cod including Atlantic cod and other whitefish species. While prices have only decreased by 2% between 2003 and 2012, the 2012 prices are 35% below the peak prices experienced in 2007.

Freezer Longliners revenue per active vessel increased by 49% of \$3.7 million in 2003 to \$5.5 million in 2012 (Figure 6.39). As a result of the voluntary cooperative arrangement, there were fewer active vessels in 2010 B Season and 2011-2012 compared with previous time periods, which has resulted in an increase in revenue per active vessel for this sector.

The last performance metric reported for the Freezer Longliners is the Gini coefficient of vessel revenues. The Gini coefficient measures the evenness of the distribution of revenue among vessels in the hook and line catcher/processor sector in a given year. The Gini coefficient varies between 0 and 1 where a value of zero 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, inequality in vessel revenues is increasing in the Gini coefficient. Between 2003 and 2006, there was a slight decline in the Gini



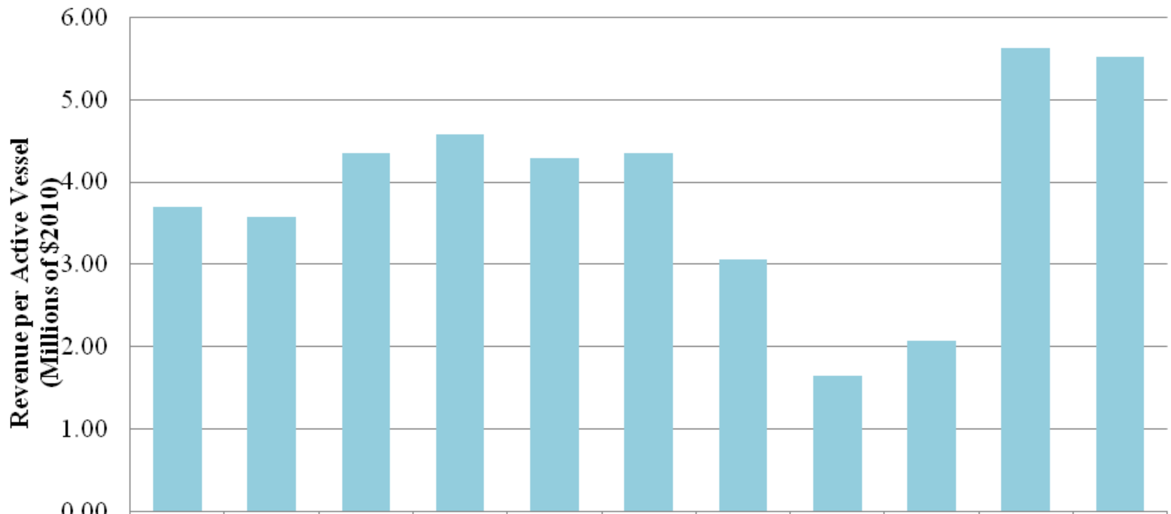
	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	144.28	139.72	169.83	178.78	158.75	169.43	116.48	59.41	57.98	168.87	170.94

Figure 6.37: Freezer Longliners Pacific cod first wholesale revenue.

	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	1,542	1,489	1,722	2,116	2,335	2,245	1,401	1,618	1,663	1,754	1,514

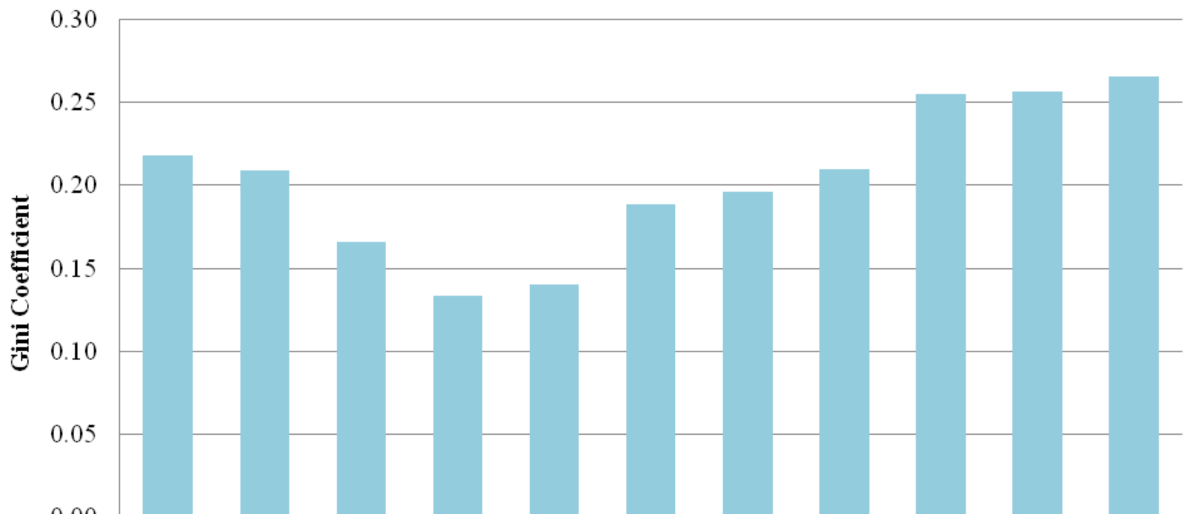
Figure 6.38: Freezer Longliners Pacific cod price per metric ton.

coefficient (decrease in inequality) from 0.22 in 2003 to 0.13 in 2006 (Figure 6.40). However, vessel revenue inequality has been increasing from 2007-2012, and the Gini coefficient in 2012 was 0.27. The formation of the voluntary cooperative in 2010 season B 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 22% increase in the Gini coefficient between the 2010 A and 2010 B seasons.



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	3.70	3.58	4.35	4.58	4.29	4.34	3.07	1.65	2.07	5.63	5.51

Figure 6.39: Hook and line catcher/processor revenue per active vessel.



	2003	2004	2005	2006	2007	2008	2009	2010A	2010B	2011	2012
FL	0.22	0.21	0.17	0.13	0.14	0.19	0.20	0.21	0.26	0.26	0.27

Figure 6.40: Freezer Longliners Pacific cod Gini coefficient.

6.6. Central Gulf of Alaska Rockfish Program

6.6.1 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 guidelines. 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 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 does not allocate any exclusive harvesting privilege to any entity and therefore does not have quota.

The Rockfish program was designed to improve resource conservation and improve economic efficiency by establishing cooperatives that receive exclusive harvesting 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 catcher/processors to form cooperatives and allows catcher vessels to form cooperatives in association with shoreside processors in Kodiak, AK, but these catcher vessels are not required to deliver to processors in their cooperative. This allows the 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 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 did begin in 2012 with the implementation of the Rockfish Program but excludes the limited entry longline fishery participants. In 2012, the Rockfish Program fee was $201,528 and was approximately 1.12% of the total value of the fishery.

6.6.2 Catch Share Privilege Characteristics

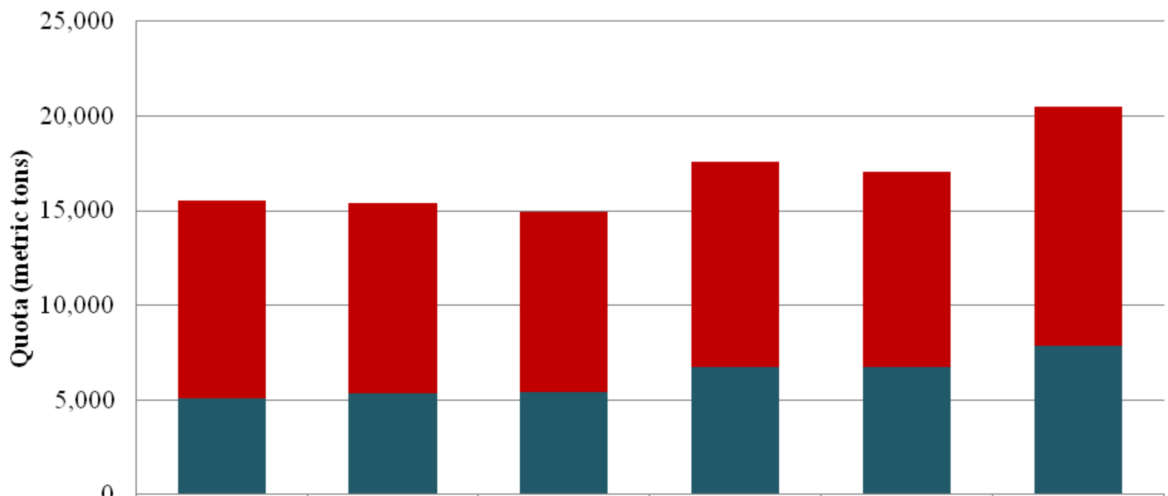
Quota shares are allocated to eligible LLP license holders, but that LLP license must be assigned to a rockfish cooperative in order to participate in the Rockfish Program. Cooperative quota (CQ) is allocated annually to the cooperatives based on the QS ownership of its membership. Quota shares are allocated to LLP license holders based on their catch history, so the LLP owners have a limited ability to sell their quota share, which can be transferred only by selling their LLP. Cooperatives within a sector can transfer shares, subject to excessive share limits. Catcher vessel cooperatives cannot sell CQ to catcher/processor co-ops, but CP co-ops are allowed to sell CQ to co-ops 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). There are also excessive share and use caps. No person may hold or use more than 4% of the CV QS, or 40% of the CP QS. No CV co-op may hold or use more than 30% of the CV CQ. 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.

It is important to note that this is total value of the fishery where catcher/processor revenues are reported in first wholesale value and catcher vessels' revenues are reported as ex-vessel values and does not involve down-weighting the catcher/processor 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 LAP program.

6.6.3 Catch and Landings Performance Metrics

The catch and landings performance metrics include the amount of quota allocated to the program, the landings of Rockfish Program species, and the percentage of the quota allocated that is landed (percent utilization). Due to a change in database management in 2007 as a result of the implementation of the Rockfish Pilot Program, annual metrics will be reported for the years 2007-2012 but will not include a “baseline” period prior to the implementation of the pilot program in 2007. Between 2007 and 2012, the quota and landings have increased by 24% and 31%, respectively, while the percent utilization fell from 83.5% in 2007 to 90.7% in 2012 (Figures 6.41 and 6.42). The quota and landings have been relatively stable between 2007 and 2012 with a large increase in quota and landings occurring in the first year of the Rockfish Program (2012).



	2007	2008	2009	2010	2011	2012
CV	10,411	10,010	9,577	10,876	10,330	12,646
CP	5,098	5,358	5,380	6,737	6,708	7,830

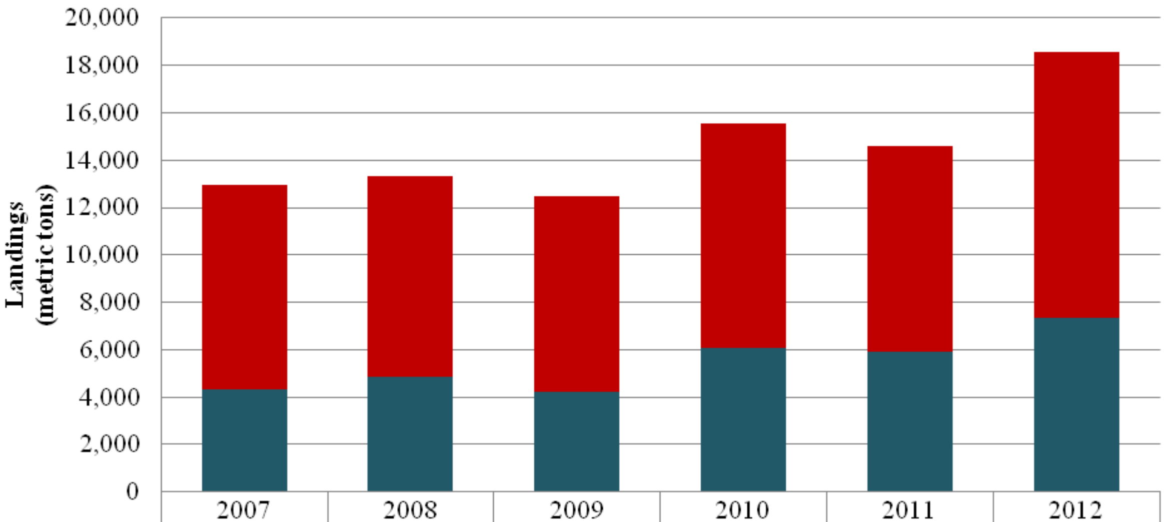
Figure 6.41: Quota allocated to the Rockfish Program.

Figure 6.42 also separates the landings by catcher vessel (CV) and catcher/processor vessel (CP) for all years of the program. Overall program landings have increased by 44% in 2012 relative to 2007, with catcher vessel landings increasing by 31% and catcher/processor vessels’ landings increasing by 69%. CPs land on average 37% of the total Rockfish Program landings, but the CP share increased from 33% in 2007 to 39% in 2012.

Utilization of the allocated quota by sector is reported shown in Figure CS43. The catcher vessel sector has generally increased their percent utilization since 2007, increasing from 83% in 2007 to 89% in 2012. Utilization by the catcher/processor sector is higher than the utilization by the catcher vessel sector in all years except 2009, but it is much more variable than the catcher vessel sector, experiencing a low of 79% in 2009 and a high of 93% in 2012.

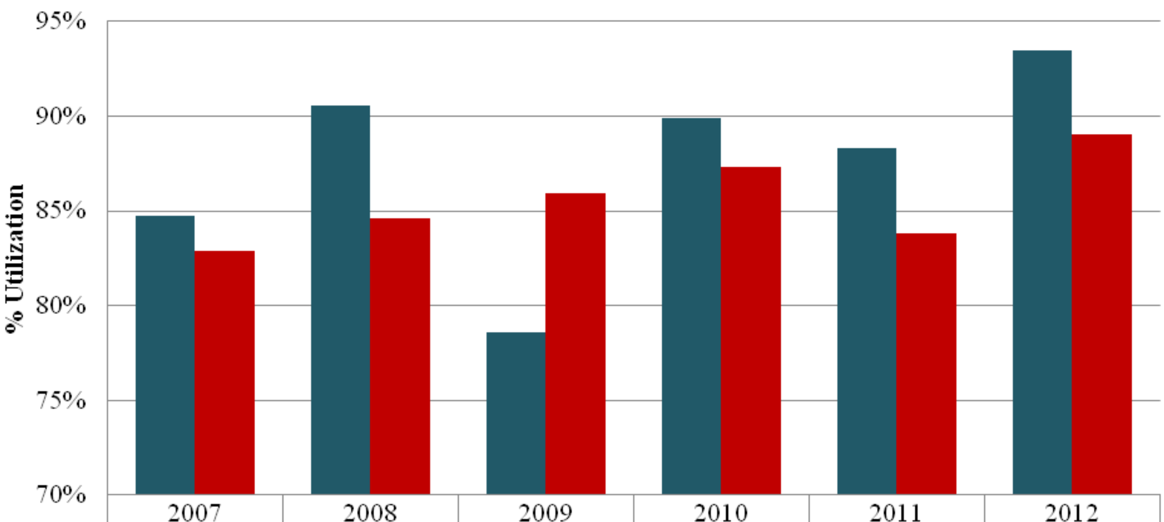
6.6.4 Effort Performance Metrics

The effort performance metrics include the number of active vessels, the number of entities holding share, and the season length index. The season length index is defined as the number of days in



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

Figure 6.42: Aggregate landings of all Rockfish Program species.



	2007	2008	2009	2010	2011	2012
CP	84.75%	90.54%	78.56%	89.93%	88.32%	93.47%
CV	82.87%	84.60%	85.93%	87.33%	83.82%	89.06%

Figure 6.43: Percent of the allocated quota that is landed in the Rockfish Program.

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, which would be an opening on May 1st and closure on November 15^{th}. This index demonstrates how much of the total time available to catch the Rockfish Program quota is actually used to catch the quota of all Rockfish Program species. The number of active days for these vessels varied from a low of 147 in 2009 to a high of 180 days in 2011, therefore the season length index varied between 147/199 = 0.74 and 180/199=0.90 from 2007-2012 (Figure 6.44).

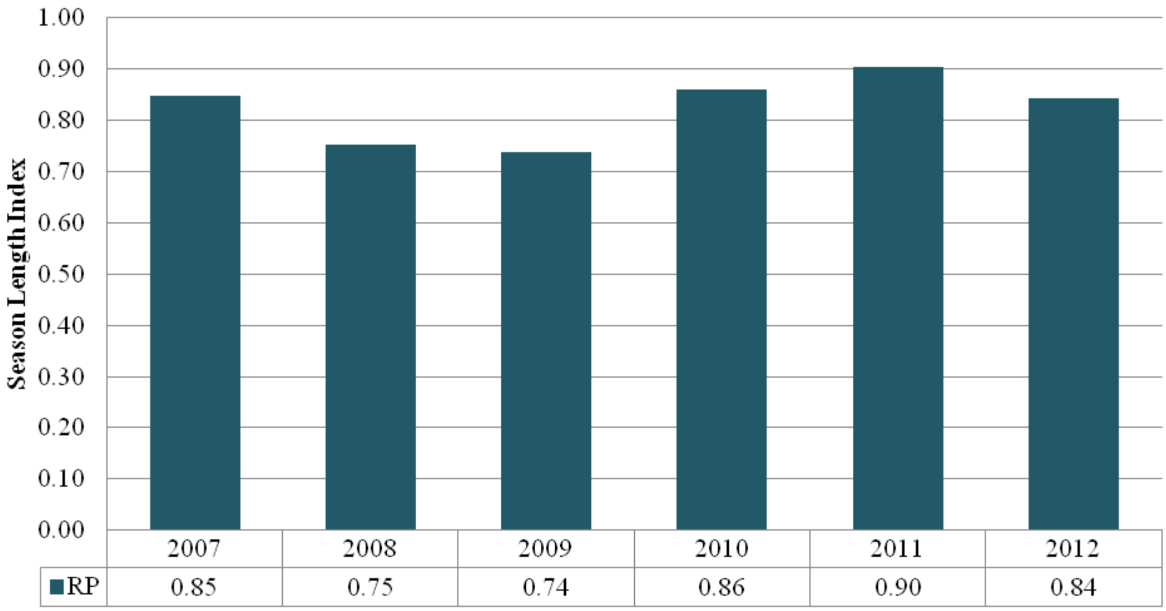


Figure 6.44: Rockfish Program season length index.

The number of active vessels reflects the number of Rockfish Program catcher and catcher/processor vessels with any commercial landings of Rockfish Program species in a given year. The total number of active vessels has been relatively stable between 2007 and 2012 between 41 and 50 vessels, with the number of catcher vessels varying between 33 and 41 vessels, while the number of catcher/processors varied between 4 and 9 vessels (Figure 6.45). It is interesting to note that 4 catcher/processor vessels landed 33% of the total program landings in 2007 while 37 catcher vessels landed the remaining 67% of the Rockfish Program quota.

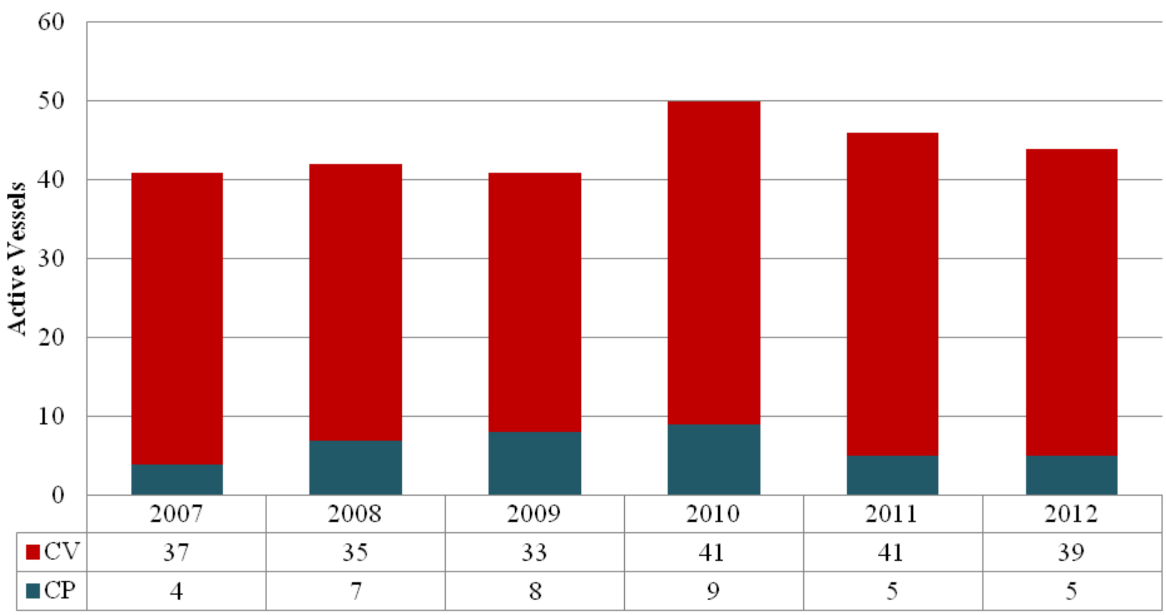


Figure 6.45: Number of active vessels in the Rockfish Program.

The number of entities holding share (LLP licenses) in the Rockfish Program has been very stable throughout the Rockfish Pilot Program (2007-2011) and the Rockfish Program (2012 to present), varying between 51 and 53 entities (Figure CS46).

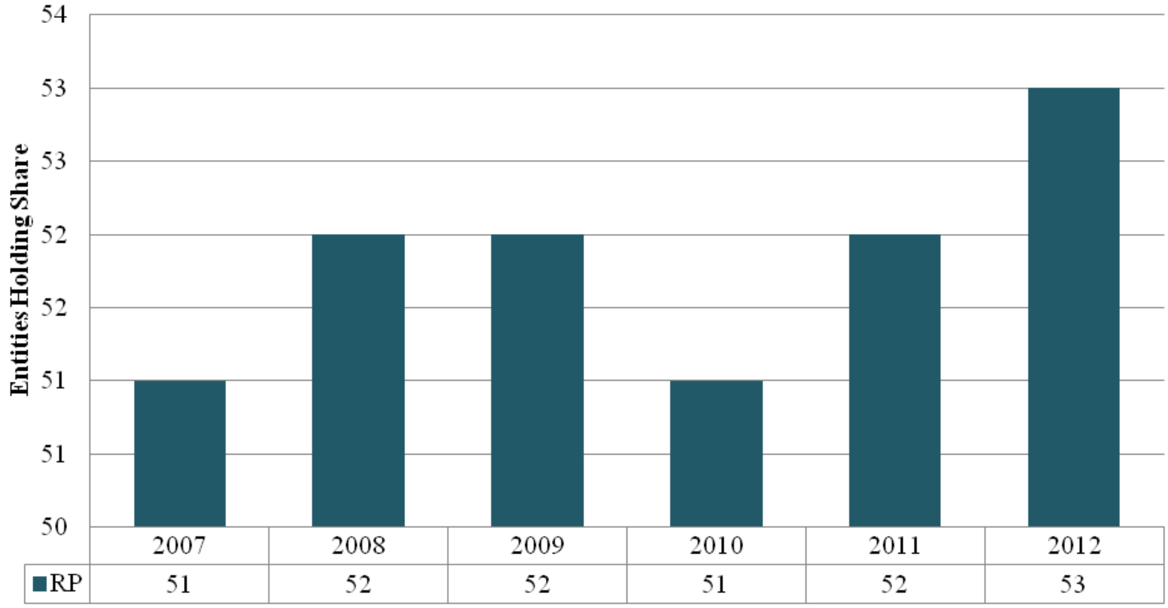
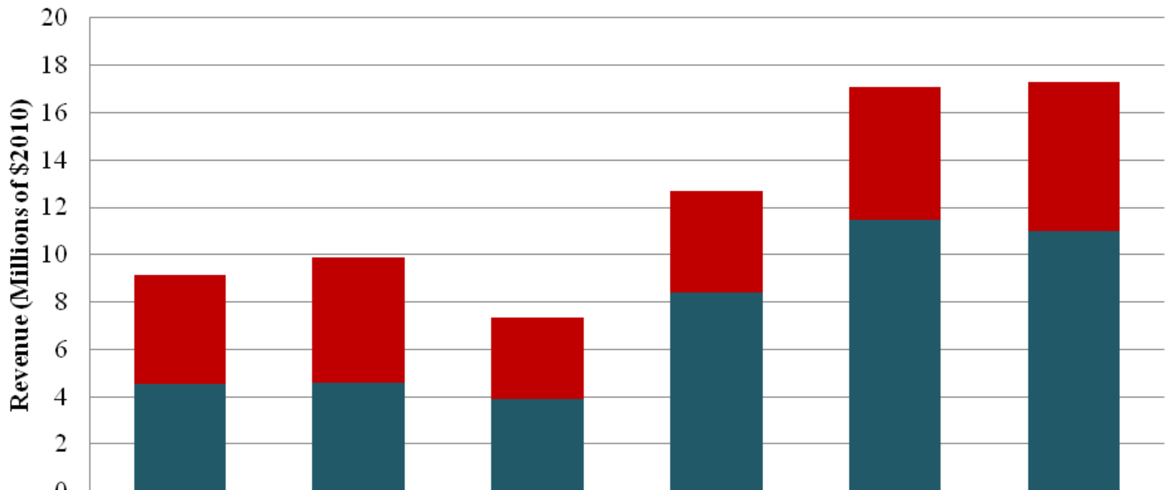


Figure 6.46: Number of entities holding share in the Rockfish Program.

6.6.5 Revenue Performance Metrics

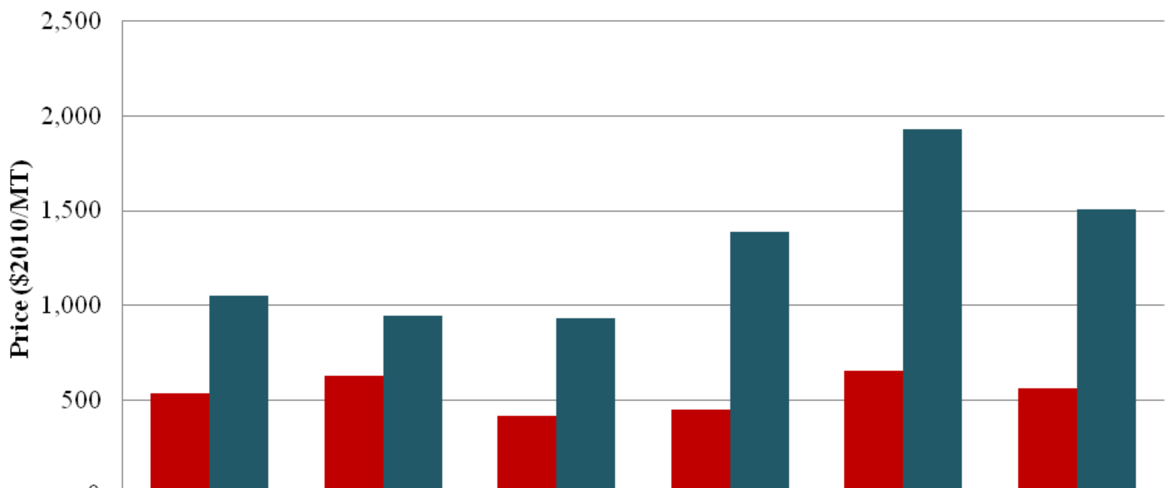
The revenue performance metrics are the aggregate revenue from catch share species, average prices of catch share species, the revenue per active vessel, and the Gini coefficient which is a measure of how concentrated revenues are among the active vessels. Revenues are adjusted for inflation by using 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 catcher vessels is the weighted annual ex-vessel price while the price received by catcher/processors 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 89% between 2007 and 2012, from $9.15 million in 2007 to $17.30 million in 2012 (Figure 6.47). While both sectors had nearly identical revenues in 2007 (CV sector=$4.6 million and CP sector=$4.55 million), the CP sector experienced a much larger gain in revenues between 2007 and 2012 with their revenues increasing by 142% while the CV sector revenues increased by only 36% over the same time period.

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 2007 and 2012 by 4.5% from $533/ton to $557/ton for CVs and 43% from $1,053/ton to $1,505 for CPs (Figure 6.48). There is substantial variation in the average prices for each sector which varied annually from -22% to 50% for CPs and from -33% to 45% for CVs between 2007 and 2012, and the catcher/processors have a higher coefficient of variation in prices at 0.22 than the catcher vessels at 0.16.



	2007	2008	2009	2010	2011	2012
CV	4.60	5.29	3.42	4.27	5.65	6.28
CP	4.55	4.59	3.93	8.42	11.45	11.02

Figure 6.47: Rockfish Program revenue.

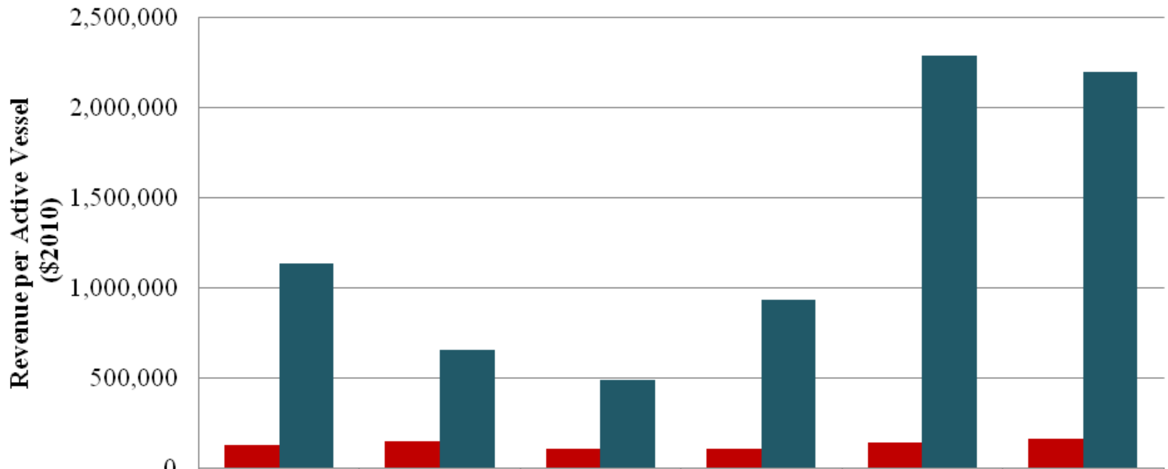


	2007	2008	2009	2010	2011	2012
CV	533	624	415	450	653	557
CP	1,053	946	929	1,390	1,932	1,505

Figure 6.48: Weighted average of all Rockfish Program species price per metric ton.

Rockfish Program revenue per vessel increased by 76% from $223,156 in 2007 to $393,078 in 2012, with the catcher/processor sector seeing a larger increase in revenue per vessel, by 94% (from $1.14 million during 2007 to $2.20 million in 2012) while catcher vessel revenue per vessel increased by 29% (from $124,370 in 2007 to $160,958 in 2012) (Figure 6.49).

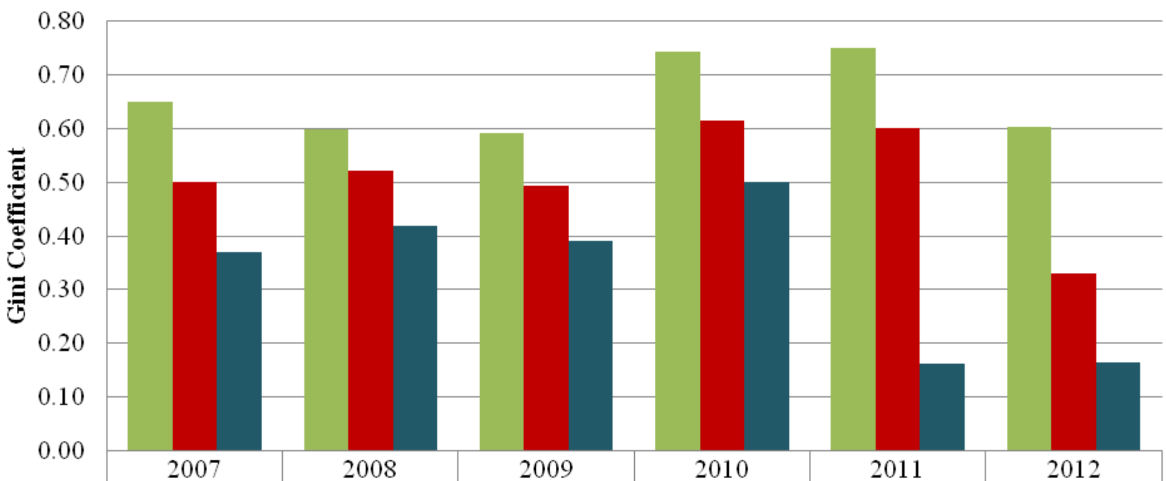
The last performance metric reported for the Rockfish Program is the Gini coefficient of vessel revenues. The Gini coefficient measures the evenness of the distribution of revenue among vessels participating in the Rockfish Program in a given year. The Gini coefficient varies between 0 and 1 where a value of zero indicates that all vessels earn exactly the same revenue while a value of 1



	2007	2008	2009	2010	2011	2012
CV	124,370	151,076	103,592	104,139	137,819	160,958
CP	1,136,927	655,848	490,882	935,481	2,289,742	2,203,613

Figure 6.49: Rockfish Program revenue per active vessel.

indicates that a single vessel had 100% of the revenues. Therefore, inequality in vessel revenues is increasing in the Gini coefficient. This becomes apparent looking at the difference in Gini coefficient for 2007 for all Rockfish Program (RP) vessels (Gini = 0.65) which implies a higher level of inequality in vessel revenues compared with the Gini coefficient for either the catcher vessels only (Gini = 0.50) or for the catcher/processors only (Gini = 0.37) (Figure CS50). This is because the revenue per vessel among catcher vessels and catcher processors is very different (Figure 6.49) and when all vessels are combined together in the Gini coefficient, it implies a higher level of revenue inequality than examining the within vessel-type revenue inequality. The Gini coefficient of Rockfish Program vessel revenue for all vessels has varied widely between a low of 0.59 in 2009 to a high of 0.75 in 2011. The CV sector experienced a similar swing in the Gini coefficient with varied between 0.49 in 2009 and 0.62 in 2010. The CP sector experienced a substantial decline in the Gini coefficient (decrease in inequality), between 2007 and 2012 when it fell from 0.37 in 2007 to 0.16 in 2011 and 2012.



	2007	2008	2009	2010	2011	2012
RP	0.65	0.60	0.59	0.74	0.75	0.60
CV	0.50	0.52	0.49	0.62	0.60	0.33
CP	0.37	0.42	0.39	0.50	0.16	0.16

Figure 6.50: Rockfish Program Gini coefficient.

7. 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. 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.

7.1. People and Places

7.1.1 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. 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.

7.1.2 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

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.

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 and 16 organized boroughs (Bockhorst 2001). 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 7.1). Other States have a very small percentage of their populations living in communities of less than 400.

Table 7.1: 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. 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.

Incorporated cities are automatically recognized by the Census as Places.

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.

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). For purposes of comparison, Table 7.2 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

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 7.2: 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 7.1.

7.2. 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). This changed slightly in 2010 to where trade transportation and utilities (63,028 or 20.7%) providing the most

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.

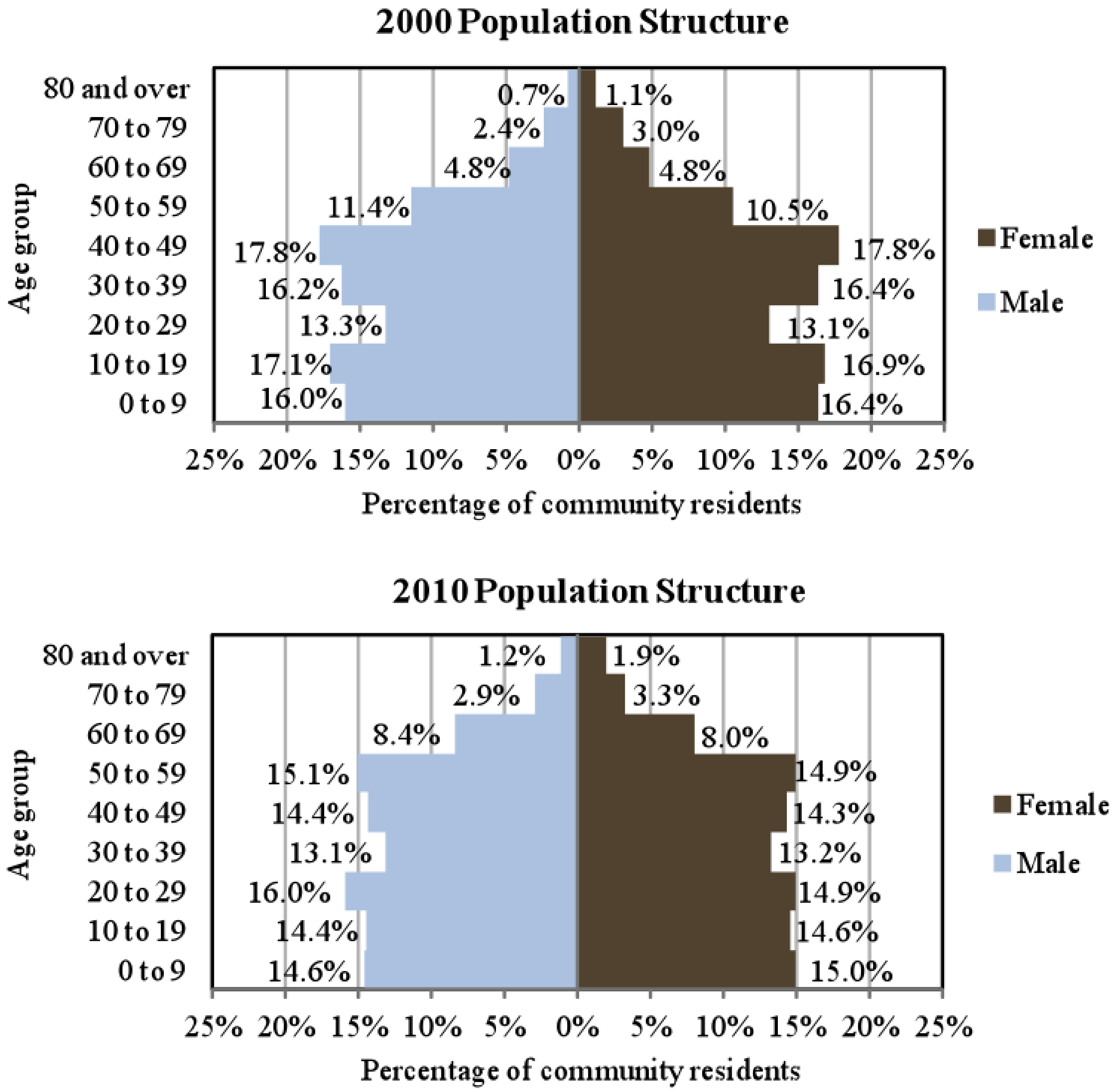


Figure 7.1: Population structure of the population as a whole in Alaska.
Source: U.S. Census Bureau. (n.d.). Profile of selected social, economic and housing characteristics of all places within Alaska. Datasets utilized include the 2000 (SF1 100% and SF3 sample data) and 2010 (Demographic Profile SF) 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%). 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.

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/.

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 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.

7.3. 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.

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.

7.4. Involvement in North Pacific Fisheries

7.4.1 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.

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.

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.

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

Ibid.

7.4.2 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. 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. 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. 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. 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. Catch of herring for bait began around 1900. A boom in processing herring for fish meal and oil took place from the 1920 to 1960s, and sac roe fisheries developed in the 1970s to provide high value product to Japanese markets. By the mid-1900s, fisheries were also developing for crab, shrimp and other shellfish, as well as an expanding variety of groundfish species. Substantial commercial exploitation of crab began in the 1950s with the development of Bering Sea king crab fisheries. Today, king crab

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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.

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.

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.

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.

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

harvests are well below their peak in 1980, when crab fisheries rivaled the highly profitable salmon industry in terms of landings value.

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.

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. 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. 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.

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

See footnote 15.

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.

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.

See footnote 15.

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.

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.

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

See footnote 20.

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. 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, and in fact the Eastern Bering Sea pollock fishery is the largest by-volume fishery' in the U.S. Pacific cod was landed in the third greatest volume in Alaska over the decade, after salmon.

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. 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. 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.

7.4.3 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, 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 Alaska communities as

See footnote 29.

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.

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.

See footnote 32.

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

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.

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.

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.

processed product is converted into a whole fish weight by NOAA for statewide tabulation. 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 7.3 and 7.4, 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. 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 7.5). 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.

7.4.4 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

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

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 7.3: 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 7.6).

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. 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. 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 7.7).

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.]

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.

Ibid.

Table 7.4: 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 7.6, however; as well as the number of community members which held a crew license (Table 7.7). 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 7.5: 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 7.6: 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 7.7: 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.]

8. 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 five-year period following implementation of the rationalization program in 2008 under Amendment 80 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 2005-2012 is provided in the Economic Performance Metrics for North Pacific Groundfish Catch Share Programs section of the report (see especially Figures 6.21-6.30 and accompanying text). In addition, details regarding catch, production, and value of BSAI and Gulf of Alaska groundfish species allocated to Amendment 80 fleet are provided in Section 4 of the Annual Fishery Statistics section.

As requirement of the Amendment 80 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 Amendment 80 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 Amendment 80 program in 2008, EDR data collection program has collected annual economic census data, with the most recent available data representing results from the 2012 calendar year of operations.

Among the goals of Amendment 80 was to create economic incentives to improve retention and utilization, and reduce bycatch by the commercial fishing vessels 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 by improving the opportunity for increasing the value of harvest species while improving operational efficiency and lowering costs.

The BSAI non-Pollock groundfish trawl catcher-processor (CP) sector is composed of vessel-entities representing the 24 CP's with history of harvesting groundfish in the BSAI, but did not qualify for inclusion in the rationalization of the CP pollock fishery under the American Fisheries Act. Of the

The EDR program is managed collaboratively by Pacific States Marine Fisheries Commission (PSMFC) and Alaska Fisheries Science Center (AFSC), with guidance and oversight from the North Pacific Fishery Management Commission (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.

Concurrent with passage of Amendment 80, the Council also developed a groundfish retention standard (GRS) program for Amendment 80 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, Amendment 80 vessel 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 Amendment 80 fleet under Amendment 93 to the FMP (77 FR 59852, October 1, 2012).

original 24 CP's, 22 remained operational as of implementation of the program in 2005, of which 20 vessels continue to operate as of 2012. Species allocated to the Amendment 80 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 Amendment 80 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 fishing activity in the Gulf of Alaska. Amendment 80 allocates the six target species and five prohibited species in the Bering Sea and Aleutian Islands to the catcher/processor sector and allows qualified vessels to form cooperatives. These voluntary harvest cooperatives manage the target allocations, incidental catch allowances and prohibited species allocations amongst themselves. From 2008 - 2010, 16 vessels formed a single cooperative, with the remainder being in the limited-access fishery. Since 2011, all vessels are in one of two cooperatives.

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 Amendment 80 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 Amendment 80 program for the period 2007-2012. The reader is referred thereto for details and 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

In the following tables, annual statistics are reported for fleet or fishery aggregate total values and vessel-level average values. All monetary values in the report are presented as inflation-adjusted 2012 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"); average values are reported as the median calculated over reported non-zero values. The arithmetic mean for a given statistic 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.

8.1. Fleet Capital Stock and Processing Capacity

Table 8.1 shows fleet aggregate and average (median) values for physical size and capacity of the currently active vessel stock in the fishery for 2008-2012. Amendment 80- qualified vessels active in EEZ fisheries have remained largely stable over the 5-year period, declining slightly from the 22 in

2008 to 20 in 2012, with the decline due to loss of two vessels at sea rather than efficiency driven consolidation (note that one of the 20 vessels active during 2012 only operated marginally and did not participate in the BSAI fishery). Apart from reduced size of the fleet and number of active vessels, no substantial changes in average or aggregate measures of vessel capacity have occurred in the extant fleet.

Table 8.2 displays statistics for vessel physical processing capacity, including total number of processing lines on the vessel, number of species and products (distinct species/product form combinations) that the vessel can process on one or more lines, and the maximum 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 per hour in 2008 to 4.43 metric tons per hour in 2012; the same metric calculated for whole-fish products alone has not shown any increase, indicating that production capacity in the fleet has been augmented to increase production efficiency of more value-added forms.

Table 8.3 displays statistics for vessel freezer capacity, in terms of cold storage capacity and maximum operating throughput capacity of plate freezers. Apart from changes in composition of the fleet between 2008 and 2009, cold storage capacity in the fleet has remained largely constant at approximately 7,500 metric tons. Reported data for freezer throughput capacity indicates that vessel-level average throughput has increased from approximately 3 to 4 metric tons per hour over the 2008-2012 period. As freezer throughput is commonly cited as the principal limiting factor in processing capacity on Amendment 80 CP's, suggesting that this result represents a significant measure of capital improvement in the fleet.

Table 8.1: Fleet Characteristics - Vessel Size

		Gross tonnage		Net tonnage		Length overall	Beam	Shaft horse-power	Fuel capacity (U.S. gal)	
Year	Obs	Total	Median	Total	Median	Median	Median	Median	Total	Median
2008	22	17,483	805.5	9,449	402.5	176.5	38.5	2,385	1,988,285	77,920
2009	21	15,482	560	8,723	380	169	38	2,250	1,8199,51	76,840
2010	20	15,285	775	8,589	402.5	176.5	38.5	2,385	1,781,457	77,920
2011	20	15,285	775	8,568	402.5	176.5	38.5	2,385	1,772,343	77,920
2012	20	15,285	775	8,568	402.5	176.5	38.5	2,385	1,772,343	77,920

Source: Amendment 80 Economic Data Reports

Table 8.4 shows median values for reported estimates of average fuel consumption rate of Amendment 80 vessels during fishing and processing, steaming loaded, and steaming empty operational modes. Reported rates vary slightly over time and activity, with no discernible trend. It should be noted that rates reported by individual vessels commonly vary by 10-15 gallons per hour from year to year.

8.2. Vessel Operating Activity, Catch, and Production

Table 8.5 reports fleet aggregate and median statistics for vessel activity days reported in EDR data, representing counts of days during which the vessel undertook fishing operations in Amendment

Table 8.2: Fleet Characteristics - Vessel Processing Capacity

Year	Obs	Processing lines on vessel Total	Processing lines on vessel Median	Number of species processed Median	Number of products (species + product) processed Median	Maximum throughput over any product (mt/hr) Median	Maximum throughput over any whole-fish product (mt/hr) Median
2008	22	39	1	12	18	3.63	3.33
2009	21	38	1	12	17	3.63	3.33
2010	20	37	1	12	18	3.85	3.32
2011	20	37	1	12	17	3.92	3.31
2012	20	36	1	12	16	4.43	3.22

Source: Amendment 80 Economic Data Reports

Table 8.3: Fleet Characteristics - Vessel Freezer Capacity

Year	Obs	Freezer space (mt) Total	Freezer space (mt) Median	Maximum freezing capacity (mt/hour) Total	Maximum freezing capacity (mt/hour) Median
2008	22	8,227	318	99.3	2.9
2009	21	7,693	318	58.8	2.7
2010	20	7,576	318	60	2.9
2011	20	7,076	309	64.2	3.6
2012	20	7,559	318	67.1	3.9

Source: Amendment 80 Economic Data Reports

Table 8.4: Vessel Fuel Consumption - Average By Vessel Activity

Year	Obs	Fishing/processing, Median (gal/hour)	Steaming loaded, Median (gal/hour)	Steaming empty, Median (gal/hour)
2008	22	97	95	97
2009	21	90	89	87
2010	20	97	95	94
2011	20	97	95	93
2012	20	100	105	96

Source: Amendment 80 Economic Data Reports

80 and other fisheries, processing operations in Amendment 80 and other fisheries, days on which the vessel was in transit or offloading in port, and inactive in shipyard. Note that counts are not mutually exclusive; a given calendar day may be counted as a day fishing as well as a day processing in Amendment 80 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 occupation in a given activity. Activity in the Amendment 80 target fisheries has decreased over the period, with total vessel processing days declining consistently on an annual basis from 4117 in 2008 to 3425 in 2012 (17% decrease overall); median per vessel results show a smaller and less consistent downward trend as well. In contrast, days fishing and processing in other fisheries (primarily sideboard allowances in

the Gulf of Alaska) show a substantial increase over the period as the number of vessels reporting activity days has increased from 11 to 17, with total aggregate and median days processing varying inconsistently but with a general upward trend.

Table 8.6 reports annual fleet aggregate and vessel average values for catch, discards, volume of production in roundweight and finished weight terms, and estimated wholesale value of finished processed volume for active Amendment 80 vessels, stratified by Amendment 80 target fisheries in the BSAI, all other fisheries in the BSAI, and all fisheries in the Gulf of Alask. Total catch (retained and discarded) of Amendment 80 species has remained largely stable over the period, varying between 250-280 thousand metric tons (mt), with the rate of discard varying between 2-5% and declining slightly over the period. Total catch of other species in the BSAI has varied between 70-83 thousand mt with retained catch increasing moderately over the period, from 44.8 thousand mt in 2008 to 60.4 thousand mt in 2012, and the discard rate decreasing consistently each year, from 37% in 2008 to 18% in 2012. Total catch in GOA fisheries has varied from approximately 20-27 thousand mt, with retained catch increasing from approximately 20 to 24 thousand mt and the rate of discard decreasing over the period from a high of 23% in 2009 to 12% in 2012.

Note that discrepancies between Table 8.8 and Table 8.6 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.

Table 8.5: Vessel Activity Days

	Amendment 80 fisheries					All other fisheries					Days travel/offload			Days inactive	
		Days fishing		Days processing			Days fishing		Days processing						
Year	Obs	Total	Median	Total	Median	Obs	Total	Median	Total	Median	Obs	Total	Median	Total	Median
2008	22	3,821	184.5	4,117	196	11	456	25	455	26	22	1,318	58	1,980	94
2009	21	3,765	181	3,774	181	11	261	20	259	20	21	1,398	72	2,355	100
2010	20	3,639	181.5	3,747	189	14	535	30	534	30	20	1,681	77	1,928	81
2011	20	3,405	174.5	3,454	173	17	812	32	819	32	20	1,956	80	1,857	78
2012	19	3,395	178	3,425	185	17	735	30	730	30	20	1,682	69	2,089	98

Source: Amendment 80 Economic Data Reports

Table 8.6: Amendment 80 Vessel Annual Catch, Production, And Value, By Fishery And Region

		Fleet aggregate total						Average per active vessel, median					
	Vessels	Retained (1000 mt)	Discard (1000 mt)	Discard rate, %	Production, round wt (1000 mt)	Production, finished wt (1000 mt)	Production value, $ million	Retained (mt)	Discard (mt)	Discard rate, %	Production, round wt (mt)	Production, finished wt (mt)	Production value, $ million
BSAI - Amendment 80 target fisheries/species													
2008	23	270.66	11.42	4%	239.12	152.31	$275.08	1,119	12	3%	1,042	660	$1.79
2009	21	239.66	12.8	5%	221.28	140.54	$228.32	886	29	5%	1,006	568	$1.06
2010	20	257.54	12.68	5%	247.26	154.95	$258.87	1,521	44	3%	1,518	820	$1.52
2011	20	262.31	6.52	2%	259.22	163.61	$322.84	1,368	15	2%	1,356	719	$1.83
2012	20	265.03	6.81	3%	261.69	167.18	$329.20	1,386	26	2%	1,528	790	$1.96
BSAI - All other fisheries/species													
2008	23	44.81	25.82	37%	36.33	22.28	$39.16	103	225	41%	122	56	$0.19
2009	21	55.44	20.94	27%	47.67	29.67	$47.19	79	198	33%	77	45	$0.11
2010	20	63.2	20.5	25%	56.3	34.29	$47.79	170	127	22%	216	122	$0.19
2011	20	62.11	17.45	22%	56.93	34.77	$60.20	124	92	14%	194	107	$0.31
2012	20	60.38	13.52	18%	55.11	34.05	$65.45	71	78	13%	197	100	$0.27
GOA - All fisheries/species													
2008	13	20.66	3.8	19%	19.87	11.16	$24.26	27	10	21%	18	9	$0.04
2009	17	20.19	6.09	24%	18.87	10.95	$23.08	27	6	18%	24	15	$0.05
2010	16	21.36	5.26	21%	21.02	12.15	$28.17	31	4	12%	28	16	$0.05
2011	16	24.35	4.41	16%	24.29	13.85	$39.79	32	4	12%	23	12	$0.05
2012	16	24.18	3.43	14%	23.73	13.21	$34.05	27	4	11%	17	11	$0.04

Source: NMFS Alaska Region, Catch Accounting

8.3. Quota Share Transfers

Table 8.7 reports information available for Amendment 80 quota share (QS) lease transfer activity over the period since the program was implemented. The number of vessels leasing out QS to other vessels has ranged from none to as many as eight vessels, with the latter occurring in 2012 with the lease of yellowfin sole QS to three lessee vessels. Transfer activity within the fishery has been limited, largely reflecting the continued operation of nearly all 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.

8.4. Sales and Revenue Earnings

Table 8.8 presents a summary of annual volume and revenue of product sales for Amendment 80 vessels, over all fisheries, vessel income from other sources (e.g., tendering, charters, cargo transport), and sales of fishery permits. To date, no Amendment 80 entities have sold interests in fishery permits, and only one vessel has reported revenue derived from vessel use other than fishing and processing in each of 2010 and 2012 (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 2012 was 198.3 thousand mt, slightly greater than the previous year sales of 197 thousand mt and the highest value for the period. Total revenue declined slightly from $401.3 million in 2011 to $392.6 million in 2012 despite increasing sales volume, reflecting a general decline in prices observed for groundfish products in 2012.

Table 8.7: Amendment 80 QS Transfers and Lease Activity

QS and PSC allocation species	Year	QS leased to other Vessels	QS leased from other Vessels
Atka mackerel	2008	6	2
	2009	3	3
	2010	4	1
	2011	5	1
	2012	0	0
Flathead sole	2008	0	0
	2009	0	0
	2010	0	0
	2011	0	1
	2012	0	1
Rock sole	2008	0	0
	2009	0	0
	2010	0	0
	2011	0	1
	2012	3	3
Yellowfin sole	2008	0	0
	2009	0	0
	2010	0	0
	2011	5	3
	2012	8	3
P. cod	2008	0	0
	2009	1	1
	2010	4	1
	2011	1	5
	2012	0	1
Pacific ocean perch	2008	0	1
	2009	2	1
	2010	2	1
	2011	2	2
	2012	3	1
Other species	2008	1	0
	2009	0	0
	2010	0	0
	2011	2	1
	2012	0	1

Source: Amendment 80 Economic Data Reports.

Table 8.8: Annual Revenue, All Sources

	Total fishery product sales					Other income from vessel operations			LLP license sales, all	
		Volume (1000 mt)		Revenue ($million)			Revenue			Revenue
Year	Obs	Total	Median	Total	Median	Obs	Total	Median	Obs	Total
2008	22	176.85	7.47	$313.84	$14.00	0			0	
2009	21	168.31	8.45	$273.27	$12.21	0			0	
2010	20	183.48	9.76	$314.49	$14.44	1	–	–	0	
2011	20	196.97	10.17	$401.15	$19.62	0			0	
2012	20	198.31	9.39	$392.56	$18.83	1	–	–	0	

8.5. Capital Expenditures and Vessel Operating Costs

Table 8.9 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 debt servicing on previously purchased assets is not included. Due to the infrequency of large investments, capital expenditures vary widely for individual reporting vessels, with many owners reporting no expenditures for a particular category of investment in some or most years. Total fleet aggregate capital expenditures have generally varied between $8.5-$11 million each year, and in the range of $0.4 to $0.7 million on an average (median) vessel basis. Aggregate investment markedly increased to $24.2 million dollars in 2012; much of the increase reflects large capital projects on the part of a small number of vessel owners, however the increased incidence of reported investment spending in 2012 across the fleet is likely attributable in part to historically low interest rates during late 2012. 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). Eighteen vessels reported such investment in 2012, totaling nearly $17.5 million, an increase from $3 million in 2011, and 10 vessels reported capital costs for fishing gear totaling $2.9 million, an increase from $1.25 million in 2012.

Table 8.10 and Figure 8.1 summarize the reported annual costs incurred by Amendment 80 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); overhead (administrative costs and insurance); freight services; fees; and 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).

Aggregate operating expenses for the active fleet during 2012 totaled $293 million, a moderate increase from 2011, and 17% greater than the 5-year average. Consistent with previous years, labor expenses represented the largest category of expenses (greater than 41% of total operating costs for the year). Total labor costs for 2011 and 2012 were largely constant at $122 million per year, including approximately $17 million paid to fishing crews, $52 million to processing employees, and $38 million to other on-board employees (captains and other officers, engineers, and others) each year, and increase of approximately 20% over the 2008-2010 period. On a daily basis, total fishing crew payment during 2012 was $2.8 thousand, and represented 4% of total gross revenue.

Fuel costs for the fleet during 2012 totaled $47 million, nearly 16% of overall expenses. In terms of gross expenditure as well as on a pro-rata basis, fuel costs for 2012 were in the middle of the range observed over the 2008-2012 period. Repair and maintenance expenses for 2012 increased to $42 million across the fleet, higher than in previous years, and representing 14.4% of overall costs, and general administrative costs increased above the previous range, to $15.5 million (5.3%) of overall costs. The remaining operating cost items make up an additional 23% of total operating expenses for 2012.

An important result of this analysis, as shown in the bottom section of Table 8.10, is the prorata comparison of total operating expenses to total vessel revenue. Operating costs in 2008 represented 95% percent of gross revenue alone, not accounting for capital investments during that year. This ration has fallen over the 5-year period, to 72-75% over 2011-2012. While this is a coarse metric of overall economic and financial performance and does not fully measure profitability in the sector, it is an indication of improving performance.

8.6. Employment

Table 8.11 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 to 107 in 2012, down from 134 in 2008, and the total number of individuals participating as crew during 2012 was 242, a slight increase from 2011. 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 2012, to 447 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, increased to 176 positions across the fleet during 2012.

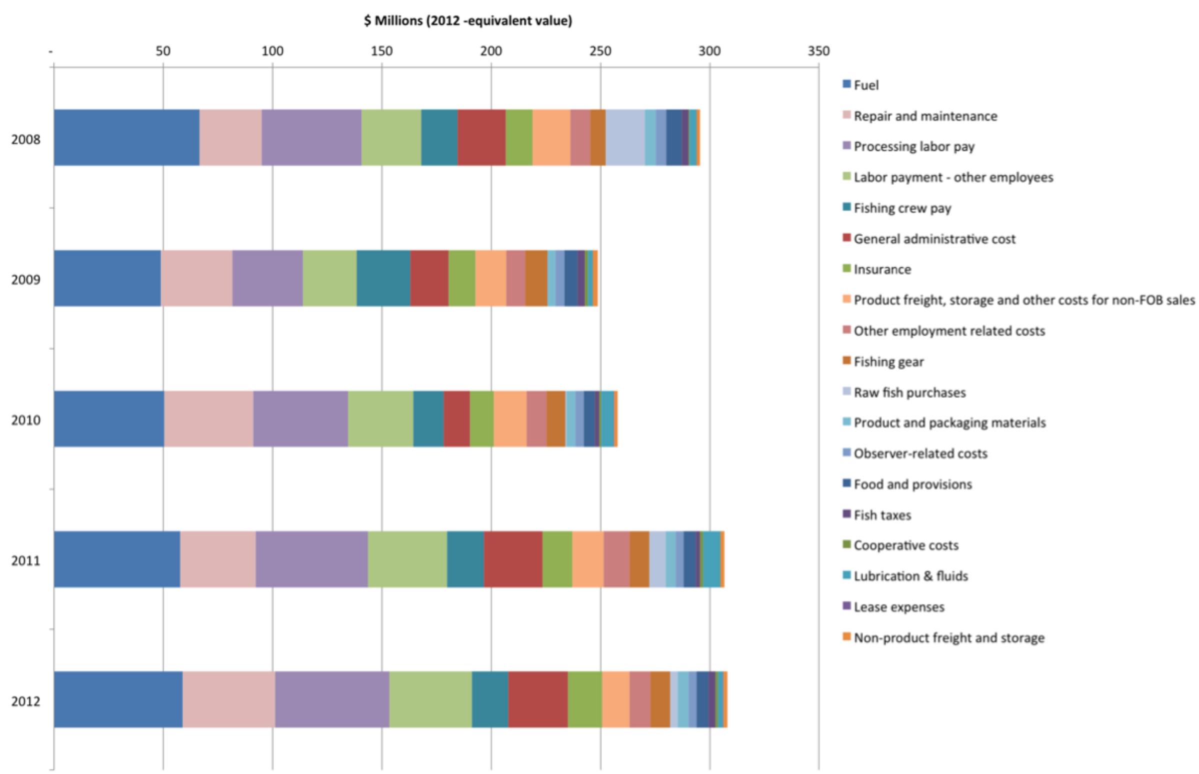

Figure 8.1: Vessel Operating Expenses, By Item And Year, 2008-2012

Table 8.9: Sum Over All Expense Categories.

Capital cost category	Year	Obs	Expenditure per vessel, median ($1,000)	Total fleet expenditure ($million)	% of total annual capital expenditures
Processing gear	2008	11	$133	$1.98	22.20%
	2009	9	$102	$1.10	11.50%
	2010	13	$159	$3.02	28.20%
	2011	10	$150	$2.38	28.20%
	2012	14	$80	$3.03	12.50%
Vessel and onboard equipment	2008	11	$57	$2.00	22.40%
	2009	13	$452	$7.08	74.30%
	2010	15	$113	$5.56	51.90%
	2011	11	$124	$3.00	35.50%
	2012	18	$65	$17.43	72.10%
Fishing gear	2008	12	$105	$1.75	19.60%
	2009	8	$59	$0.68	7.10%
	2010	8	$39	$1.27	11.80%
	2011	9	$100	$1.25	14.80%
	2012	10	$271	$2.87	11.90%
Other capital expenditures	2008	9	$96	$3.20	35.80%
	2009	5	$47	$0.67	7.00%
	2010	4	$234	$0.86	8.00%
	2011	8	$138	$1.81	21.50%
	2012	7	$97	$0.84	3.50%
LLP license purchases	2008	0			
	2009	0			
	2010	0			
	2011	0			
	2012	0			
Total over all capital investment costs	2008	43	$391	$8.93	
	2009	35	$660	$9.53	
	2010	40	$546	$10.70	
	2011	38	$512	$8.45	
	2012	49	$514	$24.17	

Source: Amendment 80 Economic Data Reports.

Table 8.10: Fishing And Processing Operating Expenses, By Category And Year, And Prorata Indices.

Expense Category	Expense Item	Year	Obs	Cost per vessel, median ($million)	Total fleet cost ($million)	Cost % of total annual expenses	Cost/vessel-day fleet, total $US	Cost/mt sold fleet, total $US	Cost % of total vessel revenue
Labor expenses	Labor payment, Fishing crew	2008	22	$0.75	$16.69	6.28%	2,834	94	6%
		2009	21	$0.83	$24.40	10.39%	4,493	145	10%
		2010	20	$0.65	$13.94	5.71%	2,339	76	5%
		2011	20	$0.87	$16.90	5.88%	2,713	86	4%
		2012	20	$0.77	$16.48	5.62%	2,823	83	4%
	Labor payment, Processing employees	2008	22	$2.07	$45.57	17.14%	7,738	258	16%
		2009	17	$1.85	$32.31	13.75%	5,948	192	14%
		2010	20	$1.95	$43.47	17.81%	7,291	237	15%
		2011	20	$2.56	$51.47	17.90%	8,263	261	13%
		2012	20	$2.58	$52.37	17.85%	8,972	264	13%
	Labor payment, Other employees	2008	17	$1.38	$27.32	10.28%	4,639	155	10%
		2009	17	$1.35	$24.71	10.52%	4,550	147	10%
		2010	20	$1.47	$29.76	12.19%	4,991	162	10%
		2011	20	$1.90	$36.19	12.59%	5,810	184	9%
		2012	20	$2.05	$37.72	12.86%	6,462	190	10%
	Other employment related costs	2008	22	$0.29	$9.09	3.42%	1,544	51	3%
		2009	21	$0.38	$8.84	3.76%	1,627	53	4%
		2010	20	$0.42	$9.17	3.76%	1,539	50	3%
		2011	20	$0.52	$11.82	4.11%	1,898	60	3%
		2012	20	$0.50	$9.50	3.24%	1,628	48	2%
	Food and provisions	2008	19	$0.30	$7.04	2.65%	1,195	40	3%
		2009	18	$0.30	$5.81	2.47%	1,069	35	2%
		2010	17	$0.29	$4.94	2.02%	828	27	2%
		2011	17	$0.34	$5.50	1.91%	883	28	1%
		2012	17	$0.34	$5.56	1.90%	953	28	1%

Source: Amendment 80 Economic Data Reports.

Continued on the next page.

Table 8.10: Fishing And Processing Operating Expenses, By Category And Year, And Prorata Indices.

Expense Category	Expense Item	Year	Obs	Cost per vessel, median ($million)	Total fleet cost ($million)	Cost % of total annual expenses	Cost/vessel-day fleet, total $US	Cost/mt sold fleet, total $US	Cost % of total vessel revenue
Gear	Repair and maintenance	2008	22	$1.01	$28.57	10.74%	4,851	162	10%
		2009	21	$1.31	$32.60	13.88%	6,003	194	14%
		2010	20	$1.77	$40.63	16.65%	6,815	221	14%
		2011	19	$1.45	$34.41	11.97%	5,523	175	9%
		2012	20	$1.75	$42.30	14.42%	7,246	213	11%
	Fishing gear	2008	19	$0.30	$7.06	2.66%	1,199	40	3%
		2009	21	$0.43	$10.06	4.28%	1,852	60	4%
		2010	20	$0.42	$8.62	3.53%	1,445	47	3%
		2011	20	$0.35	$9.14	3.18%	1,468	46	2%
		2012	19	$0.38	$9.28	3.16%	1,589	47	2%
	Lease expenses	2008	1	–	–	–	–	–	–
		2009	5	–	–	–	–	–	–
		2010	6	–	–	–	–	–	–
		2011	7	–	–	–	–	–	–
		2012	8	–	–	–	–	–	–
Overhead	General administrative cost	2008	22	$0.51	$12.24	4.60%	2,078	69	4%
		2009	21	$0.51	$12.40	5.28%	2,283	74	5%
		2010	16	$0.51	$11.00	4.51%	1,846	60	4%
		2011	16	$0.50	$13.51	4.70%	2,169	69	3%
		2012	20	$0.58	$15.53	5.29%	2,661	78	4%
	Insurance	2008	22	$0.02	$0.02	0.01%	4	0	0%
		2009	21	$0.00	$0.06	0.02%	11	0	0%
		2010	20	$0.01	$0.14	0.06%	24	1	0%
		2011	20	$0.01	$0.09	0.03%	14	0	0%
		2012	20	$0.01	$0.11	0.04%	18	1	0%

Source: Amendment 80 Economic Data Reports.

Continued on the next page.

Table 8.10: Fishing And Processing Operating Expenses, By Category And Year, And Prorata Indices.

Expense Category	Expense Item	Year	Obs	Cost per vessel, median ($million)	Total fleet cost ($million)	Cost % of total annual expenses	Cost/vessel-day fleet, total $US	Cost/mt sold fleet, total $US	Cost % of total vessel revenue
Services	Product freight and storage, non-FOB sales	2008	9	$2.22	$17.31	6.51%	2,940	98	6%
		2009	10	$0.28	$13.94	5.94%	2,567	83	6%
		2010	8	$1.50	$14.95	6.13%	2,508	81	5%
		2011	4	$3.52	$14.42	5.02%	2,315	73	4%
		2012	4	$3.66	$12.59	4.29%	2,156	63	3%
	Non-product freight and storage	2008	22	$0.05	$1.56	0.59%	265	9	1%
		2009	21	$0.06	$2.18	0.93%	402	13	1%
		2010	20	$0.07	$1.64	0.67%	276	9	1%
		2011	20	$0.06	$1.76	0.61%	283	9	0%
		2012	20	$0.06	$1.80	0.61%	308	9	0%
Fees	Observer	2008	22	$0.21	$4.85	1.82%	824	27	2%
		2009	21	$0.20	$4.13	1.76%	760	25	2%
		2010	20	$0.20	$3.90	1.60%	654	21	1%
		2011	20	$0.19	$3.65	1.27%	586	19	1%
		2012	19	$0.19	$3.63	1.24%	622	18	1%
	Fish tax	2008	22	$0.15	$3.17	1.19%	539	18	1%
		2009	21	$0.16	$3.46	1.47%	636	21	1%
		2010	20	$0.09	$2.04	0.84%	342	11	1%
		2011	20	$0.10	$2.08	0.72%	334	11	1%
		2012	20	$0.14	$3.11	1.06%	533	16	1%
	Cooperative costs	2008	16	$0.03	$0.55	0.21%	93	3	0%
		2009	15	$0.08	$1.24	0.53%	229	7	1%
		2010	14	$0.08	$1.08	0.44%	181	6	0%
		2011	16	$0.08	$1.28	0.44%	205	6	0%
		2012	16	$0.08	$1.17	0.40%	200	6	0%

Source: Amendment 80 Economic Data Reports.

Continued on the next page.

Table 8.10: Fishing And Processing Operating Expenses, By Category And Year, And Prorata Indices.

Expense Category	Expense Item	Year	Obs	Cost per vessel, median ($million)	Total fleet cost ($million)	Cost % of total annual expenses	Cost/vessel-day fleet, total $US	Cost/mt sold fleet, total $US	Cost % of total vessel revenue
Materials	Fuel	2008	22	$2.39	$51.21	19.26%	8,694	290	18%
		2009	21	$1.68	$35.06	14.93%	6,455	208	15%
		2010	20	$1.93	$37.13	15.21%	6,228	202	12%
		2011	20	$2.12	$44.45	15.46%	7,136	226	11%
		2012	20	$2.41	$46.58	15.88%	7,980	235	12%
	Product and packaging materials	2008	22	$0.23	$4.80	1.80%	814	27	2%
		2009	21	$0.17	$3.75	1.60%	691	22	2%
		2010	20	$0.18	$4.09	1.67%	685	22	1%
		2011	20	$0.25	$4.53	1.58%	728	23	1%
		2012	20	$0.25	$5.03	1.72%	862	25	1%
	Lubrication and fluids	2008	22	$0.09	$3.09	1.16%	524	17	1%
		2009	21	$0.12	$2.42	1.03%	446	14	1%
		2010	20	$0.10	$5.62	2.30%	942	31	2%
		2011	20	$0.11	$7.88	2.74%	1,266	40	2%
		2012	19	$0.12	$2.39	0.82%	410	12	1%
	Raw fish purchases	2008	2	–	–	–	–	–	
		2009	0						
		2010	1	–	–	–	–	–	
		2011	1	–	–	–	–	–	
		2012	1	–	–	–	–	–	
Total over all expenses		2008	347	$265.93	$14.36	100.00%	45,149	1,504	95%
		2009	334	$234.88	$10.51	100.00%	43,249	1,396	98%
		2010	322	$244.06	$12.43	100.00%	40,937	1,330	82%
		2011	320	$287.50	$17.65	100.00%	46,155	1,460	72%
		2012	323	$293.36	$17.38	100.00%	50,259	1,479	75%

Source: Amendment 80 Economic Data Reports.

Table 8.11: Employment In Fishing, Processing, And Other Positions On-Board Vessel.

		Year	Obs	Employees fleet total	Employees median per vessel
Fishing	Number of employees during the year	2008	22	392	11
		2009	17	173	10
		2010	20	357	13
		2011	20	234	9
		2012	20	242	10
	Average positions on board	2008	22	134	6
		2009	21	120	6
		2010	20	114	6
		2011	20	111	6
		2012	20	107	6
Processing	Number of employees during the year	2008	22	1308	48
		2009	17	1043	54
		2010	16	1742	60
		2011	20	1234	61
		2012	20	1296	52
	Average positions on board	2008	22	529	22
		2009	21	516	23
		2010	20	476	23
		2011	20	473	23
		2012	20	447	22
Other employees	Number of employees during the year	2008	22	490	18
		2009	17	291	14
		2010	16	689	17
		2011	20	356	18
		2012	20	436	20
	Average positions on board	2008	22	156	7
		2009	21	136	6
		2010	20	145	7
		2011	20	150	7
		2012	20	176	7

Source: Amendment 80 Economic Data Reports.

Alaska Groundfish Market Profiles

November 2013

Originally prepared in 2008 for the

National Marine Fisheries Service
Alaska Fisheries Science Center

By Northern Economics, Inc.

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Please cite as: Northern Economics, Inc. *Alaska Groundfish Market Profiles*. 2008. Updated by Ben Fissel, 2013.

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Preface

Contributors

The primary author of this document 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
Rick Kruger, Summit Seafood Company
Joe Plesha, Trident Seafoods Corporation
John Gauvin, Independent consultant
John Hendershedt, Premier Pacific Seafoods
Jan Jacobs, American Seafoods, Inc.
Nancy Kercheval and Todd Loomis, Cascade Fishing, Inc.
Torunn Halhjem, Trident Seafoods Corporation
George Souza, Endeavor Seafood, Inc.
William Guo, Qingdao Fortune Seafoods, Inc.
Merle Knapp, Glacier Fish Company
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.*[1]

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.

[1] Knapp, G. 2005. An Overview of Markets for Alaska Pollock Roe. Paper prepared for the North Pacific Fisheries Management Council, Anchorage, AK. p.34.

Alaska Pollock Fillets Market Profile

Description of the Fishery

Alaska pollock or walleye pollock (*Theragra 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 95 percent of the Alaska pollock fishery has been harvested in the Bering Sea and Aleutian Islands (BSAI) with the remaining 5 percent harvested in the Gulf of Alaska (GOA).

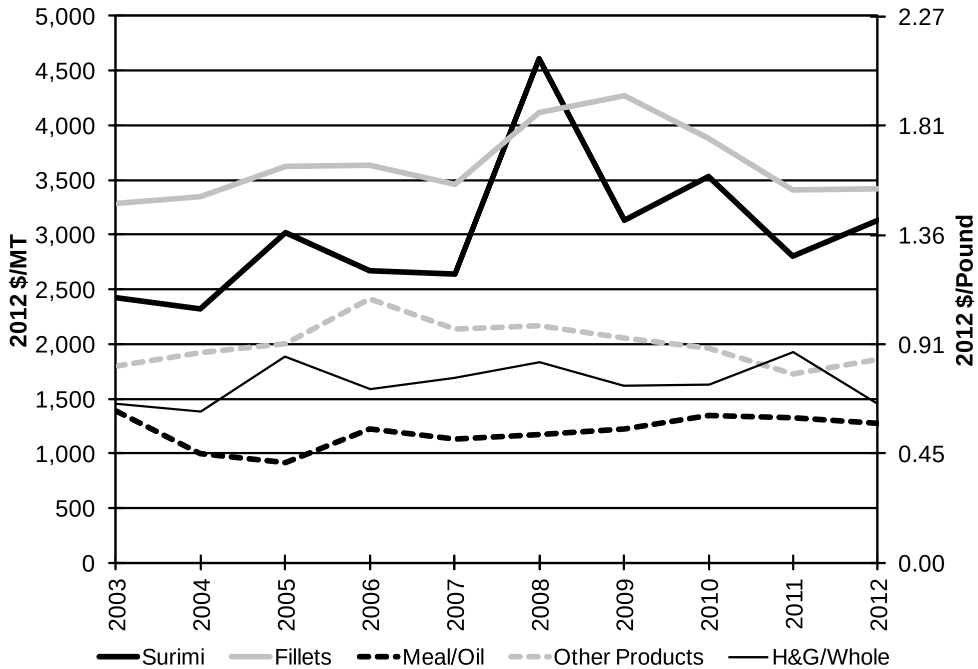
In 1998, the United States Congress passed the American Fisheries Act (AFA) which specifies how the TAC is allocated annually among the three sectors of the BSAI pollock fishery (inshore, catcher/processors, and motherships) and community development quota (CDQ) groups. The AFA also specifically identifies 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 in January 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, making this season the more profitable one for some producers. 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 high roe content of pollock harvested in the “A” season. The “B” season occurs in the latter half of the year, typically beginning in July and extending through the end of October. The primary products produced in the “B” season are surimi and fillet blocks. Figure 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 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 2 and Figure 3.

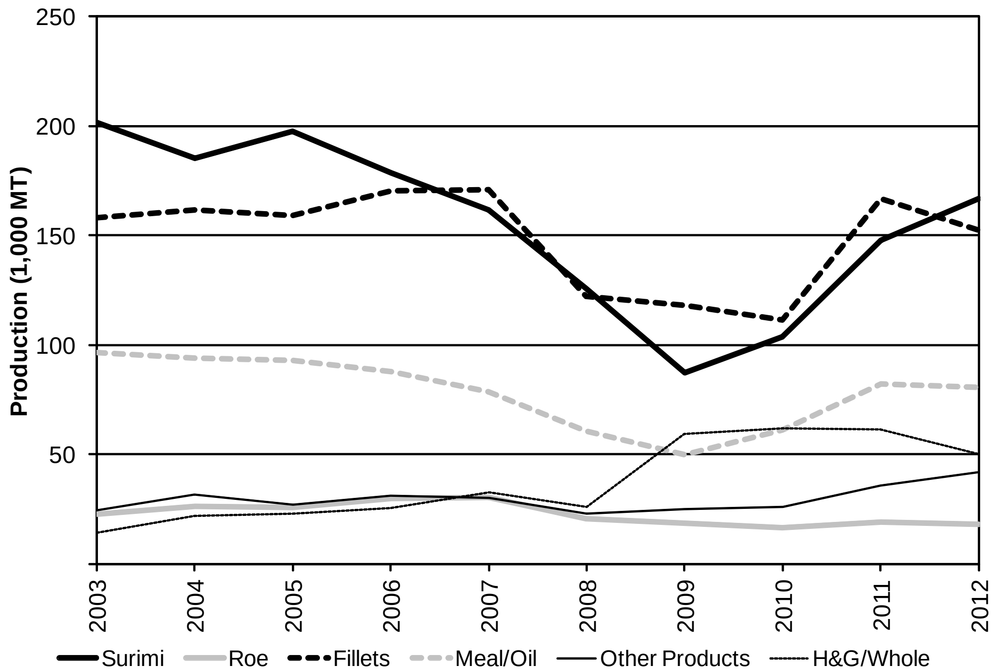
Figure 1. Wholesale Prices for Alaska Primary Production of Alaska Pollock Products (excluding Roe) by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

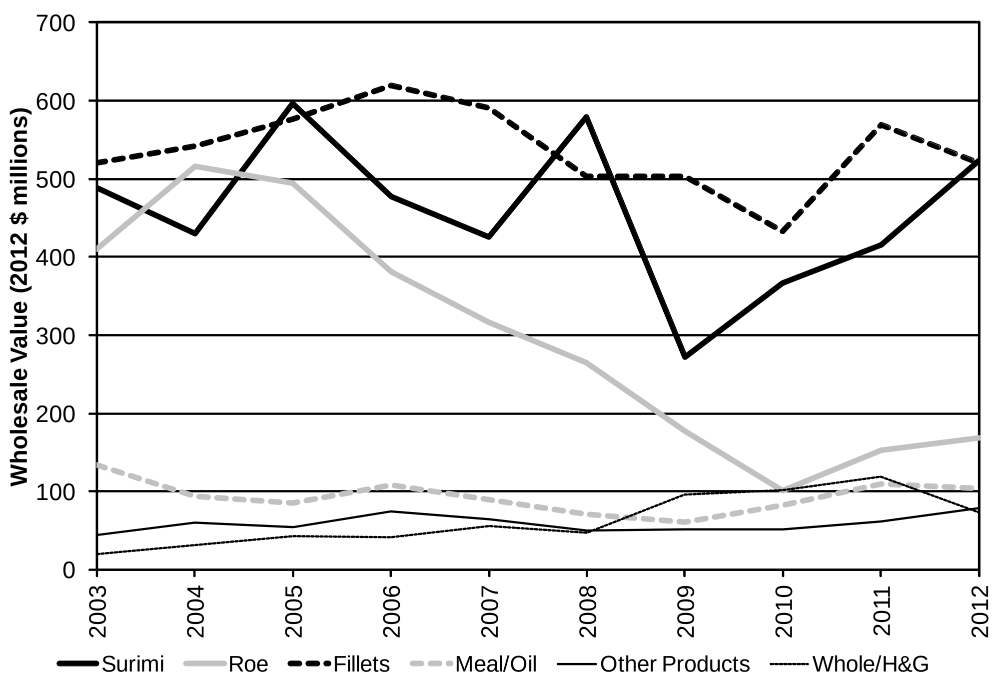
Alaska Pollock Fillets Market Profile

Figure 2. Alaska Primary Production of Alaska Pollock by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012.

Figure 3. Wholesale Value of Alaska Primary Alaska Pollock Production by Product Type, 2003 – 2012



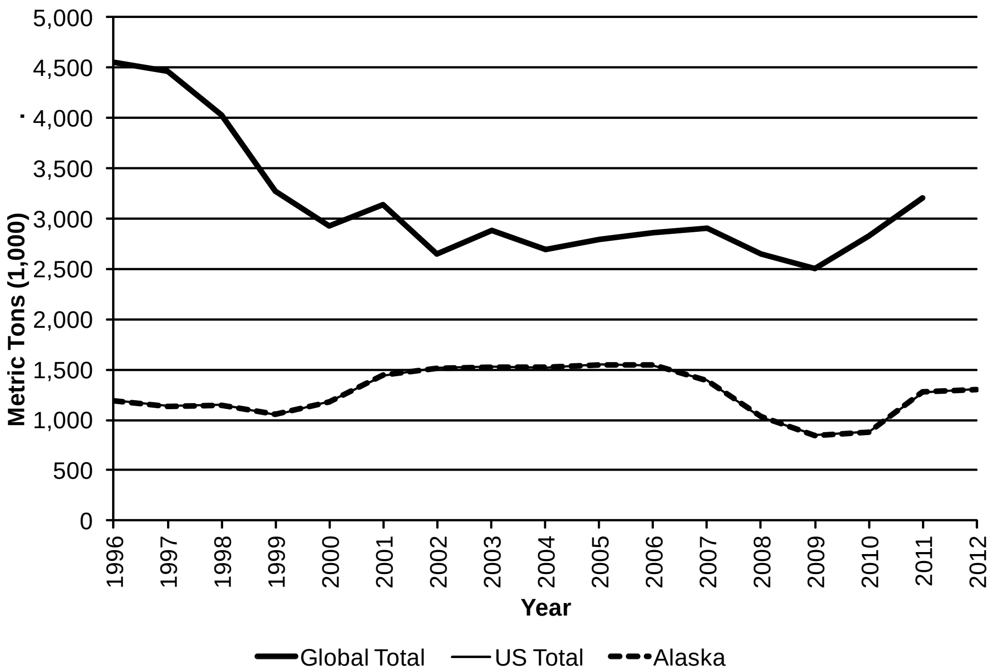
Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Production

The Alaska pollock is the most abundant groundfish/whitefish species in the world (Sjøholt 1998), and it is the world's highest-volume groundfish harvested for human consumption. 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 4). This fishery is the largest U.S. fishery by volume.

U.S. Alaska pollock fillet producers face competition from Russian Alaska pollock processed in China.[2] Catches in Russia's pollock fishery in the Sea of Okhotsk, 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 4).

Figure 4. Alaska, Total U.S. and Global Retained Harvests of Alaska Pollock, 1996 – 2012



Note: Data for 2012 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.

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-

[2] 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.

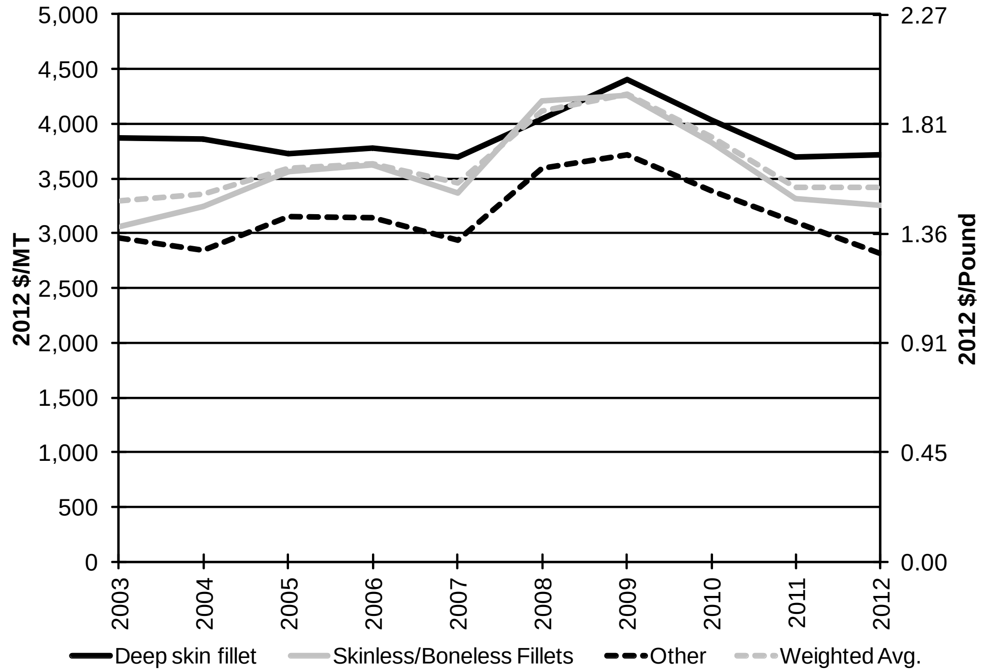
skinned fillets are generally leaner and whiter than other fillets and command the highest wholesale price (Figure 5).

The price of pollock fillets also varies according to the freezing process. The highest-priced pollock fillets are single-frozen, frozen at sea (FAS), product produced by Alaska and Russian catcher/processors. Next would be 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 discount, 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 been increasing in many markets, and the quality of this product was considered by some to be similar to that of land-frozen fillets (GSGislason & Associates Ltd. 2003). 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 6 and Figure 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.

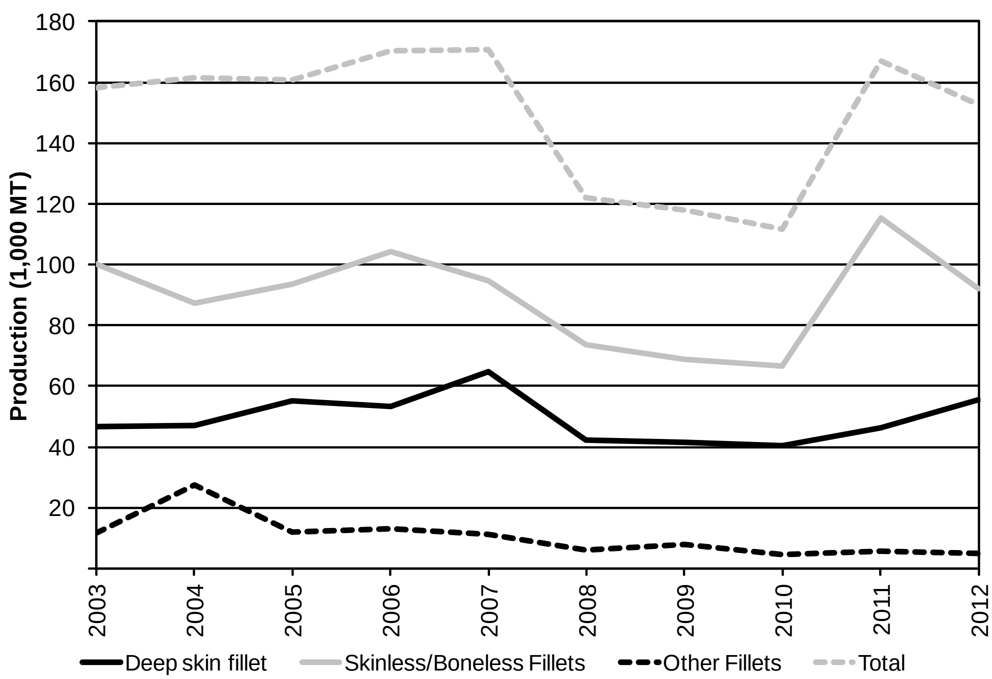
Alaska Groundfish Market Profiles

Figure 5. Wholesale Prices for Alaska Primary Production of Alaska Pollock Fillets by Fillet Type, 2003 – 2012



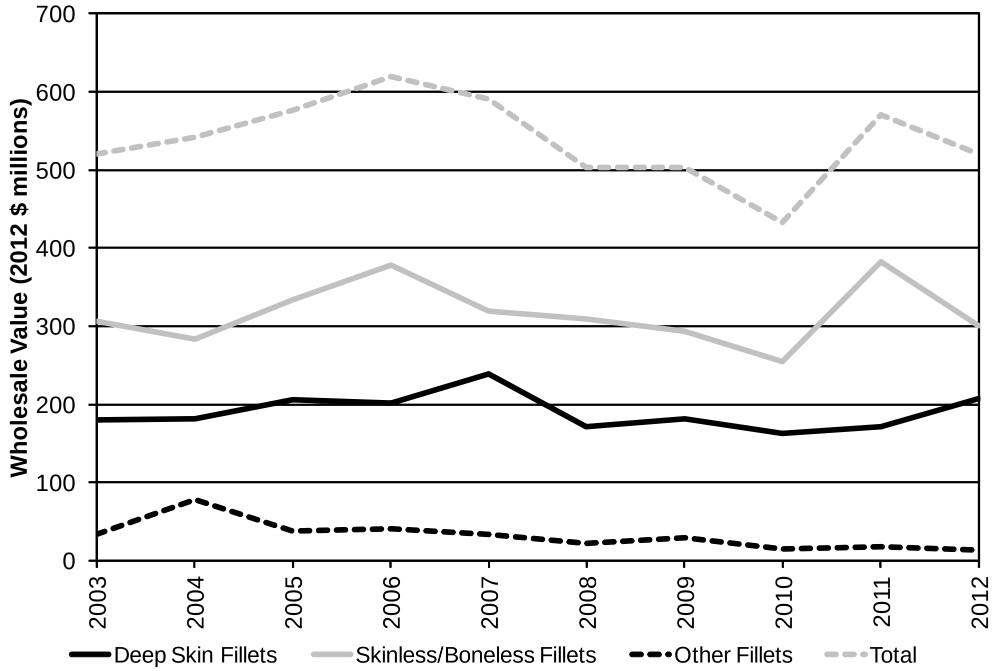
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 6. Alaska Primary Production of Alaska Pollock Fillets by Fillet Type, 2003 – 2012



Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 7. Wholesale Value of Alaska Primary Production of Alaska Pollock Fillets by Fillet Type, 2003 – 2012

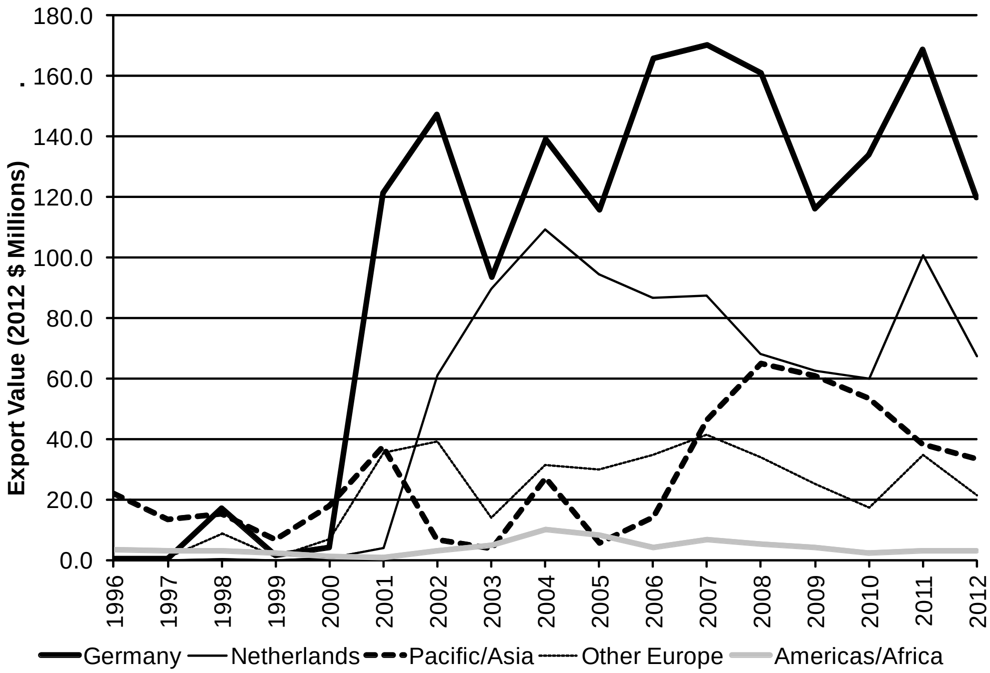


Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012.

International Trade

As shown in Figure 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 twice-frozen pollock fillets that are exported to markets in North America, Europe and elsewhere.

Figure 8. U.S. Export Value of Alaska Pollock Fillets to Leading Importing Countries, 1996 - 2012



Note: 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/

Market Position

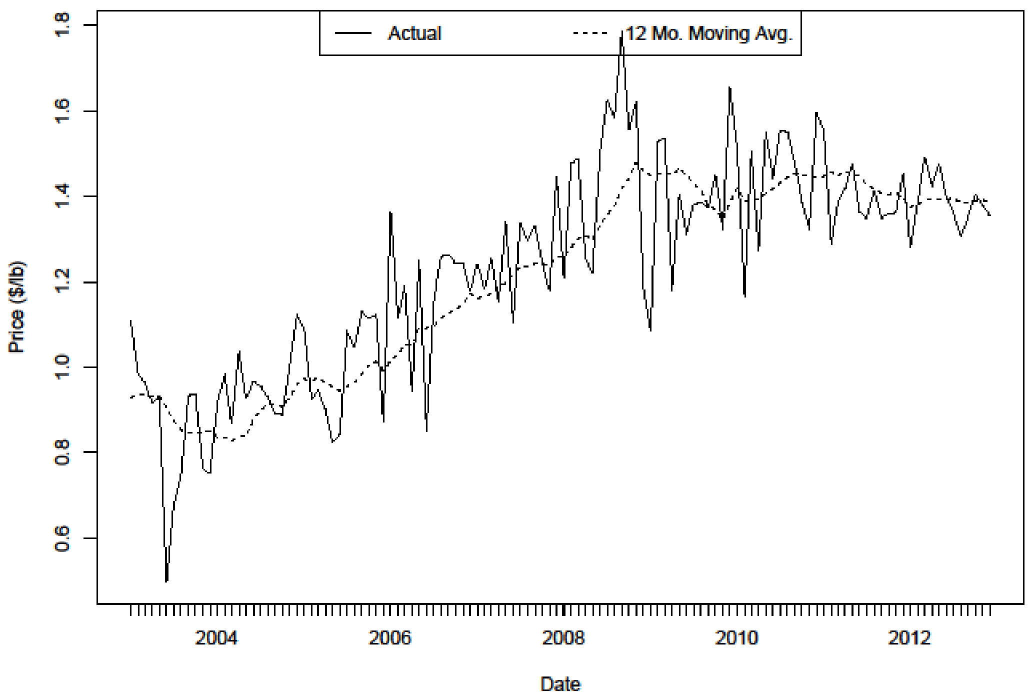
One significant advantage that U.S. producers of pollock have over competitors who harvest pollock and other groundfish in other fisheries is a relatively abundant and stable fishery (American Seafoods Group LLC 2002). Furthermore, the delicate texture, white color and mild flavor of the pollock's flesh have proven ideal for every segment of the foodservice market from fast food to "white tablecloth" restaurants. What's more, its relatively stable supply through 2006 enabled restaurants to maintain consistent menu pricing throughout the year (NMFS 2001).

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 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. With federal funding from the Alaska Fisheries Marketing Board, U.S. pollock producers have begun a "Genuine Alaska Pollock 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 is expected to boost Alaska-harvested pollock sales and help develop the already strong European market for pollock (Van Zile 2005). Consumers in Western Europe are generally perceived by the seafood industry as having more familiarity with the MSC certification than those in the United States (Van Zile 2005).

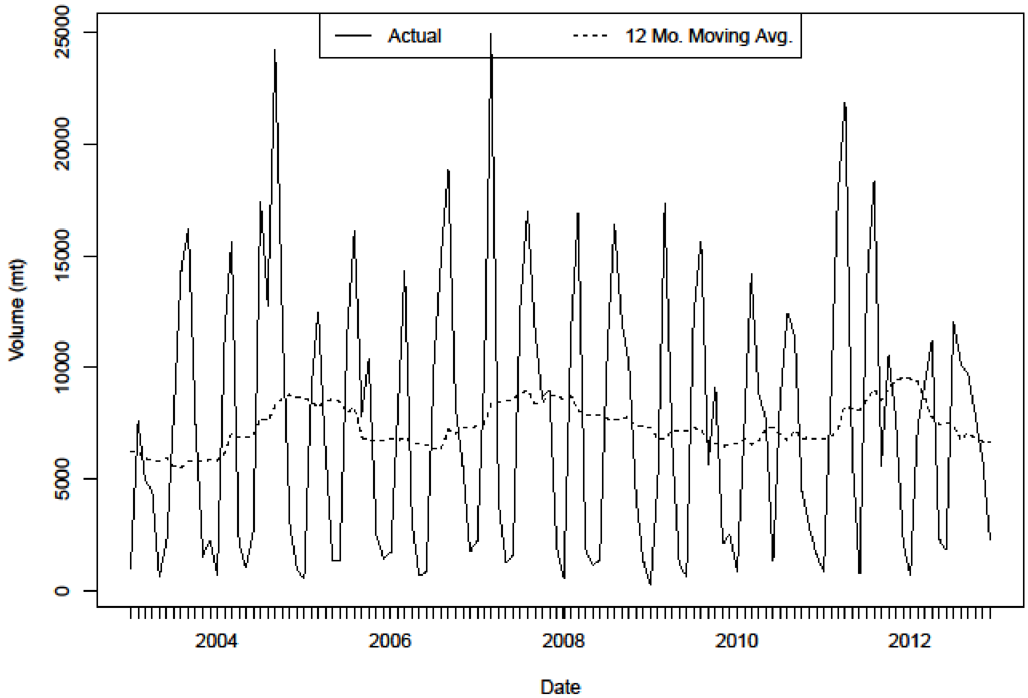
Alaska-caught pollock competes in world fillet markets with numerous other traditional whitefish marine species, such as Pacific and Atlantic cod, hake (whiting), hoki (blue grenadiers), and saithe (Atlantic pollock). Price competitive whitefish fillets and products can also be prepared from freshwater 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 9. Nominal U.S. Export Prices of Alaska Pollock Fillets to All Countries, 2003 - 2012



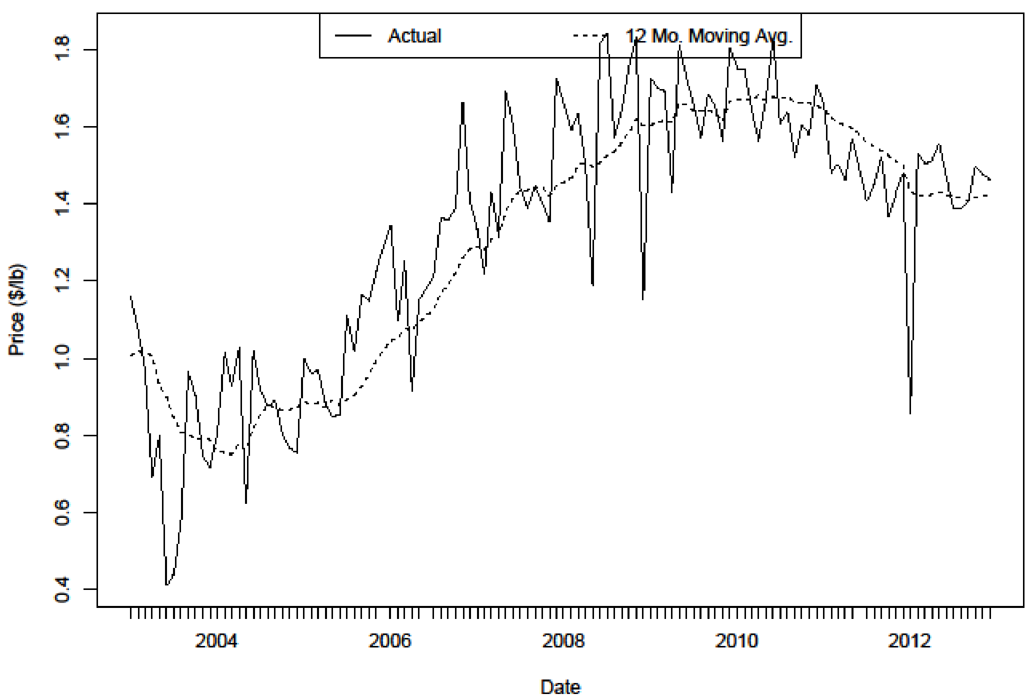
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

Figure 10. U.S. Export Volumes of Alaska Pollock Fillets to All Countries, 2003 - 2012



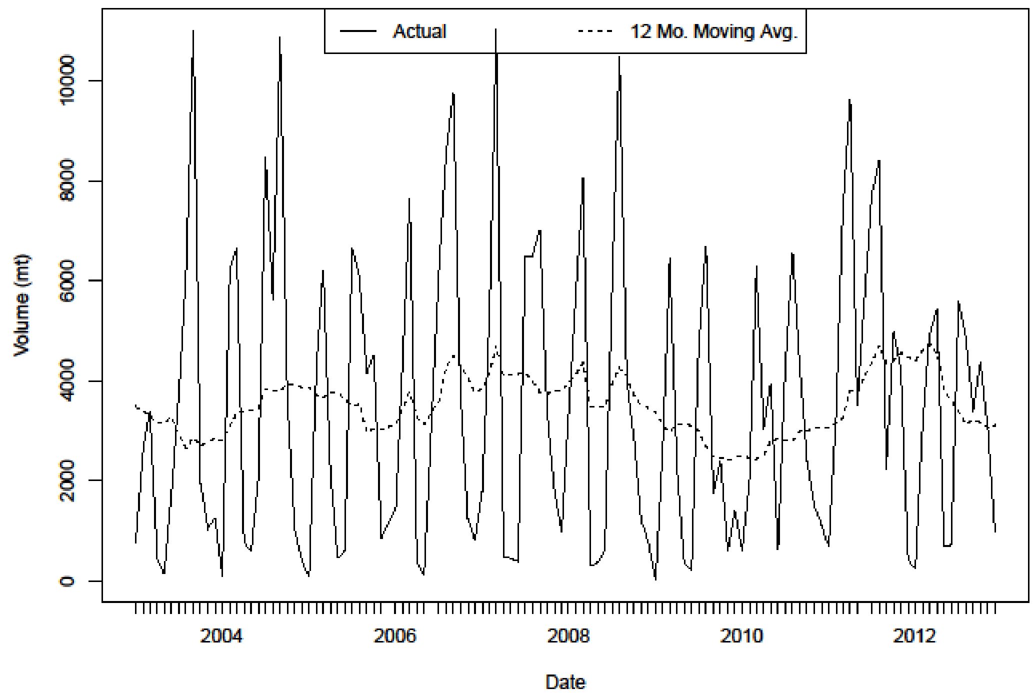
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

Figure 11. Nominal U.S. Export Prices of Alaska Pollock Fillets to Germany, 2003 - 2012



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

Figure 12. U.S. Export Volumes of Alaska Pollock Fillets to Germany, 2003 - 2012



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

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Alaska Pollock Fillets Market Profile

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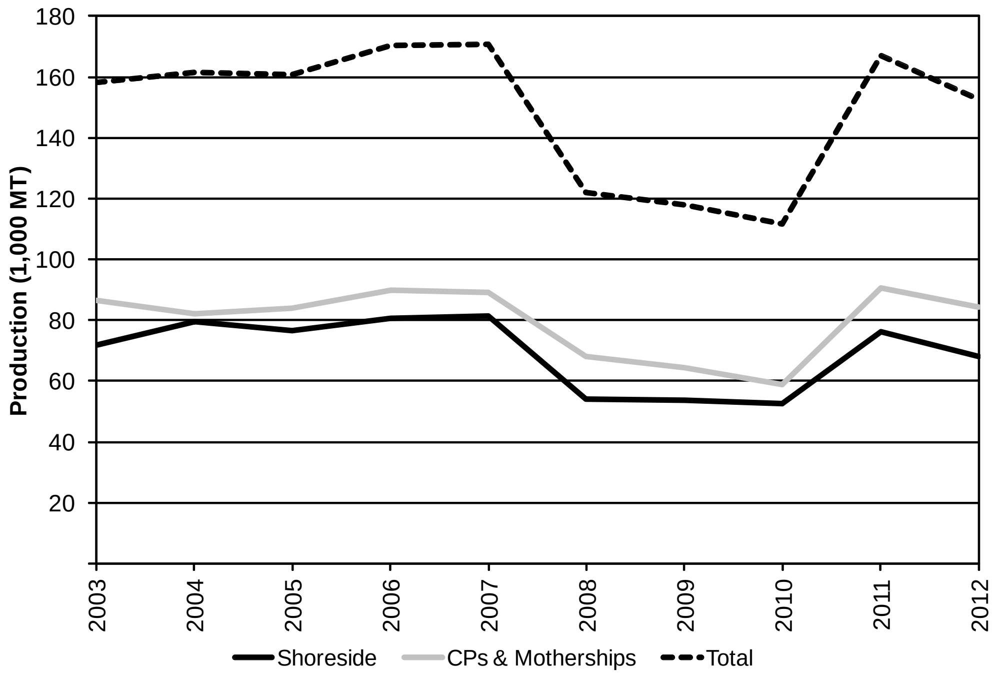
Alaska Pollock Surimi Market Profile

Description of the Fishery

See *Alaska Pollock Fillets Market Profile*

Production

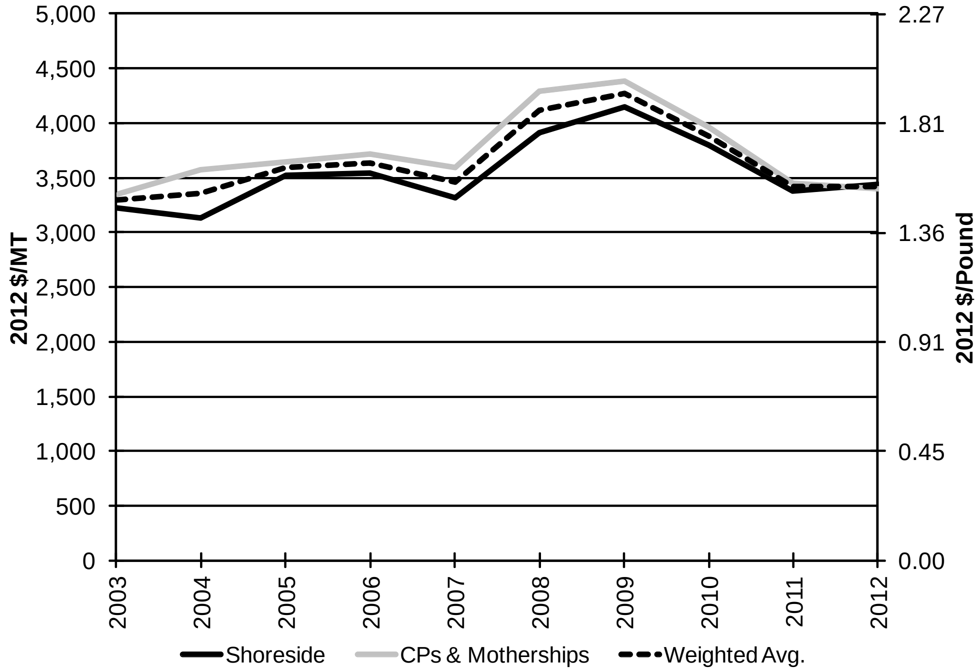
Figure 13. Alaska Primary Production of Alaska Pollock Surimi by Sector, 2003 – 2012



Note: Reported surimi production and value do not specify the grade of products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

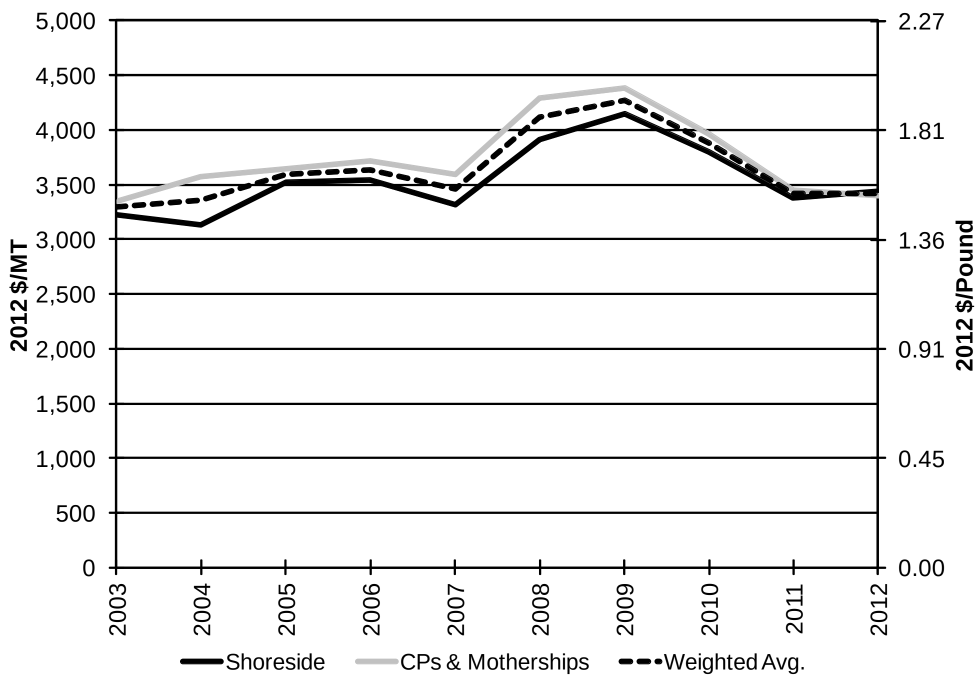
Alaska Pollock Surimi Market Profile

Figure 14. Wholesale Value of Alaska Primary Production of Alaska Pollock Surimi by Sector, 2003 – 2012



Note: Reported surimi production and value do not specify the grade of products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 15. Average Wholesale Prices for US Primary Production of Pollock Surimi by Sector, 2003 – 2012



Note: Reported surimi production and value do not specify the grade of products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Product Composition and Flow

Surimi is the generic name for a processed white paste 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, 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 close 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 more variable. 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.

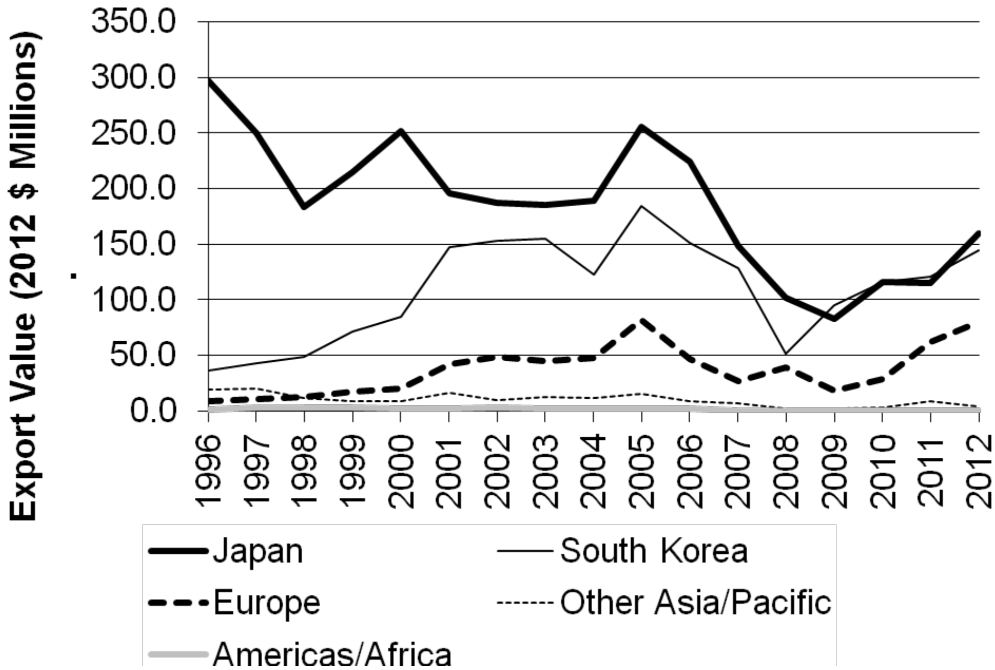
World demand for lower-quality surimi has allowed processors to market recovery grade or to blend it with primary grades to produce medium/low-quality surimi (Guenneugues and Morrissey 2005). In a survey of U.S. and EU surimi buyers, which account for more than half of the total surimi purchases in their markets, Trondsen (1998) found that most 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 and used for fish meal production (Guenneugues and Morrissey 2005). In addition, industry representatives noted that it allows the use of flesh trimmed during the production of fillets.

International Trade

As shown in Figure 18, 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, however, U.S. Alaska pollock surimi exports to all leading importers fell (Figure 18) 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 deemed to have been the relatively high prices for U.S. surimi. 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). As production of surimi increased (Figure 14) and export prices remained stable after 2010 (Figure 19), exports to Japan, South Korea and the EU all increased.

Figure 16. U.S. Export Value of Alaska Pollock Surimi to Leading Importing Countries, 1996 - 2012



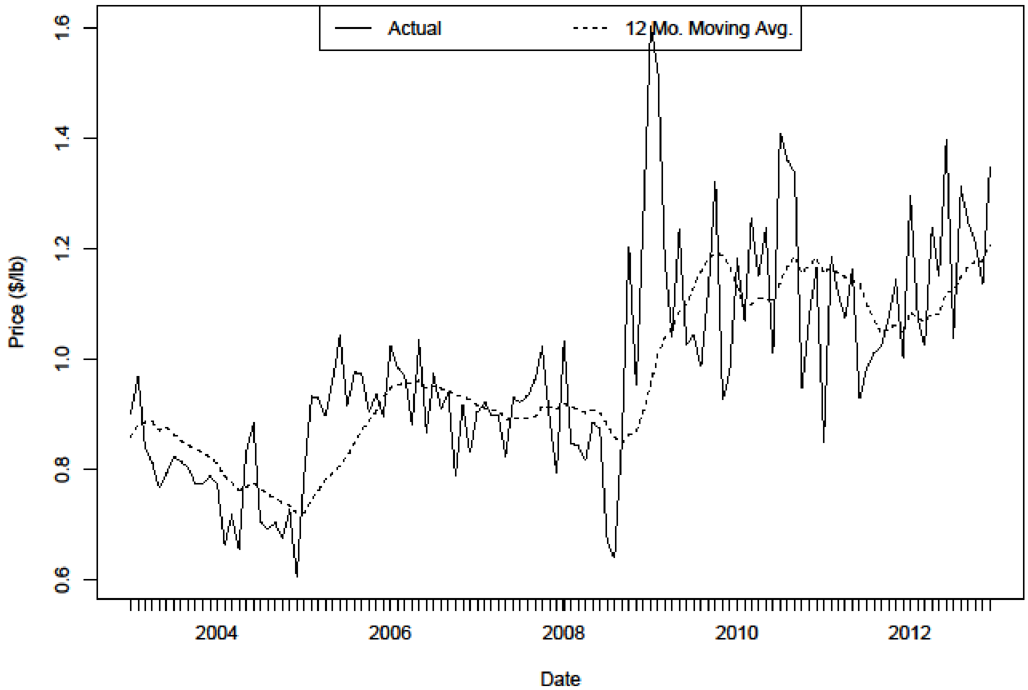
Note: Data include all exports of Alaska pollock from the U.S. Customs Pacific District.
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

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 are challenging surimi-based products consumption. Despite changing market conditions in Japan, Alaska pollock surimi prices have remained firm as international supply-demand for Alaska pollock surimi has become tighter (GLOBEFISH 2006; Seafood.com News 2007b).

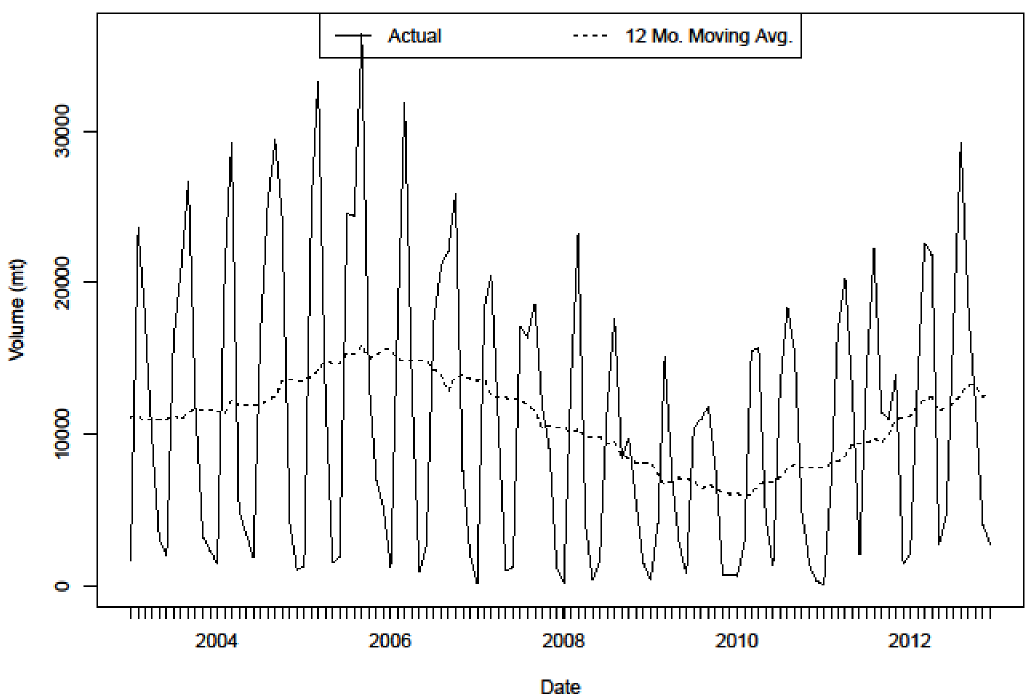
As shown in Figure 16, the 2008 surge in surimi prices was reversed by a sharp decline in 2009, which softened yet continued to decline through 2010 and 2011. The production of pollock surimi in 2009 continued to decline, while the rate of decline of fillet production lessened (Figure 2). Fillet production 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 17. Nominal U.S. Export Prices of Alaska Pollock Surimi to All Countries, 2003 - 2012



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

Figure 18. U.S. Export Volumes of Alaska Pollock Surimi to All Countries, 2003 - 2012



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

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Wal-Mart Stores, Inc. 2006. Smart Products. Available at: http://walmartstores.com/GlobalWMStoresWeb/navigate.do?catg=665. Accessed August 22, 2007.

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Alaska Pollock Roe Market Profile

Description of the Fishery

See *Alaska Pollock Fillets Market Profile*

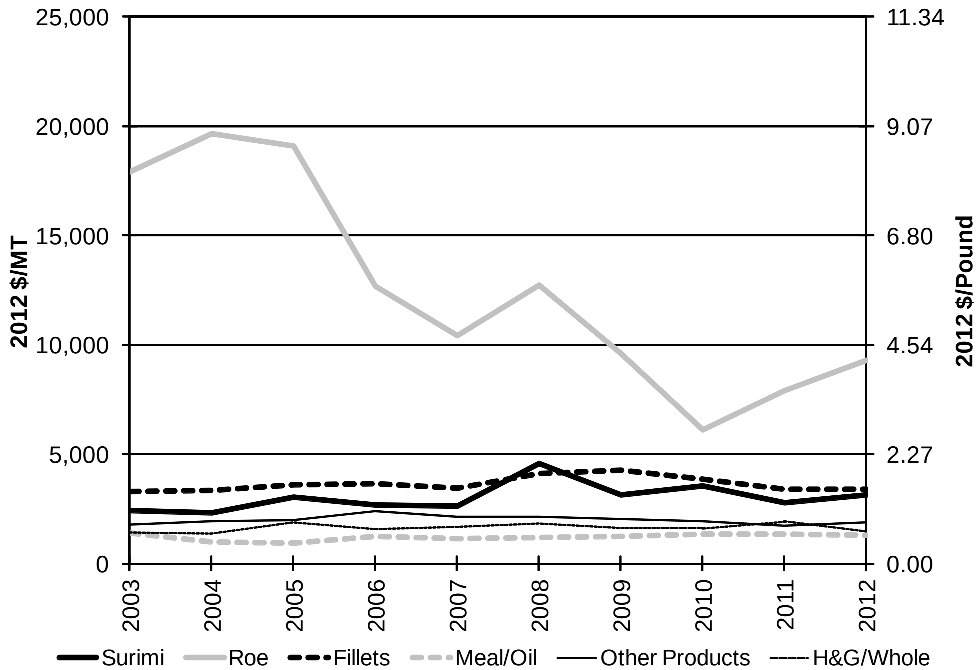
Production

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). U.S. production of roe remained stable in 2007 despite lower overall harvests (Figure 22), but declined dramatically in 2008. Production declines continued at a more measured pace through 2009. Since 2010 roe production has remain fairly stable despite the increased pollock harvest.

The best time for harvesting pollock for roe production is in winter, just before the pollock spawn, which is when the eggs are largest. Most U.S. pollock roe production is from the “A” season, when yields are significantly higher (Knapp 2005).

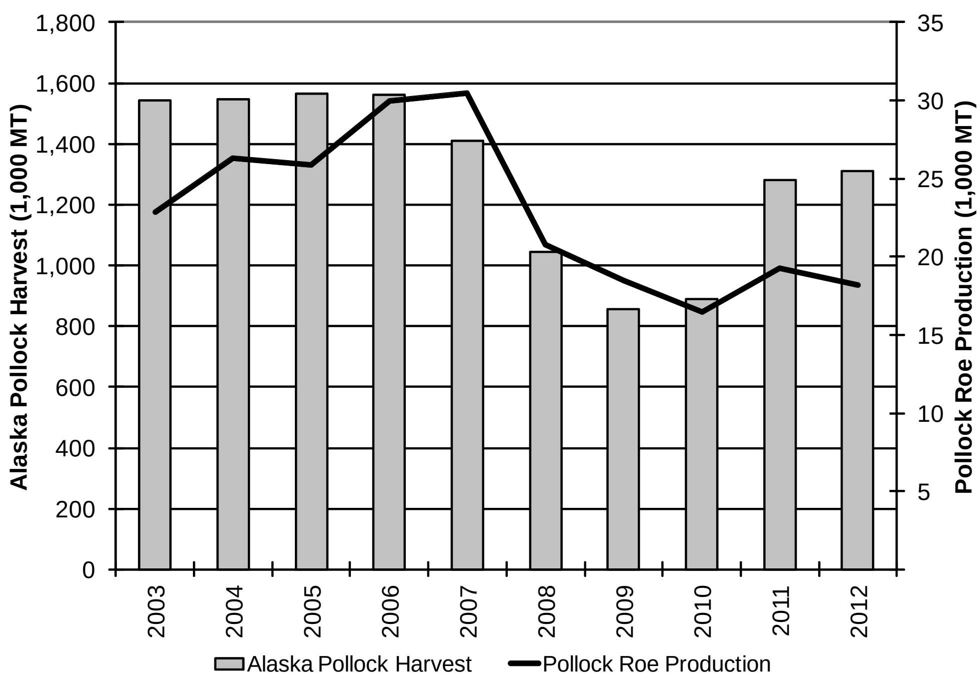
Roe is an important products component of the Alaska pollock market. Although pollock roe accounts for only a small share of the volume of Alaska pollock products, it is a high-priced product that accounts for a high share of the total value. The wholesale prices of pollock roe and other pollock products are compared in Figure 21.

Figure 19. Wholesale Prices for Alaska Primary Production of Pollock by Product Types, 2003 – 2012



Note: Reported roe production and value do not specify the grade of products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

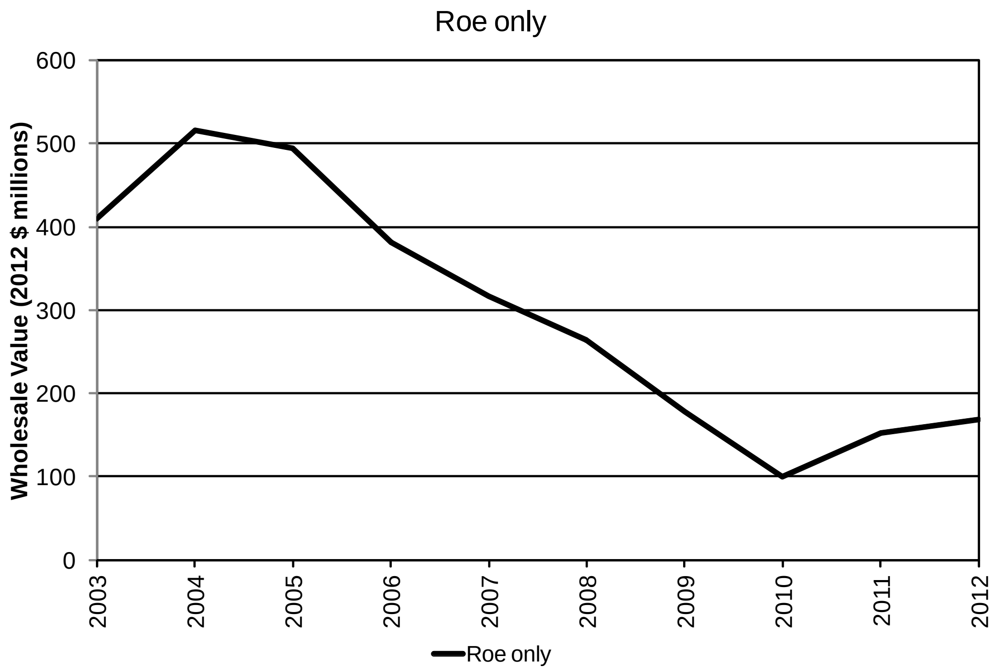
Figure 20. Alaska Pollock Harvest and Primary Production of Pollock Roe, 2003 – 2012



Source: NMFS Blend, Catch-Accounting System, and Weekly Production Reports 2003-2012

Alaska Pollock Roe Market Profile

Figure 21. Wholesale Value of Alaska Primary Production of Pollock Roe, 2003 – 2012



Note: Reported roe production and value do not specify the grade of products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

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 system—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 together (Bledsoe et al. 2003).

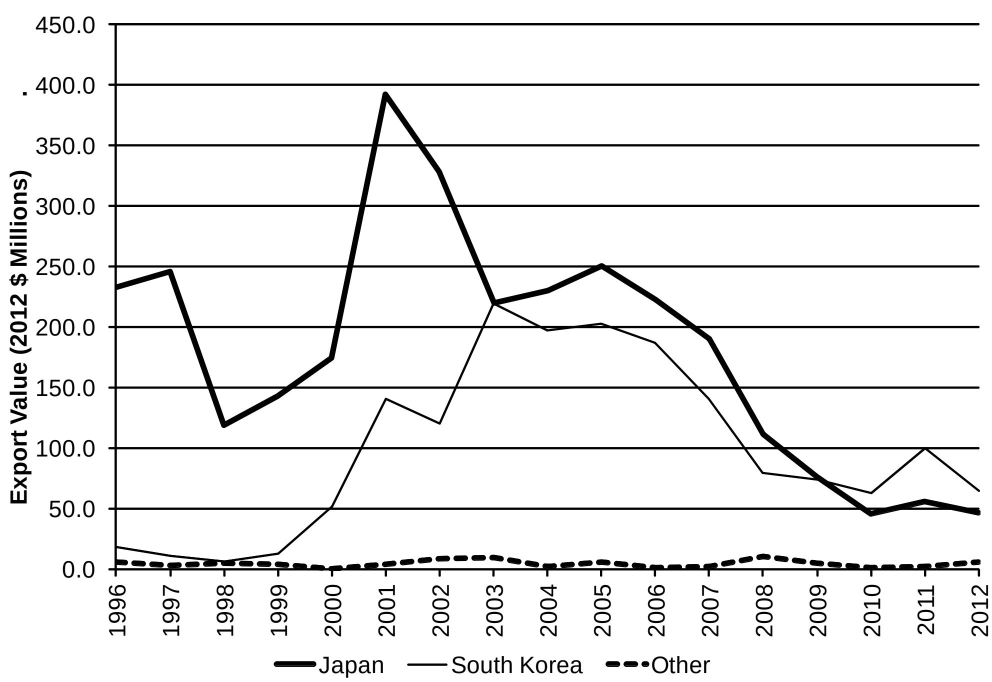
Most U.S. pollock roe is sold at auctions held each year in Seattle and Busan, South Korea, in which numerous pollock roe producers and buyers participate (Knapp 2005). The buyers must fill their individual product needs, and their keen sight and sense of smell are critical to setting the price. Once 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.

International Trade

Almost all U.S. pollock roe production is exported, the primary buyers being Japan and South Korea (Figure 25). It is possible that a substantial amount of the pollock roe exported to Korea is subsequently re-exported from Korea to Japan. Most Japanese pollock roe imports occur between March and July, with imports being highest in April and May (Knapp 2005).

Figure 22. U.S. Export Value of Alaska Pollock Roe to Leading Importing Countries, 1996 - 2012

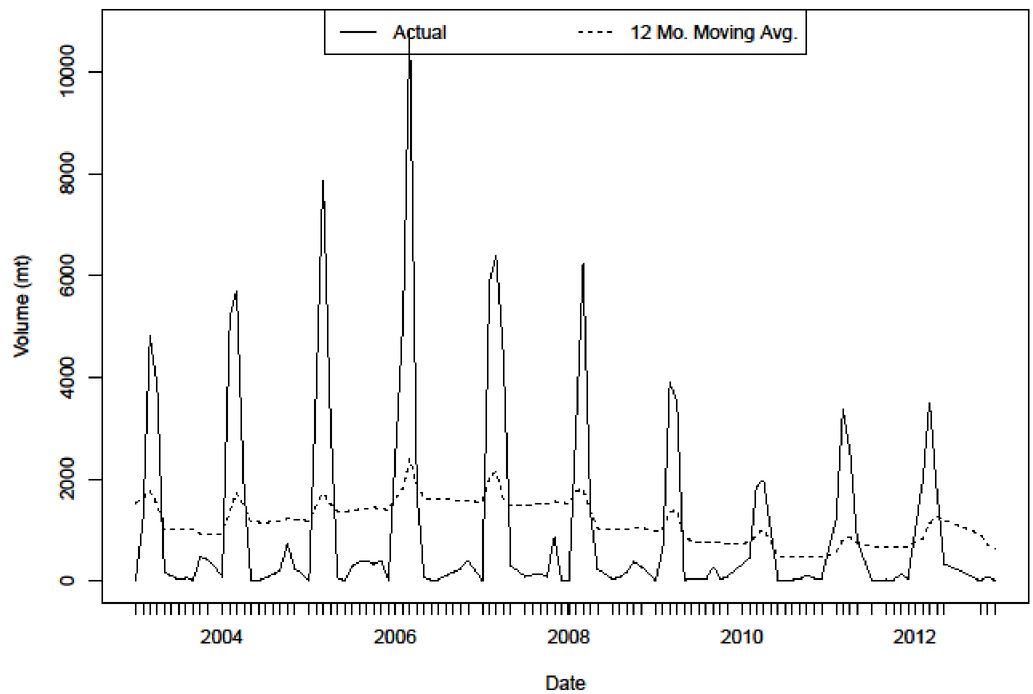


Note: Data include all exports of Alaska pollock from the U.S. Customs Pacific District.
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

Market Position

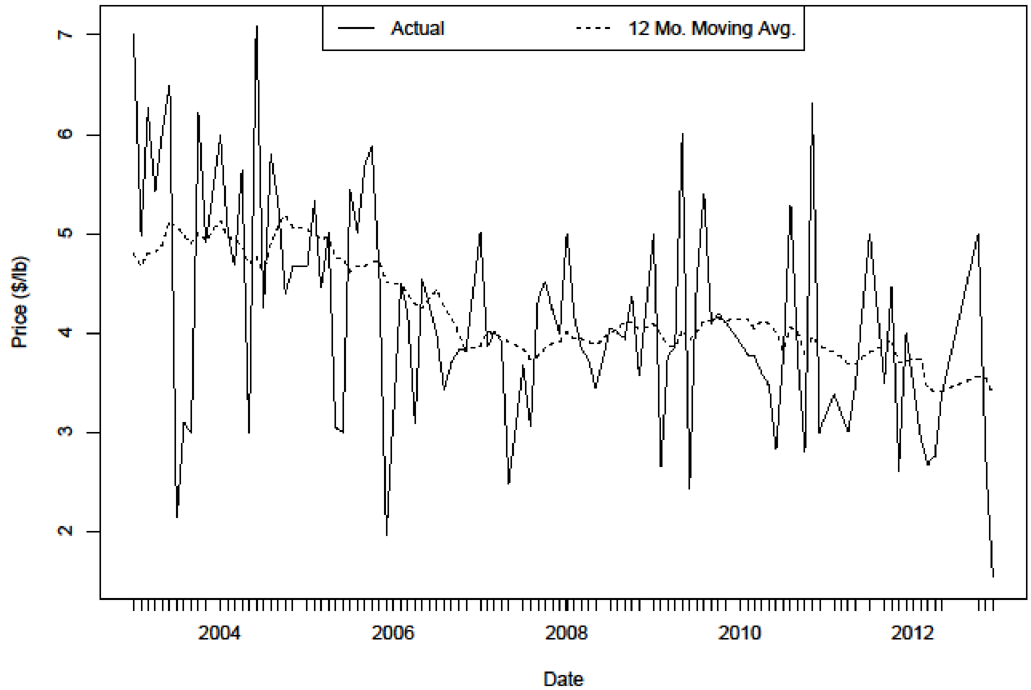
U.S. pollock roe commands premium prices in Japan because of its consistent quality. However, U.S. pollock roe also competes in Asian markets with Russian pollock roe. In general, the decline in Russian pollock production during the early 2000's reduced competition for U.S. pollock roe producers and 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 27 and Figure 29). In addition, the price of pollock roe is also heavily influenced by the size and condition of roe skeins, color and freshness and the maturity of the fish caught.

Figure 23. U.S. Export Volumes of Pollock Roe to Japan, 2003 - 2012



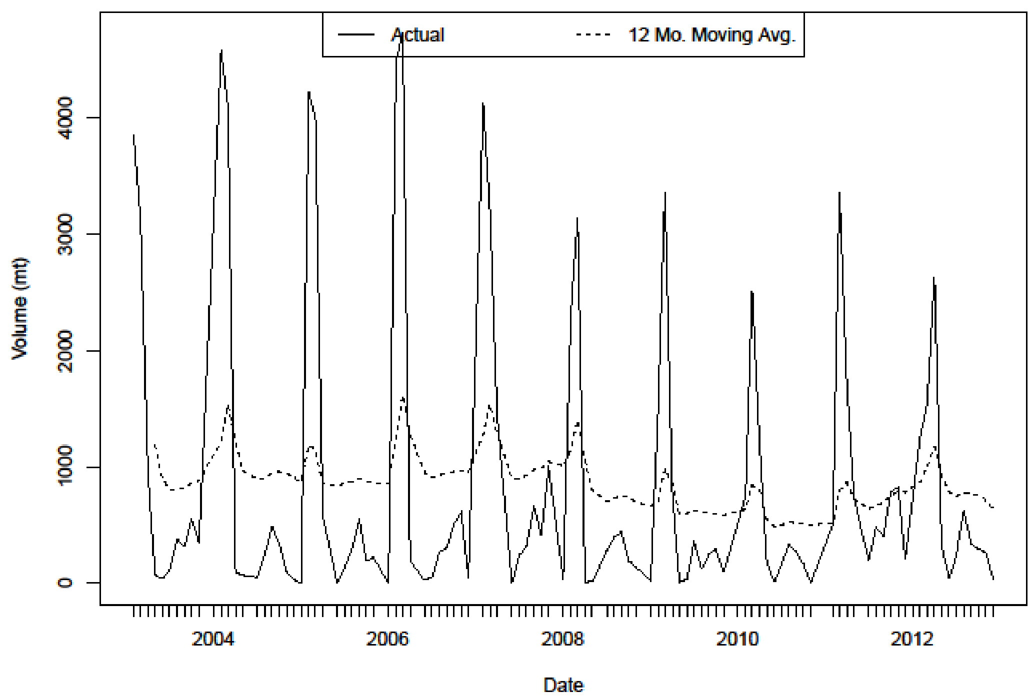
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

Figure 24. Nominal U.S. Export Prices of Pollock Roe to Japan, 2003 - 2012



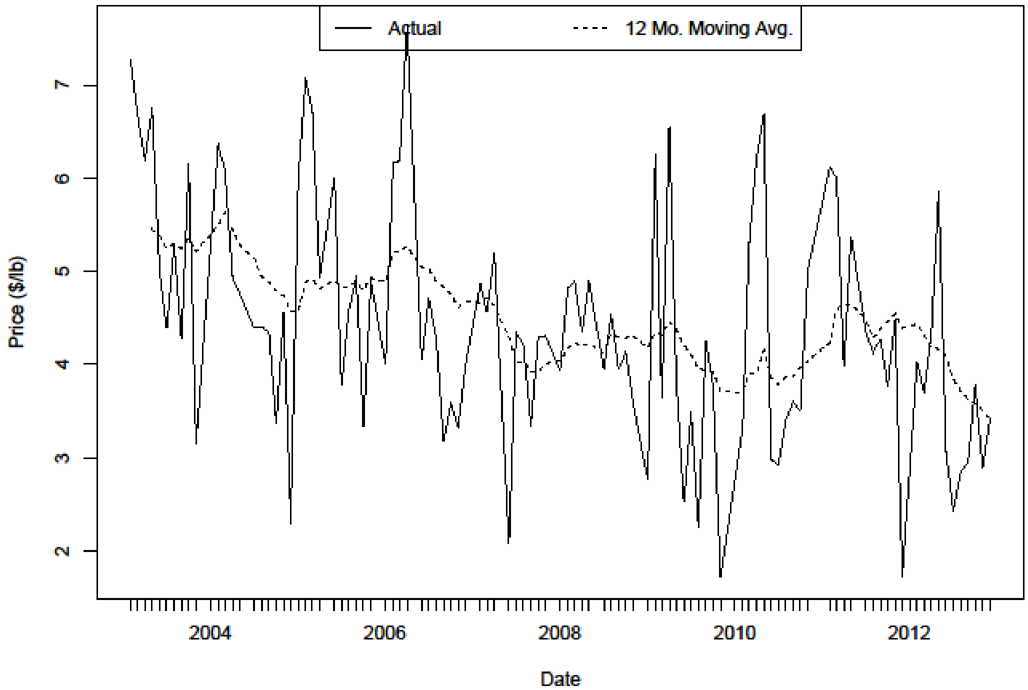
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

Figure 25. U.S. Export Volumes of Pollock Roe to Korea, 2003 - 2012



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

Figure 26. Nominal U.S. Export Prices of Pollock Roe to Korea, 2003 - 2012



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

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Pacific Cod Market Profile

Description of the Fishery

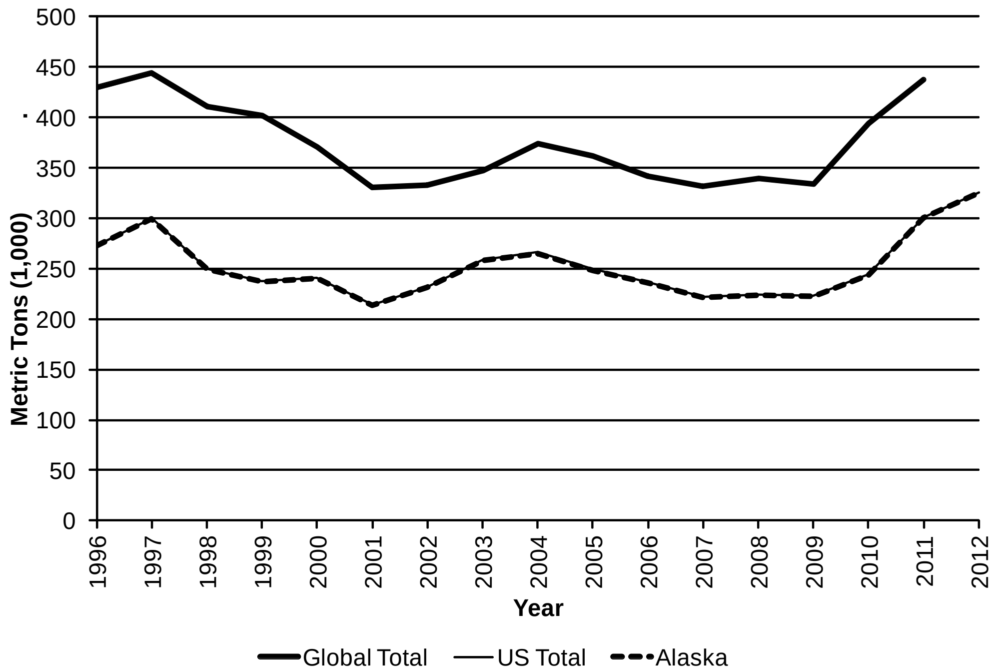
Pacific cod (*Gadus macrocephalus*) is widely distributed over the eastern Bering Sea and Aleutian Islands (BSAI) areas. Behind Alaska pollock, Pacific cod is the second most dominant species in the commercial groundfish catch off Alaska. The BSAI Pacific cod fishery is targeted by multiple gear types, primarily by trawl gear and hook-and-line catcher/processors, 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 sometimes constrains the magnitude and timing of harvests taken by these two gear types.

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, while U.S. harvests have remained relatively stable. 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 30, 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.

Figure 27. Alaska, Total U.S. and Global Retained Harvests of Pacific Cod, 1996 – 2012



Note: Data for 2012 were unavailable for global total. The fish landing statistics of some countries may not distinguish between Pacific cod and other cod species.

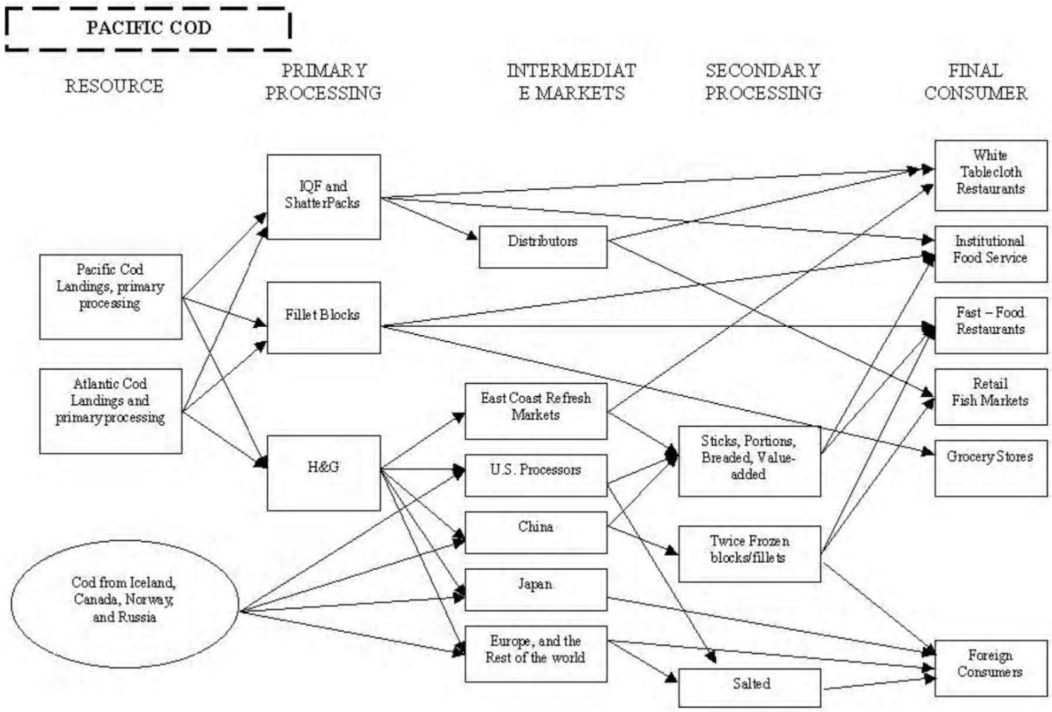
Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at http://www.psmfc.org/pacfin/pfmc.html; Global data from FAO, "FishStat" database available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073.

Product Composition and Flow

Product flows for Pacific cod have changed dramatically in recent years, following the decline of Atlantic cod (*G. morhua*) harvests. For example, buyers from Norway and Portugal began purchasing Pacific cod from Alaska for the first time in the late 2000's. Historically, Pacific cod has been considered an inferior product compared to Atlantic cod, but the lack of Atlantic cod has made Pacific cod more acceptable. As a result, Pacific cod harvests, while still lower than Atlantic cod harvests, have in recent years represented about one-fourth to one-third of total world cod supply (Knapp 2006).

As shown in Figure 31, Pacific cod, and its close substitute, Atlantic 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.

Figure 28. Product Flow and Market Channels for Pacific Cod.

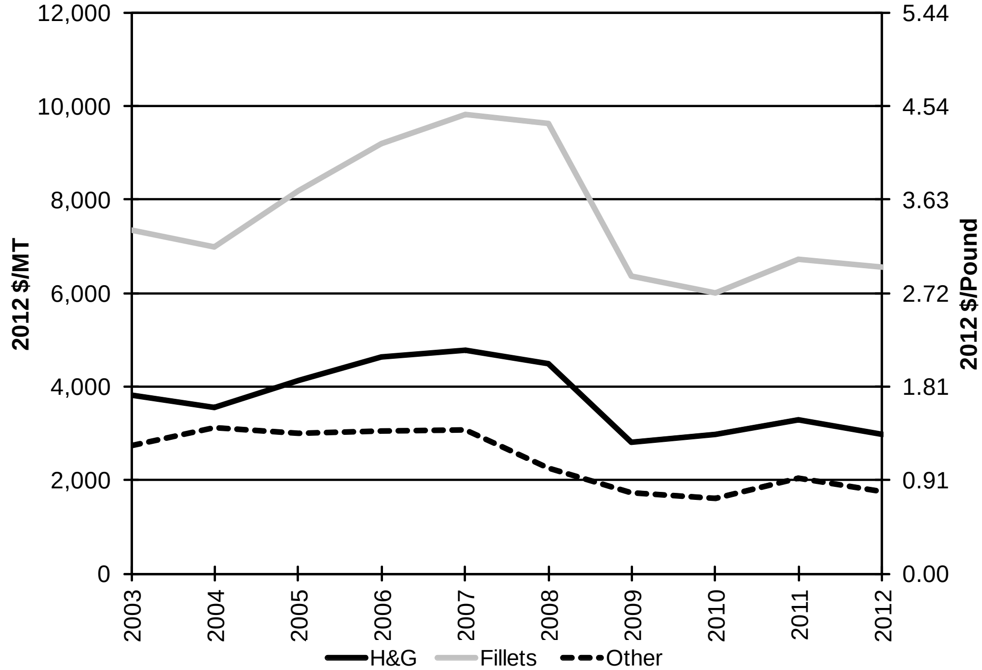


Source: NMFS (2001)

Wholesale prices are highest for fillet products, but H&G fish account for by far the largest share of Alaska Pacific cod production. The H&G production share was significant in the mid-90's at roughly 50%. Since then, the production share has steadily increased reaching 66% in 2003 and climbing further to upwards of 75% in recent year. Production shares of all other product types decreased, though most of the shift has come from other minimally processed goods such as salted-and-split (29% to <1%) and whole fish (47% to 17%). 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.

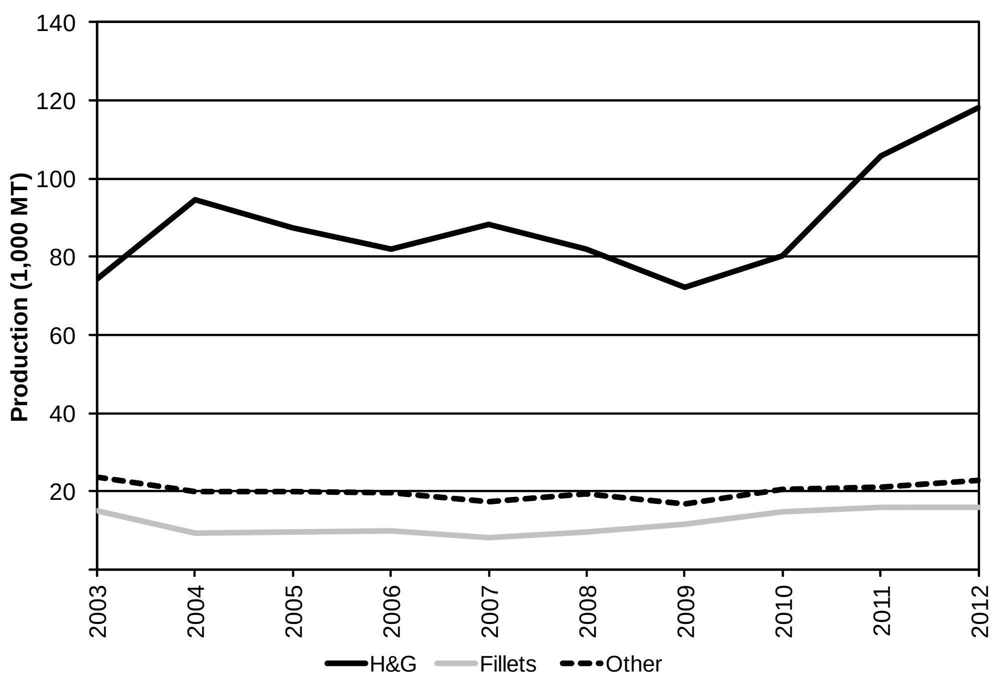
Pacific Cod Market Profile

Figure 29. Wholesale Prices for Alaska Primary Production of Pacific Cod by Product Type, 2003 – 2012



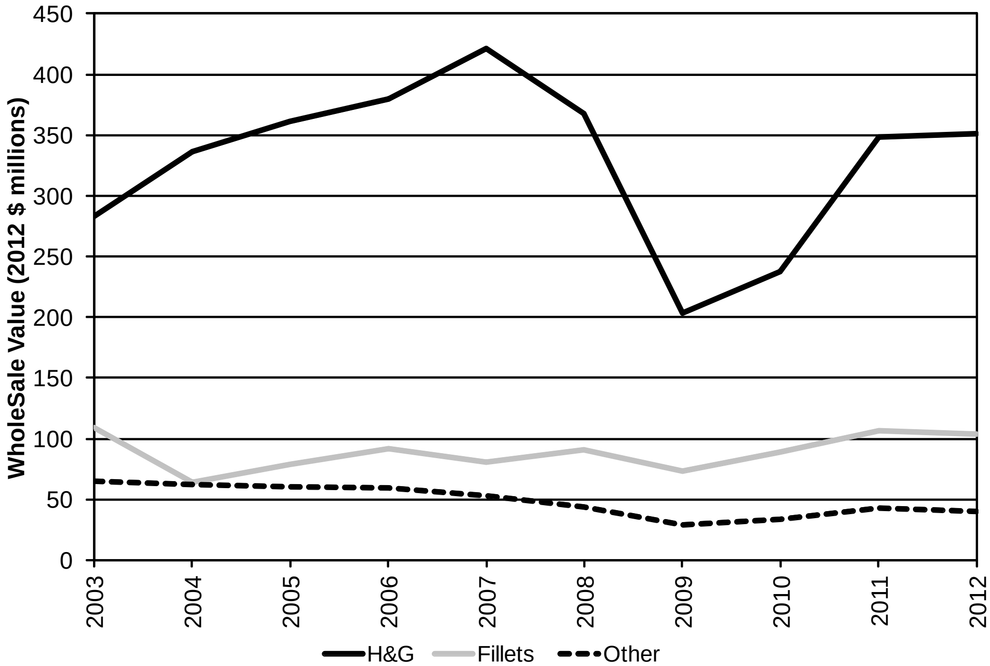
Notes: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 30. Alaska Primary Production of Pacific Cod by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 31. Wholesale Value of Alaska Primary Production of Pacific Cod by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

The three product types proceed through various market channels to several different final markets. The final markets, shown at the right of Figure 31, include: fine or "white tablecloth" restaurants, institutional food service, quick-service restaurants, retail fish markets, grocery stores, and overseas markets. The following brief description of the flow for each of the basic product types is based largely on NMFS (2001).

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.

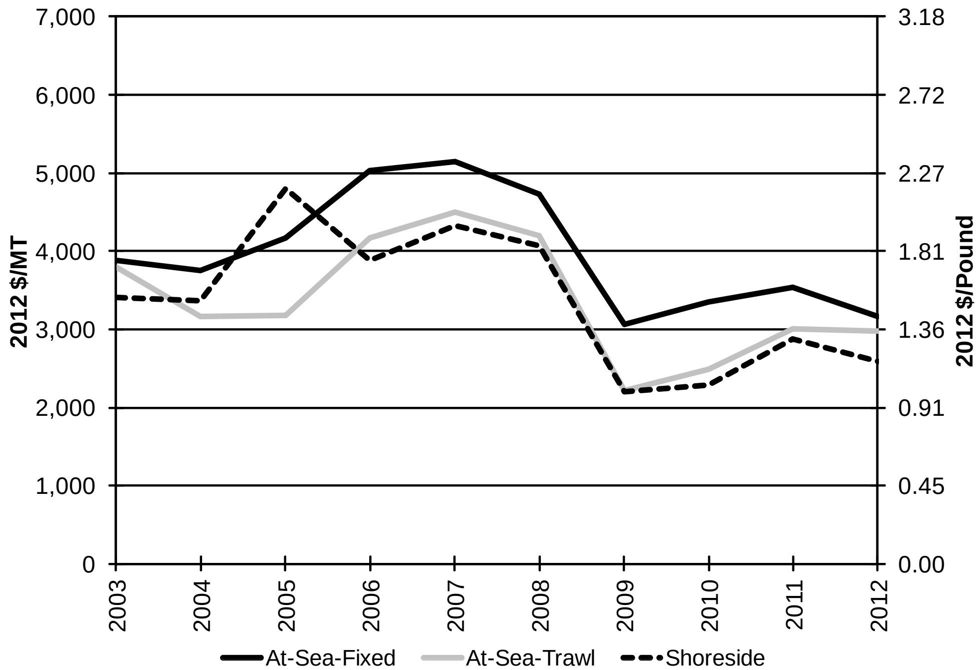
H&G Pacific cod is frozen after the first processing, and then proceeds to another processor within the U.S., or is exported for secondary processing. Some domestic H&G Pacific cod is sent to the East Coast refresh market, where it is thawed and filleted before being processed further, or sold as refreshed.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

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 35 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.

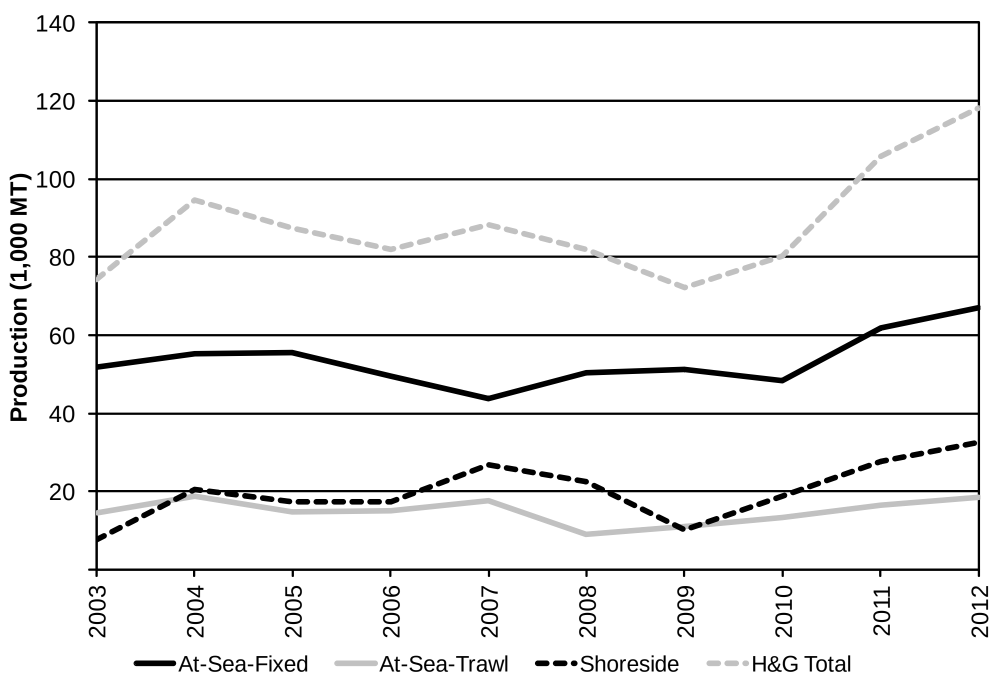
Figure 32. Wholesale Prices for Alaska Primary Production of H&G Cod by Sector, 2003 – 2012



Note: Product type may include several more specific products. Data are not available to calculate separate prices for the two at-sea sectors prior to 2001.

Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

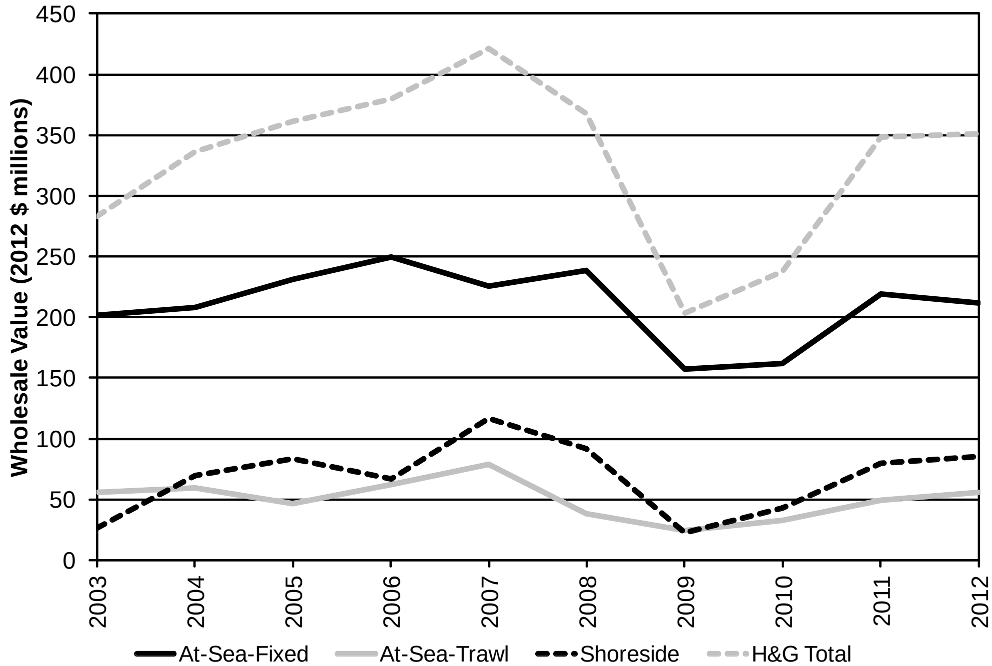
Figure 33. Alaska Primary Production of H&G Pacific Cod by Sector, 2003 – 2012



Note: Product types may include several more specific products.

Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 34. Wholesale Value of Alaska Primary Production of H&G Pacific Cod by Sector, 2003 – 2012



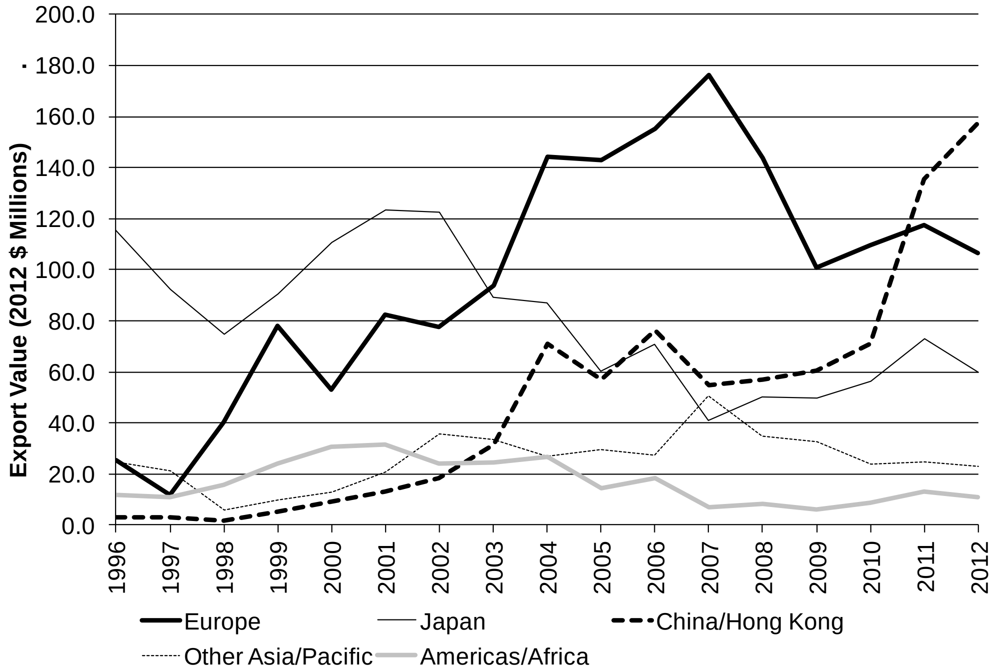
Note: Product type may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

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 over 97% 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 38.

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 38).

Figure 35. U.S. Export Value of Frozen Pacific Cod to Leading Importing Countries, 1996 - 2012



Note: 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/.

Market Position

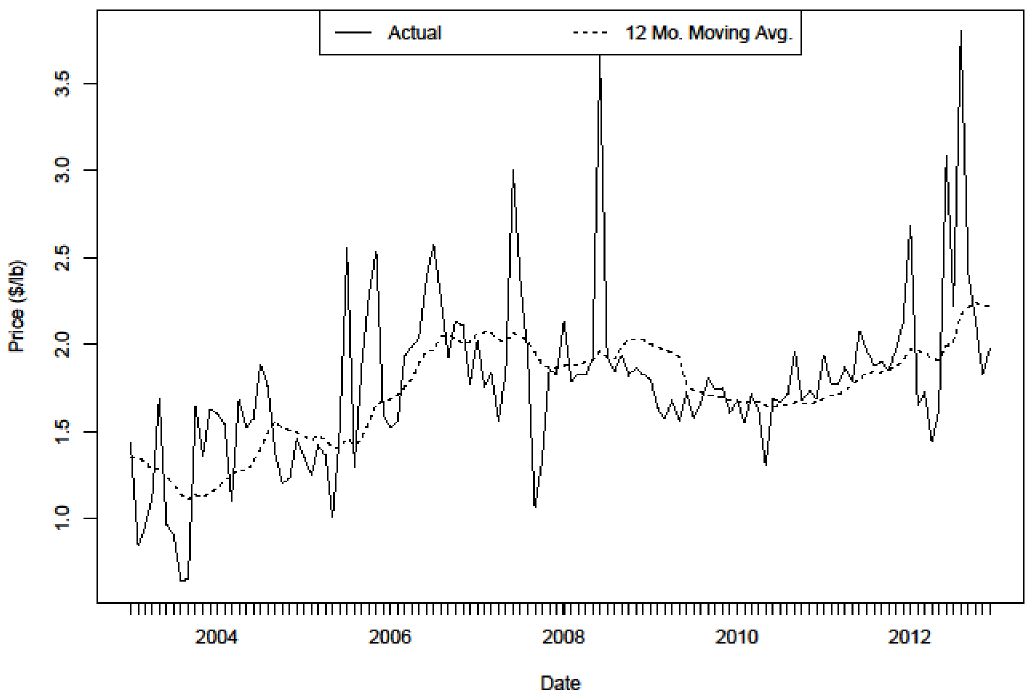
Pacific cod is a popular item in the foodservice sector because of its versatility, abundance, and year-round availability (NMFS 2001; Seafood Market Bulletin 2006a). In addition, the product is used in finer and casual restaurants, institutions, and retail fish markets. U.S. export prices and volumes of frozen cod are shown in Figure 39 and Figure 40, with much of the product destined for re-processors in China and Europe (Figure 41 through Figure 44). 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 2009, average export prices have been steadily increasing, though prices of frozen cod to China and Portugal dipped slightly in 2012.

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 Pacific cod 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 some potential down the road, it currently volumes remain low and hasn't put any competitive pressure on wild-caught cod.

Figure 36. U.S. Export Prices of Cod Fillets to All Countries, 2003 - 2012

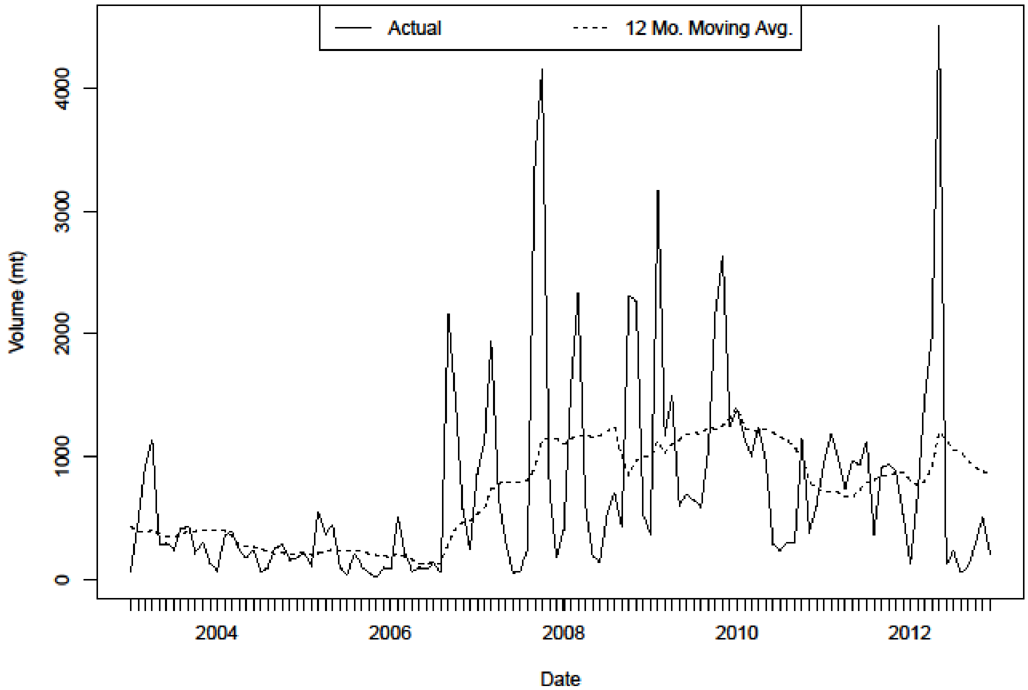


Note: U.S. foreign trade data do not differentiate Pacific and Atlantic cod; however, as discussed in the text, nearly all of this product category is Pacific cod.

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

Alaska Groundfish Market Profiles

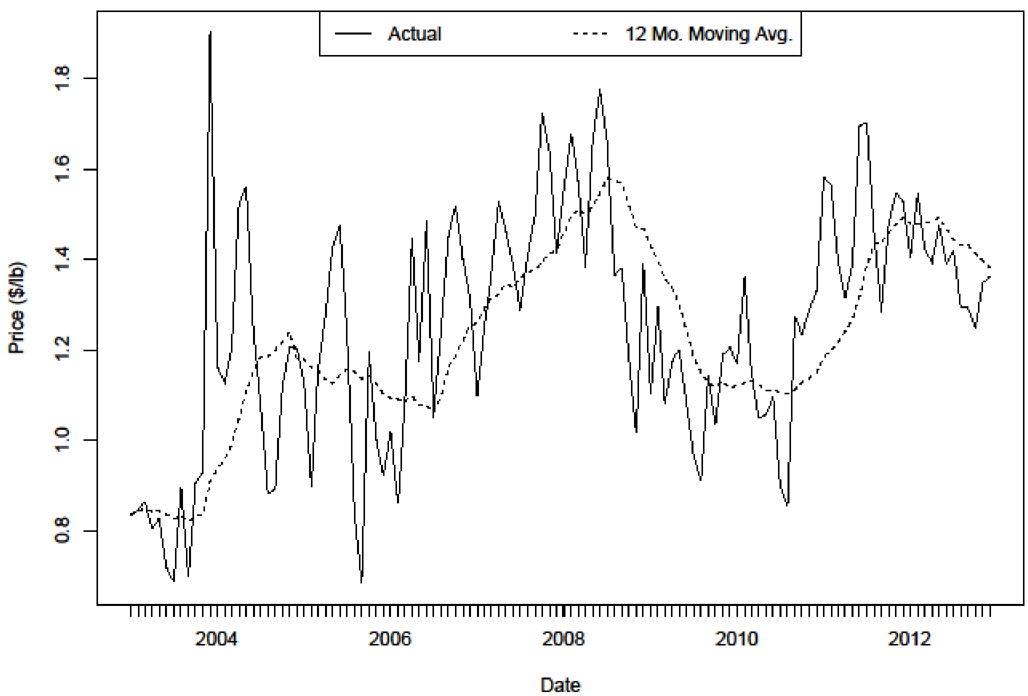
Figure 37. U.S. Export Volumes of Cod Fillets to All Countries, 2003 - 2012



Note: 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/.

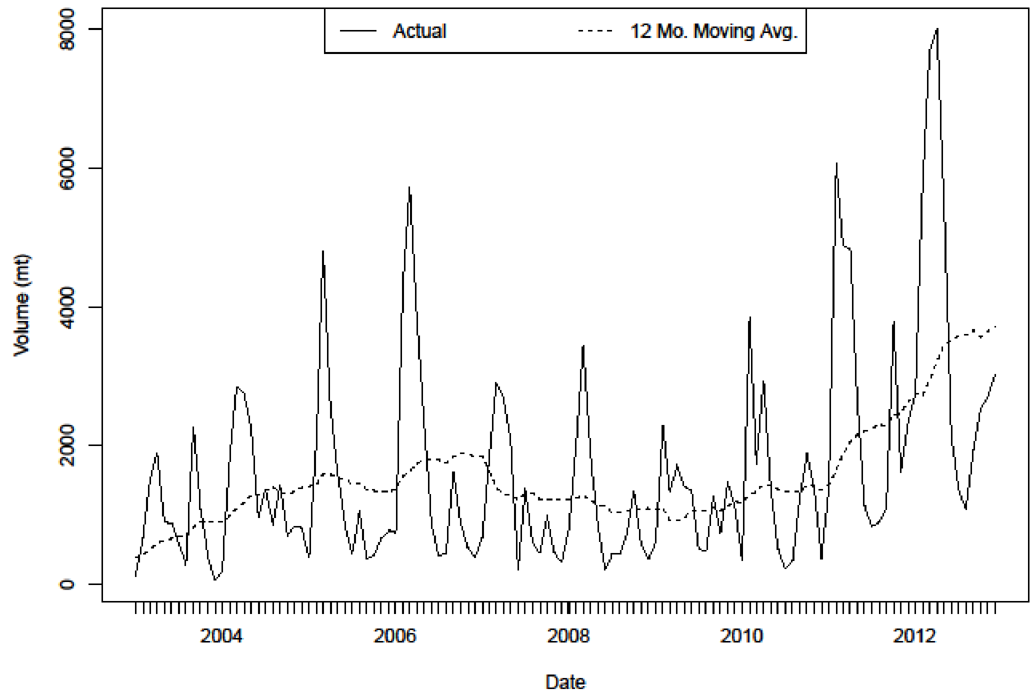
Figure 38. Nominal U.S. Export Prices of Frozen Cod to China, 2003 - 2012



Note: 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/.

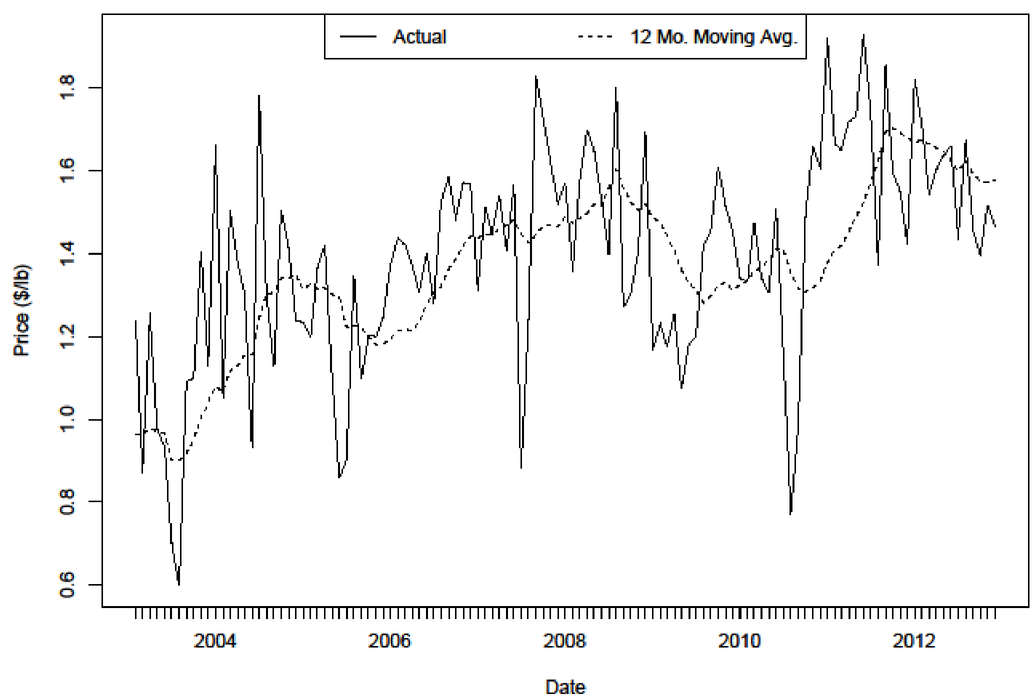
Figure 39. U.S. Export Volumes of Frozen Cod to China, 2003 - 2012



Note: 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/.

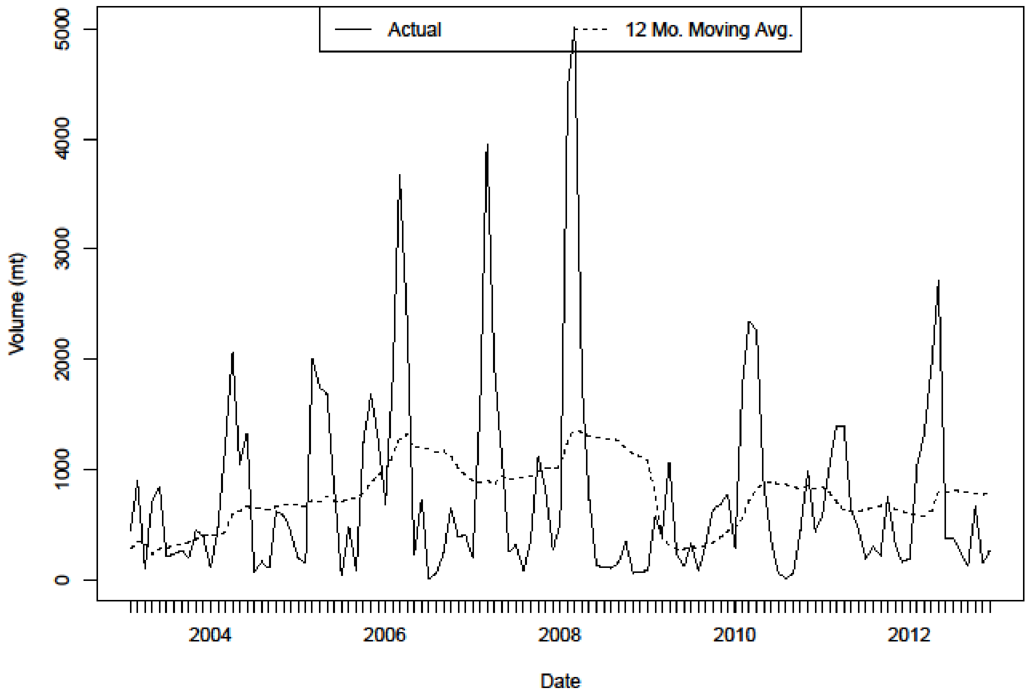
Figure 40. Nominal U.S. Export Prices of Frozen Cod to Portugal, 2003 - 2012



Note: 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 41. U.S. Export Volumes of Frozen Cod to Portugal, 2003 - 2012



Note: 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/.

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Sablefish Market Profile

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. In Federal waters off Alaska, the total allowable catch for Bering Sea and Aleutian Islands sablefish is typically about one-third of that for Gulf of Alaska sablefish.

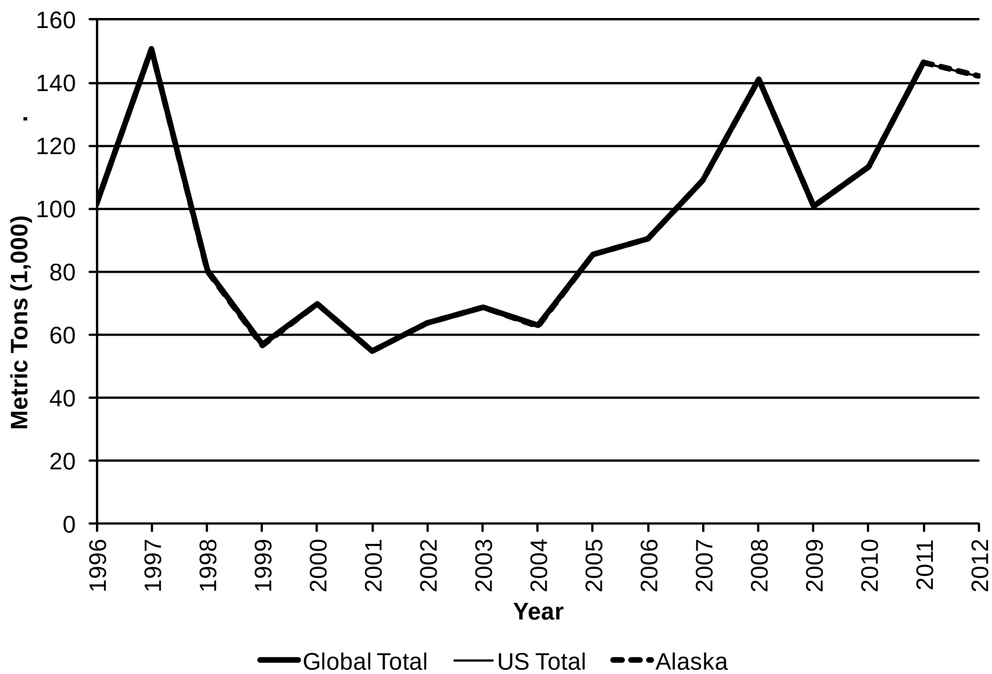
The fishing fleet for sablefish is primarily composed of owner-operated vessels that use hook-and-line or pot (fish trap) gear. An IFQ program for the Alaska sablefish and halibut fisheries was developed by the North Pacific Fishery Management Council and implemented by NMFS in 1995. The program was 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).

Production

Most of the total world catch of sablefish comes from Alaska (Figure 45). Alaska accounts for approximately two-thirds (65%) of total U.S. harvests. This share of total U.S. harvests has remained relatively stable throughout the years. Since 2008, 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).

Figure 42. Alaska, Total U.S. and Global Production of Sablefish, 1996 – 2012



Note: Data for 2012 were unavailable for Global totals.

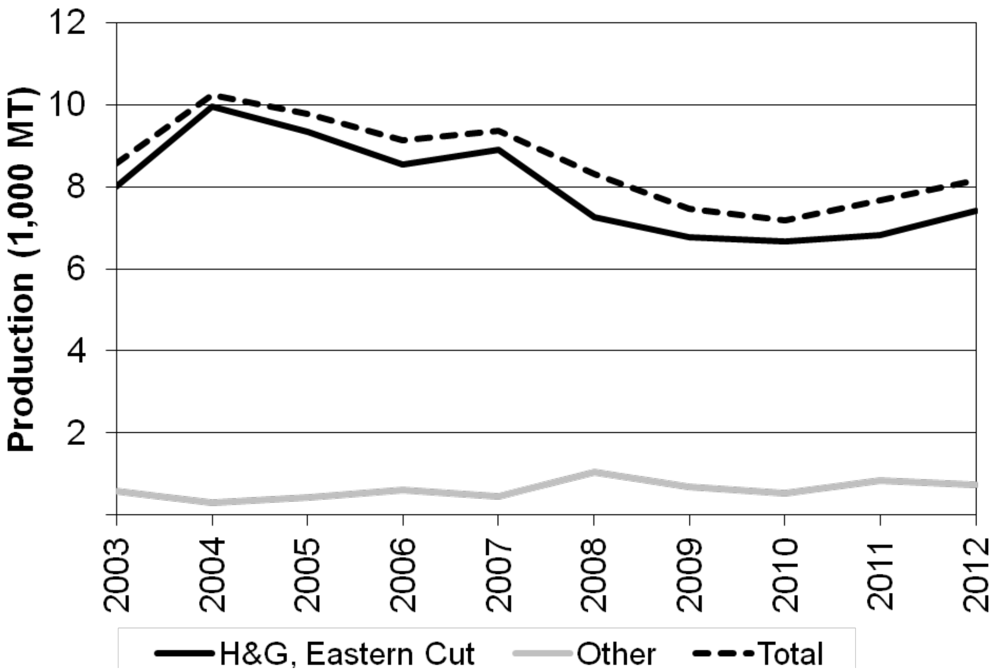
Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at http://www.psmfc.org/pacfin/pfmc.html; Global data from FAO, "FishStat" database available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073.

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 4¼ or 5 pounds), medium (4¼ 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 46, 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 sablefish as smoked Alaskan cod or sable, and fresh and frozen fillets as butterfish or black cod (Flick et al. 1990).

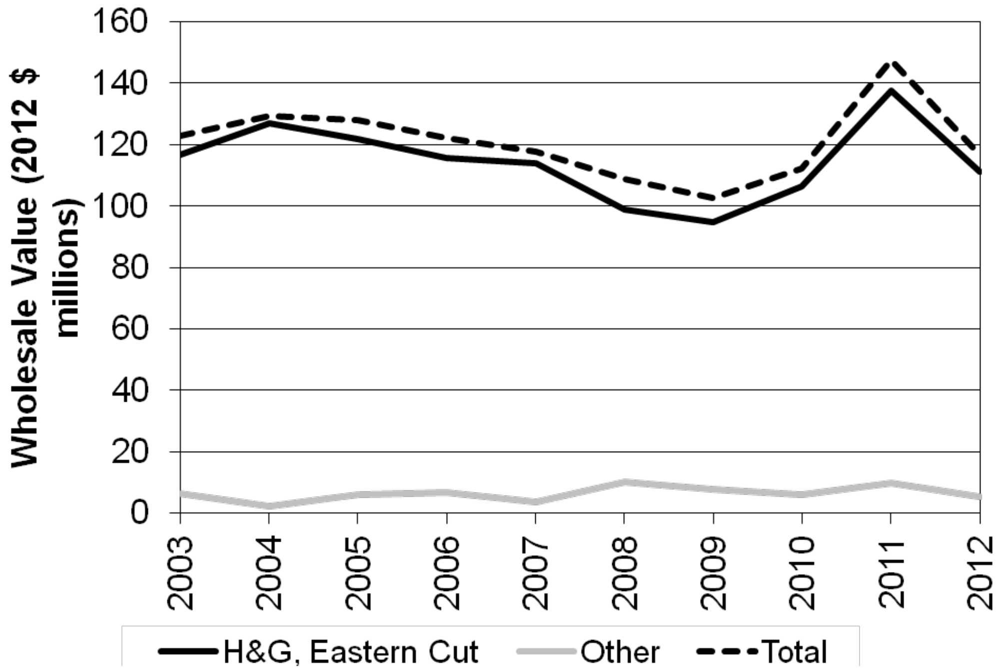
Figure 43. Alaska Primary Production of Sablefish by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

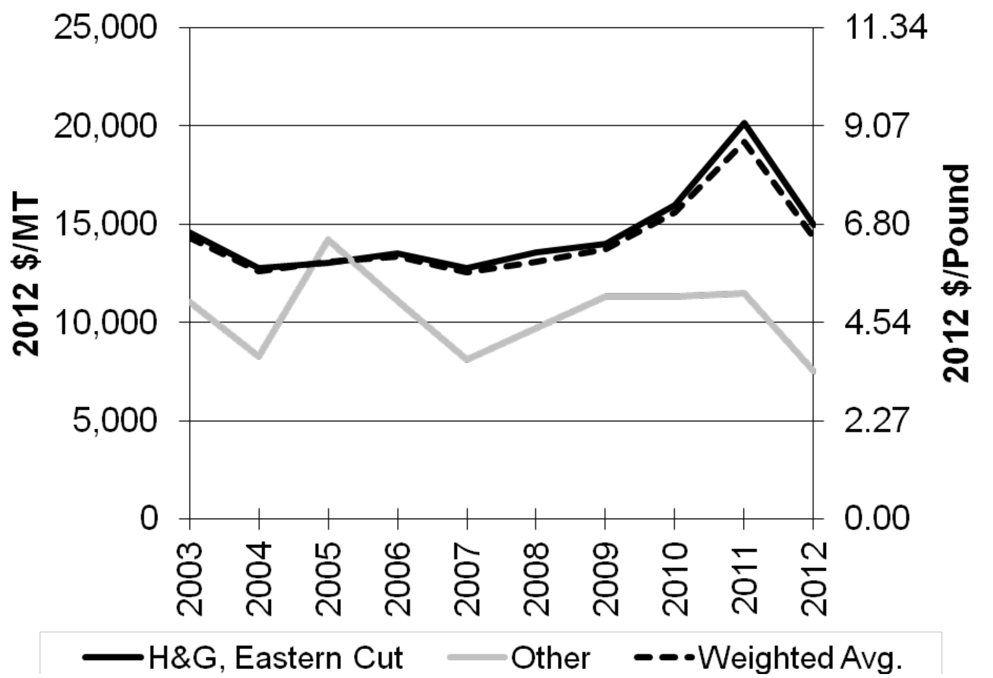
Sablefish Market Profile

Figure 44. Wholesale Value of Alaska Primary Production of Sablefish by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 45. Wholesale Prices for Alaska Primary Production of Sablefish by Product Type, 2003 – 2012

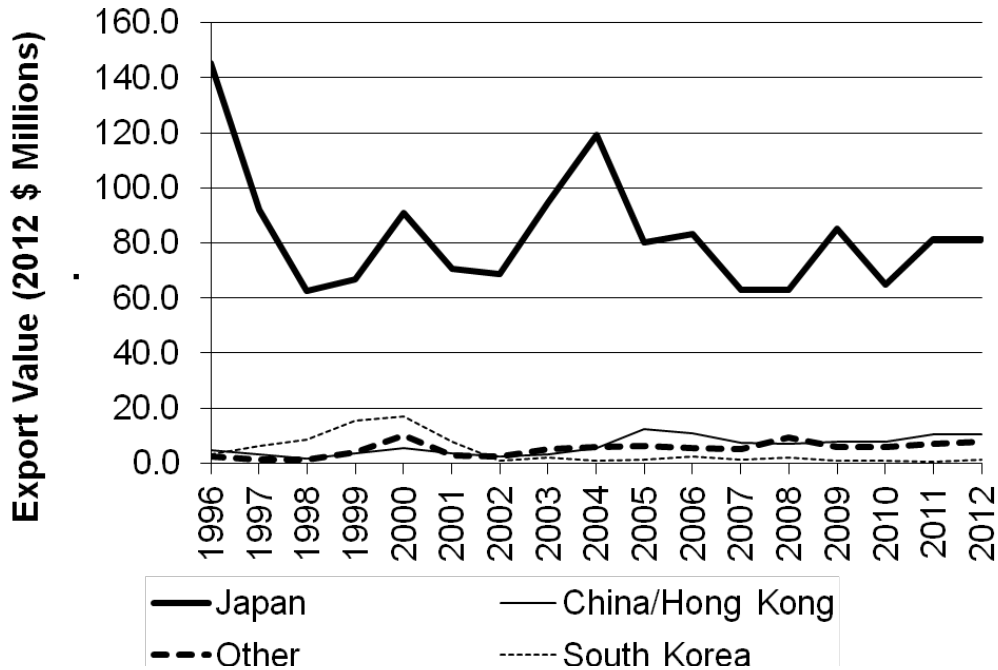


Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

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 49). 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.

Figure 46. U.S. Export Value of Frozen Sablefish to Leading Importing Countries, 1996 – 2012.



Note: 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.

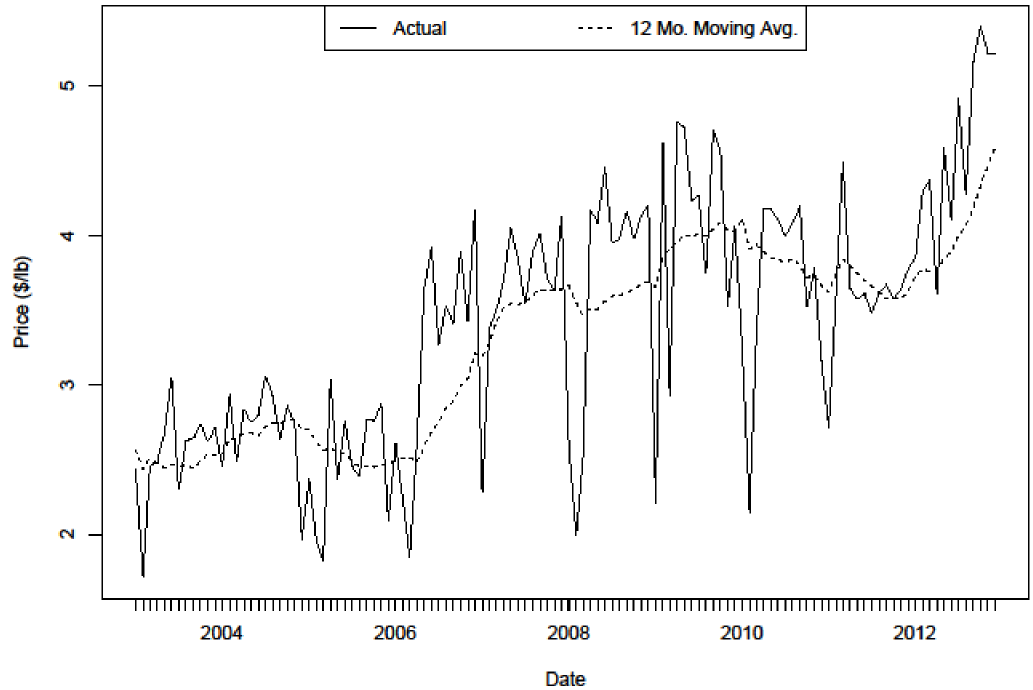
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

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 sablefish sablefish prices through 2011 (Seafood Market Bulletin 2008), as depicted in Figure 50. Alaska sablefish prices fell in 2012 (Figure 48).

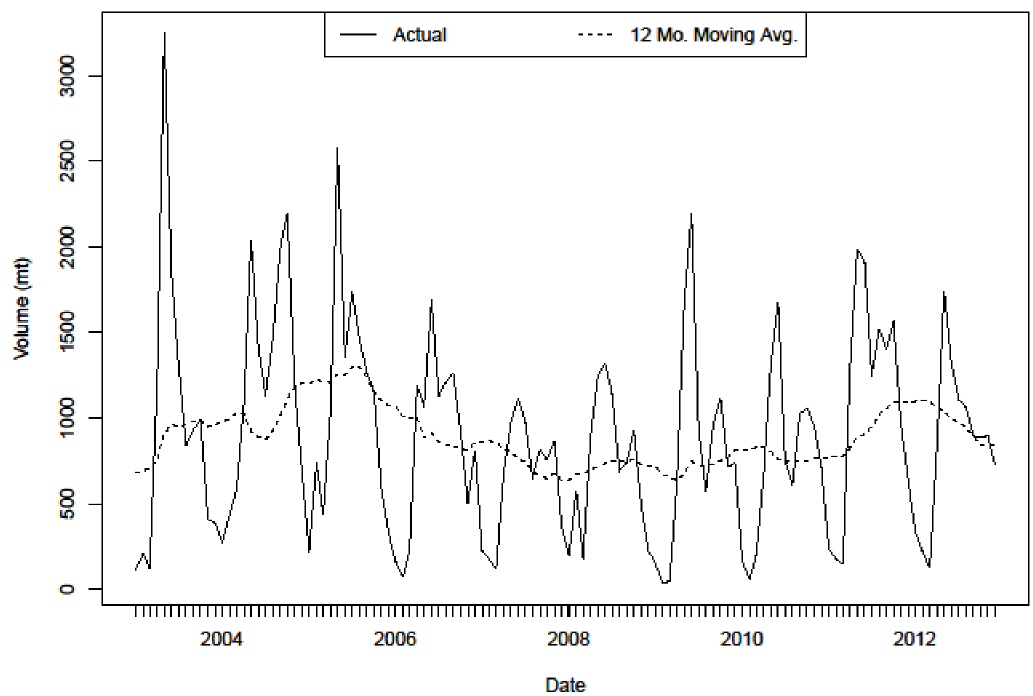
Sablefish Market Profile

Figure 47. Nominal U.S. Export Prices of Sablefish to All Countries, 2003 - 2012



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

Figure 48. U.S. Export Volumes of Sablefish to All Countries, 2003 - 2012



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

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Yellowfin Sole Market Profile

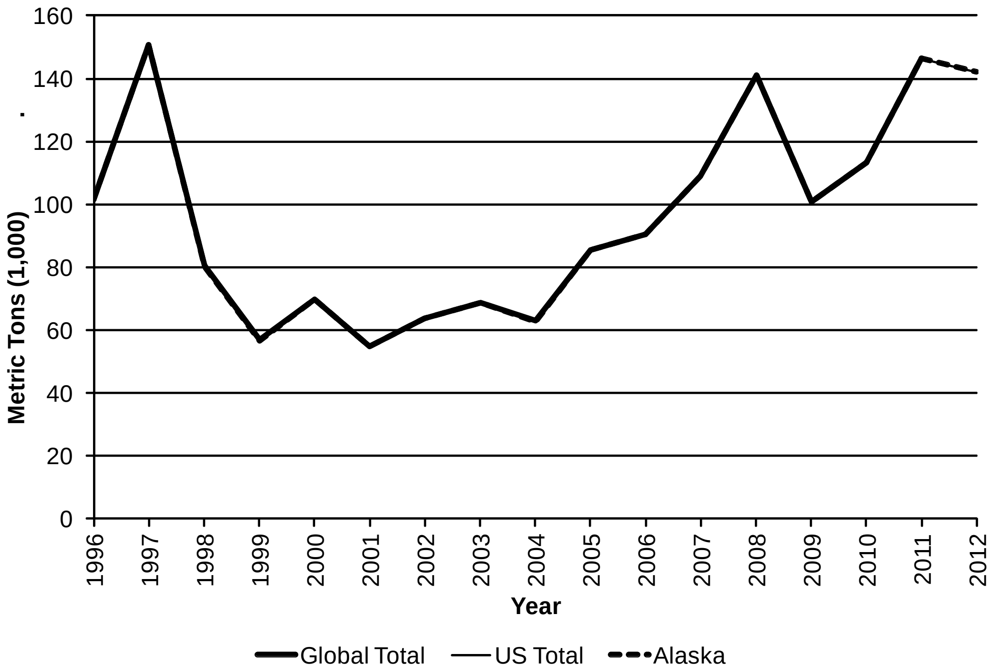
Description of the Fishery

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. Seasons are generally limited by closures to prevent exceeding the Pacific halibut apportionment or red king crab bycatch allowance.

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 52). Most of the yellowfin sole is landed in the summer when the Pacific cod fishery is closed. The fish landings statistics available indicate that Alaska fisheries account for the entire worldwide production of yellowfin and rock sole (Figure 52). 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 49. Alaska, Total U.S. and Global Retained Harvest of Yellowfin Sole, 1996 – 2012



Note: 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.

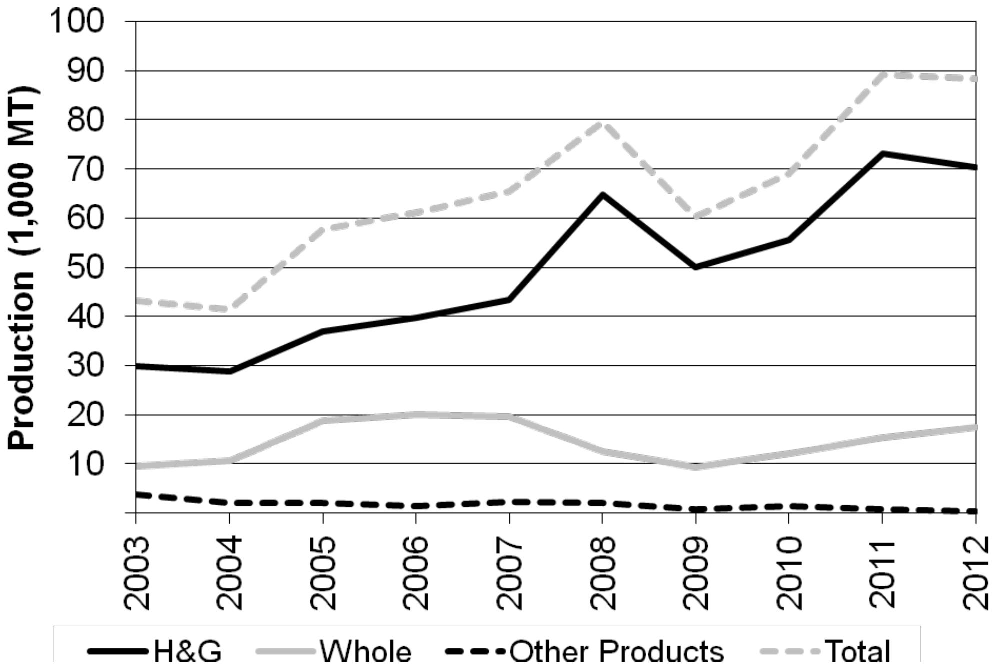
Source: Alaska data from NMFS Blend and Catch Accounting System Data. Other U.S. data from PacFIN, available at http://www.psmfc.org/pacfin/pfmc.html; Global data from FAO, "FishStat" database available at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=16073.

Product Composition and Flow

Yellowfin sole products processed offshore are sold as whole fish and headed and gutted (H&G) fish (Figure 54). 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*.

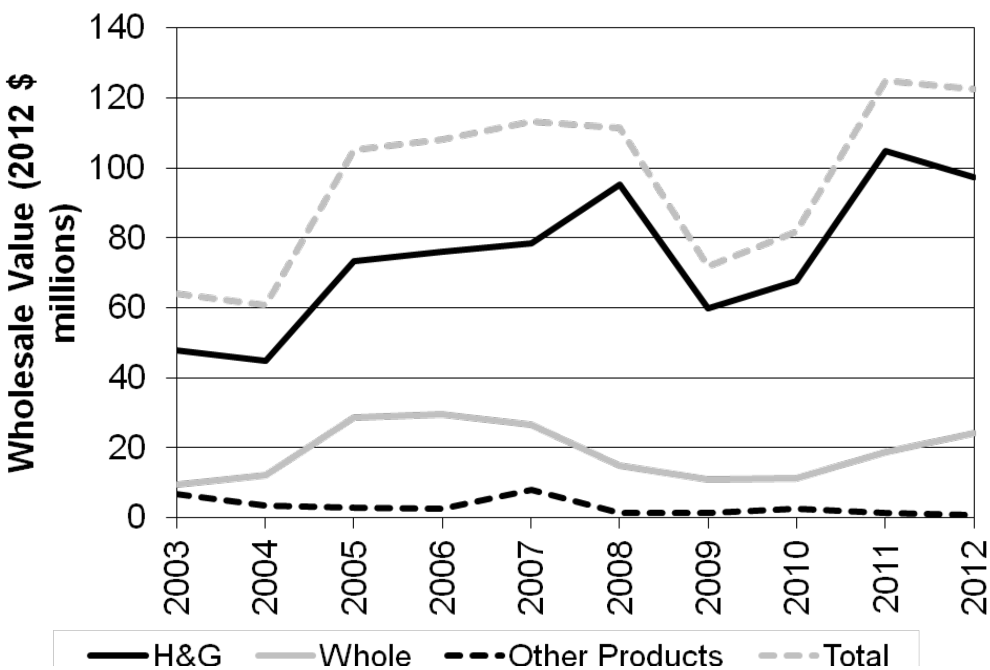
Yellowfin Sole Market Profile

Figure 50. Alaska Primary Production of Yellowfin Sole by Product Type, 2003 – 2012



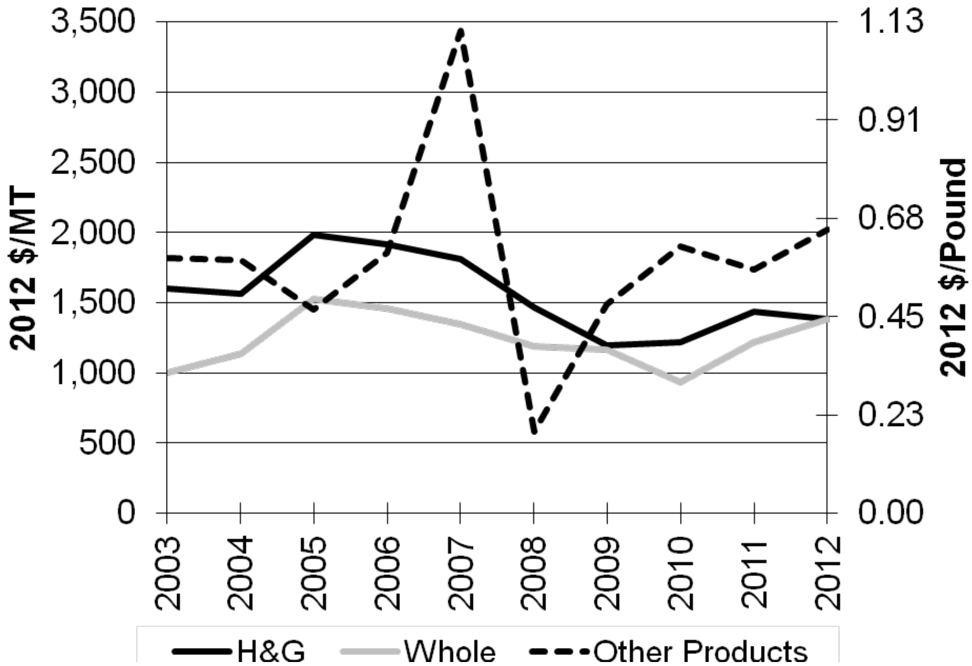
Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 51. Wholesale Value of Alaska Primary Production of Yellowfin Sole by Product Type, 2003 – 2012



Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

Figure 52. Wholesale Prices for Alaska Primary Production of Yellowfin Sole by Product Type, 2003 – 2012



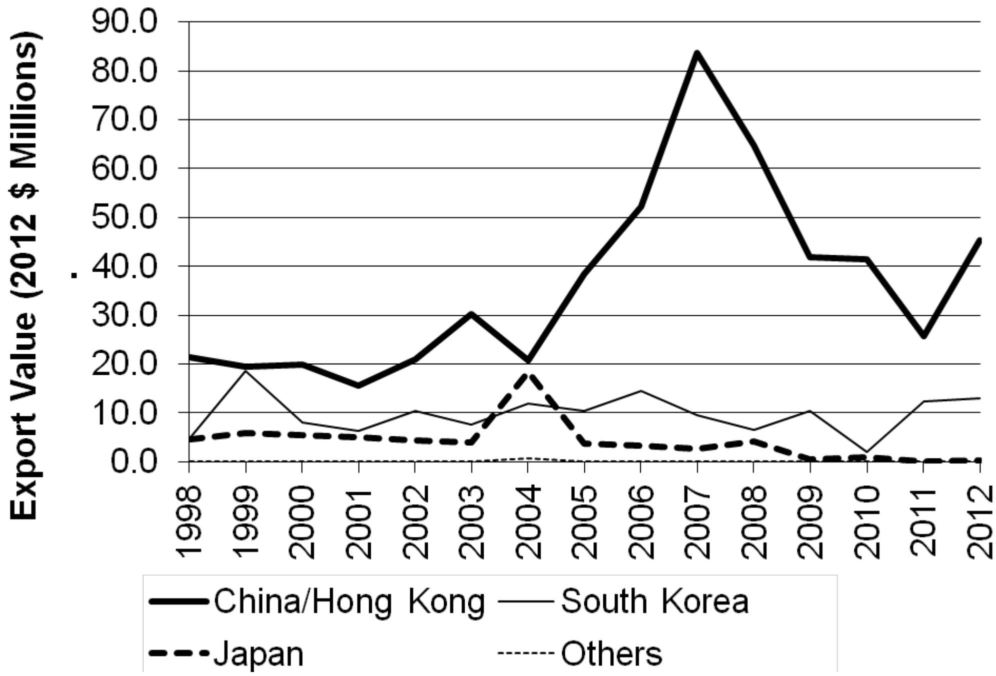
Note: Product types may include several more specific products.
Source: NMFS Weekly Production Reports and ADF&G Commercial Operator Annual Reports 2003-2012

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 (Figure 61). Whole round fish is generally sold to South Korea for domestic consumption (American Seafoods Group LLC 2002). 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 53. U.S. Export Value of Yellowfin Sole to Leading Importing Countries, 1998 – 2012



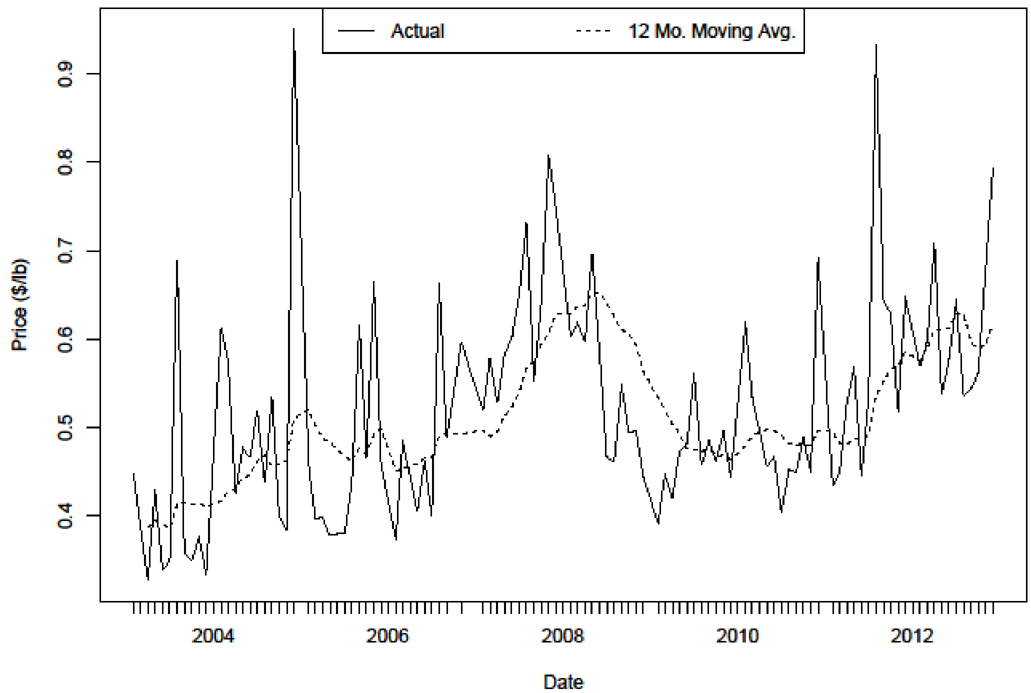
Note: Data include all exports of yellowfin sole from the U.S. Customs Pacific District.
Source: U.S. Census Bureau Foreign Trade Data available at www.st.nmfs.gov/st1/trade/.

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.

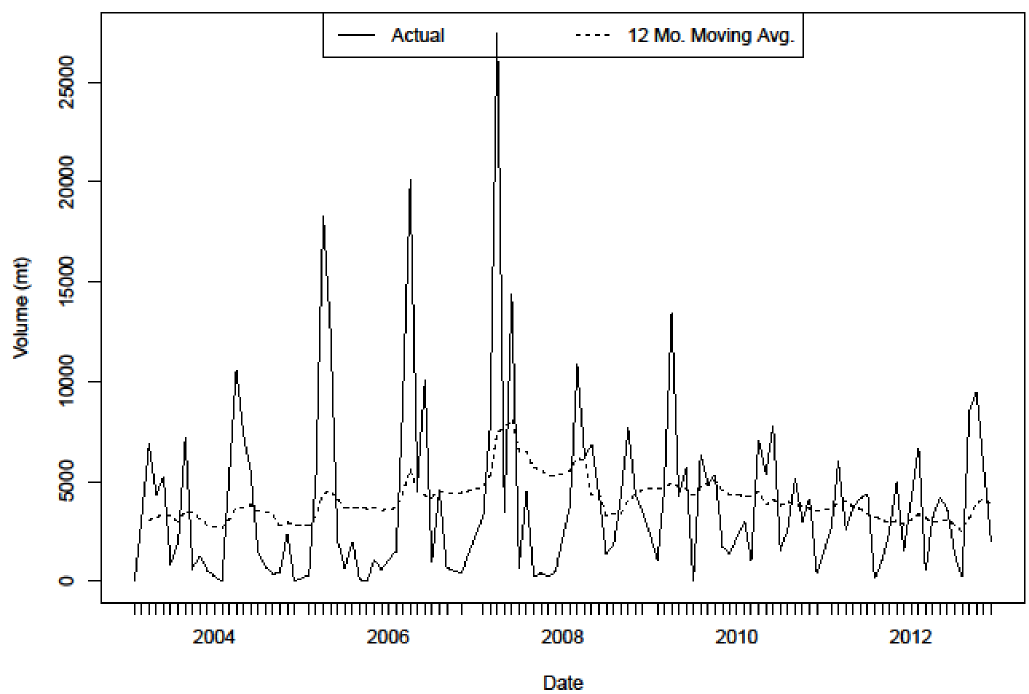
Alaskan flatfish fisheries were certified sustainable by the Marine Stewardship Council on June 1, 2010 (Marine Stewardship Council 2010). Besides yellowfin sole, the MSC sustainability certificates apply to northern rock sole, flathead sole (*Hippoglossoides elassodon*), arrowtooth flounder (*Atheresthes stomias*), rex sole (*Glyptocephalus zachirus*), and southern rock sole (*Lepidopsetta bilineata*).

Figure 54. Nominal U.S. Export Prices of Yellowfin Sole to All Countries, 2003 - 2012



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

Figure 55. U.S. Export Volumes of Yellowfin Sole to All Countries, 2003 - 2012



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

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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 - 2012 ; calculations based on CFEC fish tickets ($ millions, base year = 2012)

Year	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
2004	230.9	355.4	19.5	235.1	724.5	1565.4
2005	217.5	405.3	19	219.7	797.3	1658.7
2006	171	380.1	12	233.6	818.7	1615.4
2007	223.2	457.8	18.2	257.4	802.1	1758.7
2008	292.2	466.9	28.9	235.8	960.4	1984.4
2009	221.5	444.7	27.4	154.2	610.5	1458.4
2010	243.7	550.3	23.3	211.6	672.3	1701.3
2011	297.6	611.5	10.8	205.1	843.1	1968.1
2012	284.2	441.3	19.4	144.8	845.9	1735.6

Notes: These estimates include the value of catch from both federal and state of Alaska fisheries. The data have been adjusted to 2012 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 - 2012 ; calculations based on CFEC fish tickets.

Year	Shellfish	Salmon	Herring	Halibut	Groundfish
2004	14.8 %	22.7 %	1.2 %	15 %	46.3 %
2005	13.1 %	24.4 %	1.1 %	13.2 %	48.1 %
2006	10.6 %	23.5 %	0.7 %	14.5 %	50.7 %
2007	12.7 %	26 %	1 %	14.6 %	45.6 %
2008	14.7 %	23.5 %	1.5 %	11.9 %	48.4 %
2009	15.2 %	30.5 %	1.9 %	10.6 %	41.9 %
2010	14.3 %	32.3 %	1.4 %	12.4 %	39.5 %
2011	15.1 %	31.1 %	0.5 %	10.4 %	42.8 %
2012	16.4 %	25.4 %	1.1 %	8.3 %	48.7 %

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

Source: NMFS Alaska Region Blend and Catch-Accounting System estimates, At-Sea Production Report, Alaska Commercial Fisheries Entry Commission (CFEC) fish tickets, Fisheries of the United States. (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, 2008 - 2012 ; 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	2008	0.114	0.175	0.156	0.17	0.171
	2009	0.101	0.164	0.063	0.127	0.128
	2010	0.109	0.166	0.125	0.135	0.137
	2011	0.141	0.161	0.166	0.131	0.133
	2012	0.137	0.153	0.138	0.117	0.12
Sablefish	2008	2.926	1.963	2.771	1.18	2.819
	2009	3.114	2.04	2.99	1.28	3.001
	2010	3.686	2.793	3.568	1.595	3.584
	2011	4.927	4.019	4.874	1.792	4.83
	2012	3.967	3.226	3.444	1.013	3.806
Pacific Cod	2008	0.558	0.521	0.462	0.481	0.488
	2009	0.278	0.238	0.185	0.159	0.197
	2010	0.269	0.231	0.29	0.23	0.266
	2011	0.318	0.299	0.208	0.223	0.241
	2012	0.354	0.309	0.229	0.271	0.267
Flatfish	2008	0.045	0.115	0.041	0.168	0.161
	2009	0.036	0.119	0.123	0.14	0.137
	2010	0.051	0.1	0.038	0.147	0.141
	2011	0.055	0.091	0.136	0.18	0.169
	2012	0.066	0.105	0.196	0.199	0.192
Rockfish	2008	0.674	0.168	0.563	0.172	0.186
	2009	0.678	0.141	0.532	0.171	0.171
	2010	0.627	0.181	0.374	0.228	0.215
	2011	0.696	0.259	0.525	0.345	0.316
	2012	0.805	0.267	0.474	0.289	0.29
Atka Mackerel	2008	*	0.195	0.02	0.17	0.171
	2009	*	0.28	*	0.188	0.19
	2010	*	0.277	0.054	0.209	0.21
	2011	0.016	0.364	0.151	0.265	0.267
	2012	0.109	0.386	0.089	0.293	0.295

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, 2008 - 2012 ; calculations based on CFEC fish tickets ($ millions)

			Gulf of Alaska			Bering Sea & Aleutian Islands			All Alaska		
		Year	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors	Catcher Vessel	Catcher Processor	All Sectors
Hook & Line	Sablefish	2008	63.3	7.9	71.2	1.8	2.9	4.8	65.2	10.8	76
		2009	58.6	6.5	65.1	3.7	4.2	7.9	62.3	10.7	73
		2010	66.4	5.3	71.7	5	4.6	9.6	71.4	9.9	81.3
		2011	97.2	8.2	105.4	7.3	4.5	11.8	104.5	12.7	117.2
		2012	88.1	6.1	94.2	6	4	10.1	94.1	10.1	104.2
	Pacific Cod	2008	11.7	4.3	16	1.7	89.3	91.1	13.4	93.7	107.1
		2009	7.5	2.1	9.6	0.4	38.3	38.8	8	40.4	48.4
		2010	8	5.1	13.1	0.4	55.2	55.7	8.4	60.3	68.7
		2011	10.5	3.3	13.8	0.8	46.3	47	11.3	49.6	60.9
		2012	13.1	3.2	16.3	0.7	57.2	57.9	13.8	60.4	74.1
	Flatfish	2008	0	0	0	*	0.1	0.1	0	0.1	0.1
		2009	0	0	0	*	0.5	0.5	0	0.5	0.5
		2010	0	0	0	*	0.2	0.2	0	0.2	0.2
		2011	0	0	0	*	0.7	0.7	0	0.7	0.7
		2012	0	0	0	*	1.2	1.2	0	1.2	1.2
	Rockfish	2008	1.5	0.2	1.7	0	0.2	0.2	1.5	0.4	1.9
		2009	1.3	0.1	1.5	0.1	0.2	0.3	1.4	0.4	1.8
		2010	1.2	0.1	1.3	0.1	0.3	0.3	1.3	0.4	1.7
		2011	1.2	0.1	1.3	0.1	0.1	0.2	1.3	0.2	1.5
		2012	1.7	0.2	1.9	0.1	0.2	0.2	1.8	0.4	2.1
	All Species	2008	77	12.4	89.4	3.6	95.4	99	80.6	107.7	188.4
		2009	68	8.7	76.7	4.2	44.3	48.5	72.2	53	125.2
		2010	76.1	10.6	86.7	5.5	62.8	68.3	81.6	73.4	155
		2011	109.5	11.9	121.4	8.1	55.3	63.4	117.6	67.2	184.8
		2012	103.7	9.6	113.3	6.8	69.7	76.5	110.5	79.3	189.8

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Table 19.B: Continued

		Year	Gulf of Alaska: Catcher Vessel	Gulf of Alaska: Catcher Processor	Gulf of Alaska: All Sectors	Bering Sea & Aleutian Islands: Catcher Vessel	Bering Sea & Aleutian Islands: Catcher Processor	Bering Sea & Aleutian Islands: All Sectors	All Alaska: Catcher Vessel	All Alaska: Catcher Processor	All Alaska: All Sectors
Pot	Pacific Cod	2008	30.2	*	30.2	20.6	4.2	24.8	50.8	4.2	55
		2009	13.7	*	13.7	6.6	2	8.6	20.3	2	22.3
		2010	20	-	20	11.4	3.5	14.9	31.4	3.5	34.9
		2011	33.3	*	33.3	18.2	1.3	19.4	51.5	1.3	52.7
		2012	28.6	*	28.6	19.9	3.8	23.7	48.4	3.8	52.2
Trawl	Pollock	2008	18.6	0.2	18.8	225.8	142.4	368.2	244.4	142.6	387
		2009	14.8	0.2	15	170.6	53.4	223.9	185.4	53.5	238.9
		2010	27.4	0.3	27.6	146.7	91.9	238.6	174.1	92.2	266.3
		2011	27.8	0.4	28.1	223.3	120.5	343.8	251.1	120.9	372
		2012	34	0.4	34.4	177.1	131.1	308.2	211.1	131.5	342.6
	Sablefish	2008	1.9	1.6	3.4	0	0.7	0.7	1.9	2.2	4.1
		2009	2	1.6	3.6	0	0.5	0.5	2.1	2	4.1
		2010	2.8	2.4	5.3	0	0.4	0.4	2.8	2.8	5.6
		2011	4.7	3.5	8.1	0	0.3	0.3	4.7	3.8	8.5
		2012	2.9	2.7	5.7	*	0.5	0.5	2.9	3.3	6.2
	Pacific Cod	2008	18.8	1.1	19.9	33.5	24.7	58.1	52.2	25.8	78
		2009	5.5	0.2	5.8	12	8.1	20	17.5	8.3	25.8
		2010	9.2	0.6	9.8	11.3	18.4	29.8	20.5	19.1	39.6
		2011	9.9	0.5	10.4	17.8	18	35.8	27.7	18.5	46.2
		2012	12.5	0.8	13.3	28	23.7	51.7	40.5	24.5	65
	Flatfish	2008	7.2	1.6	8.9	0.4	86.9	87.3	7.7	88.5	96.2
		2009	5.3	2.5	7.8	0.6	60.5	61	5.9	62.9	68.8
		2010	3.8	2.2	5.9	0.2	73.1	73.3	4	75.2	79.2
		2011	4.1	2.5	6.6	0.5	102.2	102.7	4.6	104.7	109.3
		2012	3.4	2	5.5	0.5	117	117.5	3.9	119	123

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Table 19.B: Continued

		Year	Gulf of Alaska Catcher Vessel	Gulf of Alaska Catcher Processor	Gulf of Alaska All Sectors	Bering Sea & Aleutian Islands Catcher Vessel	Bering Sea & Aleutian Islands Catcher Processor	Bering Sea & Aleutian Islands All Sectors	All Alaska Catcher Vessel	All Alaska Catcher Processor	All Alaska All Sectors
Trawl	Rockfish	2008	3.1	4.5	7.6	0.2	7	7.2	3.2	11.5	14.7
		2009	1.5	4.7	6.2	0.1	6.3	6.4	1.6	11	12.6
		2010	2.5	6.6	9	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
		2012	6.2	8.1	14.3	0	16.8	16.8	6.2	24.9	31.1
	Atka Mackerel	2008	0	0.3	0.3	0	21.3	21.3	0	21.7	21.7
		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
		2012	0	0.6	0.6	0	30	30	0	30.6	30.6
	All Species	2008	50.4	9.4	59.8	260	283.2	543.2	310.4	292.6	603
		2009	29.8	10	39.8	183.3	157.8	341.1	213.1	167.9	381
		2010	46.6	13	59.6	158.4	225.1	383.5	205	238.2	443.1
		2011	50.7	16.6	67.3	241.8	290.9	532.7	292.5	307.5	600
		2012	60.4	15	75.4	205.7	319.7	525.4	266.2	334.7	600.8
All Gear	Pollock	2008	18.7	0.2	18.8	225.8	143.9	369.7	244.4	144.1	388.5
		2009	14.9	0.2	15	170.6	53.9	224.5	185.4	54.1	239.5
		2010	27.4	0.3	27.7	146.7	92.8	239.5	174.1	93.1	267.2
		2011	27.8	0.4	28.2	223.3	122.2	345.5	251.1	122.6	373.7
		2012	34.1	0.4	34.5	177.1	132.5	309.5	211.1	132.9	344
	Sablefish	2008	65.2	9.4	74.6	7.2	3.6	10.7	72.3	13	85.3
		2009	60.6	8.1	68.7	7.7	4.6	12.3	68.3	12.7	81
		2010	69.2	7.7	76.9	5	4.9	10	74.3	12.6	86.9
		2011	101.9	11.7	113.5	12.5	4.9	17.4	114.4	16.6	130.9
		2012	91	8.8	99.8	6	4.6	10.6	97	13.4	110.4

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Table 19.B: Continued

		Year	Gulf of Alaska Catcher Vessel	Gulf of Alaska Catcher Processor	Gulf of Alaska All Sectors	Bering Sea & Aleutian Islands Catcher Vessel	Bering Sea & Aleutian Islands Catcher Processor	Bering Sea & Aleutian Islands All Sectors	All Alaska Catcher Vessel	All Alaska Catcher Processor	All Alaska All Sectors
All Gear	Pacific Cod	2008	60.7	5.4	66.1	55.8	118.2	174	116.5	123.6	240.1
		2009	26.7	2.3	29.1	19	48.4	67.4	45.7	50.8	96.5
		2010	37.2	5.7	42.9	23.2	77.2	100.3	60.4	82.9	143.3
		2011	53.7	3.8	57.5	36.7	65.6	102.3	90.4	69.4	159.8
		2012	54.1	4	58.1	48.5	84.7	133.2	102.7	88.7	191.3
	Flatfish	2008	7.2	1.7	8.9	0.4	87	87.5	7.7	88.7	96.4
		2009	5.3	2.5	7.8	0.6	61	61.5	5.9	63.4	69.3
		2010	3.8	2.2	6	0.2	73.3	73.5	4	75.5	79.5
		2011	4.1	2.5	6.6	0.5	102.9	103.4	4.6	105.4	110.1
		2012	3.4	2	5.5	0.5	118.2	118.7	3.9	120.3	124.2
	Rockfish	2008	4.5	4.7	9.2	0.2	7.2	7.4	4.7	11.9	16.6
		2009	2.8	4.8	7.6	0.2	6.5	6.7	3	11.3	14.3
		2010	3.7	6.7	10.4	0.1	11	11	3.8	17.7	21.4
		2011	4.1	8.8	12.8	0.1	20.6	20.7	4.2	29.3	33.5
		2012	7.9	8.2	16.2	0.1	17	17.1	8	25.2	33.2
	Atka Mackerel	2008	0	0.3	0.3	0	21.3	21.3	0	21.7	21.7
		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
		2012	0	0.6	0.6	0	30	30	0	30.6	30.6
	All Species	2008	158	21.8	179.7	289.6	382.8	672.3	447.5	404.5	852.1
		2009	111.7	18.8	130.4	198.1	204.2	402.2	309.8	222.9	532.7
		2010	142.9	23.7	166.6	175.3	291.4	466.8	318.2	315.1	633.3
		2011	193.8	28.5	222.4	273.3	347.4	620.8	467.2	376	843.1
		2012	193	24.6	217.6	232.4	393.2	625.6	425.4	417.8	843.2

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 - 2012 ; 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
	2004	59.2	21.9	0.1	3.8	8	1.8	63	29.8	1.9
	2005	53.1	24.3	0.3	3.9	11.1	1.9	57.1	35.4	2.1
	2006	55.8	29.5	0.2	6.1	13	3.6	62	42.5	3.8
	2007	62.8	28.2	0	5.7	16.4	2.7	68.4	44.5	2.7
Fixed	2008	75.2	32.1	0.3	9.3	16.5	3.8	84.5	48.6	4.1
	2009	57.8	24.1	*	5.2	7.9	1.7	63	32	1.7
	2010	68.2	28	*	7	10.7	2.9	75.2	38.7	2.9
	2011	101.4	41.8	*	12.2	15.3	4	113.6	57.1	4
	2012	94.8	37.8	*	15.3	10.4	3.6	110.1	48.2	3.6
	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	102.3
	2006	7.2	31.4	-	*	92.5	110.3	7.2	123.8	110.3
	2007	7.7	29.6	-	*	88	96.9	7.7	117.6	96.9
Trawl	2008	12.1	38.1	*	*	103.4	118	12.1	141.5	118
	2009	5.9	23.9	-	*	69.9	81.3	5.9	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	13.3	47.1	-	*	89.2	90.9	13.3	136.2	90.9
	2004	63.3	44.6	0.1	3.8	84.9	85	67.1	129.5	85.1
	2005	60.3	52.6	0.3	3.9	94.9	104.2	64.2	147.5	104.4
	2006	63	60.8	0.2	6.1	105.5	113.8	69.2	166.3	114.1
	2007	70.5	57.8	0	5.7	104.3	99.6	76.1	162.1	99.6
All Gear	2008	87.3	70.2	0.3	9.3	119.9	121.7	96.6	190.1	122
	2009	63.7	48	*	5.2	77.8	83	68.9	125.8	83
	2010	77	65.8	*	7	71.1	70.7	84	136.9	70.7
	2011	108.6	85.3	*	12.2	111.6	108.7	120.8	196.9	108.7
	2012	108.1	84.9	*	15.3	99.6	94.5	123.4	184.5	94.5

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 - 2012 ; 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	71	106	100	63	185	101
	2005	59	204	55	60	173	125	62	235	143
	2006	61	238	60	101	207	323	66	287	345
	2007	64	258	9	78	282	222	69	320	224
	2008	71	314	75	120	271	376	78	377	369
	2009	58	254	*	77	168	210	62	274	187
	2010	68	298	*	103	224	320	73	340	288
	2011	94	454	*	170	274	497	104	488	442
	2012	87	461	*	243	226	398	100	455	358
Trawl	2004	178	422	-	*	1025	3080	164	1038	3080
	2005	266	554	-	*	1180	3934	266	1218	3934
	2006	289	654	-	*	1284	4241	289	1317	4241
	2007	296	644	-	*	1222	3728	296	1321	3728
	2008	448	867	*	*	1477	4213	448	1590	4213
	2009	220	542	-	*	1043	3011	220	1103	3011
	2010	366	879	-	*	974	2513	351	1227	2513
	2011	313	966	-	*	1395	3878	313	1704	3878
	2012	580	1002	-	*	1372	3246	580	1662	3246
All Gear	2004	64	255	27	63	574	1888	67	527	1849
	2005	66	327	55	56	708	2541	69	633	2547
	2006	68	378	60	96	787	3076	74	723	3082
	2007	72	385	9	72	809	2621	76	730	2622
	2008	82	498	60	113	922	3203	89	897	3129
	2009	64	358	*	69	689	2371	68	642	2305
	2010	76	498	*	97	647	1964	81	724	1911
	2011	100	641	*	168	893	3105	110	1010	3019
	2012	99	674	*	225	897	2553	112	997	2486

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, 2008 - 2012 ; calculations based on CFEC fish tickets ($ millions).

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Year	Alaska	Other	Alaska	Other	Alaska	Other
Pollock	2008	8	10.9	66.4	303.3	74.4	314.2
	2009	6.7	8.3	35.1	189.4	41.8	197.7
	2010	12.6	15.1	44.3	195.2	56.9	210.4
	2011	11	17.1	51.2	294.3	62.3	311.4
	2012	13.2	21.3	40.3	269.2	53.4	290.5
Sablefish	2008	38.4	36.2	3	7.9	41.4	44.1
	2009	36.6	32.1	3.7	8.6	40.3	40.7
	2010	40	36.9	3.7	9.9	43.7	46.9
	2011	59.4	54.1	7.2	10.3	66.7	64.5
	2012	51.5	48.3	4.5	8.8	56	57.1
Pacific Cod	2008	41.8	25.2	32.8	141.3	74.6	166.5
	2009	21	8.2	13.2	54.3	34.1	62.4
	2010	28.7	14.3	23.5	76.9	52.1	91.1
	2011	41.8	15.8	22.2	80.1	64	95.9
	2012	42.8	15.3	28.3	104.9	71.1	120.2
Flatfish	2008	2.9	6	20.3	67.1	23.2	73.2
	2009	2.5	5.3	16.7	44.8	19.2	50.1
	2010	2	4	20.6	52.9	22.6	56.9
	2011	1.6	5	8.2	95.2	9.8	100.2
	2012	1.2	4.3	1.3	117.4	2.5	121.7
Rockfish	2008	2.5	6.7	0.1	7.3	2.6	14
	2009	2.4	5.3	0.2	6.5	2.6	11.7
	2010	3.2	7.2	0.3	10.8	3.4	18
	2011	2.1	10.8	0.5	20.2	2.6	30.9
	2012	4	12.1	0.1	17	4.1	29.1
Atka Mackerel	2008	0	0.3	0	21.3	0	21.7
	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
	2012	0	0.6	0	30	0	30.6
All Groundfish	2008	94.6	86	122.8	549.7	217.4	635.8
	2009	70.2	60.3	69	333.2	139.2	393.6
	2010	87.6	78.9	92.7	377.7	180.4	456.6
	2011	117.3	105.1	89.8	531.1	207.2	636.2
	2012	114.1	103.5	76.1	552.2	190.2	655.6

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, 2007 - 2012 ; calculations based on CFEC fish tickets ($ millions)

Region	2007	2008	2009	2010	2011	2012
Bering Sea Pollock	204.5	257.8	174.3	172.5	247.7	220
AK Peninsula/Aleutians	28.3	23.9	10.1	5.7	12	19.6
Kodiak	55.5	67.6	42.3	60.1	79	84.3
South Central	24.4	25.9	25.7	26.8	44.3	36.4
Southeastern	29.2	33.3	28.6	31.3	41.9	39.9
All Regions	341.8	408.6	281	296.5	424.9	400.3

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, 2007 - 2012 ; calculations based on CFEC fish tickets (percent)

Region	2007	2008	2009	2010	2011	2012
Bering Sea Pollock	63.8	62.8	61.5	58.2	59.2	63.3
AK Peninsula/Aleutians	16.8	11.8	5.4	2.6	4.4	8.2
Kodiak	42.5	45.2	37.1	45.6	43.7	49.9
South Central	12.4	12.3	16.7	9.4	17	15.8
Southeastern	13.7	15.3	15.6	13.8	13.9	16.3
All Regions	33.2	34.3	30.5	25.6	29.6	32.5

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.

A.2. Small Entity Effort and Revenue Data Tables - small entity status based on vessel revenues and affiliated group (e.g. coop) revenues

The following tables present data on fishing vessels that are clearly not small entities and fishing vessels that may be small entities with entity size determined with regard to affiliation (see Section 2.6 for additional commentary on small entity status). Estimated counts of these vessel are presented in Tables 36.B and 37.B and their average revenue per vessel are presented in Tables 38.B and 39.B, respectively. 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. Tables 36.B-39.B provide an alternative tabulation of vessel counts and average revenues than what has been used to assemble Tables 36-39 where small entity status is determined without regard to affiliation. Tables 36.B-39.B utilize information on cooperative affiliations in the AFA pollock, Amendment 80 non-pollock trawl, Central Gulf of Alaska rockfish, Bering Sea & Aleutian Islands crab, and the freezer longliner BSAI Pacific cod fisheries, in addition to known corporate affiliations. For vessels in these affiliations, group revenues totaling over $4 million confers large entity status on all member vessels.

Table 36.B: Number of groundfish vessels that caught or caught and processed more than $4.0 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2008 - 2012 ; 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
2008	Hook & Line	1	18	19	1	33	34	2	33	35
	Pot	13	1	14	33	3	36	37	4	41
	Trawl	39	13	52	91	38	129	107	39	146
	All Gear	53	32	85	124	73	197	145	74	219
2009	Hook & Line	1	16	17	1	26	27	2	26	28
	Pot	7	1	8	26	1	27	28	2	30
	Trawl	35	17	52	91	35	126	103	36	139
	All Gear	42	34	76	116	62	178	130	63	193
2010	Hook & Line	-	19	19	-	36	36	-	36	36
	Pot	9	-	9	27	4	31	30	4	34
	Trawl	38	16	54	87	34	121	103	35	138
	All Gear	47	35	82	114	71	185	133	72	205
2011	Hook & Line	2	15	17	-	32	32	2	32	34
	Pot	9	1	10	31	4	35	34	4	38
	Trawl	39	17	56	94	36	130	104	37	141
	All Gear	48	33	81	125	69	194	138	70	208
2012	Hook & Line	-	11	11	1	31	32	1	31	32
	Pot	9	1	10	29	2	31	34	2	36
	Trawl	41	16	57	89	36	125	104	36	140
	All Gear	50	28	78	118	68	186	138	68	206

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $4.0 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 $4 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. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 37.B: Number of groundfish vessels that caught or caught and processed less than $4.0 million ex-vessel value or product value of groundfish and other species by area, vessel type and gear, 2008 - 2012 ; 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
2008	Hook & Line	608	4	612	45	8	53	630	9	639
	Pot	130	-	130	32	4	36	146	4	150
	Trawl	34	1	35	18	2	20	43	2	45
	All Gear	737	5	742	90	12	102	778	13	791
2009	Hook & Line	608	6	614	38	15	53	624	17	641
	Pot	115	1	116	25	3	28	130	3	133
	Trawl	36	1	37	19	1	20	45	1	46
	All Gear	718	8	726	79	17	96	755	19	774
2010	Hook & Line	616	3	619	41	3	44	630	4	634
	Pot	102	-	102	20	3	23	111	3	114
	Trawl	29	1	30	16	1	17	38	1	39
	All Gear	715	4	719	75	7	82	746	8	754
2011	Hook & Line	690	5	695	45	4	49	708	6	714
	Pot	134	-	134	22	1	23	145	1	146
	Trawl	29	-	29	11	-	11	36	-	36
	All Gear	813	5	818	76	5	81	843	7	850
2012	Hook & Line	561	4	565	30	3	33	575	7	582
	Pot	115	-	115	23	3	26	129	3	132
	Trawl	29	1	30	21	-	21	41	1	42
	All Gear	666	5	671	70	5	75	701	10	711

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $4.0 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 $4 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.B: Average revenue of groundfish vessels that caught or caught and processed more than $4.0 million ex-vessel value or product value of groundfish and other species, by area, vessel type, and gear, 2008 - 2012 ; entity size based on vessel revenues and affiliated group revenues ($ millions)

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2008	Hook & Line	-	7.36	-	6.97	-	6.97
	Pot	4.4	*	4.41	*	4.4	*
	Trawl	*	15.83	5.43	26.44	5.43	25.87
2009	Hook & Line	-	5.36	-	5.26	-	5.26
	Pot	-	*	-	*	-	*
	Trawl	-	14.03	5.43	22.43	5.43	21.94
2010	Hook & Line	-	6.15	-	6.35	-	6.35
	Pot	*	-	*	*	*	*
	Trawl	-	17.9	*	25.17	*	24.59
2011	Hook & Line	-	9.18	-	9.42	-	9.42
	Pot	*	*	5.04	*	5.04	*
	Trawl	*	23.57	5.58	34.02	5.58	33.21
2012	Hook & Line	-	8.38	*	8.36	*	8.36
	Pot	*	-	4.66	*	4.66	*
	Trawl	*	23.83	5.17	33.67	5.17	33.67

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $4.0 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 $4 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 39.B: Average revenue of groundfish vessels that caught or caught and processed less than $4.0 million ex-vessel value or product value of groundfish and other species, by area, vessel type and gear, 2008 - 2012 ; entity size based on vessel revenues and affiliated group revenues ($ millions)

		Gulf of Alaska		Bering Sea & Aleutian Islands		All Alaska	
	Gear	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors	Catcher Vessels	Catcher Processors
2008	Hook & Line	0.46	1.51	0.56	2.31	0.45	2.29
	Pot	0.75	-	0.98	1.8	0.75	1.8
	Trawl	1.21	*	1.64	*	1.4	*
2009	Hook & Line	0.36	2.5	0.57	2.5	0.36	2.39
	Pot	0.52	*	0.73	*	0.53	*
	Trawl	0.72	*	0.97	*	0.83	*
2010	Hook & Line	0.46	*	0.88	*	0.47	*
	Pot	0.66	-	1.23	*	0.69	*
	Trawl	1	*	1.21	*	1.09	*
2011	Hook & Line	0.51	1.29	0.91	2.04	0.52	1.54
	Pot	0.87	-	1.76	*	0.92	*
	Trawl	1.37	-	2.03	-	1.57	-
2012	Hook & Line	0.48	1.28	0.87	*	0.48	1.28
	Pot	0.69	-	1.23	*	0.74	*
	Trawl	1.19	*	1.65	-	1.39	*

Notes: Includes only vessels that fished part of federal groundfish TACs. Determination that a vessel is above the $4.0 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 $4 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.

Research and Data Collection Project Summaries and Updates
2013 Groundfish SAFE Report

Markets and Trade

Economic Indices for the North Pacific Groundfish Fisheries: Calculation and Visualization.

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Fisheries markets are complex; goods have many attributes such as the species, product form, and 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 they are 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 forthcoming technical report, Fissel (2013) "Economic Indices for the North Pacific Groundfish Fisheries: Calculation and Visualization", details the methods used for creating the indices.

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 of the market data available to, and used by, industry participants for a set of highly valuable and commonly caught species in Alaska. A secondary goal is to develop connections through outreach that could facilitate future data collection and possibly make available new sources of data. Better knowledge of the market data that drive the business decisions for many of the harvesters and processors operating in the region will help guide future data collection efforts.

We observe changes in product composition among processors or in species composition among harvesters, but often have difficulty modeling and explaining the underlying reasons for such changes because we lack knowledge of the data on which these decisions were based. Were they driven by market prices, market volume, prices of substitute products, biology, regulations, or myriad of other possibilities? How does industry track this information over time? Similarly, when we observe shocks in abundance, weather/climate, fish or fuel prices, or participation in a given fishery we are typically uncertain about how the industry will respond and what potential "spillover effects" may arise. One goal of this project is to collect sufficient market information to allow AFSC staff to better understand how to specify, and ultimately estimate, estimates of supply and demand elasticities associated with various species and product forms. Constructing such estimates requires one to have a solid understanding of the factors determining the market prices observed. More generally, through this project we seek information on the specific markets and data required to effectively model the price formation process. Furthermore, we believe there would be a broad range of positive outcomes associated with this project, including improving our staff's understanding of fishery markets in Alaska (thus improving our research and analysis), building relationships with fishing industry participants outside of the context of onerous data collection programs, and providing information on global seafood markets that would also be beneficial for other regions that harvest substitute products. We will be partnering with seafood industry professionals over the coming year to help inform this effort.

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.

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 and 2013.

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 the following: 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 and during the spring of 2013 to collect data for the 2012 season. At present, the data for the 2011 season are being analyzed, and the 2012 season's data are being validated. Once the initial data summarization and analysis is complete and population-level estimates are generated, additional analyses of the data to better understand the economics of the charter boat operator sector will begin. 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. The survey will be repeated in 2014 to collect data for the 2013 season.

Conservation Values in Marine Ecosystem-Based Management

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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 facilitates trade-offs between benefits from conservation and conventional commercial uses. We foreshadow these challenges using empirical estimates of the benefits and costs of conservation actions for the endangered western stock of the Steller Sea Lion (wSSL) in Alaska. We show that the public's conservation values for wSSL can be much greater than the economic gains from commercial fisheries (e.g., up to ~8 times for one large fishery). The discrepancy highlights the forthcoming politically-contentious decisions on the allocation of ocean resources and our analysis highlights the critical research gaps needed to better inform these decisions. Our findings provide a starting point for a much needed conversation 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 ocean resources than the status quo. The paper describing this research was published in *Marine Policy*.

References:

Sanchirico, James, Daniel K. Lew, Alan Haynie, David Kling, and David F. Layton (2013). "Conservation Values in Marine Ecosystem-Based Management." *Marine Policy*, 38: 523-530.

Cook Inlet Beluga Whale Economic Valuation Survey

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The purpose of this project is to develop and test survey materials that can be used to collect 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 http://www.fakr.noaa.gov/protectedresources/whales/beluga/management.htm#esa for more details). The public benefits associated with protection actions for the Cook Inlet beluga whale are substantially the result of the non-consumptive value people attribute to such protection. This includes active use values associated with being able to view beluga whales and passive use, or "existence," values unrelated to direct human use. No empirical estimates of these values for Cook Inlet beluga whales are currently available, but this information is needed for decision makers to more fully understand the trade-offs involved in evaluating population recovery planning alternatives and to complement other information available about the costs, benefits, and impacts of alternative plans (including public input).

Considerable effort was invested in developing the survey instrument and testing it. 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 and a contractor was selected to administer the full survey. PRA clearance for the full survey implementation was obtained in spring 2013, and the full survey is currently being fielded.

References:

Dillman, Don A., Jolene D. Smyth, and Leah Melani Christian (2009). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. 3rd edition. Hoboken, New Jersey: John Wiley and Sons.

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 Alaskan 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 sport fishing demand in Southeast Alaska. The third paper (Larson and Lew, 2012) is primarily a methodological one, 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. The first paper has been published in *Land Economics*, the second paper at *Marine Resource Economics*, and the last paper is currently under revision at a peer-reviewed journal.

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.

References

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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 them, of 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 the fact 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 potential catch (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, and potential 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 2013) summarizing these results will be submitted to a peer-reviewed journal.

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.

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Geospatial Aspects of Non-Market Values for Threatened and Endangered Marine Species Protection

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One issue that arises in applying non-market values in policy settings is defining the extent of the economic jurisdiction – the area that includes all people who hold values – for a good or service. In this 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 (2013), we compare estimates for two geographically embedded samples: households on the west coast of the U.S. and households throughout the nation. We statistically compare species values between the two samples to help determine the extent of and variation in the economic jurisdiction for endangered species recovery. Our findings offer support to the tenet that the summation of non-market values across the country is appropriate when evaluating alternative policies for endangered species recovery. The paper reporting these results is currently under review at 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. 2013). 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 under AFSC review and will submitted to *Land Economics*.

The Economic Impacts of Technological Change in North Pacific Fisheries

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Throughout the history of fishing, 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. For example, early advances in refrigeration made fish stocks far offshore commercially feasible which was furthered later by advances in at-sea processing. Similarly, early advances in materials made nets stronger and lighter thereby enabling larger nets and tows, and reducing per-unit-effort costs. Recent technological advances in on-board computers have increased the detection and tracking of stocks, which also potentially reduces costs. Technology induced changes in the feasibility and efficiency of fishing can impact the composition and behavior the fishing fleet. Fissel and Gilbert (2013) 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 collected historically. 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 2014. 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 and to understand the trade-offs of fishing in different locations. This knowledge can improve predictions of how fishers will respond to the creation of marine reserves, to 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.

An initial step 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 will enable new models to be more easily and robustly tested and applied when the advances lead to improved predictions of fisher behavior. FishSET efficiently organizes statistical code so that leading innovators can build on each other's work and methods can be widely available to economists and managers. Pilot projects that utilize FishSET are under 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.

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. In the Bering Sea pollock fishery, Chinook and chum salmon bycatch reduction measures have consisted principally of area closures, although a Chinook salmon bycatch hard cap with individually 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 reduce chum bycatch, including evaluating means to improve industry-imposed RHS closures. In this paper, we quantify the reduction in bycatch following the implementation of actually RHS closures. Additionally, we simulate the impacts of dynamic bycatch closures in historical periods when closures were not in place and compare the relative effectiveness of different dynamic closure system characteristics. We also briefly discuss the hard cap and incentive plan agreements that were put in place in 2011 to reduce Chinook salmon bycatch. This work is part of on-going NPFMC consideration of chum bycatch measures and is also expected to be submitted as a manuscript to a scientific journal.

The Role of Economics in the Bering Sea Pollock Fishery's Adaptation to Climate Change

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One component of the Bering Sea Integrated Ecosystem Research Project (BSIERP) is a spatial economic model that predicts changes in fishing activity in the Bering Sea pollock fishery that may result from climate change. Seasonal sea ice in the Bering Sea is predicted to decrease by 40% by 2050, resulting in more frequent warm years characterized by reduced winter ice cover and a smaller cold pool (<1.5ºC bottom temperature). Retrospective data from the pollock catcher/processer fishery were used to study the behavior of harvesters in past climate regimes to make inferences about future behavior in a warmer climate. We found that in the pollock fishery large differences in the value of catch resulting from the pursuit of roe-bearing fish in the winter fishing season result in disparate behavior between the winter and summer fishing seasons. In the winter season, warm years and high abundances drive more intensive effort early in the season to harvest earlier-maturing roe. In the summer season, a smaller cold pool and high abundances are correlated with decreased effort in the northern reaches of the fishing grounds. Spatial price differences are associated with changes in the distribution of effort of approximately the same magnitude. Although biological evidence suggests that the predicted increased frequency of warmer regimes may result in decreasing abundances, the historical data is insufficient to predict behavior in warm, low abundance regimes. This paper provides insight into the economic drivers of the fishery, many of which are related to climate, and illustrates the difficulty in making predictions about the effects of climate change on fisheries with limited historical data. This manuscript was published in 2013 in the *Canadian Journal of Fisheries and Aquatic Sciences.*

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Changing Usage and Value in the Western Alaska Community Development Quota (CDQ) Program

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An important element of fishery management in the United States North Pacific is the existence of community development quotas (CDQs) which grant community development corporations the right to fish in many fisheries in and off Alaska. The Eastern Bering Sea (EBS) pollock fishery is the largest of these fisheries, with 10 percent of quota allocated to CDQs. The CDQ program evolved from a partial catch share program within a limited-entry fishery that existed from 1992-1999 to a catch share with separate spatial rights. This paper examines the temporal and spatial uses of CDQ rights and how these uses have changed since the creation of catch shares in the entire fishery. We discuss the dispersion of CDQ royalties since the program's inception and examine the prices of CDQ fishing rights from 1992-2005 when data on quota value was reported to the government. We compare prices to information about pollock fishing conditions and the changing use of the CDQ right. 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. The results of this research will be submitted to a special volume of *Fisheries Science*.

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 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 2°C 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 its 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 harvesters' decisions about where to fish and their expected revenue.

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. Presentations and posters on aspects of this work were presented at several forums, including the Alaska Marine Science Symposium, the Ecosystem Studies of Sub-Arctic Seas meetings and the American Fisheries Society annual meetings. Work is on-going on a manuscript which 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. We conclude with a discussion of policy considerations. Results of this work will be published in a scientific journal. We will also work with the NMFS Alaska Regional Office to attempt to improve the Region's spatial effort database.

Income Diversification and Risk for Fishermen

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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.

The increasing access restrictions in many marine fisheries through license reductions and moratoriums have the potential to limit fishermen's ability to diversify their income risk across multiple fisheries. Catch share programs often result in consolidation initially and may reduce diversification. However, catch share programs also make it feasible for fishermen to build a portfolio of harvest privileges and potentially reduce their income risk. Therefore, catch share programs create both threats and opportunities for fishermen wishing to maintain diversified fishing strategies. This work was published in 2013 in the *Proceedings of the National Academy of Sciences*.

Productivity Growth and Product Choice in Fisheries: the Case of the Alaskan Pollock Fishery Revisited

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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 who 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, a few of which have focused on the large vessels that both catch and process fish onboard (catcher-processors). In this study we modify existing approaches to account for the unique decision making process characterizing catcher-processor’s production technologies. In particular, we focus 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. Our 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.

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 multi-species 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 these feedbacks 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.

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 toward implementing these approaches given our current understanding of the biological complexities of the ecosystem along with 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. Using dual estimation methods, 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.

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 and it relies on global markets as a primary source of revenue. Thus, an economic assessment of rationalization should consider the effects of global market conditions on benefits and costs. This research also 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 the 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. This model and methodology is being extended and refined for application to the Alaska H&G sector in two ways. First, it utilizes 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 has been disaggregated based on export values and quantities compiled from NMFS trade statistics (i.e., US Merchandise Trade Statistics) for select species and market categories.

To date, the following tasks have been completed:

1) The contractors met with the members of the AM80 H&G fleet to introduce the project and to determine whether owners or their representatives had significant concerns about the release of confidential data from the AM80 EDR to the contractors. The contractors submitted a report of these visits to AFSC.

2) The contractors obtained access to anonymous expenditure and revenue data from Economic Data Reports (EDR), Commercial Operators' Annual Reports (COAR) and Weekly Production Reports (WPR) representing activities of individual vessels in the H&G fleet.

3) The contractors created and distributed a survey to the H&G fleet to estimate the geographic distribution of the vessel expenditures reported in the EDR summaries. Responses to the survey were used to distribute certain expenditures by the H&G fleet to the region of origin.

4) The team contacted each of the vessel owners/operators within the fleet to confirm receipt of the surveys. Follow-ups have led to survey responses from more than half of the group. The contractors also contacted approximately ten vessel owner/operators to follow up on responses to the geographical distribution of vessel expenditures.

5) During these contacts the contractors also asked certain vessel owners/operators about their potential responses to exogenous change in the world seafood market, such as switching from one product form to another, or from one market to another. The findings from these contacts were summarized in a report.

6) The contractors also (i) compiled and aggregated the EDR data on expenditures by the H&G sector, (ii) compiled and aggregated data on H&G sector production and exports (WPR, COAR and Exports data), and (iii) constructed aggregated fishery sector production functions, trade and export accounts.

7) Drs. Seung and Waters used the assembled data to develop a multiregional SAM (MRSAM) model which features operations of the Alaska H&G fleet and other Alaska and West Coast fishery sectors.

Currently Drs. Seung and Waters are conducting simulations using the MRSAM to model the H&G sector's contribution to the Alaska and West Coast regional economies, and estimate effects of selected demand-side and supply-side shocks to the H&G industry. Results from the simulations will be documented in the final project report. A final meeting with industry representatives is being scheduled.

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Accounting for Variation in Exogenous Shocks in Economic Impact Modeling

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Expenditure and activity level inputs in regional economic impact models of outdoor recreation (e.g., recreational fishing) are generally estimates calculated from survey data, behavioral models, or other sources. However, the stochastic variability of these input estimates is traditionally ignored once they enter the economic impact models. As a consequence, the results of impact models generally do not reflect the inherent variability in the inputs and may be perceived to be more precise than the data would suggest.

Very little has been done to formally incorporate input variability into the economic impact models. Sensitivity analysis has been the primary means for acknowledging uncertainty surrounding the inputs of economic impact models, but is dependent upon the researcher's knowledge of the appropriate range of values to include. The only formal treatment of this issue in the literature is work by English (2000) and Weiler et al. (2003). English (2000) used sample bootstrapping methods to account for sampling variation of recreation-related expenditures and integrated the variation into an IO model of the impact of recreational visits to the Florida Keys. Accounting for the sampling variation led to 90% confidence intervals with endpoints for the total regional output that were 6 to 16% above and below the point estimate of the total regional output in the original sample. Weiler et al. (2003) addressed the variability from model estimates in exogenous shocks from a recreation demand model. Instead of employing bootstrapping or other simulation-based approaches, they constructed confidence intervals using the estimated covariance from a regression model for the change in the number of spending units (visitors) and calculated the range of regional economic impacts using an IO model on the economic activity of a National Park gateway community.

In this research we account for variation in both recreation-related expenditures and recreation participation estimates using bootstrapping and other simulation-based approaches to calculate confidence intervals of regional economic impacts generated from a regional computable general equilibrium (CGE) model used to assess the impacts of a change in fishing bag limit (i.e., two fewer halibut). The resulting economic impacts are presented as confidence intervals and capture the stochastic variation in the inputs to the model. Our empirical application uses data on non-resident saltwater anglers' expenditures in two major regions of Alaska: Southcental Alaska and Southeast Alaska. We also conduct sensitivity analysis for trade-related elasticities used in the CGE model.

The results suggest that the distribution of total economic impacts (as measured by the confidence intervals of total regional output) is significantly wider when both the stochastic variation of expenditure estimates and recreation participation estimates are accounted for, compared to when only the variation in expenditure estimates is considered. Second, the sensitivity analysis indicates that total economic impacts can change significantly depending on the magnitudes of the elasticity values used. In making decisions regarding natural resource management, decision makers should recognize the sensitivity of impact estimates to stochastic variations in the originating input sources. Results from this study indicate that the range of regional economic impacts from outdoor recreation could be much wider than regional scientists and decision makers have previously thought, and emphasize the importance of being aware of the caveats in interpreting the economic impact results that are used in natural resource management decisions. This paper is forthcoming in *The Annals of Regional Science* (Seung and Lew, 2013).

Extending this research, we also constructed confidence intervals using results on total economic impacts of three additional hypothetical fishing bag limit changes (i.e., one fewer Chinook salmon, one fewer coho salmon, and one fewer halibut) as well as those from two fewer halibut. The economic impacts were calculated with a regional social accounting matrix (SAM) model. The resulting paper is under review at a peer-reviewed journal.

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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. A contractor (or contractors) will be hired to conduct these surveys.

To obtain these data it is necessary to collect information from a sample using mailout or other survey instruments and to estimate the population parameters (e.g., total labor expenditures for harvesting and processing sectors) using statistical procedures. Economists are inclined to use simple random sampling (SRS) or stratified sampling methods. However if the distribution of activity within harvesting or processing sectors is very skewed or dominated by a small number of participants, an SRS would be likely to cover only a small portion of total activity and therefore be biased or misleading. Consequently to avoid bias in estimates of these population parameters, it is necessary to use an unequal probability sampling (UPS)[see Brewer and Hanif 1983, Rosén 1997, Seung 2010] in which the selection probability of each sampling unit is proportional to its relative output level (e.g., share of total fishery ex-vessel or ex-processor values). UPS methods will be used to (i) determine the sample size for fish harvesting and processing sector; and (ii) estimate population parameters of the variables of interest (e.g., employment, labor earnings, and cost of intermediate inputs such as fuel). In determining sample sizes, we will use ex-vessel revenues and ex-processor revenues as proxy indicators of economic activity. These values are available from existing data sources (CFEC, AKFIN). 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 followup. Survey recipients will be given a list of rough percentages of total revenue they may 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. Via the information collected on the location of input purchases this research will also enable estimation of 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). Currently, Jean Lee is generating information on ex-vessel revenues of all vessels landing fish in Southwest region. This information will be used to conduct UPS. Developing, pretesting, and administering the survey will follow along with preparing the Paperwork Reduction Act documents.

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Socioeconomic, Cultural and Community Analyses

Updating the North Pacific Fishing Community Profiles

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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 Science 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, 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, as well as information collected from communities in the Alaska Community Survey, a questionnaire designed to collect information from communities about their specific infrastructure available, revenue sources, and other characteristics not available in other databases, as well as their needs and concerns related to their dependence on fishing. 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 webmapping tool. The user is also able to download each community's provide and non-confidential data associated with it.

Draft versions of the regional profiles and community profiles, and access to the interactive webmaps, are available on the AFSC website: http://www.afsc.noaa.gov/REFM/Socioeconomics/Projects/CPU.php.

Developing Comparable Socio-economic Indices of Fishing Community Vulnerability and Resilience for the Contiguous US and Alaska

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Fishing communities exist within a larger coastal economy. Therefore, the ability to understand the context of vulnerability to social factors is critical to understanding how regulatory change will be absorbed into these multifaceted communities. Creating social indicators of vulnerability for fishing communities provides a pragmatic approach toward standardization of data and analysis for assessment of some of the long term effects of management actions. Historically, the ability to conduct such analysis has been limited due to a lack of quantitative social data. Over the past two years, social scientists working in NOAA's Alaska, Northeast and Southeast 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). In addition, a social scientist at the Northwest Fisheries Science Center is in the early stages of developing similar indicators for the west coast and is expected to have them completed by the time the results are needed for the proposed project. The Northeast Fisheries Science Center (NEFSC) and Southeast Regional Office (SERO) have developed a set of social indices using secondary data for nearly 3,000 coastal communities in the Eastern U.S. and Gulf Coast (Jepson and Colburn, *In prep*).

The Alaska Fisheries Science Center (AFSC) has developed similar 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 the NEFSC and SERO. To the extent feasible, the same sources of data are being used in order to allow comparability between regions. However, initial comparisons indicate that resource, structural and infrastructural differences between the NE and SE and Alaska will require modifications of each of the indices to make them strictly comparable. The data are being analyzed using principal components analysis, 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 social indices are intended to improve the analytical rigor of fisheries Social Impact Assessments, through analysis of 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.

Currently, we are actively recruiting stakeholder feedback through a groundtruthing exercise to adapt the current methodology so that a new set of indices can be created that will enable comparisons across these regions and eventually, nationwide. This will allow cross regional analysis of fishing community vulnerability and resilience and testing of the validity of the results through in-community education and outreach. Modifications to the methodology will be made based on community feedback. Thus far, groundtruthing fieldwork has been done on the Kenai Peninsula in Seldovia, Port Graham, Kenai and Soldotna, and on Kodiak Island in Kodiak, Ouzinkie and Port Lions. In September, our team of researchers will be headed to the Bristol Bay area to visit additional communities.

Groundtruthing the results will facilitate the use of these tools by the AFSC, NOAA's Alaska Regional Office and the North Pacific Fishery Management Council staff to analyze the comparative vulnerability of fishing communities across Alaska to proposed fisheries management regulations, in accordance with NS8. This research will provide policymakers with an objective and data driven approach to support effective management of North Pacific fisheries.

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Jepson, Michael and Lisa 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 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.

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 is under review at the journal *Global Environmental Change* and is expected to be published in 2014.

AFSC Economics and Social Sciences Research Program
Publication List for Full-Time Staff (names in bold), 2007-2013

2013

Published or In Press

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. LaRivievre. 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.

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. and **D. Lew**. 2013. "Accounting for Variation in Exogenous Shocks in Economic Impact Modeling." In press at *The Annals of Regional Science*. DOI 10.1007/s00168-012-0550-0

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.

Seung, C. 2013, “Measuring Spillover Effects of Shocks to Alaska Economy: An Interregional Social Accounting Matrix (IRSAM) Model Approach” In press. *Economic Systems Research*. DOI:10.1080/09535314.2013.803039

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.

Submitted for Publication

Dalton, M. 2013. "Simulated Maximum Likelihood Estimation of the Panel Tobit Model with Dynamic Variables, Autocorrelation, and Fixed Effects." Under revision at *Journal of Econometrics*.

This paper analyzes a simulated maximum likelihood estimation method for censored panel data using a Tobit model with lagged dependent variables, autocorrelation, and fixed effects. This method is based on a first-difference transformation of each dynamic Tobit likelihood function, and a mathematically simple filter for autocorrelation in the likelihood simulator that depends on initial conditions in the model. Results of Monte Carlo simulations show that estimates are accurate for large N or T, and do well in short panels, with T on order of 5 or 10, if N is large enough.

Fissel, B. 2013. “An Economic Metapopulation Model with Regime Change.” Under revision after internal review. Under review at *Natural Resource Modeling*.

Spatial heterogeneity is a characteristic of most physical processes such as winds, currents and temperature. Furthermore, many of these physical processes are cyclic in nature. This paper introduces a bioeconomic resource model that accounts for both these empirical facts. The optimal economic resource exploitation policy is derived, explicitly showing the impact of spatial connectedness. The impacts of ignoring spatial connectedness and heterogeneity are analyzed through the simulation by alternative spatial policies which chacaterize the effect on economic variables and resources stock. In general, policies that ignore the connectedness and treat areas as distinct have small adverse economic impacts and larger adverse stock effects. Policies that ignore connectedness and heterogeneity by treating distinct spatial areas as one homogenous unit have a larger adverse economic impact and a smaller adverse stock effect. Results are amplified when the asynchronous variation (heterogeneity) between areas becomes less correlated and when dispersal (connectedness) is high.

Fissel, B. and B. Gilbert. 2013. "Exogenous Productivity Shocks and Capital Investment in Common-pool Resources." Under review at *Review of Economics and Statistics*.

We model exogenous technology shocks in common-pool industries using a compound Poisson process for total factor productivity. Rapid diffusion of exogenous innovations is typical in the commons, but technology is rarely modeled this way. With myopic expectations, technology shocks cause entry and capital buildup despite a smaller steady state resource stock. For a renewable resource with logistic growth, the steady state changes from a stable node to a shifting focus with boom and bust cycles, even if only technology is uncertain. An empirical application from the Norwegian winter herring fishery illustrates these predictions.

Fissel, B. and Y. Sun. 2013. "Optimal Threshold Selection for Realized Volatility Forecasts in the Presence of Jumps." Submitted to the *Journal of Financial Econometrics.*
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1714744.

When estimating and forecasting realized volatility in the presence of jumps, a form of bias-variance tradeoff is present in the selection of the truncation threshold. We propose an optimal method for threshold selection that minimizes the out-of-sample forecasting loss. The use of a forecasting framework is fundamentally different from the testing framework in the literature. We find that a priori large truncation thresholds may not be optimal from a forecasting perspective and smaller thresholds should be used. An extensive simulation study and an empirical application to S&P 500 futures demonstrate the effectiveness of the proposed method.

Haynie, A.C. and **L. Pfeiffer**. 2013. "Climatic and Economic Drivers of the Bering Sea Pollock Fishery." Under review at *Canadian Journal of Fisheries and Aquatic Sciences.*

The Bering Sea pollock (*Theragra chalcogramma*) fishery may be affected dramatically by climate change. Sea ice is predicted to decrease by 40% by 2050, resulting in warmer ocean temperatures. Retrospective data from the pollock catcher-processer fishery were used to make inferences about future harvester behavior in a warmer climate. We find that large differences in the value of catch result in disparate behavior between the 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 and high abundances are correlated with decreased effort in the north of the fishing grounds. Spatial price differences also affect the distribution of effort. Although biological evidence suggests that warmer regimes may result in decreasing abundances, the retrospective data is insufficient to predict behavior in warm, low-abundance regimes. This paper provides insight into the economic drivers of the fishery, many of which are related to climate, and illustrates the difficulty in making predictions about the effects of climate change with limited historical data.

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. Under revisions for as a NOAA Tech Memo.

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 make up), 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. and **S. Kasperski**. 2013. “Using Indicators to Assess the Vulnerability and Resiliency of Alaskan Communities to Climate Change.” Under review at *Global Environmental Change.*

Communities in Alaska are experiencing impacts of unexpected climate-related changes and unprecedented environmental conditions on the harvests of marine and terrestrial resources. Residents of rural Alaska are already reporting heretofore unseen changes in the geographic distribution and abundance of fish and marine mammals, increases in the frequency and ferocity of storm surges in the Bering Sea, changes in the distribution and thickness of sea ice, and increases in river and coastal erosion. When combined with ongoing social and economic change, climate, weather, and changes in the biophysical system interact in a complex web of feedbacks and interactions that make life in rural Alaska extremely challenging. The purpose of this study is to develop a framework of indicators to assess the vulnerability, resilience and adaptability of Alaskan communities to climate change. The framework developed here can also be applied more generally through indicators that assess community vulnerability and resiliency to sea level rise, drought, storm intensity, and other likely impacts of climate change. These indicators can help inform how best to allocate resources for climate change adaptation.

Kasperski, S. 2013. "Optimal Multi-species Harvesting in Ecologically and Economically Interdependent Fisheries." Under review at the *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.

Larson, D., and **D. Lew**. 2013. “The Opportunity Cost of Travel Time as a Noisy Wage Fraction.” Under revision at the *American Journal of Agricultural Economics*.

Few issues are more important to welfare estimation with recreation demand models than the specification of the opportunity cost of travel time (*oct*). While the *oct* is sometimes estimated, it is more commonly predetermined by the researcher as a specific fraction of the recreationist’s wage. Recognizing that information limitations can preclude more general approaches, we show that the joint recreation travel-labor supply model leads to, under relatively modest assumptions, a specification of the *oct* as a wage fraction with noise, which is straightforward to implement as part of random parameters-based recreation demand models. We then evaluate the welfare consequences of using the two approaches commonly seen in the literature, which are special cases of the noisy wage fraction specification. Our results suggest that the more critical restriction to relax in *oct* specifications is the absence of noise in the *oct*, rather than the specific level of the wage fraction.

Lew, D. and **C. Seung**. 2013. "On the Statistical Significance of Regional Economic Impacts from Changes in Recreational Fishing Harvest Limits in Southern Alaska." Under review at *Marine Resource Economics.*

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.

Seung, C. , E. Waters., and J. Leonard. 2013. "Economic Impacts of Alaska Fisheries: A Multiregional Computable General Equilibrium (MRCGE) Analysis." Under review at *Review of Urban and Regional Development Studies*.

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. 2013. "Modeling Exogenous Output Changes: An Application of a Multiregional Social Accounting Matrix (MRSAM) Analysis to Alaska Fisheries." Under review at *Papers in Regional Science*.

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.

Wallmo, K., and **D. Lew**. 2013. "Public Preferences for Endangered Species: An Examination of Geospatial Scale and Non-Market Values." Under review at *Conservation Letters*.

Non-market valuation allows society to express their preferences for goods and services whose economic value is not reflected in traditional markets. One issue that arises in applying non-market values in policy settings is defining the extent of the economic jurisdiction – the area that includes all people who hold values – for a good or service. In this paper we estimate non-market values for recovering eight threatened and endangered marine species in the US for two geographically embedded samples: households on the west coast of the US and households throughout the nation. We statistically compare species values between the two samples to help determine the extent of and variation in the economic jurisdiction for endangered species recovery. Our findings offer support to the tenet that the summation of non-market values across the country is appropriate when evaluating alternative policies for endangered species recovery.

Completed but not yet submitted for publication

Dalton, M. 2013. "Metapopulation Maximum Economic Yield."

Metapopulation maximum economic yield (MMEY) includes search costs for fishing a spatially separated stock. For slowly growing stocks, MMEY is more conservative than maximum sustainable yield (MSY), but conventional MEY is not for some discount rates less than 5%. Numerically, MMEY is stable for intrinsic growth rates that are an order of magnitude smaller than those computable with conventional MEY. Conservation under MMEY increases for smaller growth rates, but conventional MEY is less conservative, which underestimates conservation benefits for slowly growing metapopulations.

Dalton, M. and A.E. Punt. 2013. "Rational Expectations in Fisheries Revisited: Maximum Economic Yield with Uncertain Recruitment and Population Dynamics for the Eastern Bering Sea Snow Crab Fishery."

A size-structured population dynamics model for the Eastern Bering Sea snow crab fishery was linked to bioeconomic rational expectations model to compare outcomes based on maximum sustainable yield, competitive (i.e., industry) equilibrium, and maximum economic yield (MEY). The population dynamics model provides a structural foundation for biological parameters in the bioeconomic rational expectations model. If costs are a sufficiently large fraction of ex-vessel prices, then stock size at MEY converges to a level that is more conservative (i.e., greater than) the stock size at MSY. However, if costs are a small fraction of ex-vessel prices than the rational expectations competitive equilibrium and MEY are not sustainable. In this case, a total allowable catch based on MSY is necessary, which is implemented in the bioeconomic rational expectations model with a quota share lease rate. The quota share lease rate that implements the TAC depends on behavioral assumptions in the bioeconomic rational expectations model. The quota share lease rate is greater for a rational expectations competitive equilibrium than for a single cooperative which corresponds to the MSY-constrained MEY outcome. Therefore, vessels have an incentive to cooperate for the purpose of economizing on quota share lease payments.

R. Felthoven, J. Lee, and K. Schnier. 2013. "Cooperative Formation and Peer Effects in the Alaskan Crab Fisheries."

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. 2013. "Economic Indices for the North Pacific Groundfish Fisheries: Calculation and Visualization."

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.

Johnston, R., D. Jarvis, K. Wallmo, and **D. Lew**. 2013. "Characterizing Large Scale Spatial Pattern in Nonuse Willingness to Pay: An Application to Threatened and Endangered Marine Species."

This paper demonstrates a suite of analytic methods that may be used to characterize otherwise undetectable spatial heterogeneity 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 which emerge. Relevant findings include previously unobserved, large scale clustering of nonuse WTP estimates that appears at multiple scales of analysis.

Kasperski, S. 2013. "The Impact of Trade on Biodiversity."

Economic activity has been cited as a leading threat to global biodiversity. International trade serves as a platform for the introduction of alien species and foreign diseases, which have the potential to outcompete and infect native species. This study uses a panel dataset to show that countries which trade more intensively (as a percentage of GDP) have a statistically significantly lower number of endemic bird species (species whose natural range is contained within a single country). Countries with higher trade intensities also have statistically significantly more non-endemic mammal and plant, but not bird, species. Trade intensity is found to have a positive and statistically significant impact on the number of threatened bird species in a country, which could be viewed as a global bad. These results suggest that countries devote additional resources to more effective prevention and removal of non-native species introduced via international trade.

Kasperski, S. 2013. "Optimal Multi-species Harvesting in the Presence of a Nuisance Species."

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 biological and technological 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.

Kasperski, S, S. Gmur, **A. Haynie**, and C. Faunce. 2013. “The Utility of Daily Fishing Logbook Data Towards Fisheries Management in Alaska.”

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.

Kling, D., J. Sanchirico, **A. Haynie**, and **D. Lew**. 2013. “Spatial-Dynamics of Ecosystem-Based Management: The Case of the Steller Sea Lion and Commercial Fisheries in the Aleutian Islands.”

Proposals for marine ecosystem-based management (EBM) generally call on decision-makers to maximize multiple, often conflicting, ecosystem services while taking into account the structure of complex spatial-dynamic ecosystem processes. A common trade-off arises when a predator that provides non-consumptive value depends on a commercially harvested prey species. The existing literature on marine EBM includes few models that can be used to optimize this type of trade-off between services while accounting for relevant ecological and economic structure. To fill this gap, we develop a spatial-dynamic bioeconomic model and calibrate it to the case of the endangered western Steller sea lion (*Eumetopias jubatus*) and the commercial fishery for Atka mackerel (*Pleurogrammus monopterygius*) in the Aleutian Islands. Based on the best-available estimates of willingness to pay for Steller sea lions, we characterize the optimal spatial balance of consumptive and non-consumptive services. Our case study points to the benefits of specialization across space in the production of different ecosystem services. For example, we find potentially counterintuitive optimal policies that involve concentrating commercial fisheries in areas where Steller sea lion populations are depressed but also have the greatest recovery potential. We also identify cases in which the value of nonconsumptive services is likely high enough to justify significantly curtailing Atka mackerel harvest.

Lew, D. and D. Larson. 2013. "Is a Fish in Hand Worth Two in the Sea? Evidence from a Stated Preference Study."

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.

Pienaar, E., **D. Lew**, and K. Wallmo. 2013."The Importance of Survey Content: The Context Dependence of Environmental Concern."

In this paper, we demonstrate that both environmental concern, as measured by the New Ecological Paradigm (NEP) score, and facets of environmental concern, as measured by three NEP factors, are influenced by socio-demographic variables, opinions about government spending, environmental knowledge, existing concern for the environment, and information presented about threatened and endangered marine species protected under the U.S. Endangered Species Act. This last variable provides evidence that measures of environmental concern that are based on the NEP Scale are context dependent. 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 in the survey itself.

Seung, C., **M. Dalton,** and A. Punt. 2013. "Economic Impacts of Changes in an Alaska Crab Fishery from Ocean Acidification."

We develop a bioeconomic model for Bristol Bay Red King crab (BBRKC), and generate yield projections of the crab from 2010 through 2100 both without ocean acidification (OA) (baseline) and with OA. We then use a dynamic computable general equilibrium (CGE) model for Alaska to calculate the effects of the changes in harvests of BBRKC from OA, based on the yield projections, including regional economic impacts, welfare changes, and temporal changes in quota share lease rate for BBRKC. We calculate these economic effects for the three different sets of yield projections: (i) baseline projections without effects of OA, (ii) projections with linear OA effects, and (iii) projections with nonlinear OA effects in the pre-recruitment function. This study shows that model results are very sensitive to the three different sets of projections of BBRKC yields, indicating the importance of correctly specifying the spawner-recruit function. The results are shown to be even more sensitive if we account for the changes in world price of BBRKC.

2012

Abbott, J., and **A. Haynie.** 2012. "What are we Protecting? Fisher Behavior and the Unintended Consequences of Spatial Closures as a Fishery Management Tool." *Ecological Applications* 22(3): 762-777.

Spatial closures like marine protected areas (MPAs) are prominent tools for ecosystem-based management in fisheries. However, the adaptive behavior of fishermen, the apex predator in the ecosystem, to MPAs may upset the balance of fishing impacts across species. While ecosystem-based management (EBM) emphasizes the protection of all species in the environment, the weakest stock often dominates management attention. We use data before and after the implementation of large spatial closures in a North Pacific trawl fishery to show how closures designed for red king crab protection spurred dramatic increases in Pacific halibut bycatch due to both direct displacement effects and indirect effects from adaptations in fishermen's targeting behavior. We identify aspects of the ecological and economic context of the fishery that contributed to these surprising behaviors, noting that many multispecies fisheries are likely to share these features. Our results highlight the need either to anticipate the behavioral adaptations of fishermen across multiple species in reserve design, a form of implementation error, or to design management systems that are robust to these adaptations. Failure to do so may yield patterns of fishing effort and mortality that undermine the broader objectives of multispecies management and potentially alter ecosystems in profound ways.

Babij, E., P. Niemeier, B. Hayum, **A. Himes-Cornell,** A. Hollowed, P. Little, M. Orbach, and E. Pidgeon. 2012. International Implications of Climate Change. Section 5 *In* Oceans and Marine Resources in a Changing Climate: Technical Input to the 2013 National Climate Assessment. U.S. Global Change Research Program: Washington D.C. pp 138-162.

Climate change and marine ecosystems neither begin nor end at the U.S. border. Many marine organisms, such as fish, marine mammals, and seabirds, are highly migratory and do not remain in one jurisdictional boundary. We are currently observing and documenting widespread shifts in the timing, distribution and abundance of many marine resources. Many of these species occupy the United States at some stage of their life cycle and are of conservation concern. As climatic changes become more apparent, and the rate of change potentially increases, habitats and species ranges will continue to shift significantly, expanding their ranges in countries where they were previously absent. Current protected area networks may not match critical sites needed in the future. The focus of much conservation work has historically been on critically endangered species. It is crucial that in light of climate change, attention is also given to ensuring that other species and populations remain robust and resilient to the changes that are projected to occur throughout the marine biome.

Fell, H. and **A. Haynie**. 2012. "Spatial Competition with Changing Market Institutions." *Journal of Applied Econometric*s 28: 702–719. doi: 10.1002/jae.2272.

Competition across space can be fundamentally altered by changes in market institutions. We propose a framework that integrates market-altering policy changes in the spatial analysis of competitive behavior and incorporates endogenous breaks in explanatory variables for spatial panel datasets. This paper fills a gap in the literature between work focusing on spatial price responsiveness of agents and work on changes in market regulations that affect competition. We apply the framework to an important current fishery management policy to explore how a change from aggregate to individual fishing quotas affects the spatial price responsiveness of fish processors

Haynie, A.C. and **L. Pfeiffer**. 2012. "Why Economics Matters for Understanding the Effects of Climate Change on Fisheries." *ICES Journal of Marine Science* doi: 10.1093/icesjms/fss021.

Research attempting to predict the effect of climate change on fisheries often neglects to consider how harvesters respond to changing economic, institutional, and environmental conditions, which leads to the overly simplistic prediction of "fisheries follow fish". However, climate effects on fisheries can be complex because they arise through physical, biological, and economic mechanisms that interact or may not be well understood. Although most researchers find it obvious to include physical and biological factors in predicting the effects of climate change on fisheries, the behavior of fish harvesters also matters for these predictions. A general but succinct conceptual framework for investigating the effects of climate change on fisheries that incorporates the biological and economic factors that determine how fisheries operate is presented. The use of this framework will result in more complete, reliable, and relevant investigations of the effects of climate change on fisheries. The uncertainty surrounding long-term projections, however, is inherent in the complexity of the system.

Himes-Cornell, A. and M. Orbach. 2012. 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, Griffis and Howard (eds.), NOAA Fisheries Service, Wash D.C.

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.

Lew, D. and D. Larson. 2012. "Economic Values for Saltwater Sport Fishing in Alaska: A Stated Preference Analysis." *North American Journal of Fisheries Management* 32: 745-759.

The knowledge of how anglers value their fishing opportunities is a fundamental building block of a sound marine policy, especially for stocks for which there is conflict over allocation between different uses (e.g., allocation between recreational and commercial uses and conservation goals). This paper reports on how recreational saltwater anglers value their catches, and the regulations governing them, of Pacific halibut *Hippoglossus stenolepis*, Chinook salmon *Oncorhynchus tshawytscha*, and coho salmon *O. kisutch* off the coast of Alaska using stated preference choice experiment data from 2007. Using data from a stated preference survey, we estimated the economic value, or willingness to pay, anglers place on saltwater boat fishing trips in Alaska and assess their response to changes in the characteristics of fishing trips. The results show that Alaska resident anglers had mean trip values ranging from US$246 to $444, while nonresidents had much higher values ($2,007 to $2,639), likely reflecting the fact that their trips are both less common and considerably more expensive to take. Nonresidents generally had significant positive values for increases in the 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, which is a current issue facing Alaska marine fisheries managers.

Melnikov, N., B.C. O'Neill, and **M. Dalton**. 2012. "Accounting for Household Heterogeneity in General Equilibrium Economic Growth Models." *Energy Economics* 34(5): 1475–1483.

We describe and evaluate a new method of aggregating heterogeneous households that allows for the representation of changing demographic composition in a multi-sector economic growth model. The method is based on a utility and labor supply calibration that takes into account time variations in demographic characteristics of the population. We test the method using the Population-Environment-Technology (PET) model by comparing energy and emissions projections employing the aggregate representation of households to projections representing different household types explicitly. Results show that the difference between the two approaches in terms of total demand for energy and consumption goods is negligible for a wide range of model parameters. Our approach allows the effects of population aging, urbanization, and other forms of compositional change on energy demand and CO2 emissions to be estimated and compared in a computationally manageable manner using a representative household under assumptions and functional forms that are standard in economic growth models.

O'Neill, B.C., X. Ren, L. Jiang, and **M. Dalton**. 2012. "The Effect of Urbanization on Energy Use in India and China in the iPETS model." *Energy Economics* 34(S3): S339-S345. http://dx.doi.org/10.1016/j.eneco.2012.04.004.

Urbanization is one of the major demographic and economic trends occurring in developing countries, with important consequences for development, energy use, and well being. Yet it is only beginning to be explicitly incorporated in long-term scenario analyses of energy and emissions. We assess the implications of a plausible range of urbanization pathways for energy use and carbon emissions in India and China, using the integrated Population-Economy-Technology-Science (iPETS) model, a computable general equilibrium (CGE) model of the global economy that captures heterogeneity in household types within world regions and into which we have introduced income effects on household consumption preferences. We find that changes in urbanization have a somewhat less than proportional effect on aggregate emissions and energy use. A decomposition analysis demonstrates that this effect is due primarily to an economic growth effect driven by the increased labor supply associated with faster urbanization. The influence of income on household consumption is strong, and indicates a potentially rapid transition away from traditional fuel use and toward modern fuels such as electricity and natural gas. Results also indicate important directions for future work, including the implications of alternative types and driving forces of urbanization over time, a better understanding of possible changes in consumption preferences associated with income growth and the urbanization process, and modeling strategies that can produce disaggregated household consumption outcomes within a CGE framework.

O'Neill, B.C., B. Liddle, L. Jiang, K. Smith, S. Pachauri, **M. Dalton**, and R. Fuchs. 2012. "Demographic Change and Carbon Dioxide Emissions." *The Lancet* 380(9837): 157-164.

Relations between demographic change and emissions of the major greenhouse gas carbon dioxide (CO2) have been studied from different perspectives, but most projections of future emissions only partly take demographic influences into account. We review two types of evidence for how CO2 emissions from the use of fossil fuels are affected by demographic factors such as population growth or decline, ageing, urbanization, and changes in household size. First, empirical analyses of historical trends tend to show that CO2 emissions from energy use respond almost proportionately to changes in population size and that ageing and urbanization have less than proportional but statistically significant effects. Second, scenario analyses show that alternative population growth paths could have substantial effects on global emissions of CO2 several decades from now, and that ageing and urbanization can have important effects in particular world regions. These results imply that policies that slow population growth would probably also have climate-related benefits.

Pfeiffer, L. and **A.C. Haynie**. 2012. "The Effect of Decreasing Seasonal Sea-Ice Cover on the Winter Bering Sea Pollock Fishery." *ICES Journal of Marine Science* 69(7): 1148-1159.

The winter fishing season for eastern Bering Sea pollock (*Theragra chalcogramma*) is during the period of maximum seasonal sea-ice extent, but harvesters avoid fishing in ice-covered waters. Global climate models predict a 40% reduction in winter ice cover by 2050, with potential implications for the costs incurred by vessels travelling to and around their fishing grounds and the value of their catch. Additionally, it may open entirely new areas to fishing. Using retrospective data from 1999 to 2009, a period of extensive annual climate variation, the variation in important characteristics of the fishery is analyzed. When ice is present, it restricts a portion of the fishing grounds, but in general, ice-restricted areas have lower expected profits at the time of restriction than the areas left open. Some areas show a change in effort in warm years relative to cold, but the global redistribution of effort attributable to ice cover is small. This is largely because the winter fishery is driven by the pursuit of roe-bearing fish whose spawning location is stable in the southern part of the fishing grounds.

Punt, A.E., M.S.M Siddeek, **B. Garber-Yonts, M. Dalton**, L. Rugolo, D. Stram, B. Turnock, J. Zheng. 2012. “Evaluating the Impact of Buffers to Account for Scientific Uncertainty when Setting TACs: Application to Red King Crab in Bristol Bay, Alaska.” *ICES Journal of Marine Science* 69(4): 624–634. doi:10.1093/icesjms/fss047

Increasingly, scientific uncertainty is being accounted for in fisheries management by implementing an uncertainty buffer, i.e. a difference between the limit catch level given perfect information and the set catch. An approach based on simulation is outlined, which can be used to evaluate the impact of different buffers on short- and long-term catches, discounted revenue, the probability of overfishing (i.e. the catch exceeding the true, but unknown, limit catch), and the stock becoming overfished (i.e. for crab, mature male biomass, MMB, dropping below one-half of the MMB corresponding to maximum sustainable yield). This approach can be applied when only a fraction of the uncertainty related to estimating the limit catch level is quantified through stock assessments. The approach is applied for illustrative purposes to the fishery for red king crab, *Paralithodes camtschaticus*, in Bristol Bay, AK.

Sethi, S., **M. Dalton**, and R. Hilborn. 2012. Quantitative Risk Measures Applied to Alaskan Commercial Fisheries. *Canadian Journal of Fisheries and Aquatic Sciences* 69(3): 487-498.

Risk measures can summarize the complex variability inherent in fisheries management into simple metrics. We use quantitative risk measures from investment theory to analyze catch and revenue risks for 90 commercial fisheries in Alaska, nearly a complete census. We estimate the relationship between fishery characteristics and catch risk using nonparametric random forest regression to identify attributes associated with high or low risks. Catch and revenue risks for individual Alaskan fisheries are substantial and are higher than farmed food alternatives. Revenue risks are greater than catch risks for most fisheries, indicating that price variability is an additional source of risk to fishermen. Regression results indicate that higher productivity species tend to be higher risk, and there is an increasing gradient of risk moving North and West across Alaskan waters, with the remote Western Bering Sea fisheries tending to have the highest risks. Low risk fisheries generally have large catches, and support larger fleets. Finally, fisheries with greater catch history under some form of dedicated access privileges tend to have lower catch risks.

Sethi, S.A., **Dalton, M.**, Hilborn, R. 2012. Managing Harvest Risk with Catch Pooling Cooperatives. *ICES Journal of Marine Science* 69: 1038-1044.

Catch-pooling cooperatives are a strategy for fishers to manage variability which can be organized independently of a central management agency. We examined the statistical properties of equal-share catch-pooling cooperatives, and tested their potential to mitigate risk using data from two Bering Sea crab fisheries prior to rationalization. The results suggest that small cooperatives of crabbers could have reduced vessel-level catch risk by as much as 40% in the red king crab fishery, but would have been ineffective in the snow crab fishery. Analytical examination of catch variances under cooperatives explains the discrepancy between the two fisheries and demonstrates that variability reduction depends on the degree of correlation amongst participants' catches. In the best-case scenario, catch-pooling cooperatives can diversify away all season to season variation resulting from individuals' luck and skill, leaving only variation in fishery-wide harvest.

Sethi, S.A. and **M. Dalton.** 2012. Risk Measures for Natural Resource Management: Description, Simulation Testing, and R code with Fisheries Examples. *Journal of Fish and Wildlife Management* 3(1): 150-157.

Traditional measures that quantify variation in natural resource systems include both upside and downside deviations as contributing to variability, such as standard deviation or the coefficient of variation. Here we introduce three risk measures from investment theory, which quantify variability in natural resource systems by analyzing either upside or downside outcomes and typical or extreme outcomes separately: semideviation, conditional value-at-risk, and probability of ruin. Risk measures can be custom tailored to frame variability as a performance measure in terms directly meaningful to specific management objectives, such as presenting risk as harvest expected in an extreme bad year, or by characterizing risk as the probability of fishery escapement falling below a prescribed threshold. In this paper, we present formulae, empirical examples from commercial fisheries, and R code to calculate three risk measures. In addition, we evaluated risk measure performance with simulated data, and we found that risk measures can provide unbiased estimates at small sample sizes. By decomposing complex variability into quantitative metrics, we envision risk measures to be useful across a range of wildlife management scenarios, including policy decision analyses, comparative analyses across
systems, and tracking the state of natural resource systems through time.

Seung, C. and E. Waters. 2012. "Calculating Impacts of Exogenous Output Changes: Application of a Social Accounting Matrix (SAM) Model to Alaska Fisheries." *The Annals of Regional Science*. DOI 10.1007/s00168-012-0546-9.

Some previous studies calculated backward linkage and forward linkage effects of exogenous change in output capacity using mixed endogenous-exogenous models within an input-output (IO) or social accounting matrix (SAM) framework. For calculating forward linkage effects, these studies used the supply-driven Ghosh (1958) approach. However, the Ghosh approach has been criticized based on its problematic theoretical interpretation. This study uses an Alaska SAM model to estimate the regional economic impacts of restricting catch of Pacific cod and Atka mackerel in the Aleutian Islands in order to protect Steller sea lions. This study overcomes the problem of calculating forward linkage effects in the previous studies by running the SAM model with (i) changes in output converted to final demand shocks; and (ii) regional purchase coefficients (RPCs) for all the directly impacted industries (fish harvesting and processing industries) set equal to zero. The impacts of the shift in harvest opportunities in response to the Steller sea lion protection measures are displayed in terms of changes in output, employment, value added, household income, and state and local government revenue.

Wallmo, K. and **D. Lew**. 2012. "The Value of Recovering Threatened and Endangered Marine Species: A Multi-Species Choice Experiment." *Conservation Biology*, 26(5): 830-839.

Nonmarket valuation research has produced economic value estimates for a variety of threatened, endangered, and rare species around the world. Although over 40 value estimates exist, it is often difficult to compare values from different studies due to variations in study design, implementation, and modeling specifications. We conducted a stated-preference choice experiment to estimate the value of recovering or downlisting 8 threatened and endangered marine species in the United States: loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermochelys coriacea*), North Atlantic right whale (*Eubalaena glacialis*), North Pacific right whale (*Eubalaena japonica*), upper Willamette River Chinook salmon (*Oncorhynchus tshawytscha*), Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*), Hawaiian monk seals (*Monachus schauinslandi*), and smalltooth sawfish (*Pristis pectinata*). In May 2009, we surveyed a random sample of U.S. households. We collected data from 8476 households and estimated willingness to pay for recovering and downlisting the 8 species from these data. Respondents were willing to pay for recovering and downlisting threatened and endangered marine taxa. Willingness-to-pay values ranged from $40/household for recovering Puget Sound Chinook salmon to $73/household for recovering the North Pacific right whale. Statistical comparisons among willingness-to-pay values suggest that some taxa are more economically valuable than others, which suggests that the U.S. public's willingness to pay
for recovery may vary by species.

2011

Fell, H. and **A. Haynie**. 2011. "Estimating Time-varying Bargaining Power: A Fishery Application." *Economic Inquiry* 49(3): 685-696.

We propose an unobserved-components-inspired approach to estimate time-varying bargaining power in bilateral bargaining frameworks. We apply the technique to an ex-vessel fish market that changed management systems from a regulated open-access system to an individual fishing quota (IFQ) system over the time span analyzed. We find that post-IFQ implementation fishers do improve their bargaining power and thus accrue more of the rents generated by the fishery. However, unlike previous studies, we find that fishers do not move to a point of complete rent extraction. Rather, fishers and processors appear to be in a near-symmetric bargaining situation post-IFQ implementation.

Fissel, B., N.C.H Lo, and S. Herrick. 2011. "Egg Production, Spawning Biomass and Recruitment for the Central Subpopulation of Northern Anchovy 1981-2009." *CalCOFI Reports* 52(1): 116-135.

This paper updates estimates of critical stock assessment parameters for the central subpopulation of northern anchovy (*Engraulis mordax*). Ichthyoplankton data from the CalCOFI database were used to implement the historical egg production method and estimate annual mortality curves, from which daily egg production, and egg and larval mortality parameters were derived. Spawning biomass was estimated using historical data under the assumption of a constant daily specific fecundity. A Ricker recruitment model, augmented with environmental factors, was estimated based on historical data and used to predict recruitment using the new spawning biomass data. We found that egg densities were highly variable while larval densities have been persistently low since 1989. Recruitment estimation suggests that poor environmental conditions have potentially contributed to the low productivity. Mortality estimation reveals through an increasing egg mortality rate that low larval densities were primarily the result of high mortality during the pre-yolk-sac period.

Himes-Cornell, A., C. Package, and A. Durland. 2011. "Improving Community Profiles for the North Pacific Fisheries." *NOAA Technical Memorandum* NMFS-AFSC-230.

To provide baseline information about a large number of Alaskan fishing communities to fisheries managers, the Alaska Fisheries Science Center's (AFSC) Economic and Social Sciences Research Program (ESSRP) compiled existing information about, and published the Community Profiles for North Pacific Fisheries – Alaska (referred to as the Community Profiles from here on) in 2005 (Sepez et al. 2005). The Community Profiles have been widely used as the basis for fisheries management plans, social and economic impact assessments of proposed fishing regulations, and numerous discussions by natural resource agencies. However, it has become clear that the Community Profiles need to be updated with current information about communities' dependence on fishing and additional categories of information that would be integral in determining the social and economic impacts of fishing regulations on local communities. In preparation for updating the Community Profiles, the ESSRP began the revision process by hosting conversations with community leaders and representatives around Alaska to engage them in how to revise the Community Profiles so that they better reflect their involvement in fishing. This effort represents a paradigm shift in how communities are engaged in fisheries management in Alaska by bringing them into the information gathering process that indirectly informs policymakers. The basic assumption of this approach is that communities are best equipped to describe their relationship to fisheries. To ensure that the new profiles reflect this knowledge, the AFSC consulted with community representatives to ensure that local knowledge about their communities is incorporated. Meetings were hosted in six Alaska regional hubs and involved over 100 community representatives ranging from tribal elders to community mayors to regional tribal consortiums. The meetings involved a group dialogue that provided an opportunity for ESSRP social scientists and Alaska community representatives to come together and discuss how to make the Community Profiles more informative and representative of Alaskan communities. The discussion focused on an exchange of local stories and knowledge that best illustrates the way in which fishing shapes the fabric of Alaskan communities. It is this sort of information that fishery managers need to know about Alaska communities that is not currently represented in the Community Profiles. Our task was to learn how to work with communities to best gather this unique information. Suggestions were made for improving the criteria for the selection of included communities. Throughout the meeting process, relationships and ties were built between community members and our team, and it became evident that community input into this source of baseline information about Alaskan fishing communities is a crucial element for improving the involvement of communities in the fishery management process and getting their voices heard. The information gathered at the meetings is being used to restructure the format of the Community Profiles, compile and organize data that may need to be included in the Community Profiles, and generate new criteria for the selection of included communities.

Ianelli, J.N., A. Hollowed, **A. Haynie**, F.Mueter, and N. Bond. 2011. “Evaluating Management Strategies For Eastern Bering Sea Walleye Pollock (Theragra Chalcogramma) in a Changing Environment.” *ICES Journal of Marine Science* 68(6), July, pp. 1297-1304.

The impacts of climate change on fish and fisheries is expected to increase the demand for more accurate stock projections and harvest strategies that are robust to shifting production regimes. To address these concerns, we evaluate the performance of fishery management control rules for eastern Bering Sea walleye pollock stock under climate change. We compared the status quo policy with six alternative management strategies under two types of recruitment pattern simulations: one that follows temperature-induced trends and the other that follows a stationary recruitment pattern similar to historical observations. A subset of 82 Intergovernmental Panel on Climate Change climate models provided temperature inputs from which an additional 100 stochastic simulated recruitments were generated to obtain the same overall recruitment variability as observed for the stationary recruitment simulations. Results indicate that status quo management with static reference points and current ecosystem considerations will result in much lower average catches and an increased likelihood of fishery closures, should reduced recruitment because of warming conditions hold. Alternative reference point calculations and control rules have similar performance under stationary recruitment relative to status quo, but may offer significant gains under the changing environmental conditions.

Lazrus, H., **J. Sepez, R. Felthoven** and **J. Lee**. 2011. "Post-Rationalization Restructuring of Commercial Crew Member Opportunities in Bering Sea and Aleutian Island Crab Fisheries." *NOAA Technical Memorandum* NMFS-AFSC-217, United States Department of Commerce.

This report examines how employment opportunities for commercial fishing vessel crew members have changed in the BSAI crab fisheries following the implementation of a catch shares style of management system by the North Pacific Fishery Management Council. Based on hundreds of hours of ethnographic interviews with current and former crew members, captains, boat owners, processing plant employees, and other stakeholders, the analysis examines the effects of rationalization on many aspects of crew employment, including geographic distribution of jobs, the number of crew jobs available, the types of crew positions on a vessel, the decision making processes of potential crew job-seekers, the structure of compensation of crew, the effects of leased quota on crew compensation per unit of effort, the scheduling of deliveries to shore-based processing plants and the effects of local sources of alternative employment on crew. The conclusions regarding these aspects of crew of employment are followed by recommendations for further social science research on issues raised in this report.

Lew, D. and **A. Himes-Cornell**. 2011. "A Guide to Designing, Testing, and Implementing AFSC Economic and Social Surveys." U.S. Dept of Commerce, *NOAA Technical Memorandum* NMFS-AFSC-228, 43 pages.

Economic and social surveys are useful and powerful tools used to help better understand the characteristics, attitudes, opinions, and behavior of specific populations. However, it is not always clear to researchers how these surveys should be developed and implemented so that the most accurate information is obtained. This guide is intended to address this concern and to guide Alaska Fisheries Science Center (AFSC) researchers through the survey research and development process with the basic protocols and techniques developed in the survey research literature for maximizing item and unit response, minimizing biases, and generally producing surveys that will yield high quality information. The information presented is generally applicable to all voluntary economic and social surveys conducted by AFSC researchers and its contractors and provides a number of guidelines intended to ensure that economic and social surveys produced by the AFSC are developed and implemented according to the standards of the survey literature and required administrative and internal protocols.

Lew, D. and D.M. Larson. 2011. "A Repeated Mixed Logit Approach to Valuing a Local Sport Fishery: The Case of Southeast Alaska Salmon." *Land Economics*, 87(4): 712-729.

We estimate the values of fishing opportunities and changes in harvest rates for single-day private boat saltwater fishing for king and silver salmon in Southeast Alaska, using a repeated mixed logit model of trip frequency and distribution estimated jointly with anglers' shadow values of time. The standard assumption that the shadow value of time is a fixed fraction of the angler's wage is rejected in favor of a more flexible model. The mean value of a fishing choice occasion is approximately $45 per angler and the mean marginal values of a king salmon and silver salmon are approximately $71 and $106.

Lew, D. and Kristy F. Wallmo. 2011. "External Tests of Embedding and Scope in Stated Preference Choice Experiments: An Application to Endangered Species Valuation." *Environmental and Resource Economics,* 48(1): 1-23. DOI 10.1007/s10640-010-9394-1.

A criticism often levied against stated preference (SP) valuation results is that they sometimes do not display sensitivity to differences in the magnitude or scope of the good being valued. In this study, we test the sensitivity of preferences for several proposed expanded protection programs that would protect up to three U.S. Endangered Species Act-listed species: the Puget Sound Chinook salmon, the smalltooth sawfish, and the Hawaiian monk seal. An external scope test is employed via a split-sample SP choice experiment survey to evaluate whether there is a significant difference in willingness to pay (WTP) for protecting more species and/or achieving greater improvements in the status of the species. The majority of 46 scope tests indicate sensitivity to scope, and the pattern of scope test failures is consistent with diminishing marginal utility with respect to the amount of protection to each species. Further tests suggest WTP may be proportional to the number of species valued.

Schnier, K. and **R. Felthoven**. 2011. "Accounting for Spatial Heterogeneity and Autocorrelation in Spatial Discrete Choice Models: Implications for Behavioral Predictions." *Land Economics* 87(3): 382-402.

The random utility model (RUM) is commonly used in the land-use and fishery economics literature. This research investigates the affect that spatial heterogeneity and spatial autocorrelation have within the RUM framework using alternative specifications of the multinomial logit, multinomial probit and spatial multinomial probit models. Using data on the spatial decisions of fishermen, the results illustrate that ignoring spatial heterogeneity in the unobservable portion on the RUM dramatically effects model performance and welfare estimates. Furthermore, accounting for spatial autocorrelation in addition to spatial heterogeneity increases the performance of the RUM.

Seung, C., and C.I. Zhang. 2011. "Developing Socioeconomic Indicators for Fisheries off Alaska: a Multi-Attribute Utility Function Approach." *Fisheries Research* 112(3): 117-126.

Ecosystem-based fisheries management requires a holistic assessment of fisheries status that integrates fishery ecosystem indicators for several major objectives such as sustainability, biodiversity, habitat quality, and socioeconomic status. Scientists have already paid much attention to the first three objectives and to the development of their indicators. Although there have been some efforts to develop socioeconomic indicators, relatively less attention has been paid to socioeconomic status and the development of its indicators. In addition, the socioeconomic indicators developed to date are not firmly based on economic theory. We (i) discuss the problems with previous approaches to developing socioeconomic indicators; (ii) present theoretical foundations of a multi-attribute utility function (MAUF) approach in developing socioeconomic indicators; (iii) discuss the issues associated with implementing the MAUF approach for fisheries in Alaska; (iv) present, as an example, several socioeconomic indicators developed using the MAUF approach for a fishery off Alaska; and (v) present results from some sensitivity analyses for the form of utility functions and weights. Future directions are also discussed.

Wallmo, K. and **D. Lew**. 2011. "Valuing Improvements to Threatened and Endangered Marine Species: An Application of Stated Preference Choice Experiments." *Journal of Environmental Management,* 92: 1793-1801. DOI:10.1016/j.jenvman.2011.02.012.

Non-market valuation research has produced value estimates for over forty threatened and endangered (T&E) species, including mammals, fish, birds, and crustaceans. Increasingly, Stated Preference Choice Experiments (SPCE) are utilized for valuation, as the format offers flexibility for policy analysis and may reduce certain types of response biases relative to the more traditional Contingent Valuation method. Additionally, SPCE formats can allow respondents to make trade-offs among multiple species, providing information on the distinctiveness of preferences for different T&E species. In this paper we present results of a SPCE involving three U.S. Endangered Species Act (ESA)-listed species: the Puget Sound Chinook salmon, the Hawaiian monk seal, and the smalltooth sawfish. We estimate willingness to pay (WTP) values for improving each species' ESA listing status and statistically compare these values between the three species using a method of convolutions approach. Our results suggest that respondents have distinct preferences for the three species, and that WTP estimates differ depending on the species and the level of improvement to their ESA-status. Our results should be of interest to researchers and policy-makers, as we provide value estimates for three species that have limited, if any, estimates available in the economics literature, as well as new information about the way respondents make trade-offs among three taxonomically different species.

2010

Abbott, J., **B. Garber-Yonts**, and J. Wilen. 2010. "Employment and Remuneration Effects of IFQs in the Bering Sea/Aleutian Islands Crab Fisheries." *Marine Resource Economics* 25(4): 333-354.

This paper utilizes an unprecedented, quantitative census of vessels before and after the implementation of catch shares in the Bering Sea/Aleutian Island crab fisheries to examine the effects of catch shares on the employment and remuneration of crew in the catcher vessel sector. We find that the number of individuals employed in the fishery declined proportionately to the exit of vessels from the fishery following program implementation. Nevertheless, total crew-hours dedicated to fishing activities remained roughly constant while employment in redundant pre- and post-season activities declined due to the consolidation of harvest quota on fewer vessels. We find little evidence of substantial changes in the share contracts used to compensate fishermen. Finally, we explore a wide array of remuneration measures for crew and conclude that both seasonal and daily employment *increased* substantially for many crew in the post-rationalization fishery relative to previously while remuneration per unit of landings has declined as a result of a combination of increased crew productivity and the necessity of paying for fishing quota in the new system. By relying on quantitative, population-level data, our findings provide a strong empirical counterexample to prior studies that have questioned the fairness of employment and remuneration outcomes for crew in rationalized fisheries.

Carothers, C, **D.K. Lew, and J. Sepez**. 2010. "Fishing Rights and Small Communities: Community Size and Transfer Patterns in the North Pacific Halibut Quota Share Market." *Ocean and Coastal Management* 53: 518-523.

In the Alaska halibut quota fishery, small remote fishing communities (SRFCs) have disproportionately lost fishing rights. Our analysis of quota market participation from 1995 to 1999 confirms that SRFC residents are more likely to sell than buy quota. Alaska Native heritage is another important predictor of quota market behavior. Residents of Alaska Native villages have an increased likelihood of selling quota. Loss of fisheries participation in small indigenous communities can be an unintended consequence of quota systems. Mitigation measures should take into account the social factors that can lead to such a redistribution of fishing rights in privatized access fisheries.

A substantial theoretical and experimental literature has focused on the conditions under which cooperative behavior among actors providing public goods or extracting common-pool resources arises. The literature identifies the importance of coercion, small groups of actors, or the existence of social norms as conducive to cooperation. This research empirically investigates cooperative behavior in a natural resource extraction industry in which the provision of a public good (bycatch avoidance) in the Alaskan flatfish fishery is essential to the duration of the fishing season, and an information provision mechanism exists to relay information to all individuals. Using a model of spatial fishing behavior our results show that conditionally cooperative behavior is prevalent but deteriorates as bycatch constraints tighten.

Haynie, A. and D. Layton. 2010. "An Expected Profit Model for Monetizing Fishing Location Choices." *Journal of Environmental Economics and Management* 59(2): 165-176.

We develop and analyze the properties of a new type of discrete choice model which jointly estimates the expected value of catch and location choice. This model implicitly monetizes location choices and can be used to predict costs and effort redistribution of creating marine protected areas or of implementing other policy changes that either increase travel costs or alter expected revenue. We illustrate our approach by considering the closing of the Steller sea lion conservation area in the United States Bering Sea to pollock fishing.

Kasperski, S. and R. Weiland. 2010. "When Is It Optimal To Delay Harvesting? The Role of Ecological Services In The Northern Chesapeake Bay Oyster Fishery." *Marine Resource Economics 24(4): 361-385.*

Despite decades of rebuilding efforts, the population of oysters in the Chesapeake Bay has fallen to historically low levels. We develop a novel bioeconomic model which includes the value of ecological services provided by oysters *in situ* to determine the optimal length of a harvest moratorium and a subsequent harvest rate that will maximize the net present value of the oyster resource. Not surprisingly, steady state stocks and optimal harvest rates are increasing and decreasing in ecological service values, respectively. The results also suggest that instituting a harvest moratorium and limiting harvest effort in the fishery can increase the net present value of the resource more than effort limitation alone.

Lew, D., **Jean Lee**, and D. Larson. 2010. "Saltwater Sport Fishing In Alaska: A Summary and Description of the Alaska Saltwater Sport Fishing Economic Survey, 2007." U.S. Department of Commerce, NOAA Technical Memorandum. NMFS-AFSC-214, 229 pages.

In early 2007, a survey of Alaska saltwater anglers was implemented to collect information on saltwater fishing participation, effort, and preferences of resident and non-resident anglers, focusing on their activities in the 2006 fishing season. The survey was administered to three distinct groups of anglers for which separate survey instruments were developed: non-residents, residents of Southeast Alaska, and all other Alaska residents. This report describes the development, content, and structure of the three survey versions, their implementation, and a summary of the data. The summary highlights several differences between the different angler groups and their saltwater fishing behavior, in particular with respect to where they fish, what species are harvested (caught and retained), trip expenditures, and modes of fishing.

Lew, D., D. Layton and R. Rowe**.** 2010. "Valuing Enhancements to Endangered Species Protection Under Alternative Baseline Futures: The Case Of The Steller Sea Lion." *Marine Resource Economics*, 25(2): 133-154.

This article presents results from a stated preference survey of U.S. households intended to value the public's preferences for enhancements to the protection of western stock of Steller sea lions, which is listed as endangered under the Endangered Species Act. To account for the uncertainty of future populations under current programs without additional protection efforts, three different survey versions were implemented that each present different, yet plausible, baseline futures for Steller sea lions. Stated preference choice experiment data from each survey are analyzed using repeated, rank ordered random parameters logit models, and welfare estimates are calculated and compared for each baseline. Results suggest willingness to pay is sensitive to projected future baselines and that public values for protecting Steller sea lions are positive and large, but level out for larger, non-incremental improvements.

Lew, D. and C. Seung. 2010. "The Economic Impact of Saltwater Sportfishing Harvest Restrictions in Alaska: An Empirical Analysis of Non-Resident Anglers." *North American Journal of Fishery Management* 30: 538-551

Saltwater sportfishing is a popular tourist activity for visitors to Alaska. In this paper, a stated preference model of saltwater sportfishing participation is used to generate estimates of changes in participation resulting from changes in harvest limits for three primary recreational target species in Alaska saltwater fisheries: Pacific halibut, king (Chinook) salmon, and silver (coho) salmon. These estimates are then used in a state-level computable general equilibrium (CGE) model to generate estimates of the economic impacts of harvest policies. We find that the impacts from the CGE model of changes in the number of non-resident anglers' expenditures are smaller than those from a social accounting matrix model, and that much of the impacts from an increase in the expenditures leak out of the state due to the state's heavy dependence on imports of goods and services from the rest of the United States. Moreover, changes to harvest limits appear to have a small effect on the Alaskan economy, at least in comparison to the overall size of the state economy.

Morrison Paul, C., **R. Felthoven** and M. Torres. 2010. "Economic Performance in Fisheries: Modeling, Measurement and Management." *Australian Journal of Agricultural and Resource Economics* 54(3): 343-360.

We overview the roles of production structure models in measuring fisheries' productive performance to provide policy-relevant guidance for fishery managers and analysts. In particular, we summarize the literature on the representation and estimation of production structure models to construct productive performance measures for fisheries, with a focus on parametric empirical applications. We also identify the management implications of these kinds of measures and some promising directions for future research.

O'Neill, B.C., **M. Dalton**, L. Jiang, S. Pachauri, R. Fuchs, and K. Zigova. 2010. "Influence of Demographic Change on Future Carbon Emissions from Energy Use." *Proceedings of the National Academy of Sciences* 107(41): 17521-17526.

Substantial changes in population size, age structure, and urbanization are expected in many parts of the world this century. Although such changes can affect energy use and greenhouse gas emissions, emissions scenario analyses have either left them out or treated them in a fragmentary or overly simplified manner. We carry out the first comprehensive assessment of the implications of demographic change for global emissions of carbon dioxide. Using a new energy-economic growth model that accounts for a range of demographic dynamics, we show that slowing population growth could provide 16-29% of the emissions reductions suggested to be necessary by 2050 to avoid dangerous climate change. We also find that aging and urbanization can substantially influence emissions in particular world regions.

Seung, C. 2010. "Estimating Regional Economic Information Using Unequal Probability Sampling for Alaska Fisheries." *Fisheries Research* 105 (2): 134-140.

This study provides detailed descriptions of procedures for conducting unequal probability sampling (UPS) and deriving the population parameters for important economic variables that are critical in regional economic analysis of fisheries. This study uses a Pareto sampling method and describes how the Horvitz-Thompson (HT) estimator is adjusted for non-response and how this adjustment is applied to the certainty units and non-certainty units separately. As an example, this study applies the UPS method without replacement to fisheries in the Southwest region of Alaska, to estimate the total employment and total labor income for each of three disaggregated harvesting sectors. This study shows that the suggested method is a useful approach that can be used to estimate similar regional economic information through surveys of fish harvesting and processing sectors.

Seung, C. and S. Ahn. 2010. "Forecasting Industry Employment for a Resource-based Economy Using Bayesian Vector Autoregressive Models." *The Review of Regional Studies 40 (2): 181-196.*

Bayesian vector autoregressive (BVAR) models are developed to forecast industry employment for a resource-based economy. Two different types of input-output (IO) information are used as priors – (i) reduced-form IO relationship and (ii) an economic-base version of the IO information. Out-of-sample forecasts from these two IO-based

BVAR models are compared with forecasts from an autoregressive model, an unconstrained VAR model, and a BVAR model with a Minnesota prior. Results indicate most importantly that overall the model version with economic base information performs the best in the long run.

Seung, C. and E. Waters. 2010. "Evaluating Supply-Side and Demand-Side Shocks for Fisheries: a Computable General Equilibrium (CGE) Model for Alaska." *Economic Systems Research 22(1): 87-109.*

This study used computable general equilibrium (CGE) models to investigate economic effects of three exogenous shocks to Alaska fisheries: (1) reduction in pollock allowable catch (TAC), (2) increase in fuel price, and (3) reduction in demand for seafood. Two different model versions, “Keynesian” and “neoclassical”, were used to estimate impacts on endogenous output, employment, value added, and household income. We also estimated change in household welfare, thereby overcoming a limitation of traditional fixed-price models. There are currently few examples of CGE studies addressing fisheries issues appearing in the literature. This study is unique in that it uses a relatively disaggregated sector scheme and examines both supply-side and demand-side shocks.

Waters, E. and **C. Seung**. 2010. “Impacts of Recent Shocks to Alaska Fisheries: A Computable General Equilibrium (CGE) Model Analysis.” *Marine Resource Economics 25 (2): 155-183.*

We use a computable general equilibrium (CGE) model to investigate impacts of three exogenous shocks to Alaska fisheries: (1) a 31% reduction in walleye pollock allowable catch; (2) a 125% increase in fuel price; and (3) both shocks simultaneously. The latter scenario reflects actual industry trends between 2004 and 2008. Impacts on endogenous output, employment, factor income and household income are assessed. We also estimate changes in a measure of household welfare, and compare model results against actual change in pollock and seafood prices. Few examples of CGE studies addressing fisheries issues appear in the literature. This study is unique in that it includes more disaggregated industry sectors and examines supply-side shocks that are difficult to address using fixed-price models. This study also overcomes a serious deficiency in models that use unadjusted seafood sector data in IMPLAN (IMpact analysis for PLANning) by developing the fish harvesting and processing sectors independently from available data, supplemented by interviews with key informants to ground-truth industry cost estimates.

2009

Felthoven, R., K. Schnier and W. Horrace. 2009. "Estimating Heterogeneous Primal Capacity and Capacity Utilization Measures in a Multi-Species Fishery." *Journal of Productivity Analysis* 32: 173-189.

We use a stochastic production frontier model to investigate the presence of heterogeneous production and its impact on fleet capacity and capacity utilization in a multi-species fishery. We propose a new fleet capacity estimate that incorporates complete information on the stochastic differences between vessel-specific technical efficiency distributions. Results indicate that ignoring heterogeneity in production technologies within a multispecies fishery as well as the complete distribution of a vessel's technical efficiency score, may lead to erroneous fleet-wide production profiles and estimates of capacity. Our new estimate of capacity enables out-of-sample production predictions which may be useful to policy makers.

Felthoven, R., C. Morrison Paul, and M. Torres. 2009. "Measuring Productivity Change and its Components for Fisheries: The Case of the Alaskan Pollock Fishery, 1994-2002." *Natural Resource Modeling* 22(1): 105-136.

Traditional productivity measures have been much less prevalent in fisheries economics than other measures of economic and biological performance. It has been increasingly recognized, however, that modeling and measuring fisheries' production relationships is central to understanding and ultimately correcting the repercussions of externalities and poorly designed regulations. We use a transformation function production model to estimate productivity and its components for catcher processors in the Bering Sea and Aleutian Islands pollock fishery, before and after the introduction of cooperative system that grants exclusive harvesting privileges and allows quota exchange. We also recognize the roles of externalities from pollock harvesting by incorporating data on climate, bycatch, and fish biomass. We find that productivity has been increasing over time, that many productive contributions and interactions of climate, bycatch, and fishing strategies are statistically significant, and that regulatory changes have had both direct and indirect impacts on catch patterns and productivity.

Haynie, A., R. Hicks and K. Schnier. 2009. "Common Property, Information, and Cooperation: Commercial Fishing in the Bering Sea." *Ecological Economics* 69(2): 406-413.

A substantial theoretical and experimental literature has focused on the conditions under which cooperative behavior among actors providing public goods or extracting common-pool resources arises. The literature identifies the importance of coercion, small groups of actors, or the existence of social norms as conducive to cooperation. This research empirically investigates cooperative behavior in a natural resource extraction industry in which the provision of a public good (bycatch avoidance) in the Alaskan flatfish fishery is essential to the duration of the fishing season, and an information provision mechanism exists to relay information to all individuals. Using a model of spatial fishing behavior our results show that conditionally cooperative behavior is prevalent but deteriorates as bycatch constraints tighten.

Layton, D. and **A. Haynie**. 2009. "Specifying, Simulating, and Estimating Multivariate Extreme Value (GEV) Discrete Choice Models in Fisheries." Conference Proceedings for the 3rd World Conference of Spatial Econometrics, July 8-10, Barcelona, Spain.

In this paper, we explore estimable Generalized Extreme Value (GEV) spatial discrete choice models. In the statistics literature, GEV models are termed multivariate extreme value (MEV). Interestingly, most of the discrete choice literature aside from GEV models develops choice probabilities by focusing on the underlying error structure and then integrating to arrive at the choice probabilities. However, it seems fair to characterize the GEV literature as proceeding largely from the position of establishing how functions of random variables are consistent with the GEV requirements and then derives choice probabilities using a basic probability-generating relationship. We believe that understanding random component based interpretations of GEV models yields productive insights into the structure of the models just as it has in other discrete choice contexts such as with the mixed logit and the multinomial probit model. To accomplish this, we first provide the standard treatment of GEV models, then discuss a cross-nested version of these models and relate them to earlier statistical work. This method of conceptualizing the GEV discrete choice problem opens up avenues of incorporating spatial correlation that are better adapted to modeling spatial choice in economic activities such as fishing location choice. We explore various random effects structures that provide for correlation in zonal discrete choice models. These include pair-wise correlation models that are part of the cross-nested family, and new models that interact inter-zonal distances with the positive alpha-stable scale components, thus inducing correlated zonal utilities (profits) in an economical manner. In coming work, the model will be applied to the Bering Sea pollock fishery.

Morrison Paul, C.J., M. Torres, and **R. Felthoven**. 2009. "Fishing Revenue, Productivity, and Product Choice in the Alaskan Pollock Fishery." *Environmental and Resource Economics* 44: 457-474.

A key element in evaluating fishery management strategies is examining their effects on the economic performance of fishery participants, yet nearly all empirical studies of fisheries focus exclusively on the amount of fish harvested. The economic benefits derived from fish stocks involve the amount of revenue generated from fish processing, which is linked to both the way fish are harvested and the products produced from the fish. In this study we econometrically estimate a flexible revenue function for catcher-processor vessels operating in the Alaskan pollock fishery, recognizing potential endogeneity and a variety of fishing inputs and conditions. We find significant own-price supply responses and product substitutability, and enhanced revenues from increased fishing days and tow duration after a regulatory change introduced property rights through a new fishing cooperative. We also find significant growth in economic productivity, or higher revenues over time after controlling for observed productive factors and price changes, which exceeds that attributable to increased harvest. These patterns suggest that the move to rights-based management has contributed significantly to economic performance in the pollock fishery.

Sepez, J. 2009. "North Pacific Region." Pp. 7-12 in *Fishing Communities of the United States 2006.* Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-98, 84 p. Available at: http://www.st.nmfs.noaa.gov/st5/publication/index.html

Fishing Communities of the U.S., 2006 is the first volume in the new periodic series. It reports descriptive demographic data on a subset of each coastal state's commercial fishing communities and ports, as well as descriptive geographic information and other social indicator data for each state. It is a companion to *Fisheries Economics of the U.S., 2006.* The purpose of the publication is to provide the public with easily accessible information about the Nation's fishing communities and the states where they are located. Up to ten communities and ports per state were selected by experts in each region primarily on the basis of commercial landings data for 2006. These communities are not necessarily "fishing communities" as defined by the Magnuson-Stevens Fishery Conservation and Management Act.

Seung, C and E. Waters. 2009. "Measuring the Economic Linkage of Alaska Fisheries: A Supply-Driven Social Accounting Matrix (SDSAM) Approach." *Fisheries Research* 97: 17-23.

A supply-driven social accounting matrix (SDSAM) model is developed to examine backward and forward linkage effects of Alaska fisheries. The model includes five harvesting sectors (Trawlers, Longliners, Crabbers, Salmon Netters, and Other Harvesters), two processing sectors (Motherships and Shorebased processors), and a Catcher-processor sector, which both harvests and processes. The study shows that total backward linkage effects of the Other Harvesters sector are strongest, followed by Trawlers and Salmon Netters, while the strongest total forward linkage effects are from Salmon Netters, followed by Other Harvesters and Crabbers. Results of a policy simulation where the effect of a 10% reduction in pollock catch was investigated show that total output will decrease by $37.1 million via backward linkages while total output in forward-linked sectors falls by $16.6 million. When the direct impacts on the harvesting sectors ($73.6 million) are included, total output decreases by $110.7 million via the combined direct shock and backward linkage effects. Income to Alaska households falls by $17.6 million due to effects on backward-linked industries, and by $0.5 million due to forward-linked effects.

Vaccaro, I., L. Zanotti, and **J. Sepez**. 2009. Commons and Markets: Opportunities for Development of Local Sustainability. *Environmental Politics* 18(4): 522-538.

Development studies have often evolved amidst a bilateral tension, if not contradiction, between 1) the tendency to declare all forms of communal management archaic and in need of modernization via privatization and market integration, and 2) the temptation to essentialise indigenous management with nostalgia while vilifying market impacts. A closer examination suggests that common property systems will not simply collapse under market pressure, nor create defensive bulwarks to maintain market-free enclaves, but can strategically engage with market systems and global trade. In a world experiencing all sorts of environmental conflicts, this potential for articulation offers a serious managerial opportunity for the design of sustainable environmental policies. This paper presents ethnographic examples that open the field to discussion of an often dismissed possibility: sometimes the connection of small-scale societies to market systems has created a productive opportunity that has allowed these communities to actually survive as such.

<u>2008:</u>

Dalton, M., B. C. O'Neill, A. Prskawetz, L. Jiang, J. Pitkin. 2008. "Population Aging and Future Carbon Emissions in the United States." *Energy Economics* 30(2): 642-675.

Changes in the age composition of U.S. households over the next several decades could affect energy use and carbon dioxide (CO2) emissions, the most important greenhouse gas. This article incorporates population age structure into an energy-economic growth model with multiple dynasties of heterogeneous households. The model is used to estimate and compare effects of population aging and technical change on baseline paths of U.S. energy use and CO2 emissions. Results show that population aging reduces long-term emissions, by almost 40% in a low population scenario, and effects of aging on emissions can be as large, or larger than, effects of technical change in some cases. These results are derived under standard assumptions and functional forms that are used in economic growth models. The model also assumes the economy is closed, that substitution elasticities are fixed and identical across age groups, and that labor supply patterns vary by age group but are fixed over time.

Etnier, M. and **Sepez, J**. 2008. "Changing Patterns of Sea Mammal Exploitation among the Makah" Pp. 143-158 in Time and Change: Archaeology and Anthropological Perspectives on the Long-Term in Hunter-Gatherer Societies. Robert Layton, Herb Maschner and Dimitra Papagianni (eds.). Oxbow Press, Woodbridge, CT.

The Makah Indians from the outer coast of Washington are renowned for their strong maritime orientation, and have maintained high levels of continuity in resource use over 500 years. However, marine mammal use has declined considerably. Today, the Makah consume less than 30% of the same taxa as their ancestors at Ozette. Comparison between the Ozette archaeofaunas and the modern ecological communities on the coast of Washington indicate major changes in this ecosystem within the past 200-300 years. In the past, northern fur seals (*Callorhinus ursinus*) appear to have been the dominant pinniped species, with a breeding population perhaps as close as 200 km from Ozette. Among cetaceans, gray whales (*Eschrichtius robustus*) and humpback whales (*Megaptera novaeangliae*) were equally abundant. Today, the dominant pinniped species is California sea lion (*Zalophus californianus*), while cetaceans are dominated by a single species, the gray whale. Thus, most of the differences in Makah consumptive use of marine mammals can be explained by examination of the modern ecological environment. However, the article discusses some case in which political and cultural motivations provide better explanations.

Lew, Daniel K. and Douglas M. Larson. 2008. "Valuing a Beach Day with a Repeated Nested Logit Model of Participation, Site Choice, and Stochastic Time Value." *Marine Resource Economics* 23(3): 233-252.

Beach recreation values are often needed by policy-makers and resource managers to efficiently manage coastal resources, especially in popular coastal areas like Southern California. This article presents welfare values derived from random utility maximization-based recreation demand models that explain an individual's decisions about whether or not to visit a beach and which beach to visit. The models utilize labor market decisions to reveal each individual's opportunity cost of recreation time. The value of having access to the beach in San Diego County is estimated to be between $21 and $23 per day.

Polasky, S., E. Nelson, J. Camm, B. Csuti, P. Fackler, E. Lonsdorf, C. Montgomery, D. White, J. Arthur, **B. Garber-Yonts**, R. Haight, J. Kagan, A. Starfield, and C. Tobalske. 2008. "Where to Put Things? Spatial Land Management to Sustain Biodiversity and Economic Returns." *Biological Conservation* 141(6): 1505-1524.

Expanding human population and economic growth have lead to large-scale conversion of natural habitat to human-dominated landscapes with consequent large-scale declines in biodiversity. Conserving biodiversity, while at the same time meeting expanding human needs, is an issue of utmost importance. In this paper we develop a spatially explicit landscape-level model for analyzing the biological and economic consequences of alternative land-use patterns. The spatially-explicit biological model incorporates habitat preferences, area requirements and dispersal ability between habitat patches for terrestrial vertebrate species to predict the likely number of species that will be sustained on the landscape. The spatially explicit economic model incorporates site characteristics and location to predict economic returns in a variety of potential land uses. We use the model to search for efficient land-use patterns that maximize biodiversity conservation objectives for a given level of economic returns, and vice-versa. We apply the model to the Willamette Basin, Oregon, USA. By thinking carefully about the arrangement of activities, we find land-use patterns that sustain high biodiversity and economic returns. Compared to the current land-use pattern, we show that both biodiversity conservation and the value of economic activity could be increased substantially.

Sepez, J. 2008. "Historical Ecology of Makah Subsistence Foraging Patterns." *Journal of Ethnobiology* Volume 28(1): 110-133.

The paper combines archaeological data with data from early ethnography and contemporary harvest surveys to examine consistency and change in Makah Tribe subsistence hunting and fishing practices between 1500 and today. The data indicate a significant shift in contribution of different resource groups to the animal protein diet between 1500 and today, with harvest of marine mammals dropping tremendously (from 92% to less than 1%), and the contemporary diet consisting primarily of fish (50%), shellfish (11%), land mammals (15%), and store-bought meats (24%). However, a high diversity of species used by tribal members prior to Euroamerican colonization are still in use today, from halibut and salmon to harbor seals and sea urchins. Several species no longer used, such as wolves and fur seals, can be explained by ecological factors. Other resources no longer used, such as many small birds and small shellfish, represent a general contraction of the subsistence diet breadth following the introduction of commercial foods. As predicted by optimal foraging theory, the resources most likely to be eliminated from the diet are those that rank low in terms of post-encounter caloric return. Tribal members made use of nearly all available resources in ancient times; additions to the tribe's subsistence base in modern times were due primarily to the introduction of exotic species such as the Pacific oyster, and local population growth of other species, such as the California sea lion. Road building and habitat changes in the forests increased access to land-based resources, such as deer and elk. Land-based resources in general (terrestrial mammals and commercial meats) increased from less than 1% of consumed animal protein prior to 1500 to close to 40% today. However, with over 60% of animal protein still stemming from marine resources, Makah tribal members remain oriented, both nutritionally and culturally, toward the ocean environment.

Seung, C. 2008. "Estimating Dynamic Impacts of Seafood Industry in Alaska." *Marine Resource Economics* 23(1): 87-104.

To date, regional economic impact analyses for fisheries have neglected use of time-series models. This study, for the first time in the literature of regional economic impacts of fisheries, address this weakness by employing a vector autoregressive error correction model (VECM). Based on economic base concept, this study develops a VECM to investigate multivariate relationships between basic sectors (including seafood sector) and nonbasic sectors for each of two fishery-dependent regions in Alaska. While structural models such as input-output model and computable general equilibrium model facilitate more detailed intersectoral long-run relationships in a regional economy, the present study shows that the VECMs have the advantage of properly attributing the impact of shocks, estimating directly the long-run relationships, and of identifying the process of adjustment by nonbasic sectors to the long-run equilibrium. Results show, first, that a nonbasic sector may increase or decrease in response to a shock to a basic sector – a result that would be obscured in a linear economic impact model such as an input-output model, which always predicts positive impacts. Second, the impacts of seafood processing employment are relatively small in the two study regions, where a significant number of seafood processing workers are nonresidents and a large portion of intermediate inputs used in seafood processing are imported from the rest of the United States.

Wolf, P., R. Gimblett, L. Kennedy, R. Itami, and **B. Garber-Yonts**. 2008. "Monitoring and Simulating Recreation and Subsistence Use in Prince William Sound, Alaska." In Randy Gimblett and Hans Skov-Petersen (eds.), *Monitoring, Simulation and Management of Visitor Landscapes*. University of Arizona Press: Tuscon, AZ.

This chapter outlines methods and results of a study that employs survey and simulation data to reveal patterns in the spatial and temporal distribution of visitors across the Prince William Sound (PWS), Alaska. This study employs simulation to analyze the potential interactions between humans and wildlife and directly relates to the recovery of the Sound from the Exxon Valdez Oil Spill. Five species were analyzed (Bald Eagles, Black Oyster Catchers, Harbor Seals, Cutthroat Trout & Pigeon Guillemot) to determine the interaction of recreational activities on known nesting sites of these species. To evaluate potential impacts, the number of visits and nesting sites per acre, duration of visit and the type of travel mode coinciding within these areas by season were combined to evaluate the potential impact from recreational use that is occurring in the Sound.

2007:

Ingles, P. and **Sepez, J**. 2007. "Anthropology's Contributions to Fisheries Management." *National Association of Practicing Anthropologists Bulletin* 28: 1-12.

The collection of articles in this volume of NAPA Bulletin describes various types of social science research currently conducted in support of federal and state fisheries management by anthropologists and sociologists studying fishing-dependent communities and fisheries participants. The contributors work for NOAA, National Marine Fisheries Service (NMFS); various state fisheries agencies; in academia; or as contract researchers. These articles represent a wide geographical range, employ a diverse set of methods, and demonstrate different research goals ranging from responding to specific statutory or management requirements to establishing broader baseline social information to exploring the theoretical constructs that constrain or advance the field of applied anthropology in fisheries. This introduction provides background to the recent expansion of anthropological capacity in U.S. fisheries management and the divergent methods employed by practitioners. The range of methods includes classic ethnography and survey methods, cultural modeling, participatory research, and quantitative indicators-based assessment. The compilation of articles presents an opportunity to think about standardizing some methodological approaches for certain types of tasks, while expanding the array of accepted methodologies available to anthropologists advising fisheries managers.

Norman, Karma, **J. Sepez**, H. Lazrus, N. Milne, C. Package, S. Russell, K. Grant, R. Petersen, J. Primo, M. Styles, B. Tilt, I. Vaccaro. 2007. Community Profiles for West Coast and North Pacific Fisheries - Washington, Oregon, California, and other U.S. States. *NOAA Tech. Memor*. NMFS-NWFSC-85. 602p.

This document profiles 125 fishing communities in Washington, Oregon, California, and other U.S. states, with basic information on social and economic characteristics. Various federal statutes, including the Magnuson-Stevens Fishery Conservation and Management Act and the National Environmental Policy Act, among others, require federal agencies to examine the social and economic impacts of policies and regulations. These profiles can serve as a consolidated source of baseline information for assessing community impacts in these states. The profiles are given in a narrative format that includes four sections: *People and Place, Infrastructure, Involvement in West Coast Fisheries,* 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. *Infrastructure* covers current economic activity, governance (including city classification, taxation, and proximity to fisheries management and immigration offices) and facilities (transportation options and connectivity, water, waste, electricity, schools, police, public accommodations, and ports). *Involvement in West Coast Fisheries* and *Involvement in North Pacific Fisheries* detail 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, yielding 125 individual profiles.
The communities were selected by a process that assessed involvement in commercial fisheries using quantitative data from the year 2000, in order to coordinate with 2000 U.S. Census data. The quantitative indicators looked at communities that have commercial fisheries landings (indicators: weight and value of landings, number of unique vessels delivering fish to a community) and communities that are home to documented participants in the fisheries (indicators: state and federal permit holders and vessel owners). Indicators were assessed in two ways, once as a ratio to the community's population, and in another approach, as a ratio of involvement within a particular fishery. The ranked lists generated by these two processes were combined and communities with scores one standard deviation above the mean were selected for profiling.
The communities selected and profiled in this document are, in Washington: Aberdeen, Anacortes, Bay Center, Bellingham, Blaine, Bothell, Cathlamet, Chinook, Edmonds, Everett, Ferndale, Fox Island, Friday Harbor, Gig Harbor, Grayland, Ilwaco, La Conner, La Push, Lakewood, Long Beach, Lopez, Mount Vernon, Naselle, Neah Bay, Olympia, Port Angeles, Port Townsend, Raymond, Seattle, Seaview, Sedro-Woolley, Sequim, Shelton, Silvana, South Bend, Stanwood, Tacoma, Tokeland, Westport, and Woodinville;

in Oregon: Astoria, Bandon, Beaver, Brookings, Charleston, Clatskanie, Cloverdale, Coos Bay, Depoe Bay, Florence, Garibaldi, Gold Beach, Hammond, Harbor, Logsdon, Monument, Newport, North Bend, Pacific City, Port Orford, Reedsport, Rockaway Beach, Roseburg, Seaside, Siletz, Sisters, South Beach, Tillamook, Toledo, Warrenton, and Winchester Bay; and in California: Albion, Arroyo Grande, Atascadero, Avila Beach, Bodega Bay, Corte Madera, Costa Mesa, Crescent City, Culver City, Dana Point, Dillon Beach, El Granada, El Sobrante, Eureka, Fields Landing, Fort Bragg, Half Moon Bay, Kneeland, Lafayette, Long Beach, Los Angeles, Los Osos, Marina, McKinleyville, Monterey, Morro Bay, Moss Landing, Novato, Oxnard, Pebble Beach, Point Arena, Port Hueneme, Princeton, San Diego, San Francisco, San Jose, San Pedro, Santa Ana, Santa Barbara, Santa Cruz, Santa Rosa, Sausalito, Seaside, Sebastopol, Sunset Beach, Tarzana, Terminal Island, Torrance, Trinidad, Ukiah, Valley Ford, and Ventura. Two selected communities were located in other states: Pleasantville, New Jersey, and Seaford, Virginia.

Sepez, J., K. Norman and **R. Felthoven**. 2007. "A Quantitative Model for Identifying and Ranking Communities Involved in Commercial Fisheries." *National Association of Practicing Anthropologists Bulletin* 28:43-56.

This article proposes a quantitative model for ranking commercial fisheries involvement by communities and describes our experience applying this model to North Pacific and West Coast fisheries. Analysis of recent fishing community profiling projects shows there have been four basic approaches to selecting a manageable number of communities, including focusing on major ports, aggregated regions, representative examples, and the top of a ranked list. Data envelopment analysis (DEA) is presented as a non-parametric, multi-dimensional modeling method appropriate for evaluating and ranking fishing communities based on an array of quantitative indicators of fisheries involvement. The results of applying this model to communities involved in West Coast and North Pacific fisheries are summarized. Nineteen indicators of fisheries dependence and 92 indicators of fisheries engagement were modeled yielding ranked lists of 1564 and 1760 U.S. communities respectively. Comparison of the DEA method's top-ranked communities in Alaska to those selected by an indicators-based threshold-trigger model for Alaska showed 71 percent overlap of selected communities. The strengths and weaknesses of the DEA modeling approach are discussed. DEA modeling is not a substitute for ethnographic analysis of communities based on field work, but it does present an enticing way to consider which communities might be selected for fieldwork or profiling, or as fishing communities, based on quantitative indicators.

Sepez, J., C. Package, P. Malcolm, and A. Poole. 2007. "Unalaska, Alaska: Memory and Denial in the Globalization of the Aleutian Landscape." *Polar Geography* 30(3):193-209.

This paper explores history and globalization as situated in the landscape of Unalaska, Alaska, an island in the Aleutian chain. The history of the area is characterized by successive waves of occupation and resource extraction by the geopolitical powers of Asia and North America that began with Russian colonization. Unalaska's landscape is littered with World War II debris that still echoes of Japanese attacks and the bitter memory of U.S.-ordered evacuation and relocation to distant internment camps of the entire indigenous Aleut population. Unalaska's adjacent Port of Dutch Harbor has grown to become the Nation's busiest commercial fishing port ironically due to the demand of the Japanese market for fishery products and substantial investment by Japanese companies. Applying post-colonial theory to Unalaska's history suggests that territorial acquisition has been succeeded by the dynamics of economic globalization in this American periphery. The Aleutian landscape is shaped by its history of foreign and domestic exploitation, wartime occupation and displacement, economic globalization, and the historical narratives and identities that structure the relationship of past and present through place.