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, 2004

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ABSTRACT

The domestic groundfish fishery off Alaska is an important segment of the U.S. fishing industry. This report contains figures and tables which summarize various aspects of the economic performance of the fishery. Generally, data are presented for the domestic groundfish fishery for 2000 through 2004. Limited catch and ex-vessel value data are reported for earlier years in order to depict the rapid development of the domestic groundfish fishery in the 1980s and to provide a more complete historical perspective on catch. Pacific halibut (*Hippoglossus stenolepis*) is not included in data for the groundfish fishery in this report because for management purposes halibut is not part of the groundfish complex.

The report provides estimates of total groundfish catch, groundfish discards and discard rates, prohibited species bycatch and bycatch rates, the ex-vessel value of the groundfish catch, the ex-vessel value of the catch in other Alaska fisheries, the gross product value (F.O.B. Alaska) of the resulting groundfish seafood products, the number and sizes of vessels that participated in the Alaska groundfish fisheries, vessel activity, and employment on at-sea processors.

In addition, this report contains data on some of the external factors which, in part, determine the economic status of the fisheries. Such factors include foreign exchange rates, the prices and price indexes of products that compete with products from these fisheries, domestic per capita consumption of seafood products, and fishery imports.

This report concludes with an appendix that summarizes the goals and ongoing research activities of the Economics and Social Science Research Program at the Alaska Fisheries Science Center, and provides a list of publications that have arisen out of our work. We have included contact information for each of the ongoing projects so that readers may contact us for more detail or an update on the project status.

Finally, it should be noted that the estimates in this report are intended both to provide information that can be used to describe the Alaska groundfish fisheries, and to provide industry and others an opportunity to comment on the validity of these estimates.

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INTRODUCTION

The domestic groundfish fishery off Alaska is an important segment of the U.S. fishing industry. With a total catch of 2.2 million metric tons (t), a retained catch of 2.0 million t, and an ex-vessel value of $593 million in 2004, it accounted for 50% of the weight and 16% of the ex-vessel value of total U.S. domestic landings as reported in Fisheries of the United States, 2004. The value of the 2004 catch after primary processing was approximately $1.7 billion (F.O.B. Alaska).

All but a small part of the commercial groundfish catch off Alaska occurs in the groundfish fisheries managed under the Fishery Management Plans (FMP) for the Gulf of Alaska (GOA) and the Bering Sea/Aleutian Islands area (BSAI) groundfish fisheries. In 2004, other fisheries accounted for only about 3,000 t of the catch reported above. The footnotes for each table indicate if the estimates provided in that table are only for the fisheries with catch that is counted against federal TACs or if they also include other Alaska groundfish fisheries.

The fishery management and development policies for the BSAI and GOA groundfish fisheries have resulted in high levels of catch, ex-vessel value (i.e., revenue), processed product value (i.e., revenue), exports, employment, and other measures of economic activity. The cost data required to estimate the success of these policies with respect to net benefits to either the participants in these fisheries or the Nation are not available. However, the use of the race for fish as a principal mechanism for allocating the groundfish quotas and prohibited species catch (PSC) limits among competing fishing operations has adversely affected at least some aspects of the economic performance of the fisheries. The individual fishing quota (IFQ) program for the fixed gear sablefish fishery, the Western Alaska Community Development Quota (CDQ) program for BSAI groundfish, and the American Fisheries Act (AFA) cooperatives for the BSAI pollock fishery have demonstrated that eliminating the race for fish as the allocation mechanism and replacing it with a market-based allocation mechanism can decrease harvesting and processing costs, increase the value of the groundfish catch, and, in some cases, decrease the cost of providing more protection for target species, non-target species, marine mammals, and seabirds. It is anticipated that the recent rationalization program instituted in the BSAI crab fisheries will generate many of the same benefits. However, it is unclear at this time how such benefits will be distributed; as with most management measures, there may be winners and losers.

This report presents the economic status of groundfish fisheries off Alaska in terms of economic activity and outputs using estimates of catch, bycatch, 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 Production Reports, Observer Reports, fish tickets, and the Commercial Operators' Annual Reports. All catch data reported for 1991-2002 are based on the blend estimates of total catch, which were used by the National Marine Fisheries

Service (NMFS) to monitor groundfish and PSC quotas in those years. Catch data for 2003-04 come from NMFS's new catch accounting system, which replaces the blend as the primary tool for monitoring groundfish and PSC quotas.

A variety of external factors influence the economic status of the fisheries. Therefore, information concerning the following external factors are included in this report: foreign exchange rates, the prices and price indexes of products that compete with products from these fisheries, gross domestic product implicit price deflators, and fishery imports. This report updates last year's report (Hiatt et al. 2004) and is intended to serve as a reference document for those involved in making decisions with respect to conservation, management, and use of GOA and BSAI fishery resources.

The qualifications made in both the overview of the fisheries and the footnotes to the tables are critical to understanding the information contained in this report.

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. It is hoped that the industry and others will identify 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 should be addressed through 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.

OVERVIEW

The commercial groundfish catch off Alaska totaled 2.2 million t in 2004, approximately the same as in 2003 (Fig. 1 and Table 1). The real ex-vessel value of the catch, excluding the value added by at-sea processing, decreased from $627 million in 2003 to $593 million in 2004 (Fig. 3 and Table 16). The gross value of the 2004 catch after primary processing was approximately $1.7 billion (F.O.B. Alaska). The groundfish fisheries accounted for the largest share (51%) of the ex-vessel value of all commercial fisheries off Alaska in 2004 (Fig. 4, Tables 16 and 17), while the Pacific salmon (*Oncorhynchus spp*.) fishery was second with $225 million or 19% of the total Alaska ex-vessel value. The value of the Pacific halibut (*Hippoglossus stenolepis*) catch amounted to $169 million or 15% of the total for Alaska, and exceeded the ex-vessel value of the shellfish fishery by just $3.3 million. Of particular note in 2004 is the return, after a three-year decline, of Pacific salmon to its position as the second most valuable fishery; the 31% increase in real ex-vessel value of the salmon catch from 2003 to 2004 results from an 11% increase in the catch (as reported in Fisheries of the United States, 2004) and increases in the ex-vessel prices of all salmon species except sockeye (as derived from Commercial Operators' Annual Reports).

During the last 14 years, estimated total catch in the commercial groundfish fisheries off Alaska (including foreign and joint venture fisheries as well as the domestic fishery) varied between 1.7 and 2.4 million t (Fig. 1 and Table 1). 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.

The peak catch occurred in 1991, in part, because blend estimates of catch and bycatch were not yet used to monitor most quotas. If they had been, several fisheries would have been closed earlier in the year. There are three reasons why the catch estimates for 1988 through 1990 have a significant downward bias compared to the estimates for the other years. First, the domestic fishery accounted for a large part of total catch in 1988 through 1990. Second, discards were not included in the reported estimates of domestic catch prior to 1991, but they were included in the catch estimates for the foreign and joint venture fisheries. Based on estimates of the discard rates for 1992 through 1995, discards would have been about 16% of total catch. Finally, the blend estimates of catch, excluding at-sea discards, tend to exceed the estimates based solely on industry reports and, prior to 1991, only industry reports were used to estimate retained catch in the domestic fishery. Variations in the catch estimates also reflect changes in the total allowable catch (TAC), area closures or restrictions, and bycatch restrictions.

The information provided by what was formerly the North Pacific Groundfish Observer Program and is now the Fisheries Monitoring and Analysis Division (FMA) of the Alaska Fisheries Science Center 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 bycatch 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 and AFA fisheries. 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. Estimates of the numbers of vessels and plants with observers, observer-deployment days, and estimated observer costs by year and type of operation for 2002-03 are presented in Table 51.

Walleye (Alaska) pollock (*Theragra chalcogramma*) has been the dominant species in the commercial groundfish catch off Alaska. The 2004 pollock catch of 1.54 million t accounted for 71% of the total groundfish catch of 2.2 million t (Table 1). The pollock catch was essentially unchanged from 2003. The next major species, Pacific cod (*Gadus macrocephalus*), accounted for 270,500 t or 12.5% of the total 2004 groundfish catch. The Pacific cod catch was up about 3.1% from a year earlier. The 2004 catch of flatfish, which includes yellowfin sole (*Pleuronectes asper*), rock sole (*Pleuronectes bilineatus*), and arrowtooth flounder (*Atheresthes stomias*) was 197,700 t, down about 3% from 2003. Pollock, Pacific cod, and flatfish comprised almost 93% of the total 2004 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 Fig. 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 for each of these three gear groups. Table 2 presents catch data by area, gear, vessel type, and species. The catch data in Table 2 and the catch, ex-vessel value, and vessel information in the tables of the rest of this report are for the BSAI and GOA FMP fisheries, unless otherwise indicated.

In the last five years, the trawl catch averaged about 90% of the total catch, while the catch with hook and line gear accounted for 8.1%. Most species are harvested predominately by one type of gear, which typically accounts for 90% or more of the catch. The one exception is Pacific cod, where in 2004, 37.4% (101,000 t) was taken by trawls, 46.7% (126,000 t) by hook-and-line gear, and 15.9% (43,000 t) by pots. In each of the years since 2000, catcher vessels took about 49% of the total catch and catcher/processors took the other 51%. That increase from 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.

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 blend (2000-02) and catch accounting system (2003-04) estimates of the discarded groundfish catch and discard rates by gear, area, and species. The discard rate is the percent of total catch that is discarded.

Although these are the best available estimates of discards and are used for several management purposes, these estimates are not necessarily accurate. The groundfish TACs are established and monitored in terms of total catch, not retained catch; this means that both retained catch and discarded catch are counted against the TACs. Therefore, 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 rough 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 occur in a variety of places on fishing vessels. Discards include 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, quality-control discard, etc. Because observers can only be in one place at a time, they can provide only this rough approximation based on their visual observations rather than data from direct sampling. The discard estimate derived by expanding these approximations from sampled hauls to the remainder of the catch may be inaccurate because the approximation may be inaccurate. The numbers derived from the observer discard approximation can provide users with some information as to the disposition of the catch, but the discard numbers should not be treated as sound estimates. At best, they should be considered a rough gauge of the quantity of discard occurring.

For the BSAI and GOA fisheries as a whole, the annual discard rate for groundfish decreased from 8.6% in 2000 to 6.2% in 2001, increased slightly to 6.8% in 2002, was essentially unchanged at 6.8% in 2003, and then increased again to 7.0% in 2004. The overall discard rate in 2000 represents a 47% reduction from the 1997 rate (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 48% from 1997 to 2000 due to the reduction in the discard rate and an 11.9% reduction in total catch. The prohibition was 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 2004, the overall discard rates were 9.6% and 6.7%, respectively, for the GOA and the BSAI compared to 16.2% and 14.3% in 1997.

Although the fixed gear fisheries accounted for a small part of either total catch or total discards, in 1998 and later years the overall discard rates were substantially higher for fixed gear (10.8% in 2004) than for trawl gear (6.5% in 2004). 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 2004 discard rates were 12.7% and 6.2% for fixed and trawl gear, respectively. In the GOA, however, the corresponding discard rates were 5.4% and 11.5%. 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.

Target fisheries are defined by area, gear and target species. The target designations are used to estimate prohibited species catch (PSC), to apportion PSC limits by fishery (i.e., establish PSC allowances by fishery) and to monitor those PSC allowances. The target fishery designations can also be used to provide estimates of catch and bycatch data by fishery. The blend catch data are assigned to a target fishery by processor, week, area, and gear. The new catch accounting system, 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 approximately 4% of total catch that comes from NMFS Weekly 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 percent or more of the total catch is pollock.

Tables 3 and 4, 7 and 8, and 9 and 10, respectively, provide estimates of total catch, 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.

The bycatch of Pacific halibut, crab, Pacific salmon, and Pacific herring (*Clupea pallasi*) has been an important management issue for more than twenty years. The retention of these species was prohibited first in the foreign groundfish fisheries. This was done to ensure that groundfish fishermen had no incentive to target these species. Estimates of the bycatch of these prohibited species for 2001-04 are summarized by area and gear in Table 11. More detailed estimates of prohibited species bycatch and of bycatch rates for 2003 and 2004 are in Tables 12 - 15. The estimates for halibut are in terms of bycatch mortality because the bycatch limits for halibut are set and monitored using estimated discard mortality rates. The estimates for the other prohibited species are of total bycatch, 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 substantially lower.

An extensive at-sea observer program was developed for the foreign fleets and then extended to the domestic fishery once it had all but replaced participation by foreign fishing and processing vessels. The observer program, now the Fisheries Monitoring and Analysis Division (FMA) of the Alaska Fisheries Science Center, resulted in fundamental changes in the nature of the bycatch problem. First, by providing good estimates of total groundfish catch and non-groundfish bycatch by species, it eliminated much of the concern that total fishing mortality was being 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 bycatch 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 bycatch and bycatch mortality. In summary, the observer program provided fishery managers with the information and tools necessary to prevent bycatch from adversely affecting the stocks of the bycatch species. Therefore, the bycatch in the groundfish fishery is principally not a conservation problem but it can be an allocation problem. Although this does not make it less controversial, it does help identify the types of information and management measures that are required to reduce bycatch to the extent practicable, as is required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

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, 94% of the 2004 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 Gulf where Alaskan vessels accounted for the majority of the Pacific cod catch.

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. The ex-vessel value of the domestic landings in the FMP fisheries, excluding the value added by at-sea processing, decreased from $598 million in 2000 to $584 million in 2001, increased in 2002 to $619 million, decreased to $610 million in 2003, and decreased again to $593 million in 2004. The distribution of ex-vessel value by type of vessel differed by area, gear and species. In 2004, catcher vessels accounted for 53% of the ex-vessel value of the groundfish landings compared to 49% of the total catch because catcher vessels take larger percentages of higher-priced species such as sablefish, which was $2.06 per pound in 2004. Similarly, trawl gear accounted for only 71% of the total ex-vessel value compared to 90% of the catch because much of the trawl catch is of low-priced species such as pollock, which was about $0.11 per pound in 2004.

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, 87% of the 2004 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 13% of the total. The vessels owned by residents of Alaska accounted for a much larger share of the ex-vessel value than of catch (13% compared to 5.9%) because these vessels accounted for relatively large shares of the higher-priced species such as sablefish.

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.

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.

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

Beginning in 2002, all processors (including previously-exempted catcher/processors that operate exclusively in the EEZ and process only their own catch) have been required to submit the Alaska Department of Fish and Game (ADF&G) Commercial Operators' Annual Report (COAR). Even though complete at-sea production data are now available from the COAR, however, the estimates of groundfish gross product value (i.e., revenue) for at-sea processors in 2002 through 2004 are calculated the same as in previous years in order to provide a comparison of the estimates from year to year. These estimates are based on COAR product price data (submitted voluntarily by at-sea processors for activity through 2001) and on product quantity data in the WPR. Beginning with the 2001 report (Hiatt et al. 2001), the estimates of gross product value for shoreside processors are based on COAR product price and quantity data. Prior to that, the estimates for all processors were based on COAR price data and WPR product quantity data.

The requirement that all processors now report their production in the COAR enables us to present Table 30, which gives estimates of the weight and value of processed products from catch in the non-groundfish commercial fisheries of Alaska.

For the purposes of Regulatory Flexibility Act analyses, a business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $3.5 million for all its affiliated operations worldwide. The information necessary to determine if a vessel is independently owned and operated and had gross earnings of less than $3.5 million is not available. However, by using estimates of Alaska groundfish revenue by vessel, 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 could be small entities are presented in Tables 36 and 37, respectively. With more complete revenue, ownership and affiliation information, some of the vessels included in Table 37 would be determined to be large entities. Estimates of the average revenue per vessel for the vessels in Tables 36 and 37, respectively, are presented in Tables 38 and 39.

Estimates of the numbers and net registered 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.

The Weekly Production Reports include employment data for at-sea processors but not inshore processors. Those data are summarized in Table 50 by month and area. The data indicate that in 2004, the crew weeks (defined as the number of crew aboard each vessel in a week summed over the entire year) totaled 103,175 with the majority of them (99,577) occurring in the BSAI groundfish fishery. In 2004, the maximum monthly employment (16,187) occurred in February. Much of this was accounted for by the BSAI pollock fishery.

There are a variety of at least 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 indexes, and foreign exchange rates. Such data are included in Tables 52 - 60. U.S. cold-storage holdings data, which were published in this report in previous years, have not been collected by NMFS since the end of 2002. The availability of cold-storage holdings data depends on the cooperation of industry in the form of voluntary reporting, which has declined to the extent that reports compiled from the data were deemed to lack sufficient accuracy by NMFS management. Consequently, the affected tables have been omitted from this report, but the pre-2003 levels may be found in Tables 48 and 49 of earlier reports.

Exchange rates and world supplies of fishery products play a major role in international trade. Exchange rates change rapidly and can significantly affect the economic status of the groundfish fisheries. There is also 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 actions taken 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 bycatch 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; 5) excess harvesting and processing capacity; and 6) the allocations of groundfish quotas among user groups.

CITATIONS

Hiatt, Terry, Ron Felthoven, Chang Seung and Joe Terry. Stock assessment and fishery evaluation report for the groundfish fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island area: economic status of the groundfish fisheries off Alaska, NPFMC, November 2004.
http://www.afsc.noaa.gov/refm/docs/2004/economic.pdf

National Marine Fisheries Service. 2005. Fisheries of the United States, 2004.
www.st.nmfs.gov/st1/fus/fus04/index.html

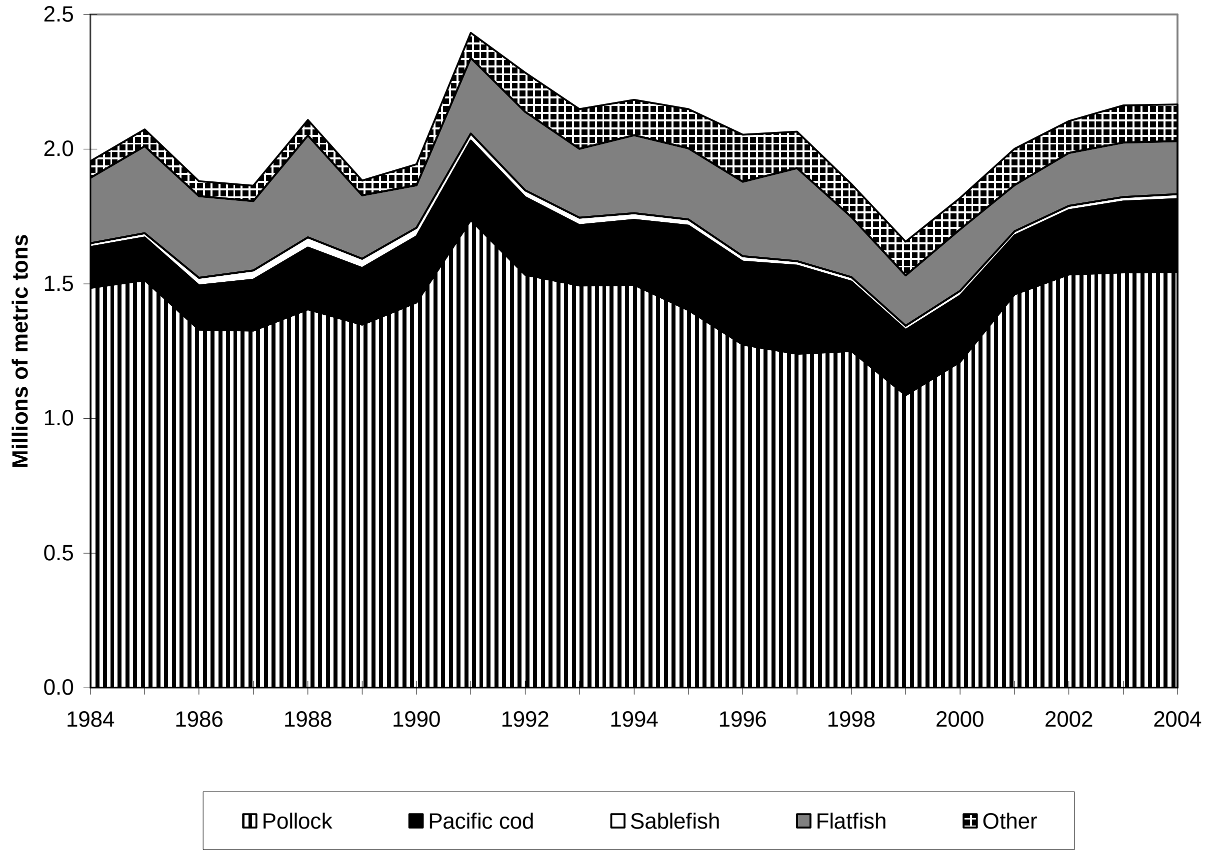


Figure 1. Groundfish catch in the commercial fisheries off Alaska by species, 1984-2004.

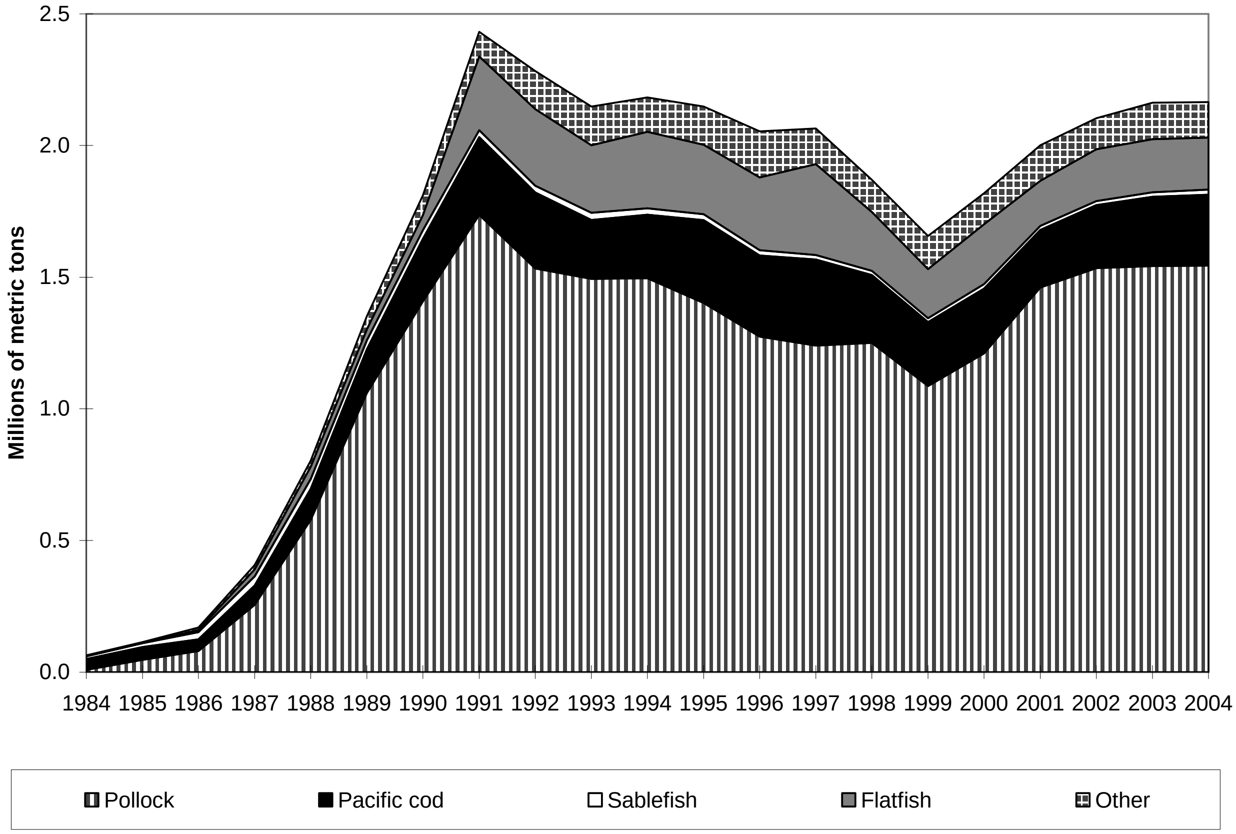


Figure 2. Groundfish catch in the domestic commercial fisheries off Alaska by species, 1984-2004.

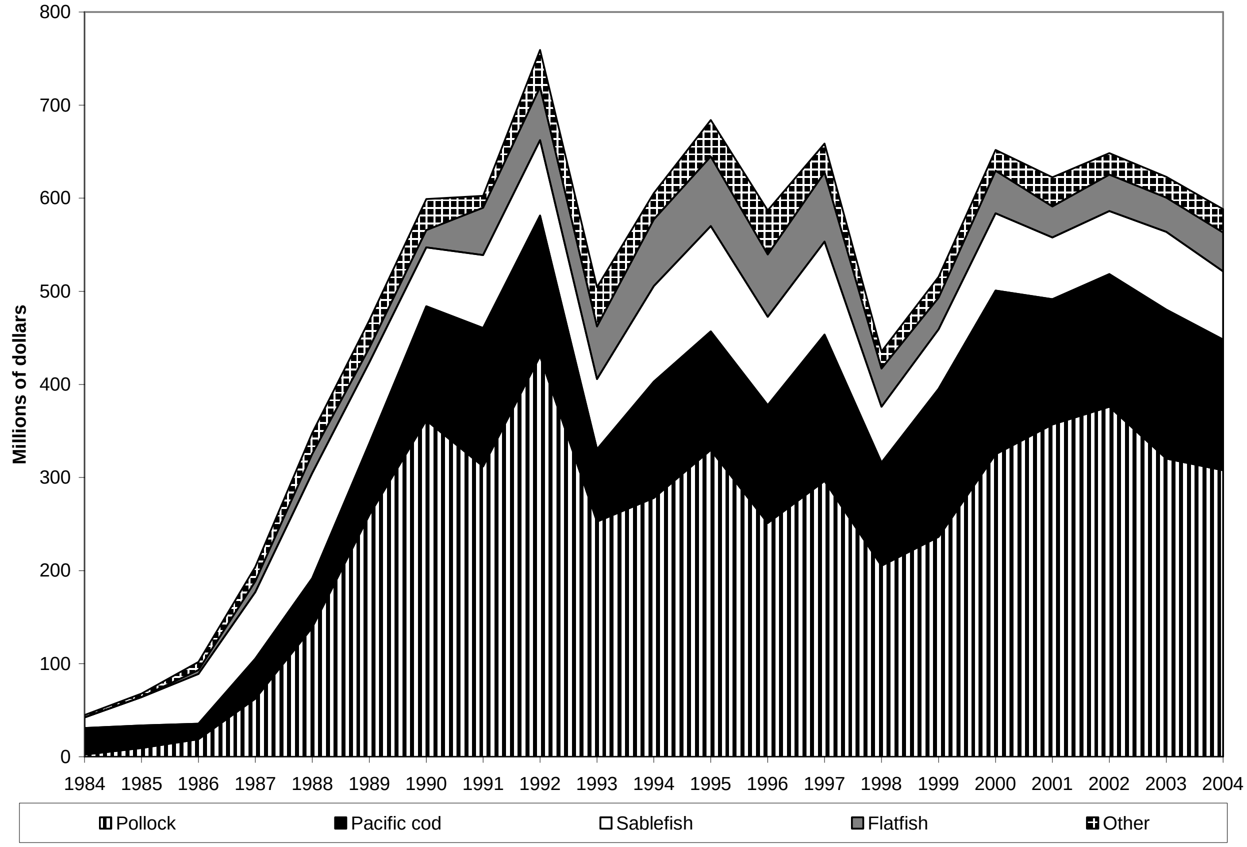


Figure 3. Real ex-vessel value of the groundfish catch in the domestic commercial fisheries off Alaska by species, 1984-2004 (base year = 2004).

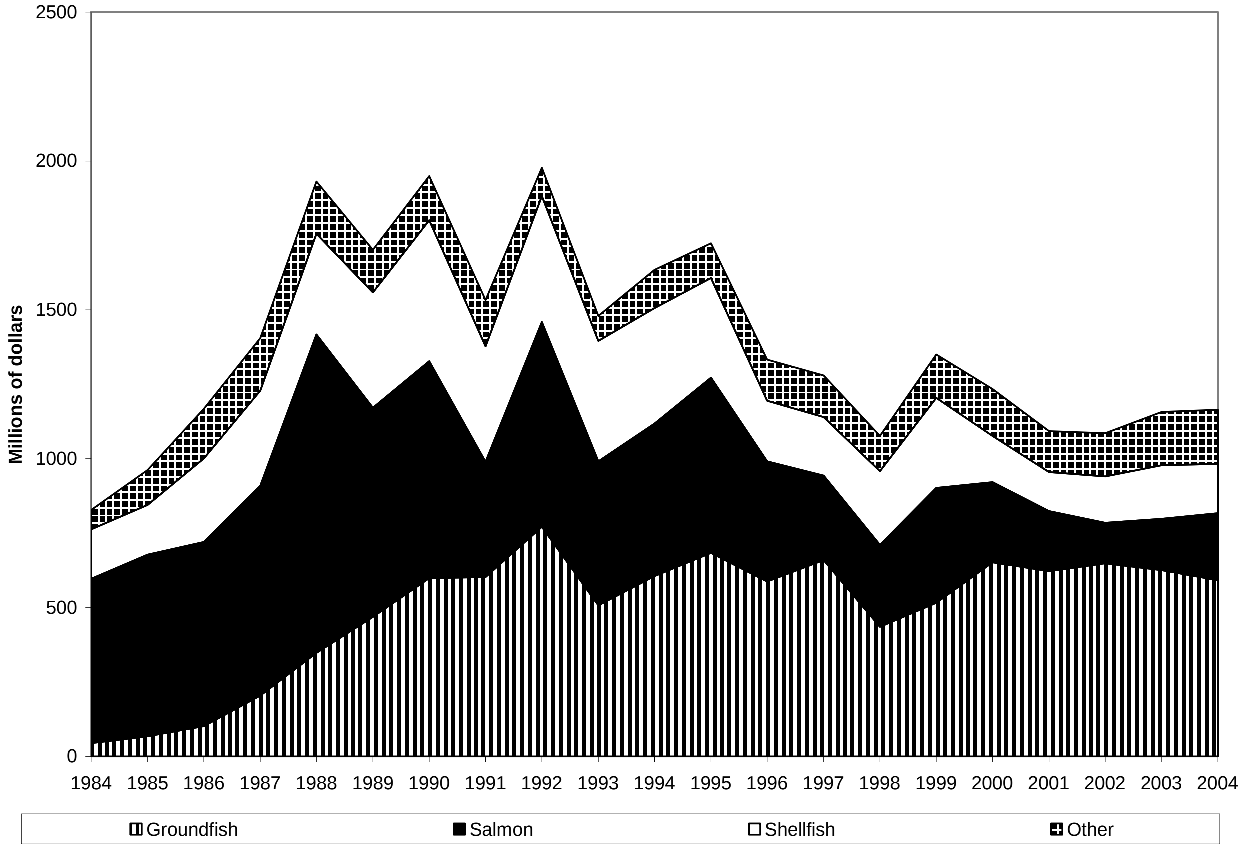


Figure 4. Real ex-vessel value of the domestic fish and shellfish catch off Alaska, 1984-2004 (base year = 2004).

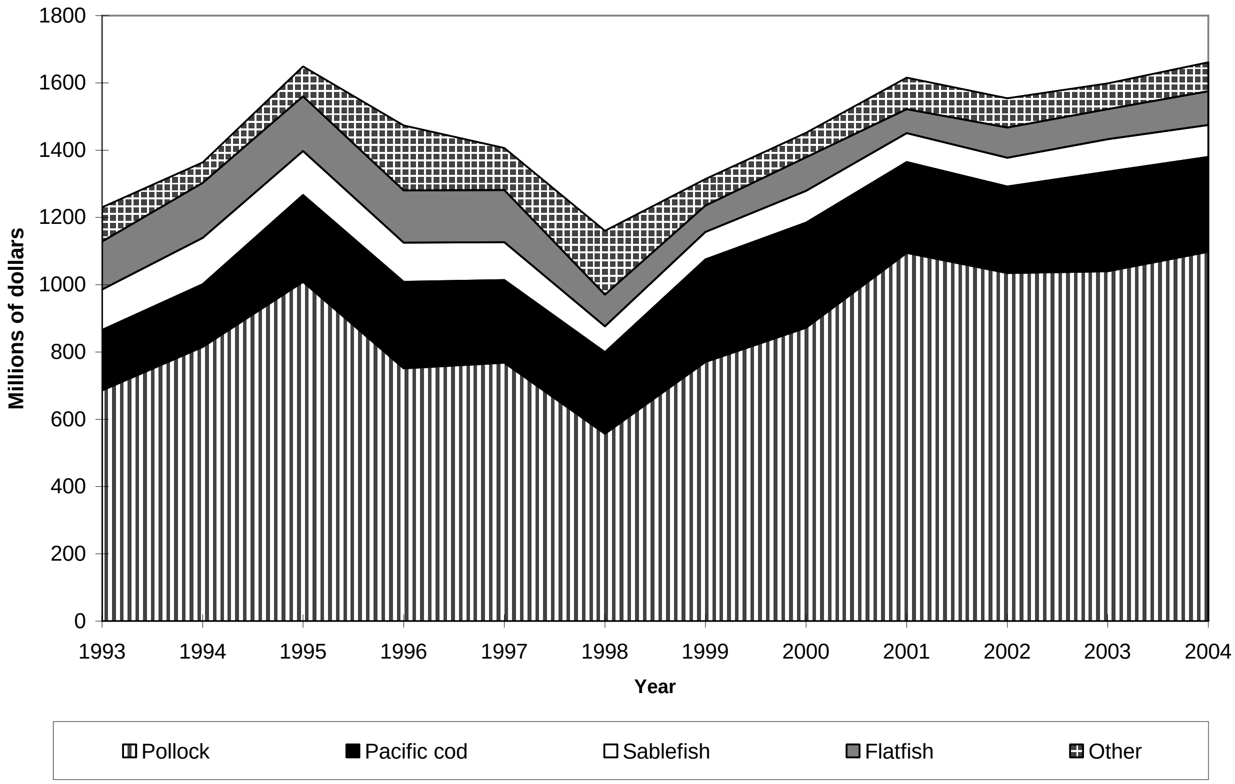
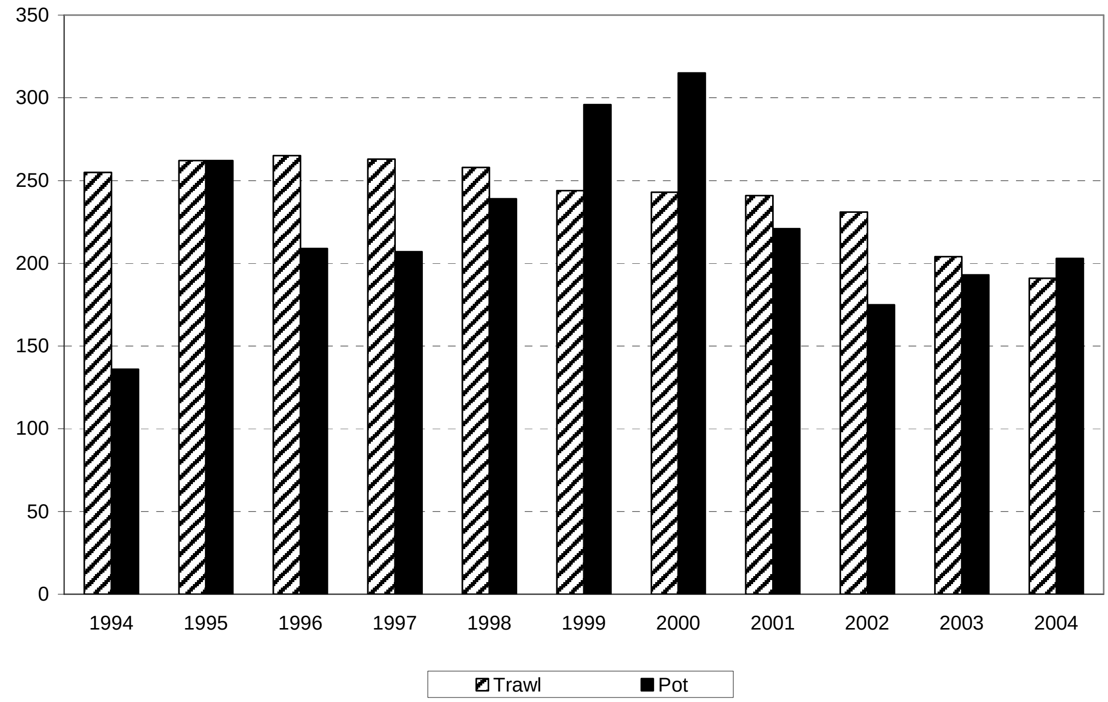


Figure 5. Real gross product value of the groundfish catch off Alaska, 1993-2004 (base year = 2004).



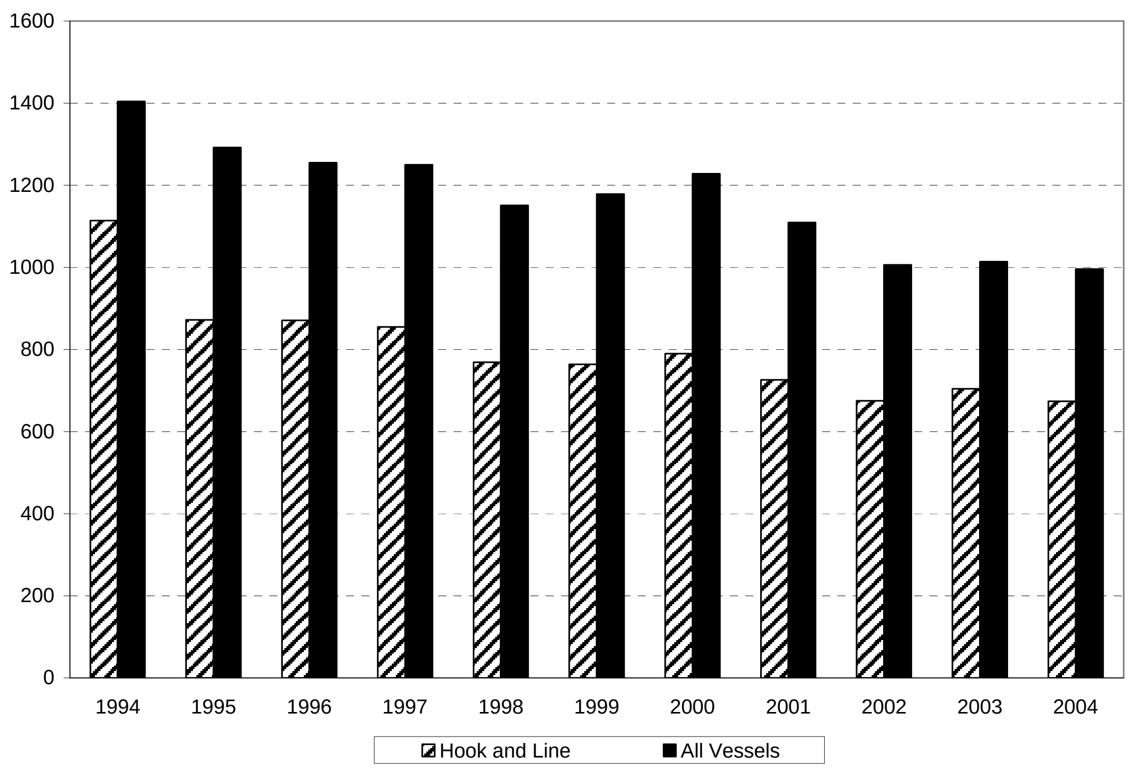


Figure 6. Number of vessels in the domestic groundfish fishery off Alaska by gear type, 1994-2004.

Table 1. Groundfish catch in the commercial fisheries off Alaska by area and species, 1991-2004 (1,000 metric tons, round weight).

		Pollock	Sablefish	Pacific cod	Flatfish	Rockfish	Atka mackerel	Total
Gulf of Alaska	1991	107.5	23.1	77.0	40.1	21.2	1.4	276.1
	1992	90.9	23.6	80.7	41.9	24.9	6.4	280.7
	1993	108.9	24.8	56.5	39.5	19.7	5.1	261.4
	1994	107.3	22.5	47.5	36.0	16.1	3.5	235.8
	1995	72.6	20.8	69.0	32.3	19.3	.7	218.1
	1996	51.3	18.2	68.3	43.1	18.2	1.6	205.2
	1997	90.1	15.7	68.5	33.6	19.8	.3	233.5
	1998	125.1	15.2	62.1	23.3	19.5	.3	249.3
	1999	95.6	13.9	68.6	24.9	24.5	.3	231.6
	2000	76.4	15.7	54.5	37.3	21.5	.2	211.1
	2001	72.6	13.2	41.6	31.8	21.5	.1	185.6
	2002	51.9	13.5	42.4	34.1	22.2	.1	168.3
	2003	50.7	15.5	52.6	41.9	23.6	.6	191.1
	2004	63.9	16.9	56.7	23.0	22.1	.8	188.0
Bering Sea and Aleutian Islands	1991	1,629.1	3.4	218.1	240.3	10.6	26.7	2,155.8
	1992	1,442.9	2.2	207.3	248.9	17.9	48.5	2,003.0
	1993	1,384.6	2.7	167.4	216.9	24.7	66.0	1,887.2
	1994	1,388.6	2.4	193.8	253.4	18.7	65.4	1,947.2
	1995	1,329.5	2.0	245.0	232.2	16.8	81.6	1,929.8
	1996	1,222.3	1.4	240.7	233.7	24.0	103.9	1,848.6
	1997	1,150.5	1.3	257.8	311.9	17.0	65.8	1,831.1
	1998	1,125.1	1.2	195.8	199.8	15.5	57.1	1,620.9
	1999	990.9	1.4	173.9	161.6	19.9	56.2	1,424.9
	2000	1,134.0	1.8	191.1	190.9	16.4	47.2	1,607.9
	2001	1,388.3	1.9	176.7	140.2	17.6	61.6	1,815.2
	2002	1,482.4	2.3	196.7	162.4	16.8	45.3	1,935.7
	2003	1,492.7	2.1	209.8	162.3	20.8	58.4	1,975.0
	2004	1,481.4	2.0	213.8	174.7	17.7	60.5	1,980.7
All Alaska	1991	1,736.6	26.6	295.1	280.4	31.8	28.1	2,431.9
	1992	1,533.8	25.7	288.0	290.8	42.8	54.9	2,283.7
	1993	1,493.5	27.5	223.9	256.4	44.4	71.2	2,148.6
	1994	1,495.9	24.9	241.3	289.4	34.8	68.9	2,183.0
	1995	1,402.1	22.9	314.0	264.4	36.1	82.3	2,147.9
	1996	1,273.6	19.6	309.0	276.8	42.2	105.5	2,053.8
	1997	1,240.7	17.1	326.2	345.6	36.9	66.2	2,064.6
	1998	1,250.2	16.4	257.9	223.1	34.9	57.4	1,870.2
	1999	1,086.4	15.3	242.5	186.4	44.4	56.5	1,656.5
	2000	1,210.3	17.5	245.6	228.2	37.9	47.4	1,819.0
	2001	1,460.9	15.1	218.4	172.0	39.1	61.6	2,000.8
	2002	1,534.3	15.8	239.1	196.5	39.0	45.4	2,104.0
	2003	1,543.3	17.6	262.3	204.2	44.4	59.0	2,166.1
	2004	1,545.3	18.9	270.5	197.7	39.8	61.3	2,168.7

Notes: These estimates include catch from federal and state of Alaska fisheries. Totals may include additional categories.

Source: Blend estimates for 1991-2002. Catch accounting system estimates for 2003-04. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 2. Groundfish catch off Alaska by area, vessel type, gear and species, 2000-04 (1,000 metric tons, round weight).

			Gulf of Alaska			Bering Sea and Aleutian			All Alaska		
			Catcher vessels	Catcher process ors	Total	Catcher vessels	Catcher process ors	Total	Catcher vessels	Catcher process ors	Total
All gear	All Groundfish	2000	162	45	207	686	922	1,608	848	967	1,815
		2001	144	38	182	791	1,024	1,815	935	1,062	1,997
		2002	119	47	165	864	1,072	1,936	983	1,118	2,101
		2003	135	53	188	883	1,092	1,975	1,018	1,145	2,163
		2004	153	32	185	857	1,124	1,981	1,010	1,156	2,166
Hook & Line	Sablefish	2000	11	1	12	1	1	1	11	2	13
		2001	9	1	11	1	0	1	10	2	12
		2002	9	2	11	1	1	1	10	2	12
		2003	11	2	13	1	1	1	12	2	14
		2004	13	2	14	0	0	1	13	2	15
	Pacific cod	2000	7	5	12	1	97	98	8	102	109
		2001	6	4	10	1	108	108	7	112	118
		2002	7	8	15	1	103	103	7	111	118
		2003	7	6	13	1	107	108	8	113	121
		2004	9	5	13	1	112	113	10	117	126
	Flatfish	2000	1	0	1	0	7	8	2	8	9
		2001	1	0	1	1	5	6	1	5	7
		2002	0	0	1	0	5	5	1	5	6
		2003	0	0	0	1	5	5	1	5	6
		2004	0	0	0	0	5	5	0	5	5
	Rockfish	2000	1	0	1	0	1	1	1	1	2
		2001	2	0	2	0	1	1	2	1	2
		2002	1	0	1	0	0	1	1	1	2
		2003	1	0	1	0	0	0	1	1	2
		2004	1	0	1	0	0	0	1	1	2
	All Groundfish	2000	22	7	29	3	124	126	25	131	156
		2001	19	6	25	2	135	138	21	141	163
		2002	18	11	29	2	130	132	20	140	161
		2003	21	9	30	2	137	140	24	146	170
		2004	24	7	31	2	142	143	26	149	175
Pot	Pacific cod	2000	16	1	17	16	3	19	33	4	36
		2001	6	2	7	14	3	17	19	5	24
		2002	7	1	8	13	2	15	20	3	23
		2003	21	-	21	20	2	22	41	-	43
		2004	25	0	26	14	3	17	39	3	43

Table 2. Continued.

			Gulf of Alaska			Bering Sea and Aleutian			All Alaska		
			Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
Trawl	Pollock	2000	74	0	75	615	514	1,129	689	515	1,204
		2001	71	0	71	746	636	1,382	817	636	1,453
		2002	50	0	51	799	677	1,476	849	677	1,526
		2003	49	1	49	807	678	1,486	856	679	1,535
		2004	62	0	63	792	684	1,476	854	685	1,539
	Sablefish	2000	1	1	2	0	0	0	1	1	2
		2001	1	1	1	0	0	0	1	1	2
		2002	1	1	2	0	0	0	1	2	2
		2003	1	1	2	0	0	0	1	1	2
		2004	1	1	1	0	0	0	1	1	2
	Pacific cod	2000	23	2	25	42	33	74	65	35	100
		2001	21	3	24	21	30	51	43	33	76
		2002	18	1	20	41	37	79	60	39	98
		2003	17	2	19	42	38	80	58	40	99
		2004	16	1	18	38	45	84	55	47	101
	Flatfish	2000	15	21	36	8	175	183	22	197	219
		2001	17	14	31	3	131	134	20	145	165
		2002	14	20	33	4	153	157	18	172	191
		2003	14	27	41	5	151	157	20	179	198
		2004	14	9	23	6	164	170	19	173	193
	Rockfish	2000	9	10	19	0	16	16	9	26	35
		2001	7	11	19	0	17	17	7	28	35
		2002	9	12	20	0	16	16	9	28	37
		2003	10	11	22	0	20	20	11	31	42
		2004	9	12	21	0	17	17	10	28	38
	Atka mackerel	2000	0	0	0	0	47	47	0	47	47
		2001	0	0	0	0	61	61	0	61	61
		2002	0	0	0	0	45	45	0	45	45
		2003	0	1	1	2	56	58	2	57	59
		2004	0	1	1	1	59	60	1	60	61
	All Groundfish	2000	124	36	160	665	796	1,461	789	832	1,621
		2001	119	30	149	774	886	1,659	893	916	1,809
		2002	94	35	129	847	940	1,788	941	975	1,916
		2003	93	44	137	859	953	1,812	952	997	1,949
		2004	103	24	128	840	979	1,818	943	1,003	1,946

Note: 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. A dash (-) indicates that data are not available, either because there was no activity or to preserve confidentiality.

Source: Blend (2000-02) and Catch Accounting System (2003-04) estimates, 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, 2003-04 (1,000 metric tons, round weight).

			Species											
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rex sole	Flat deep	Flat shallow	Rock-fish	Atka mack.	Other	Total
2003 Gear/ Target	Hook & line	Sablefish	.0	13.2	.1	.3	.0	.0	.0	.0	.9	.0	.2	14.7
		Pacific cod	.0	.0	12.4	.0	.0	-	.0	.0	.0	.0	.8	13.3
		Rockfish	-	.0	.0	-	-	-	-	-	.5	-	.0	.5
		Halibut	-	.5	.4	.1	.0	.0	.0	.0	.4	-	.4	1.7
		Total	.1	13.7	13.0	.3	.0	.0	.0	.0	1.8	.0	2.8	31.7
	Pot	Pacific cod	.0	-	20.7	.0	.0	-	-	.0	.0	.0	.4	21.2
		Total	.0	-	20.7	.0	.0	-	-	.0	.0	.0	.4	21.2
	Trawl	Pollock, bottom	3.2	.0	.1	.4	.1	.0	.0	.0	.0	-	.0	3.8
		Pollock, pelagic	46.2	.0	.2	.3	.1	.0	-	.0	.2	.0	.2	47.1
		Pacific cod	.3	.0	13.3	1.1	.2	.1	.0	.6	.1	.0	.3	16.0
		Arrowtooth	.3	.3	.8	15.1	.4	1.0	.2	.1	1.0	.0	.3	19.6
		Flathead sole	.1	.0	.3	2.2	.9	.1	.0	.1	.1	.0	.3	4.2
		Rex sole	.1	.1	.6	5.9	.4	2.2	.2	.0	.5	.0	.5	10.6
		Flatfish, deep	.0	.1	.0	.2	.0	.0	.3	.0	.1	-	.0	.8
		Flatfish, shallow	.1	.0	1.6	2.2	.4	.0	.0	3.4	.0	.0	.7	8.5
		Rockfish	.3	1.2	1.7	1.4	.1	.2	.1	.1	19.7	.4	.2	25.4
		Total	50.6	1.8	18.9	29.9	2.5	3.6	.9	4.6	21.8	.6	3.2	138.3
	All gear	Total	50.7	15.5	52.6	30.2	2.5	3.6	.9	4.6	23.6	.6	6.4	191.1

Table 3. Continued.

2004 Gear/ Target			Species											
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rex sole	Flat deep	Flat shallow	Rock-fish	Atka mack.	Other	Total
	Hook & line	Sablefish	.0	14.8	.1	.2	.0	-	.0	.0	.9	.0	.4	16.4
		Pacific cod	.0	.0	13.1	.1	.0	-	.0	.0	.1	.0	.9	14.2
		Rockfish	-	.0	.0	-	-	-	-	-	.3	-	-	.4
		Halibut	.0	.8	.3	.0	.0	-	.0	.0	.2	.0	.1	1.4
		Total	.2	15.6	13.5	.3	.0	-	.0	.0	1.5	.0	1.8	33.0
	Pot	Pacific cod	.0	-	25.6	.0	.0	.0	-	.0	.0	.0	.6	26.2
		Total	.0	-	25.6	.0	.0	.0	-	.0	.0	.0	.6	26.2
	Trawl	Pollock, bottom	9.6	.0	.3	.7	.2	.0	.0	.0	.1	.0	.1	11.1
		Pollock, pelagic	53.1	.0	.2	.3	.1	.0	.0	.0	.0	.0	.2	53.9
		Sablefish	-	.1	-	.0	.0	.0	.0	-	.0	-	.0	.2
		Pacific cod	.2	.0	13.5	1.6	.1	.1	.0	.8	.3	.0	.2	16.8
		Arrowtooth	.2	.1	.5	6.0	.8	.2	.1	.3	.1	.0	.4	8.5
		Flathead sole	.0	.0	.2	1.5	.9	.2	.0	.0	.0	.0	.1	3.1
		Rex sole	.0	.0	.2	2.0	.1	.7	.0	.0	.3	.0	.1	3.5
		Flatfish, deep	.0	.1	.1	.3	.0	.0	.5	.0	.0	-	.0	1.2
		Flatfish, shallow	.1	.0	.8	.7	.2	.0	.0	1.8	.0	.0	.5	4.1
		Rockfish	.4	1.0	1.7	1.8	.1	.1	.1	.1	19.7	.7	.1	25.9
		Total	63.7	1.3	17.6	15.0	2.4	1.5	.7	3.1	20.6	.8	2.2	128.8
	All gear	Total	63.9	16.9	56.7	15.3	2.4	1.5	.7	3.1	22.1	.8	4.6	188.0

Notes: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs.

Source: Blend estimates, 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, 2003-04 (1,000 metric tons, round weight).

			Species												
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock-fish	Atka mack.	Other	Total
2003 Gear/ Target	Hook & line	Sablefish	.0	.7	.0	.1	.0	-	.6	-	.0	.1	.0	.1	1.6
		Pacific cod	7.1	.1	107.9	1.3	.4	.0	.2	.6	.1	.1	.0	16.7	134.6
		Turbot	.0	.1	.0	.2	.0	.0	1.6	-	.0	.1	.0	.2	2.2
		Halibut	.0	.2	.1	.1	.0	.0	.2	.0	.0	.1	.0	.3	1.1
		Total	7.1	1.2	108.1	1.6	.4	.0	2.5	.6	.1	.4	.0	17.4	139.6
	Pot	Sablefish	.0	.7	.0	.1	.0	.0	.1	-	.0	.0	.0	.0	.9
		Pacific cod	.0	.0	22.0	.0	.0	.0	.0	.1	.0	.0	.2	.4	22.7
		Total	.0	.7	22.0	.1	.0	.0	.1	.1	.0	.0	.2	.4	23.6
	Trawl	Pollock, bottom	14.1	.0	.2	.1	.1	.1	.0	.1	.0	.3	.4	.3	15.6
		Pollock, pelagic	1,440.3	.0	5.8	.6	1.6	1.3	.0	.1	.2	.8	.4	1.4	1,452.6
		Pacific cod	9.8	.1	61.3	4.9	1.5	6.1	.1	1.1	1.3	.5	4.9	3.1	94.7
		Arrowtooth	.2	.0	.1	1.2	.1	.0	.2	.0	.2	.1	.0	.1	2.4
		Flathead sole	3.0	.0	1.8	2.1	6.5	1.2	.1	2.5	.7	.1	.0	1.0	18.9
		Rock sole	5.0	.0	3.4	.4	.8	19.5	.0	6.6	1.2	.0	.0	1.0	38.0
		Turbot	.1	.0	.0	.2	.1	.0	.2	.0	.0	.0	-	.0	.7
		Yellowfin	11.8	-	4.7	1.1	2.9	8.5	.0	69.8	9.0	.0	.0	3.2	111.0
		Other flatfish	.1	.0	.1	.4	.0	.0	.0	.0	.2	.0	.1	.0	1.0
		Rockfish	.5	.0	.3	.4	.0	.0	.2	-	.0	11.1	.7	.1	13.5
		Atka mackerel	.5	.0	1.9	.3	.0	.2	.1	.0	.0	7.4	51.6	.5	62.6
		Total	1,485.5	.2	79.7	11.8	13.8	37.0	.9	80.3	12.9	20.4	58.2	11.0	1,811.8
	All gear	Total	1,492.7	2.1	209.8	13.6	14.3	37.0	3.5	81.0	13.0	20.8	58.4	28.8	1,975.0

Table 4. Continued.

			Species												
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock-fish	Atka mack.	Other	Total
2004 Gear/ Target	Hook & line	Sablefish	-	.6	.0	.0	-	-	.1	-	-	.1	.0	.0	.8
		Pacific cod	5.3	.0	112.8	1.4	.6	.0	.2	.6	.2	.2	.0	18.6	140.0
		Turbot	.0	.1	.0	.2	.0	.0	1.2	-	.0	.1	.0	.1	1.7
		Halibut	.0	.2	.1	.1	.0	.0	.1	.0	.0	.0	.0	.3	.7
		Total	5.4	.9	113.0	1.6	.6	.0	1.5	.6	.2	.4	.0	19.1	143.3
	Pot	Sablefish	.0	.8	.0	.1	.0	.0	.0	-	.0	.0	.0	.0	.9
		Pacific cod	.0	.0	17.2	.0	.0	.0	-	.1	.0	.0	.1	.3	17.7
		Total	.0	.8	17.2	.1	.0	.0	.0	.1	.0	.0	.1	.5	18.9
	Trawl	Pollock, bottom	17.4	.0	.2	.1	.1	.3	.0	.2	.2	.1	.6	.3	19.5
		Pollock, pelagic	1,418.3	.0	6.2	.5	2.0	2.3	.0	.7	.3	.4	.4	1.8	1,433.0
		Sablefish	.0	.0	.0	.0	.0	.0	.0	-	.0	.0	.0	.0	.1
		Pacific cod	13.7	.1	62.1	8.0	2.8	9.2	.1	1.8	2.4	.5	4.8	3.4	108.9
		Arrowtooth	.5	.1	.2	1.6	.1	.0	.1	.0	.3	.1	.4	.1	3.4
		Flathead sole	5.3	.0	2.8	3.8	9.7	2.1	.2	2.4	.7	.1	.0	1.8	29.0
		Rock sole	8.9	.0	5.6	.3	.9	24.3	.0	3.9	1.9	.0	.0	.8	46.8
		Turbot	.1	.0	.0	.1	.0	.0	.1	.0	.0	.0	-	.0	.3
		Yellowfin	10.4	.0	3.6	.3	1.1	10.1	.0	65.6	6.3	.0	.0	1.6	99.0
		Other flatfish	.6	.0	.2	.9	.1	.1	.0	.0	.3	.0	.1	.1	2.6
		Rockfish	.3	.0	.2	.4	.0	.0	.1	-	.0	9.0	.4	.1	10.4
		Atka mackerel	.5	.0	2.4	.4	.0	.2	.1	.0	.1	7.1	53.6	.7	65.2
		Total	1,476.1	.3	83.5	16.5	16.8	48.6	.7	74.7	12.7	17.3	60.3	10.9	1,818.4
	All gear	Total	1,481.4	2.0	213.8	18.2	17.4	48.7	2.2	75.4	12.8	17.7	60.5	30.5	1,980.6

Notes: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, processing mode, NMFS area, and gear. These estimates include only catch counted against federal TACs.

Source: Blend estimates, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 5. Groundfish catch off Alaska by area, residency, and species, 2000-04 (1,000 metric tons, round weight).

		Gulf of Alaska			Bering Sea and Aleutian			All Alaska		
		Alaska	Other	Unknown	Alaska	Other	Unknown	Alaska	Other	Unknown
All groundfish	2000	90	116	1	52	1,556	0	142	1,672	1
	2001	70	111	0	46	1,767	2	116	1,878	3
	2002	67	98	0	45	1,889	2	112	1,987	2
	2003	72	116	0	47	1,928	0	120	2,044	0
	2004	80	105	0	47	1,933	0	128	2,038	0
Pollock	2000	31	44	0	11	1,123	0	42	1,167	0
	2001	29	42	0	16	1,370	2	45	1,412	2
	2002	19	31	0	17	1,464	1	36	1,496	1
	2003	18	32	0	15	1,478	0	33	1,509	0
	2004	24	39	0	16	1,466	0	39	1,505	0
Sablefish	2000	7	7	0	1	1	0	7	8	0
	2001	6	7	0	1	1	0	6	8	0
	2002	6	7	0	1	1	0	7	8	0
	2003	7	8	0	1	1	0	7	9	0
	2004	7	8	0	1	1	0	8	10	0
Pacific cod	2000	33	21	0	24	167	0	57	188	0
	2001	22	20	0	17	160	0	39	180	0
	2002	25	17	0	19	178	0	44	195	0
	2003	30	22	0	19	191	0	49	213	0
	2004	34	22	0	19	194	0	53	217	0
Flatfish	2000	11	26	0	8	182	0	19	209	0
	2001	8	23	0	3	137	0	12	160	0
	2002	10	24	0	7	156	0	17	180	0
	2003	8	34	0	9	154	0	17	187	0
	2004	8	15	0	7	168	0	15	183	0
Rockfish	2000	6	15	0	2	15	0	8	29	0
	2001	4	17	0	3	15	0	6	31	0
	2002	5	16	0	0	17	0	6	33	0
	2003	6	18	0	0	21	0	6	38	0
	2004	5	17	0	0	17	0	5	34	0
Atka mackerel	2000	0	0	0	3	45	0	3	45	0
	2001	0	0	0	5	57	0	5	57	0
	2002	0	0	0	0	45	0	0	45	0
	2003	0	0	0	2	57	0	2	57	0
	2004	0	1	0	3	57	0	3	58	0

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.

Source: Blend estimates (2000-02), Catch Accounting System estimates (2003-04), fish tickets, CFEC vessel data, 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, 2000-04 (1,000 metric tons, round weight).

			Fixed		Trawl		All gear	
			Total Discards	Discard Rate	Total Discards	Discard Rate	Total Discards	Discard Rate
Gulf of Alaska	All Groundfish	2000	5.5	11.5%	22.0	13.7%	27.5	13.2%
		2001	3.7	11.0%	20.7	13.8%	24.3	13.3%
		2002	2.7	7.4%	20.3	15.8%	23.1	13.9%
		2003	3.2	6.0%	26.7	19.3%	29.9	15.6%
		2004	3.2	5.4%	14.8	11.5%	18.0	9.6%
	Pollock	2000	.3	78.1%	1.9	2.6%	2.2	2.9%
		2001	.0	9.3%	.7	1.0%	.7	1.0%
		2002	.0	16.7%	1.1	2.2%	1.1	2.2%
		2003	.0	15.6%	1.1	2.1%	1.1	2.1%
		2004	.0	14.8%	1.1	1.7%	1.1	1.8%
	Sablefish	2000	.5	4.2%	.6	35.9%	1.1	8.2%
		2001	.3	2.6%	.5	35.3%	.8	6.4%
		2002	.3	2.9%	.7	36.1%	1.0	8.0%
		2003	.5	3.4%	.7	37.8%	1.2	7.4%
		2004	.5	2.9%	.2	14.8%	.7	3.9%
	Pacific cod	2000	.1	.5%	1.2	4.9%	1.4	2.5%
		2001	.3	1.9%	1.6	6.5%	1.9	4.6%
		2002	.2	.9%	3.5	17.7%	3.7	8.8%
		2003	.5	1.4%	2.0	10.5%	2.4	4.6%
		2004	.4	1.1%	.9	5.1%	1.3	2.3%
	Flatfish	2000	1.4	95.2%	14.0	39.0%	15.3	41.1%
		2001	.9	94.4%	13.7	44.3%	14.5	45.7%
		2002	.7	96.0%	11.3	33.7%	11.9	35.0%
		2003	.3	86.8%	18.4	44.3%	18.7	44.7%
		2004	.3	86.6%	9.5	41.9%	9.8	42.6%
	Rockfish	2000	.4	21.8%	2.1	11.1%	2.5	12.1%
		2001	.6	23.0%	2.0	10.6%	2.6	12.1%
		2002	.3	19.8%	1.9	9.4%	2.2	10.1%
		2003	.4	22.1%	3.1	14.3%	3.5	14.9%
		2004	.4	23.1%	2.0	9.6%	2.3	10.5%
	Atka mackerel	2000	.0	100.0%	.0	5.0%	.0	6.1%
		2001	.0	93.2%	.0	22.6%	.0	23.5%
		2002	.0	87.1%	.0	60.3%	.1	61.1%
		2003	.0	98.8%	.2	42.2%	.2	43.1%
		2004	.0	96.9%	.3	38.6%	.3	40.1%

Table 6. Continued.

			Fixed		Trawl		All gear	
			Total Discards	Discard Rate	Total Discards	Discard Rate	Total Discards	Discard Rate
Bering Sea & Aleutians	All Groundfish	2000	20.4	13.9%	107.7	7.4%	128.1	8.0%
		2001	20.5	13.2%	78.9	4.8%	99.4	5.5%
		2002	18.8	12.7%	100.1	5.6%	118.9	6.1%
		2003	18.6	11.4%	98.4	5.4%	117.0	5.9%
		2004	20.6	12.7%	112.3	6.2%	132.9	6.7%
	Pollock	2000	1.0	21.1%	21.4	1.9%	22.4	2.0%
		2001	1.0	16.7%	16.7	1.2%	17.7	1.3%
		2002	.9	13.3%	20.6	1.4%	21.4	1.4%
		2003	.8	11.2%	16.7	1.1%	17.5	1.2%
		2004	.6	11.2%	22.7	1.5%	23.3	1.6%
	Sablefish	2000	.1	7.5%	.1	17.1%	.2	9.2%
		2001	.1	6.9%	.0	7.1%	.1	6.9%
		2002	.2	8.0%	.0	14.7%	.2	9.0%
		2003	.1	7.2%	.1	37.7%	.2	10.8%
		2004	.0	2.7%	.1	26.4%	.1	6.5%
	Pacific cod	2000	2.9	2.5%	1.1	1.4%	4.0	2.1%
		2001	1.8	1.5%	1.1	2.1%	2.9	1.7%
		2002	2.4	2.0%	1.9	2.4%	4.3	2.2%
		2003	2.3	1.8%	1.1	1.4%	3.4	1.6%
		2004	2.0	1.5%	.8	.9%	2.8	1.3%
	Flatfish	2000	3.2	40.7%	66.0	36.1%	69.2	36.3%
		2001	3.1	51.2%	37.8	28.2%	40.8	29.1%
		2002	2.8	53.2%	52.6	33.5%	55.4	34.1%
		2003	3.3	58.5%	51.1	32.6%	54.4	33.5%
		2004	2.9	61.0%	62.4	36.7%	65.3	37.4%
	Rockfish	2000	.4	60.9%	5.7	36.0%	6.1	37.1%
		2001	.4	58.7%	8.1	47.9%	8.5	48.4%
		2002	.4	58.9%	5.5	34.1%	5.9	35.0%
		2003	.2	46.8%	7.5	36.8%	7.7	37.0%
		2004	.2	51.4%	6.3	36.4%	6.5	36.7%
	Atka mackerel	2000	.2	97.2%	2.6	5.6%	2.8	5.9%
		2001	.2	53.6%	4.4	7.1%	4.5	7.3%
		2002	.1	98.6%	7.5	16.5%	7.6	16.7%
		2003	.2	96.1%	13.6	23.4%	13.8	23.7%
		2004	.1	98.5%	11.7	19.3%	11.8	19.5%

Table 6. Continued.

			Fixed		Trawl		All gear	
			Total Discards	Discard Rate	Total Discards	Discard Rate	Total Discards	Discard Rate
All Alaska	All Groundfish	2000	25.9	13.3%	129.6	8.0%	155.6	8.6%
		2001	24.2	12.8%	99.6	5.5%	123.7	6.2%
		2002	21.5	11.6%	120.4	6.3%	141.9	6.8%
		2003	21.8	10.1%	125.1	6.4%	146.9	6.8%
		2004	23.9	10.8%	127.1	6.5%	151.0	7.0%
	Pollock	2000	1.3	24.9%	23.3	1.9%	24.6	2.0%
		2001	1.0	16.6%	17.4	1.2%	18.5	1.3%
		2002	.9	13.4%	21.7	1.4%	22.6	1.5%
		2003	.8	11.2%	17.8	1.2%	18.6	1.2%
		2004	.6	11.3%	23.8	1.5%	24.4	1.6%
	Sablefish	2000	.6	4.6%	.7	32.9%	1.3	8.3%
		2001	.4	3.2%	.5	29.1%	.9	6.4%
		2002	.5	3.7%	.7	32.9%	1.2	8.2%
		2003	.6	3.8%	.8	37.8%	1.4	7.8%
		2004	.5	2.9%	.3	17.1%	.8	4.1%
	Pacific cod	2000	3.0	2.1%	2.3	2.3%	5.3	2.2%
		2001	2.2	1.5%	2.7	3.5%	4.8	2.2%
		2002	2.6	1.8%	5.4	5.5%	8.0	3.3%
		2003	2.7	1.7%	3.1	3.1%	5.8	2.2%
		2004	2.4	1.4%	1.7	1.6%	4.1	1.5%
	Flatfish	2000	4.6	49.1%	80.0	36.5%	84.5	37.1%
		2001	3.9	57.0%	51.5	31.2%	55.4	32.2%
		2002	3.5	58.3%	63.9	33.5%	67.4	34.3%
		2003	3.6	60.3%	69.5	35.1%	73.1	35.8%
		2004	3.2	62.9%	71.9	37.3%	75.1	38.0%
	Rockfish	2000	.8	32.5%	7.8	22.3%	8.6	23.0%
		2001	1.0	30.8%	10.1	28.4%	11.1	28.6%
		2002	.7	31.0%	7.4	20.3%	8.1	20.9%
		2003	.6	26.8%	10.6	25.2%	11.2	25.3%
		2004	.6	28.7%	8.3	21.8%	8.8	22.2%
	Atka mackerel	2000	.2	97.2%	2.6	5.6%	2.8	5.9%
		2001	.2	53.8%	4.4	7.1%	4.5	7.4%
		2002	.1	98.3%	7.5	16.6%	7.6	16.8%
		2003	.2	96.2%	13.9	23.6%	14.1	23.9%
		2004	.2	98.3%	12.0	19.6%	12.1	19.8%

Notes: All groundfish and all gear may include additional categories. 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; 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.

Source: Blend estimates (2000-02) and catch accounting system estimates (2003-04) 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, 2003-04 (1,000 metric tons, round weight).

			Species											
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rex sole	Flat deep	Flat shallow	Rock-fish	Atka mack.	Other	Total
2003 Gear/ Target	Hook & line	Sablefish	.0	.4	.1	.2	.0	.0	.0	.0	.2	.0	.2	1.2
		Pacific cod	.0	.0	.2	.0	.0	-	.0	.0	.0	.0	.5	.8
		Rockfish	-	.0	.0	-	-	-	-	-	.1	-	.0	.1
		Halibut	-	.1	.2	.0	.0	.0	.0	.0	.0	-	.3	.7
		Total	.0	.5	.4	.3	.0	.0	.0	.0	.4	.0	1.1	2.7
	Pot	Pacific cod	.0	-	.0	.0	.0	-	-	.0	.0	.0	.4	.4
		Total	.0	-	.0	.0	.0	-	-	.0	.0	.0	.4	.4
	Trawl	Pollock, bottom	.0	.0	.0	.2	.0	.0	.0	.0	.0	-	.0	.2
		Pollock, pelagic	.7	.0	.0	.1	.0	.0	-	.0	.1	.0	.1	1.0
		Pacific cod	.0	.0	.2	.8	.0	.0	.0	.2	.0	.0	.2	1.5
		Arrowtooth	.1	.3	.3	4.1	.1	.1	.1	.0	.8	.0	.2	6.0
		Flathead sole	.0	.0	.1	2.0	.1	.0	.0	.0	.1	.0	.1	2.5
		Rex sole	.0	.1	.1	5.7	.0	.1	.2	.0	.4	.0	.2	6.9
		Flatfish, deep	.0	.1	.0	.2	.0	.0	.0	.0	.1	-	.0	.3
		Flatfish, shallow	.1	.0	1.0	1.9	.0	.0	.0	.1	.0	.0	.2	3.2
		Rockfish	.1	.3	.2	1.0	.0	.1	.1	.1	1.7	.2	.1	3.8
		Total	1.1	.7	2.0	17.0	.3	.2	.5	.4	3.1	.2	1.3	26.7
	All gear	Total	1.1	1.2	2.4	17.3	.3	.2	.5	.4	3.5	.2	2.8	29.9

Table 7. Continued.

2004 Gear/ Target			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rex sole	Flat deep	Flat shallow	Rock-fish	Atka mack.	Other	Total
			Species											
	Hook & line	Sablefish	.0	.4	.0	.2	.0	-	.0	.0	.3	.0	.4	1.3
		Pacific cod	.0	.0	.2	.0	.0	-	.0	.0	.0	.0	.7	1.0
		Rockfish	-	.0	.0	-	-	-	-	-	.0	-	-	.0
		Halibut	.0	.0	.2	.0	.0	-	.0	.0	.0	.0	.1	.3
		Total	.0	.5	.3	.3	.0	-	.0	.0	.3	.0	1.2	2.6
	Pot	Pacific cod	.0	-	.1	.0	.0	.0	-	.0	.0	.0	.4	.6
		Total	.0	-	.1	.0	.0	.0	-	.0	.0	.0	.4	.6
	Trawl	Pollock, bottom	.1	.0	.1	.1	.0	.0	.0	.0	.1	.0	.0	.5
		Pollock, pelagic	.7	.0	.0	.1	.0	.0	.0	.0	.0	.0	.1	.9
		Sablefish	-	.0	-	.0	.0	.0	.0	-	.0	-	.0	.0
		Pacific cod	.1	.0	.0	1.3	.0	.0	.0	.2	.2	.0	.2	2.1
		Arrowtooth	.0	.0	.1	1.4	.1	.0	.0	.0	.0	.0	.1	1.7
		Flathead sole	.0	.0	.1	1.4	.2	.0	.0	.0	.0	.0	.1	1.9
		Rex sole	.0	.0	.0	1.9	.0	.0	.0	.0	.2	.0	.0	2.3
		Flatfish, deep	.0	.1	.0	.3	.0	.0	.0	.0	.0	-	.0	.4
		Flatfish, shallow	.0	.0	.4	.5	.0	.0	.0	.1	.0	.0	.2	1.3
		Rockfish	.1	.1	.1	1.3	.0	.0	.1	.0	1.4	.3	.1	3.5
		Total	1.1	.2	.9	8.4	.5	.1	.1	.4	2.0	.3	.9	14.8
	All gear	Total	1.1	.7	1.3	8.7	.5	.1	.1	.4	2.3	.3	2.5	18.0

Notes: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, 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.

Source: Blend estimates, 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, 2003-04 (1,000 metric tons, round weight).

			Species												
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock-fish	Atka mack.	Other	Total
2003 Gear/ Target	Hook & line	Sablefish	.0	.0	.0	.0	.0	-	.5	-	.0	.0	.0	.1	.7
		Pacific cod	.8	.1	2.0	1.0	.4	.0	.1	.6	.1	.1	.0	10.8	15.9
		Turbot	.0	.0	.0	.1	.0	.0	.0	-	.0	.0	.0	.2	.4
		Halibut	.0	.0	.1	.1	.0	.0	.2	.0	.0	.1	.0	.3	.6
		Total	.8	.1	2.1	1.2	.4	.0	.7	.6	.1	.2	.0	11.3	17.6
	Pot	Sablefish	.0	.0	.0	.1	.0	.0	.1	-	.0	.0	.0	.0	.2
		Pacific cod	.0	.0	.2	.0	.0	.0	.0	.1	.0	.0	.2	.3	.8
		Total	.0	.0	.2	.1	.0	.0	.1	.1	.0	.0	.2	.4	1.0
	Trawl	Pollock, bottom	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	.2	.5
		Pollock, pelagic	.5	.0	.0	.2	.6	.6	.0	.1	.1	.5	.2	.7	3.6
		Pacific cod	6.9	.0	.5	4.1	1.0	4.7	.0	.8	.9	.5	3.7	2.6	25.5
		Arrowtooth	.1	.0	.0	.3	.0	.0	.1	.0	.0	.0	.0	.1	.6
		Flathead sole	1.6	.0	.0	1.2	.9	.4	.0	.4	.7	.0	.0	.7	5.8
		Rock sole	2.4	.0	.3	.4	.3	6.6	.0	1.7	1.1	.0	.0	.8	13.6
		Turbot	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0	-	.0	.2
		Yellowfin	4.7	-	.3	.8	.8	3.9	.0	8.4	8.6	.0	.0	2.5	30.1
		Other flatfish	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0	.1	.0	.5
		Rockfish	.1	.0	.0	.3	.0	.0	.0	-	.0	.2	.1	.1	.9
		Atka mackerel	.2	.0	.1	.2	.0	.1	.0	.0	.0	6.2	9.4	.5	16.7
		Total	16.7	.1	1.1	8.1	3.7	16.4	.2	11.3	11.4	7.5	13.6	8.3	98.4
	All gear	Total	17.5	.2	3.4	9.4	4.1	16.4	1.0	12.0	11.5	7.7	13.8	20.0	117.0

Table 8. Continued.

			Species												
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock-fish	Atka mack.	Other	Total
2004 Gear/ Target	Hook & line	Sablefish	-	.0	.0	.0	-	-	.0	-	-	.0	.0	.0	.0
		Pacific cod	.6	.0	1.9	1.3	.6	.0	.0	.5	.2	.1	.0	14.1	19.4
		Turbot	.0	.0	.0	.0	.0	.0	.0	-	.0	.0	.0	.1	.2
		Halibut	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.4
		Total	.6	.0	2.0	1.4	.6	.0	.1	.5	.2	.2	.0	14.5	20.1
	Pot	Sablefish	.0	.0	.0	.0	.0	.0	.0	-	.0	.0	.0	.0	.1
		Pacific cod	.0	.0	.0	.0	.0	.0	-	.1	.0	.0	.1	.3	.5
		Total	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0	.1	.3	.6
	Trawl	Pollock, bottom	.0	.0	.0	.1	.0	.0	.0	.0	.2	.0	.1	.1	.6
		Pollock, pelagic	.4	.0	.1	.4	1.0	.9	.0	.4	.2	.1	.2	1.1	5.0
		Sablefish	.0	.0	.0	.0	.0	.0	.0	-	.0	.0	.0	.0	.1
		Pacific cod	9.1	.0	.3	7.3	1.8	6.6	.0	1.4	1.9	.4	3.8	2.8	35.4
		Arrowtooth	.3	.0	.0	.7	.0	.0	.0	.0	.0	.0	.3	.1	1.6
		Flathead sole	3.5	.0	.1	2.3	1.1	1.1	.1	.4	.5	.0	.0	1.2	10.2
		Rock sole	4.4	.0	.2	.3	.6	8.3	.0	2.1	1.8	.0	.0	.7	18.4
		Turbot	.1	.0	.0	.1	.0	.0	.0	.0	.0	.0	-	.0	.2
		Yellowfin	4.2	.0	.1	.2	.3	4.3	.0	7.9	5.9	.0	.0	1.5	24.2
		Other flatfish	.5	.0	.0	.8	.0	.0	.0	.0	.0	.0	.1	.1	1.6
		Rockfish	.1	.0	.0	.3	.0	.0	.0	-	.0	.4	.1	.1	1.1
		Atka mackerel	.1	.0	.0	.4	.0	.1	.0	.0	.0	5.3	7.1	.7	13.8
		Total	22.7	.1	.8	13.0	4.9	21.5	.2	12.2	10.7	6.3	11.6	8.4	112.3
	All gear	Total	23.3	.1	2.8	14.4	5.4	21.5	.4	12.7	10.9	6.5	11.8	23.2	133.0

Notes: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, 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.

Source: Blend estimates, 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, 2003-04 (percent).

			Species											
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rex sole	Flat deep	Flat shallow	Rock-fish	Atka mack.	Other	Total
2003 Gear/ Target	Hook & line	Sablefish	7.4	3.1	65.1	86.2	73.1	100.0	92.4	97.8	25.7	100.0	97.7	7.9
		Pacific cod	2.6	39.6	1.3	99.1	58.4	-	.0	80.5	45.8	100.0	70.5	5.7
		Rockfish	-	.0	.1	-	-	-	-	-	21.1	-	.0	19.9
		Halibut	-	10.9	60.8	86.1	100.0	100.0	72.3	98.7	10.0	-	82.0	41.0
		Total	2.8	3.4	3.3	86.7	59.7	100.0	87.3	84.7	21.7	100.0	40.6	8.7
	Pot	Pacific cod	90.2	-	.1	99.1	.0	-	-	99.7	99.0	98.6	90.0	2.1
		Total	90.2	-	.1	99.1	.0	-	-	99.7	99.0	98.6	90.0	2.1
	Trawl	Pollock, bottom	.4	22.2	.5	40.6	6.6	24.9	5.3	1.1	4.9	-	36.2	4.9
		Pollock, pelagic	1.6	52.9	7.2	24.5	31.3	17.0	-	47.8	34.1	.0	75.0	2.2
		Pacific cod	16.7	80.7	1.3	72.6	22.9	7.0	66.9	29.2	68.1	10.5	53.1	9.3
		Arrowtooth	18.9	77.9	40.0	27.1	24.1	6.0	64.7	19.1	76.5	7.4	66.0	30.7
		Flathead sole	46.6	26.7	25.3	93.9	9.2	4.8	46.8	27.0	55.1	39.1	39.4	59.5
		Rex sole	21.0	51.1	21.9	96.7	12.8	2.4	98.0	2.0	71.8	30.5	44.3	64.9
		Flatfish, deep	.0	68.0	1.4	85.6	.0	.0	.0	.0	68.7	-	78.9	40.9
		Flatfish, shallow	44.1	55.1	60.6	84.9	2.5	.8	38.9	2.8	83.3	41.2	27.0	38.1
		Rockfish	22.2	23.2	13.7	72.0	25.5	35.8	71.2	58.9	8.5	50.1	83.4	15.1
		Total	2.1	37.8	10.5	57.0	12.6	5.1	49.2	8.9	14.3	42.2	39.3	19.3
	All gear	Total	2.1	7.4	4.6	57.3	12.6	5.1	49.9	9.4	14.9	43.1	43.2	15.6

Table 9. Continued.

2004 Gear/ Target			Species											
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rex sole	Flat deep	Flat shallow	Rock-fish	Atka mack.	Other	Total
	Hook & line	Sablefish	3.1	2.9	23.2	89.9	100.0	-	99.7	100.0	28.8	100.0	96.4	8.0
		Pacific cod	24.0	80.0	1.2	66.5	60.0	-	100.0	91.5	73.0	98.1	77.8	6.9
		Rockfish	-	.1	1.1	-	-	-	-	-	.0	-	-	.1
		Halibut	100.0	1.2	59.4	98.0	100.0	-	67.4	77.1	13.7	100.0	87.4	23.2
		Total	7.3	2.9	2.4	85.7	60.6	-	97.6	92.2	21.7	98.1	64.4	7.9
	Pot	Pacific cod	95.7	-	.4	100.0	100.0	.0	-	100.0	99.7	96.5	77.4	2.3
		Total	95.7	-	.4	100.0	100.0	.0	-	100.0	98.4	96.5	75.2	2.3
	Trawl	Pollock, bottom	1.4	3.4	34.3	10.6	6.3	2.8	.0	61.6	90.5	99.8	60.5	4.4
		Pollock, pelagic	1.2	45.0	9.0	19.7	32.2	48.3	.0	25.0	8.1	31.9	58.3	1.7
		Sablefish	-	.0	-	100.0	.0	96.4	100.0	-	18.2	-	95.7	22.3
		Pacific cod	70.3	31.8	.2	82.2	53.7	18.9	97.9	27.1	80.0	40.2	79.5	12.7
		Arrowtooth	6.7	56.8	26.5	22.9	10.8	9.1	20.1	6.3	25.4	100.0	13.5	20.5
		Flathead sole	55.0	.1	32.7	97.0	26.2	7.6	60.0	46.8	69.7	31.0	59.2	61.6
		Rex sole	1.6	15.2	15.5	96.4	21.5	2.2	100.0	3.5	75.2	61.0	37.2	65.4
		Flatfish, deep	67.3	62.4	25.1	77.6	.0	.0	.0	.1	16.2	-	68.7	33.1
		Flatfish, shallow	20.6	62.5	53.3	76.8	8.4	7.5	46.6	5.7	47.0	34.7	35.4	31.0
		Rockfish	27.1	9.2	4.0	73.5	58.4	30.6	67.3	22.4	6.9	35.9	81.3	13.5
		Total	1.7	14.8	5.1	55.9	19.9	7.4	17.0	12.6	9.6	38.6	38.3	11.5
	All gear	Total	1.8	3.9	2.3	56.5	20.0	7.4	19.4	13.0	10.5	40.1	53.2	9.6

Notes: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, 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.

Source: Blend estimates, 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, 2003-04 (percent).

2003 Gear/ Target			Species: Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock-fish	Atka mack.	Other	Total
	Hook & line	Sablefish	33.6	1.3	25.1	64.9	100.0	-	82.5	-	96.1	32.3	100.0	98.7	41.1
		Pacific cod	11.0	81.4	1.9	75.7	92.3	98.3	28.9	97.8	92.9	82.1	70.6	64.3	11.8
		Turbot	23.2	29.2	12.9	46.5	98.0	100.0	2.9	-	99.6	23.0	100.0	96.9	18.6
		Halibut	14.6	3.8	48.5	70.8	43.1	100.0	77.5	.0	95.8	55.0	96.0	84.2	58.3
		Total	11.1	10.8	2.0	72.1	92.3	98.3	28.7	97.8	93.3	45.3	72.0	65.2	12.6
	Pot	Sablefish	79.6	.9	96.1	82.3	96.2	100.0	81.9	-	82.1	86.7	67.0	96.1	22.7
		Pacific cod	48.6	75.4	.8	99.6	50.9	99.4	100.0	99.8	99.8	99.8	98.7	86.8	3.7
		Total	49.5	.9	.8	82.9	56.4	99.7	81.9	99.8	99.2	93.9	98.7	86.9	4.4
	Trawl	Pollock, bottom	.5	22.1	.0	61.7	26.7	17.0	4.9	.1	20.3	26.9	26.4	56.1	3.3
		Pollock, pelagic	.0	76.9	.5	36.8	36.6	43.1	30.5	68.4	39.2	61.2	61.7	50.7	.2
		Pacific cod	70.3	62.0	.8	83.5	61.9	77.2	67.8	71.8	67.6	83.8	74.3	83.6	27.0
		Arrowtooth	50.9	15.8	.0	28.1	13.8	51.1	29.5	12.5	1.8	10.2	57.5	74.4	26.9
		Flathead sole	51.9	14.3	.1	55.4	13.6	37.2	16.9	14.6	97.5	36.7	1.3	71.6	30.8
		Rock sole	48.4	20.4	7.6	83.7	41.3	33.7	20.5	26.1	92.5	32.2	88.4	78.0	35.7
		Turbot	77.3	.0	.0	48.4	11.0	6.9	.0	2.9	4.3	3.3	-	78.3	28.3
		Yellowfin	39.7	-	5.6	74.8	28.3	46.1	33.3	12.0	96.0	99.4	50.4	79.9	27.1
		Other flatfish	43.2	47.5	2.1	79.5	28.6	88.1	100.0	100.0	3.9	32.4	69.9	80.0	51.4
		Rockfish	23.2	.0	.2	72.1	26.4	20.9	2.3	-	29.0	2.0	14.0	96.8	6.5
		Atka mackerel	39.0	36.2	3.2	71.8	57.5	60.1	35.9	44.2	29.5	83.8	18.3	95.0	26.7
		Total	1.1	37.7	1.4	68.4	26.7	44.3	19.2	14.1	88.2	36.8	23.4	75.1	5.4
	All gear	Total	1.2	10.8	1.6	69.0	28.7	44.4	27.5	14.9	88.2	37.0	23.7	69.3	5.9

Table 10. Continued.

2004 Gear/Target			Species												
			Pollock	Sable-fish	Pacific cod	Arrow-tooth	Flathd. sole	Rock sole	Turbot	Yellow fin	Flat other	Rock-fish	Atka mack.	Other	Total
	Hook & line	Sablefish	-	.2	.0	31.7	-	-	7.2	-	-	13.9	100.0	87.6	4.7
		Pacific cod	11.2	80.9	1.7	94.8	95.8	99.5	14.8	77.4	95.9	82.2	99.6	76.0	13.9
		Turbot	21.0	13.0	3.5	21.6	99.8	100.0	1.5	-	100.0	25.6	100.0	80.5	11.6
		Halibut	8.2	.6	36.0	79.8	79.8	21.4	68.8	.0	73.8	39.8	100.0	90.1	56.5
		Total	11.2	3.4	1.7	85.4	95.9	99.3	6.6	77.4	95.9	50.9	99.6	76.0	14.0
	Pot	Sablefish	17.1	1.8	14.0	60.1	88.9	.0	64.5	-	87.5	53.8	2.7	89.1	8.4
		Pacific cod	50.9	100.0	.3	99.9	25.8	95.3	-	99.7	78.3	100.0	98.6	81.6	2.8
		Total	49.7	1.8	.3	62.1	28.0	95.2	61.3	99.7	78.7	73.4	98.1	50.3	3.0
	Trawl	Pollock, bottom	.1	46.8	.2	97.8	32.0	15.5	73.8	20.2	96.8	7.3	15.5	35.0	3.3
		Pollock, pelagic	.0	28.9	1.6	78.0	52.0	41.0	49.6	59.4	55.4	34.0	45.3	61.2	.3
		Sablefish	68.1	.5	.0	59.9	40.1	30.1	.0	-	16.4	18.4	82.4	99.3	40.6
		Pacific cod	66.0	46.8	.5	91.1	64.4	71.5	60.3	76.3	79.3	77.2	79.9	80.9	32.5
		Arrowtooth	64.3	32.9	.4	47.7	34.7	65.9	34.4	16.1	10.4	25.2	66.1	81.6	46.8
		Flathead sole	65.3	1.2	2.0	60.6	11.3	51.3	45.7	15.1	80.4	10.9	11.7	66.2	35.3
		Rock sole	49.3	14.0	2.8	87.1	62.5	34.2	11.0	53.8	94.4	18.8	4.3	92.1	39.3
		Turbot	94.8	.0	.0	99.5	.6	100.0	2.2	.4	27.8	36.2	-	70.8	58.7
		Yellowfin	40.1	11.2	1.9	77.9	23.8	42.3	100.0	12.0	93.3	9.3	4.0	92.8	24.5
		Other flatfish	79.2	12.6	.4	84.8	21.4	43.3	44.9	33.8	9.3	42.7	67.1	73.3	60.7
		Rockfish	41.6	33.6	1.6	76.4	46.5	42.9	3.1	-	50.8	4.6	34.2	94.2	10.2
		Atka mackerel	23.2	21.4	1.6	85.7	46.7	72.3	33.4	73.1	17.2	75.1	13.2	95.8	21.2
		Total	1.5	26.4	.9	78.5	28.9	44.2	34.4	16.3	84.5	36.4	19.3	77.3	6.2
	All gear	Total	1.6	6.5	1.3	79.0	31.2	44.2	15.8	16.9	84.7	36.7	19.5	76.1	6.7

Notes: Totals may include additional categories. The target, determined by AFSC staff, is based on processor, week, 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.

Source: Blend estimates, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 11. Prohibited species bycatch by species, area and gear, 2001-04 (metric tons (t) or number in 1,000s)

Area	Gear	Year	Halibut mort. (t)	Herring (t)	Chinook (1,000s)	Other salmon (1,000s)	Red king crab (1,000s)	Other k. crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)
Bering Sea & Aleutians	Hook & Line	2001	882	0	0	0	18	9	15	88
		2002	698	0	0	0	26	18	17	76
		2003	573	0	0	0	13	2	12	64
		2004	504	0	0	0	15	1	10	45
	Pot	2001	5	0	-	0	1	12	65	127
		2002	8	-	-	0	1	27	80	280
		2003	5	-	-	-	0	143	93	23
		2004	4	-	-	-	0	66	28	95
	Trawl	2001	3,275	270	40	60	62	17	1,001	1,853
		2002	3,399	130	40	81	105	16	1,110	1,131
		2003	3,435	966	55	194	94	6	997	703
		2004	3,303	1,093	62	448	79	6	817	1,803
	All gear	2001	4,163	270	40	60	81	39	1,081	2,068
		2002	4,106	130	40	81	133	61	1,207	1,487
		2003	4,014	966	55	194	107	151	1,103	789
		2004	3,812	1,093	62	448	94	73	855	1,943
Gulf of Alaska	Hook & Line	2001	-	-	-	-	0	0	0	0
		2002	-	-	-	-	0	0	0	0
		2003	-	-	-	0	0	0	0	0
		2004	-	-	0	0	-	0	0	0
	Pot	2001	4	-	-	-	0	-	69	0
		2002	2	-	-	-	0	-	93	3
		2003	14	-	-	-	-	-	10	-
		2004	23	-	-	-	0	-	15	-
	Trawl	2001	2,259	7	15	6	0	1	127	4
		2002	2,005	2	13	4	0	1	88	3
		2003	2,080	13	16	10	0	1	138	1
		2004	2,287	277	18	6	0	0	64	-
	All gear	2001	2,263	7	15	6	0	1	196	4
		2002	2,007	2	13	4	0	1	182	5
		2003	2,094	13	16	11	0	1	148	1
		2004	2,310	277	18	6	0	0	79	0
All Alaska	All gear	2001	6,427	277	56	66	81	39	1,277	2,073
		2002	6,113	133	53	84	133	62	1,389	1,492
		2003	6,108	979	71	205	107	152	1,250	791
		2004	6,122	1,370	80	454	94	74	934	1,943

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 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 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.

Source: Blend estimates (2000-02) Catch Accounting System (2003), National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 12. Prohibited species bycatch in the Gulf of Alaska by species,gear, and groundfish target fishery, 2003-04 (Metric tons (t) or number in 1,000s).

Year	Gear	Target	Halibut mortality (t)	Herring (t)	Red king crab (1,000s)	Other king crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)	Chinook (1,000s)	Other salmon (1,000s)
2003	Hook & Line	Sablefish	n.a.	.0	.0	.2	.0	.0	.0	.2
		Total	n.a.	.0	.0	.2	.0	.0	.0	.2
	Pot	Pacific cod	13.7	.0	.0	.0	10.1	.0	.0	.0
		Total	13.7	.0	.0	.0	10.1	.0	.0	.0
	Trawl	Pollock, bottom	9.6	.1	.0	.0	.0	.0	.9	.0
		Pollock, pelagic	.4	13.0	.0	.0	.0	.0	3.7	6.3
		Sablefish	.1	.0	.0	.0	.0	.0	.0	.0
		Pacific cod	453.3	.0	.0	.0	2.5	.9	3.2	.0
		Arrowtooth	413.4	.0	.0	.1	29.2	.0	3.5	.9
		Flathd. sole	118.2	.1	.0	.5	17.3	.2	.6	.0
		Rex sole	240.0	.0	.0	.0	28.8	.0	2.9	.5
		Flat deep	20.7	.0	.0	.0	.0	.0	.0	.0
		Flat shallow	538.9	.0	.0	.0	59.6	.4	.1	.0
		Rockfish	262.2	.0	.1	.0	.2	.0	.9	2.5
		Total	2,080.2	13.3	.1	.7	137.6	1.4	15.8	10.3
	All gear	Total	2,093.8	13.3	.1	.9	147.7	1.5	15.8	10.5
2004	Hook & Line	Sablefish	n.a.	.0	.0	.0	.0	.1	.0	.2
		Pacific cod	n.a.	.0	.0	.0	.0	.0	.0	.0
		Total	n.a.	.0	.0	.0	.0	.1	.0	.2
	Pot	Pacific cod	23.0	.0	.0	.0	15.1	.0	.0	.0
		Total	23.0	.0	.0	.0	15.1	.0	.0	.0
	Trawl	Pollock, bottom	13.7	88.1	.1	.0	1.1	.0	5.4	.2
		Pollock, pelagic	1.1	188.6	.0	.0	.1	.0	8.0	.5
		Sablefish	2.0	.0	.0	.0	.0	.0	.0	.0
		Pacific cod	970.4	.0	.0	.0	1.2	.0	1.0	.1
		Arrowtooth	299.0	.0	.0	.0	33.1	.0	.3	.0
		Flathd. sole	63.1	.0	.0	.0	7.3	.0	1.4	.1
		Rex sole	188.7	.0	.0	.0	9.0	.0	.5	1.0
		Flat deep	57.8	.0	.0	.0	.0	.0	.0	.0
		Flat shallow	367.7	.0	.0	.0	10.2	.0	.5	3.4
		Rockfish	298.3	.0	.3	.3	1.5	.0	.9	.4
		Total	2,286.9	276.8	.3	.3	63.6	.0	18.0	5.7
	All gear	Total	2,309.8	276.8	.4	.4	78.8	.1	18.0	5.8

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, calculated by AFSC staff, is based on processor, week, processing mode, NMFS area and gear. The estimates of halibut bycatch 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 bycatch numbers unavailable. Therefore, estimates of halibut bycatch mortality are not included in this table for those fisheries.

Source: Catch Accounting System, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 13. Prohibited species bycatch in the Bering Sea and Aleutian Islands by species, gear, and groundfish target fishery, 2003-04 (Metric tons (t) or number in 1,000s).

			Halibut mortality (t)	Herring (t)	Red king crab (1,000s)	Other king crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)	Chinook (1,000s)	Other salmon (1,000s)
2003	Hook & Line	Sablefish	n.a.	.0	.0	.4	.0	.0	.0	.0
		Pacific cod	551.5	.0	13.5	1.8	11.6	63.6	.0	.0
		Turbot	20.4	.0	.0	.1	.1	.0	.0	.0
		Total	573.4	.0	13.5	2.4	11.6	63.7	.0	.0
	Pot	Sablefish	2.8	.0	.0	142.5	.2	.0	.0	.0
		Pacific cod	2.3	.0	.1	.4	93.3	22.6	.0	.0
		Total	5.1	.0	.1	142.9	93.5	22.6	.0	.0
	Trawl	Pollock, bottom	1.9	18.2	.0	.0	.0	.0	1.0	1.8
		Pollock, pelagic	96.6	895.2	.1	.0	.8	.8	46.0	190.1
		Pacific cod	1,277.2	13.7	9.5	1.4	183.5	80.7	4.2	1.0
		Arrowtooth	46.1	.1	.0	.5	5.1	.5	1.6	.0
		Flathd. sole	151.7	2.5	.1	.2	321.1	231.8	.1	.2
		Rock sole	904.9	2.9	53.9	.4	239.5	39.5	.6	.0
		Turbot	7.8	.0	.0	.1	2.8	1.8	.0	.0
		Yellowfin	764.7	33.0	28.1	.3	240.1	346.3	.3	.5
		Flat, other	21.0	.0	.0	.0	.5	.0	.2	.0
		Rockfish	66.8	.0	1.7	2.5	.3	.0	.0	.0
		Atka mack.	88.6	.0	.4	.2	.0	.0	.8	.3
		Total	3,435.2	965.6	93.8	5.6	997.5	703.1	54.8	193.9
	All gear	Total	4,013.7	965.7	107.3	150.9	1,102.6	789.4	54.8	194.0

Table 13. Continued.

			Halibut mortality (t)	Herring (t)	Red king crab (1,000s)	Other king crab (1,000s)	Bairdi (1,000s)	Other tanner (1,000s)	Chinook (1,000s)	Other salmon (1,000s)
2004	Hook & Line	Sablefish	n.a.	.0	.0	.2	.0	.0	.0	.0
		Pacific cod	482.6	.0	14.7	1.0	10.3	45.4	.0	.1
		Turbot	20.5	.0	.0	.2	.0	.0	.0	.1
		Total	504.5	.0	14.7	1.4	10.3	45.4	.1	.2
	Pot	Sablefish	1.0	.0	.0	65.9	.0	.0	.0	.0
		Pacific cod	2.9	.0	.3	.0	27.9	95.0	.0	.0
		Total	3.9	.0	.3	65.9	28.0	95.0	.0	.0
	Trawl	Pollock, bottom	2.6	33.2	.0	.0	.0	.0	.7	2.0
		Pollock, pelagic	92.1	963.4	.0	.0	1.2	.7	53.3	436.2
		Sablefish	1.6	.8	.0	.0	.1	.0	.0	.0
		Pacific cod	1,516.3	8.1	1.8	2.0	212.7	86.7	5.6	6.4
		Arrowtooth	81.0	.1	.0	.7	3.9	1.0	.8	.0
		Flathd. sole	440.1	6.3	.1	.1	163.6	130.5	.5	2.4
		Rock sole	514.6	5.6	37.8	.4	165.8	182.3	.7	.0
		Turbot	2.1	.0	.0	.1	.0	.1	.0	.0
		Yellowfin	462.7	75.7	39.2	.0	258.2	1,388.2	.0	.3
		Flat, other	54.8	.0	.0	.0	8.6	.8	.0	.1
		Rockfish	57.2	.0	.0	2.5	.2	.0	.0	.0
		Atka mack.	71.2	.0	.0	.0	.3	.1	.6	.1
		Total	3,303.4	1,093.3	78.9	5.8	817.2	1,802.7	62.4	447.6
	All gear	Total	3,811.8	1,093.3	93.9	73.2	855.5	1,943.1	62.4	447.8

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, calculated by AFSC staff, is based on processor, week, processing mode, NMFS area and gear.
The estimates of halibut bycatch 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 bycatch numbers unavailable. This is particularly a problem in the Bering Sea and Aleutian Islands sablefish hook-and-line fishery. Therefore, estimates of halibut bycatch mortality are not included in this table for that fishery.

Source: Catch Accounting System, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 14. Prohibited species bycatch rates in the Gulf of Alaska by species, gear, and groundfish target fishery, 2003-04 (Metric tons per metric ton or numbers per metric ton).

			Halibut mortality (t/t)	Herring (t/t)	Red king crab (No./t)	Other king crab (No./t)	Bairdi (No./t)	Other tanner (No./t)	Chinook (No./t)	Other salmon (No./t)
2003	Hook & Line	Sablefish	n.a.	.000	.006	.044	.005	.008	.000	.034
		Total	n.a.	.000	.006	.044	.005	.008	.000	.034
	Pot	Pacific cod	.001	.000	.000	.000	.476	.000	.000	.000
		Total	.001	.000	.000	.000	.476	.000	.000	.000
	Trawl	Pollock, bottom	.003	.000	.000	.000	.000	.000	.239	.012
		Pollock, pelagic	.000	.000	.000	.000	.000	.000	.080	.138
		Sablefish	.010	.000	.000	.000	.000	.000	.000	.000
		Pacific cod	.029	.000	.000	.000	.159	.055	.200	.000
		Arrowtooth	.021	.000	.000	.006	1.496	.000	.180	.047
		Flathd. sole	.030	.000	.000	.138	4.463	.045	.157	.005
		Rex sole	.023	.000	.000	.000	2.779	.000	.280	.050
		Flat deep	.025	.000	.000	.000	.000	.000	.000	.000
		Flat shallow	.063	.000	.000	.000	7.015	.045	.014	.000
		Rockfish	.011	.000	.002	.000	.007	.000	.037	.102
		Total	.015	.000	.000	.005	1.016	.011	.117	.076
	All gear	Total	.013	.000	.001	.005	.916	.009	.098	.065
2004	Hook & Line	Sablefish	n.a.	.000	.000	.008	.005	.016	.002	.026
		Pacific cod	n.a.	.000	.000	.000	.000	.000	.003	.002
		Total	n.a.	.000	.000	.005	.003	.009	.002	.016
	Pot	Pacific cod	.001	.000	.001	.000	.578	.000	.000	.000
		Total	.001	.000	.001	.000	.578	.000	.000	.000
	Trawl	Pollock, bottom	.001	.008	.005	.000	.103	.000	.486	.015
		Pollock, pelagic	.000	.004	.000	.000	.003	.000	.152	.009
		Sablefish	.013	.000	.000	.000	.000	.000	.000	.000
		Pacific cod	.058	.000	.000	.000	.072	.000	.060	.003
		Arrowtooth	.035	.000	.000	.000	3.895	.000	.035	.000
		Flathd. sole	.021	.000	.000	.000	2.366	.000	.453	.030
		Rex sole	.054	.000	.000	.000	2.560	.000	.141	.298
		Flat deep	.049	.000	.000	.000	.000	.000	.000	.002
		Flat shallow	.089	.000	.000	.000	2.486	.000	.132	.828
		Rockfish	.013	.000	.011	.014	.063	.000	.037	.019
		Total	.018	.002	.003	.003	.507	.000	.144	.045
	All gear	Total	.014	.002	.002	.002	.487	.001	.112	.036

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, calculated by AFSC staff, is based on processor, week, processing mode, NMFS area and gear. The estimates of halibut bycatch 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 bycatch numbers unavailable. Therefore, estimates of halibut bycatch mortality are not included in this table for those fisheries.

Source: Catch Accounting System, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 15. Prohibited species bycatch rates in the Bering Sea and Aleutian Islands by species, gear, and groundfish target fishery, 2003-04 (Metric tons per metric ton or numbers per metric ton).

			Halibut mortality (t/t)	Herring (t/t)	Red king crab (No./t)	Other king crab (No./t)	Bairdi (No./t)	Other tanner (No./t)	Chinook (No./t)	Other salmon (No./t)
2003	Hook & Line	Sablefish	n.a.	.000	.000	.290	.000	.000	.000	.011
		Pacific cod	.004	.000	.101	.014	.086	.476	.000	.000
		Turbot	.010	.000	.000	.069	.032	.016	.005	.009
		Total	.004	.000	.098	.017	.085	.465	.000	.000
	Pot	Sablefish	.003	.000	.036	163.965	.195	.053	.000	.000
		Pacific cod	.000	.000	.002	.016	4.114	.994	.000	.000
		Total	.000	.000	.004	6.067	3.969	.959	.000	.000
	Trawl	Pollock, bottom	.000	.001	.000	.000	.001	.000	.063	.113
		Pollock, pelagic	.000	.001	.000	.000	.001	.001	.032	.131
		Pacific cod	.014	.000	.102	.015	1.966	.864	.045	.011
		Arrowtooth	.020	.000	.000	.211	2.270	.242	.728	.004
		Flathd. sole	.008	.000	.004	.008	17.049	12.309	.003	.009
		Rock sole	.026	.000	1.539	.012	6.847	1.129	.017	.000
		Turbot	.011	.000	.000	.142	4.021	2.585	.000	.000
		Yellowfin	.007	.000	.259	.002	2.212	3.190	.003	.005
		Flat, other	.024	.000	.000	.052	.595	.000	.190	.000
		Rockfish	.005	.000	.136	.197	.023	.000	.000	.000
		Atka mack.	.001	.000	.007	.004	.000	.000	.013	.006
		Total	.002	.001	.052	.003	.554	.390	.030	.108
	All gear	Total	.002	.000	.055	.077	.562	.402	.028	.099

Table 15. Continued.

			Halibut mortality (t/t)	Herring (t/t)	Red king crab (No./t)	Other king crab (No./t)	Bairdi (No./t)	Other tanner (No./t)	Chinook (No./t)	Other salmon (No./t)
2004	Hook & Line	Sablefish	n.a.	.000	.000	.423	.000	.000	.000	.015
		Pacific cod	.004	.000	.107	.007	.075	.330	.000	.001
		Turbot	.013	.000	.000	.113	.007	.000	.010	.049
		Total	.004	.000	.105	.010	.074	.325	.000	.001
	Pot	Sablefish	.001	.000	.012	74.077	.051	.000	.000	.000
		Pacific cod	.000	.000	.017	.001	1.574	5.355	.000	.000
		Total	.000	.000	.017	3.538	1.501	5.098	.000	.000
	Trawl	Pollock, bottom	.000	.002	.001	.000	.001	.000	.036	.105
		Pollock, pelagic	.000	.001	.000	.000	.001	.001	.037	.304
		Sablefish	.013	.006	.000	.000	.800	.000	.000	.000
		Pacific cod	.014	.000	.016	.018	1.953	.796	.051	.059
		Arrowtooth	.024	.000	.013	.212	1.161	.288	.252	.000
		Flathd. sole	.015	.000	.002	.004	5.683	4.534	.017	.082
		Rock sole	.011	.000	.809	.009	3.548	3.902	.014	.000
		Turbot	.014	.000	.000	.449	.000	.449	.000	.000
		Yellowfin	.005	.001	.398	.000	2.622	14.098	.000	.004
		Flat, other	.021	.000	.000	.000	3.256	.303	.000	.038
		Rockfish	.005	.000	.000	.236	.019	.000	.000	.000
		Atka mack.	.001	.000	.001	.000	.005	.002	.010	.002
		Total	.002	.001	.043	.003	.450	.992	.034	.246
	All gear	Total	.002	.001	.048	.037	.433	.983	.032	.227

Notes: These estimates include only catches counted against federal TACs. Totals may include additional categories. The target, calculated by AFSC staff, is based on processor, week, processing mode, NMFS area and gear. The estimates of halibut bycatch 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 bycatch numbers unavailable. This is particularly a problem in the Bering Sea and Aleutian Islands sablefish hook-and-line fishery. Therefore, estimates of halibut bycatch mortality are not included in this table for that fishery.

Source: Catch Accounting System, 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, 1984-2004 ($ millions, base year = 2004)

	Shellfish	Salmon	Herring	Halibut	Groundfish	Total
1984	166.4	551.9	32.8	31.5	44.9	827.6
1985	167.4	610.0	57.8	58.7	67.9	961.8
1986	280.1	618.6	58.8	107.3	102.0	1,166.8
1987	320.5	704.4	62.1	113.6	204.2	1,404.7
1988	338.3	1,069.7	80.4	94.9	347.8	1,931.2
1989	387.0	702.4	25.9	117.0	469.0	1,701.3
1990	473.3	728.7	32.0	115.8	599.2	1,949.0
1991	388.4	387.1	36.9	118.2	602.4	1,533.0
1992	423.2	687.7	34.1	60.6	771.4	1,977.0
1993	405.5	482.8	17.4	66.2	507.9	1,479.8
1994	387.9	512.6	26.1	102.3	605.5	1,634.4
1995	335.2	587.5	46.3	70.5	684.2	1,723.7
1996	203.9	403.3	52.1	86.4	587.3	1,332.9
1997	197.0	283.6	18.2	121.9	659.3	1,279.9
1998	247.5	274.7	12.2	106.5	435.8	1,076.8
1999	302.5	385.7	15.8	130.4	516.0	1,350.4
2000	155.5	268.9	10.5	147.0	652.2	1,234.1
2001	131.5	200.7	11.1	127.0	623.1	1,093.5
2002	156.0	136.1	9.5	135.1	648.9	1,085.6
2003	180.1	172.6	9.1	170.3	626.5	1,158.6
2004	165.4	225.3	13.7	168.7	592.9	1,166.0

Note: The value added by at-sea processing is not included in these estimates of ex-vessel value. The data have been adjusted to 2004 dollars by applying the GDP implicit price deflators presented in Table 57.

Source: Blend estimates, ADFG fishtickets, Commercial Operators Annual Reports (COAR), weekly processor reports. 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, 1984-2004.

	Shellfish	Salmon	Herring	Halibut	Groundfish
1984	20.1%	66.7%	4.0%	3.8%	5.4%
1985	17.4%	63.4%	6.0%	6.1%	7.1%
1986	24.0%	53.0%	5.0%	9.2%	8.7%
1987	22.8%	50.1%	4.4%	8.1%	14.5%
1988	17.5%	55.4%	4.2%	4.9%	18.0%
1989	22.7%	41.3%	1.5%	6.9%	27.6%
1990	24.3%	37.4%	1.6%	5.9%	30.7%
1991	25.3%	25.3%	2.4%	7.7%	39.3%
1992	21.4%	34.8%	1.7%	3.1%	39.0%
1993	27.4%	32.6%	1.2%	4.5%	34.3%
1994	23.7%	31.4%	1.6%	6.3%	37.0%
1995	19.4%	34.1%	2.7%	4.1%	39.7%
1996	15.3%	30.3%	3.9%	6.5%	44.1%
1997	15.4%	22.2%	1.4%	9.5%	51.5%
1998	23.0%	25.5%	1.1%	9.9%	40.5%
1999	22.4%	28.6%	1.2%	9.7%	38.2%
2000	12.6%	21.8%	.8%	11.9%	52.8%
2001	12.0%	18.4%	1.0%	11.6%	57.0%
2002	14.4%	12.5%	.9%	12.4%	59.8%
2003	15.5%	14.9%	.8%	14.7%	54.1%
2004	14.2%	19.3%	1.2%	14.5%	50.8%

Source: Blend estimates, ADFG fishtickets, Commercial Operators Annual Reports (COAR), weekly processor reports. 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, 2000-04 ($/lb, round weight).

		Gulf of Alaska		Bering Sea and Aleutians		All Alaska
		Fixed	Trawl	Fixed	Trawl	All gear
Pollock	2000	.148	.135	-	.118	.120
	2001	.081	.127	-	.109	.111
	2002	.068	.107	-	.116	.115
	2003	.081	.095	.049	.107	.106
	2004	.060	.102	-	.106	.106
Sablefish	2000	2.659	1.764	2.037	1.016	2.558
	2001	2.248	1.769	1.843	.888	2.148
	2002	2.148	1.682	2.177	.934	2.112
	2003	2.440	1.749	2.229	.920	2.376
	2004	2.122	1.691	1.827	.837	2.056
Pacific cod	2000	.338	.326	.303	.291	.313
	2001	.299	.258	.244	.234	.260
	2002	.287	.234	.213	.193	.245
	2003	.304	.282	.292	.268	.283
	2004	.267	.251	.254	.219	.245
Flatfish	2000	.157	.151	.236	.133	.134
	2001	-	.161	.255	.124	.127
	2002	-	.124	.157	.143	.142
	2003	-	.116	.188	.137	.136
	2004	-	.085	-	.165	.160
Rockfish	2000	.464	.144	.610	.123	.162
	2001	.642	.095	.577	.122	.134
	2002	.714	.132	.609	.125	.156
	2003	.707	.147	.614	.128	.158
	2004	.746	.159	.737	.153	.178
Atka mackerel	2000	-	.104	-	.096	.096
	2001	-	.174	-	.167	.167
	2002	-	.217	-	.134	.134
	2003	-	.163	-	.099	.100
	2004	-	.129	-	.115	.115

Notes: 1) Prices do not include the value added by at-sea processing; therefore they reflect prices prior to processing. Prices do reflect the value added by dressing fish at sea, where the fish have not been frozen. Except where noted, unfrozen landings price is calculated as landed value divided by estimated or actual round weight.
2) Trawl-caught sablefish and flatfish in the BSAI and trawl-caught Atka mackerel and rockfish 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.
3) The "All Alaska/All gear" column is the weighted average of the other columns.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), ADFG fish tickets, Commercial Operators Annual Report (COAR), weekly processor reports, 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, 2000-04, ($ millions).

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
All gear	All species	2000	125.9	20.1	146.0	192.5	259.1	451.5	318.4	279.2	597.6
		2001	97.5	16.5	114.1	200.1	270.6	470.7	297.6	287.1	584.7
		2002	106.5	19.5	126.0	223.2	269.8	492.9	329.6	289.3	618.9
		2003	107.1	20.4	127.5	222.8	259.6	482.4	329.9	280.0	609.9
		2004	106.2	17.4	123.6	206.0	263.0	469.0	312.2	280.4	592.6
	Pollock	2000	20.2	.1	20.2	155.1	122.8	277.9	175.3	122.8	298.1
		2001	19.1	.0	19.1	177.0	138.9	315.9	196.1	138.9	335.0
		2002	11.9	.0	12.0	197.5	149.4	346.9	209.5	149.4	358.9
		2003	10.3	.1	10.4	181.2	120.7	301.9	191.5	120.8	312.3
		2004	12.1	.0	12.2	178.4	117.3	295.7	190.5	117.3	307.9
	Sablefish	2000	60.3	9.0	69.2	3.0	3.6	6.6	63.2	12.6	75.8
		2001	47.9	7.4	55.2	4.5	2.2	6.7	52.3	9.6	61.9
		2002	48.6	8.9	57.5	4.5	2.4	6.9	53.0	11.3	64.4
		2003	62.4	9.8	72.2	6.4	2.6	9.0	68.8	12.4	81.1
		2004	60.2	9.0	69.2	1.9	1.9	3.8	62.1	10.9	73.0
	Pacific cod	2000	37.5	6.6	44.1	33.0	83.9	116.9	70.5	90.4	161.0
		2001	24.9	5.6	30.4	17.8	78.7	96.4	42.6	84.2	126.9
		2002	39.4	5.8	45.2	20.4	70.2	90.6	59.8	76.0	135.8
		2003	27.5	4.8	32.3	34.3	89.3	123.6	61.8	94.1	155.9
		2004	27.5	3.8	31.3	24.0	86.1	110.1	51.5	89.8	141.4
	Flatfish	2000	2.8	1.6	4.4	1.3	36.2	37.5	4.1	37.8	41.9
		2001	2.3	1.4	3.6	.6	27.1	27.7	2.9	28.4	31.3
		2002	2.0	1.5	3.5	.5	33.5	34.0	2.5	35.0	37.5
		2003	1.4	2.3	3.6	.6	32.2	32.8	1.9	34.5	36.4
		2004	1.4	.6	2.0	.7	39.2	39.9	2.1	39.8	41.9
	Rockfish	2000	4.9	2.9	7.9	.1	3.0	3.1	5.0	5.9	11.0
		2001	3.3	2.2	5.5	.2	2.6	2.8	3.5	4.8	8.3
		2002	4.4	3.1	7.5	.2	3.0	3.3	4.6	6.2	10.8
		2003	4.8	3.1	7.9	.2	3.8	4.0	5.0	6.9	11.8
		2004	4.7	3.7	8.5	.2	3.8	4.0	4.9	7.5	12.4
	Atka mackerel	2000	.0	.0	.0	.0	9.4	9.4	.0	9.5	9.5
		2001	-	.0	.0	.0	21.0	21.0	.0	21.1	21.1
		2002	.0	.0	.0	.1	11.1	11.1	.1	11.1	11.2
		2003	.0	.1	.1	.1	9.7	9.8	.1	9.8	9.9
		2004	.0	.1	.1	.2	12.2	12.3	.2	12.3	12.5

Table 19. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
Trawl	All species	2000	41.6	7.7	49.3	178.3	184.6	362.8	219.8	192.3	412.1
		2001	35.2	6.5	41.7	187.5	201.7	389.2	222.7	208.2	430.9
		2002	25.0	7.4	32.4	209.6	210.1	419.6	234.6	217.5	452.1
		2003	31.7	8.1	39.8	203.8	185.0	388.8	235.5	193.1	428.6
		2004	27.4	6.6	34.1	195.0	190.2	385.3	222.5	196.9	419.3
	Pollock	2000	18.5	.1	18.5	155.1	121.8	277.0	173.6	121.9	295.5
		2001	19.1	.0	19.1	177.0	137.8	314.8	196.1	137.8	333.9
		2002	11.9	.0	12.0	197.5	148.1	345.6	209.5	148.1	357.6
		2003	10.3	.1	10.3	181.2	119.5	300.8	191.5	119.6	311.1
		2004	12.1	.0	12.2	178.4	116.5	294.8	190.5	116.5	307.0
	Sablefish	2000	1.2	1.9	3.0	.0	.6	.6	1.2	2.5	3.6
		2001	1.0	1.4	2.4	.0	.7	.7	1.0	2.1	3.1
		2002	1.0	2.4	3.3	.0	.5	.6	1.0	2.9	3.9
		2003	1.9	1.8	3.7	.0	.3	.3	1.9	2.1	4.0
		2004	2.6	1.6	4.1	.0	.4	.4	2.6	2.0	4.6
	Pacific cod	2000	16.8	1.4	18.2	21.9	16.8	38.7	38.7	18.3	57.0
		2001	11.3	1.7	13.0	9.9	14.0	23.9	21.2	15.7	36.9
		2002	7.6	.5	8.1	11.5	14.9	26.3	19.0	15.4	34.4
		2003	14.6	.8	15.5	21.8	20.4	42.2	36.4	21.3	57.7
		2004	8.3	.7	9.0	15.5	18.9	34.4	23.8	19.6	43.4
	Flatfish	2000	2.4	1.6	4.0	1.2	33.1	34.3	3.6	34.7	38.3
		2001	2.3	1.4	3.6	.5	25.9	26.4	2.8	27.2	30.0
		2002	2.0	1.5	3.5	.4	32.6	33.0	2.5	34.1	36.5
		2003	1.4	2.3	3.6	.6	31.3	31.9	1.9	33.6	35.5
		2004	1.4	.6	2.0	.7	38.5	39.2	2.1	39.1	41.2
	Rockfish	2000	2.7	2.7	5.4	.0	2.7	2.7	2.7	5.5	8.2
		2001	1.4	2.0	3.5	.0	2.4	2.4	1.5	4.4	5.9
		2002	2.4	3.0	5.4	.1	2.9	2.9	2.5	5.8	8.3
		2003	3.2	2.8	6.0	.0	3.6	3.6	3.3	6.4	9.7
		2004	3.0	3.5	6.5	.1	3.6	3.7	3.1	7.1	10.2
	Atka mackerel	2000	.0	.0	.0	.0	9.4	9.4	.0	9.5	9.5
		2001	-	.0	.0	.0	21.0	21.0	.0	21.0	21.0
		2002	.0	.0	.0	.1	11.1	11.1	.1	11.1	11.2
		2003	.0	.1	.1	.1	9.7	9.8	.1	9.8	9.9
		2004	.0	.1	.1	.2	12.2	12.3	.2	12.3	12.5

Table 19. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total	Catcher vessels	Catcher processors	Total
Hook and line	All species	2000	69.4	11.6	81.0	3.8	72.8	76.5	73.2	84.3	157.6
		2001	53.9	9.0	62.9	5.6	67.2	72.7	59.4	76.2	135.6
		2002	71.7	11.8	83.5	7.7	58.7	66.4	79.4	70.5	149.9
		2003	67.2	12.3	79.4	3.9	73.6	77.5	71.1	85.9	156.9
		2004	64.8	10.7	75.4	2.4	70.9	73.3	67.2	81.6	148.8
	Sablefish	2000	59.1	7.1	66.2	3.0	3.1	6.0	62.1	10.1	72.2
		2001	46.9	6.0	52.9	4.4	1.5	6.0	51.3	7.5	58.8
		2002	47.6	6.6	54.2	4.4	1.8	6.3	52.0	8.4	60.5
		2003	60.5	8.0	68.4	3.4	2.3	5.7	63.9	10.2	74.1
		2004	57.6	7.4	65.0	1.9	1.5	3.3	59.5	8.9	68.4
	Pacific cod	2000	5.9	4.3	10.2	.6	65.3	65.9	6.5	69.6	76.2
		2001	5.1	2.9	8.0	.9	63.0	63.8	5.9	65.8	71.8
		2002	22.2	5.0	27.1	3.0	54.4	57.4	25.2	59.3	84.5
		2003	4.7	3.9	8.6	.4	67.9	68.3	5.1	71.8	76.9
		2004	5.4	2.9	8.3	.5	65.3	65.8	5.8	68.3	74.1
	Flatfish	2000	.5	.0	.5	.1	3.1	3.2	.5	3.1	3.7
		2001	-	.0	.0	.1	1.2	1.3	.1	1.2	1.3
		2002	-	.0	.0	.0	1.0	1.0	.0	1.0	1.0
		2003	-	.0	.0	-	.9	.9	-	.9	.9
		2004	-	.0	.0	-	.7	.7	-	.7	.7
	Rockfish	2000	2.2	.2	2.4	.1	.3	.4	2.3	.5	2.8
		2001	1.9	.2	2.1	.2	.2	.4	2.1	.4	2.5
		2002	2.0	.2	2.1	.2	.2	.3	2.1	.3	2.5
		2003	1.6	.2	1.8	.1	.2	.3	1.7	.5	2.2
		2004	1.7	.2	2.0	.1	.2	.2	1.8	.4	2.2
Pot	Pacific cod	2000	14.9	.8	15.7	10.4	1.7	12.2	25.3	2.5	27.8
		2001	8.4	1.0	9.4	7.0	1.7	8.7	15.5	2.7	18.2
		2002	9.6	.3	9.9	5.9	1.0	6.9	15.5	1.3	16.8
		2003	8.2	.1	8.3	12.1	1.0	13.1	20.3	1.0	21.3
		2004	13.9	.2	14.0	8.0	1.8	9.8	21.9	2.0	23.9

Note: These estimates include only catch counted against federal TACs. Ex-vessel value is calculated using prices on Table 18. Please refer to Table 18 for a description of the price derivation. All groundfish includes additional species categories. The value added by at-sea processing is not included in these estimates of ex-vessel value.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), CFEC fish tickets, Commercial Operators Annual Report (COAR), weekly processor reports. 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, 1996-2004. ($ millions)

		Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
		<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Fixed	1996	40.2	28.3	.2	1.5	8.1	.9	41.7	36.4	1.1
	1997	43.3	27.7	.1	.9	5.8	1.3	44.3	33.4	1.4
	1998	31.4	20.0	.1	1.0	3.6	.8	32.4	23.5	.9
	1999	41.1	22.0	-	1.0	5.9	2.1	42.1	27.8	2.1
	2000	49.9	28.1	.7	2.1	6.5	3.0	52.0	34.7	3.7
	2001	38.7	18.3	-	3.4	7.6	1.2	42.1	25.9	1.2
	2002	40.4	17.1	-	4.0	6.1	1.2	44.4	23.2	1.2
	2003	50.6	23.7	-	4.0	10.4	2.7	54.6	34.1	2.7
	2004	48.6	24.5	-	3.6	7.9	1.4	52.2	32.4	1.4
Trawl	1996	9.1	19.0	1.3	-	43.3	43.8	9.1	62.3	45.1
	1997	11.5	28.1	4.2	-	42.1	56.6	11.5	70.1	60.8
	1998	8.0	23.8	3.9	.2	26.2	38.0	8.2	50.1	41.9
	1999	8.6	32.0	2.0	.3	43.0	61.2	8.9	75.0	63.2
	2000	8.8	30.4	-	-	64.5	78.2	8.8	94.9	78.2
	2001	8.5	27.0	-	.7	59.7	82.0	9.2	86.7	82.0
	2002	4.3	18.8	-	2.0	67.1	88.6	6.3	85.9	88.6
	2003	2.6	19.7	-	1.4	59.0	71.9	4.0	78.7	71.9
	2004	3.0	19.3	-	.6	51.7	72.2	3.6	71.1	72.2
All gear	1996	49.3	47.3	1.5	1.5	51.4	44.7	50.8	98.7	46.2
	1997	54.8	55.8	4.3	.9	47.8	57.9	55.7	103.6	62.2
	1998	39.4	43.8	4.0	1.2	29.8	38.8	40.6	73.6	42.8
	1999	49.7	54.0	2.0	1.3	48.9	63.4	51.0	102.9	65.3
	2000	58.7	58.6	.7	2.1	71.0	81.2	60.7	129.6	81.9
	2001	47.2	45.4	-	4.1	67.2	83.1	51.3	112.6	83.1
	2002	44.6	35.9	-	6.0	73.2	89.8	50.7	109.1	89.8
	2003	53.2	43.4	-	5.4	69.4	74.6	58.6	112.8	74.6
	2004	51.6	43.8	-	4.2	59.7	73.6	55.9	103.5	73.6

Note: These estimates include only catch counted against federal TACs.

Source: CFEC Fishtickets, NMFS permits, CFEC permits. 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, 1996-2004. ($ thousands)

		Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
		<60	60-124	>=125	<60	60-124	>=125	<60	60-124	>=125
Fixed	1996	47	168	34	26	72	59	47	177	72
	1997	49	186	13	19	61	88	49	184	70
	1998	39	135	16	21	44	39	40	134	40
	1999	50	127	-	26	64	92	50	136	92
	2000	59	170	73	37	73	125	60	174	124
	2001	52	164	-	45	99	82	54	166	82
	2002	60	158	-	60	108	84	65	169	84
	2003	74	230	-	59	144	137	78	232	137
	2004	74	219	-	64	124	99	78	218	99
Trawl	1996	152	246	83	-	541	1,509	152	582	1,555
	1997	188	319	167	-	592	1,825	188	638	1,960
	1998	141	265	177	29	403	1,187	139	451	1,308
	1999	159	395	75	56	566	1,913	156	695	1,975
	2000	157	454	-	-	859	2,443	157	855	2,443
	2001	170	392	-	55	796	2,827	165	788	2,827
	2002	89	324	-	120	919	3,055	115	834	3,055
	2003	76	333	-	92	798	2,479	107	787	2,479
	2004	137	358	-	153	729	2,488	157	756	2,488
All gear	1996	56	200	70	26	268	994	56	327	1,028
	1997	60	245	137	19	290	1,259	60	367	1,219
	1998	48	190	142	22	214	826	49	272	873
	1999	59	225	75	30	298	1,152	60	349	1,187
	2000	68	266	73	37	433	1,449	69	438	1,321
	2001	62	261	-	46	445	1,933	64	435	1,933
	2002	65	227	-	73	563	2,088	72	470	2,088
	2003	77	275	-	66	482	1,736	82	468	1,736
	2004	79	269	-	71	445	1,711	83	433	1,711

Note: These estimates include only catch counted against federal TACs.

Source: CFEC Fishtickets, NMFS permits, CFEC permits. 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, 2000-04, ($ millions).

		Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
		Alaska	Other	Unknown	Alaska	Other	Unknown	Alaska	Other	Unknown
All groundfish	2000	77.3	68.4	.3	22.8	428.7	.0	100.1	497.2	.3
	2001	54.9	58.9	.3	18.5	451.6	.5	73.4	510.6	.8
	2002	67.0	58.5	.5	16.4	476.0	.5	83.4	534.5	1.0
	2003	63.1	64.5	.0	17.4	465.0	.0	80.5	529.4	.0
	2004	61.6	61.9	.0	15.4	453.7	.0	77.0	515.6	.0
Pollock	2000	8.1	12.1	.1	2.5	275.4	.0	10.6	287.4	.1
	2001	7.7	11.5	.0	3.7	311.7	.5	11.4	323.1	.5
	2002	4.4	7.5	.0	3.9	342.5	.4	8.4	350.1	.4
	2003	3.7	6.6	.0	3.0	298.9	.0	6.7	305.6	.0
	2004	4.6	7.6	.0	3.1	292.6	.0	7.6	300.2	.0
Sablefish	2000	37.1	32.0	.1	2.5	4.1	.0	39.5	36.2	.1
	2001	28.3	26.8	.1	2.7	4.0	.0	31.0	30.8	.1
	2002	30.0	27.3	.2	2.8	4.1	.0	32.8	31.4	.2
	2003	36.6	35.6	.0	2.8	6.1	.0	39.4	41.7	.0
	2004	35.2	34.0	.0	1.2	2.5	.0	36.5	36.5	.0
Pacific cod	2000	27.4	16.7	.1	15.2	101.6	.0	42.6	118.3	.1
	2001	16.4	13.9	.1	9.3	87.1	.0	25.8	101.0	.1
	2002	29.2	15.8	.2	8.5	82.0	.1	37.7	97.9	.2
	2003	18.9	13.4	.0	10.0	113.6	.0	29.0	127.0	.0
	2004	18.7	12.6	.0	9.6	100.5	.0	28.3	113.1	.0
Flatfish	2000	1.8	2.7	.0	1.6	35.9	.0	3.4	38.5	.0
	2001	1.0	2.6	.0	.7	27.0	.0	1.7	29.6	.0
	2002	1.1	2.4	.0	1.1	32.9	.0	2.2	35.3	.0
	2003	.8	2.8	.0	1.4	31.4	.0	2.2	34.2	.0
	2004	.7	1.3	.0	1.0	38.9	.0	1.7	40.1	.0
Rockfish	2000	2.9	4.9	.0	.5	2.6	.0	3.4	7.6	.0
	2001	1.5	4.1	.0	.5	2.3	.0	2.0	6.3	.0
	2002	2.3	5.2	.0	.1	3.2	.0	2.3	8.4	.0
	2003	2.4	5.5	.0	.1	3.9	.0	2.5	9.4	.0
	2004	2.3	6.1	.0	.1	3.9	.0	2.4	10.0	.0
Atka mackerel	2000	.0	.0	.0	.4	9.0	.0	.4	9.0	.0
	2001	.0	.0	.0	1.5	19.5	.0	1.5	19.6	.0
	2002	.0	.0	.0	.0	11.1	.0	.0	11.1	.0
	2003	.0	.1	.0	.1	9.7	.0	.1	9.8	.0
	2004	.0	.1	.0	.2	12.1	.0	.2	12.2	.0

Note: These estimates include only catches counted against federal TACs. Ex-vessel value is calculated using prices on Table 18. Please refer to Table 18 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.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), Commercial Operators Annual Report (COAR), ADFG fish tickets, weekly processor reports. 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, 1998-2004. ($ millions)

	1998	1999	2000	2001	2002	2003	2004
Bering Sea Pollock	72.1	103.2	153.7	157.6	174.7	173.3	166.1
AK Peninsula/Aleutians	16.7	23.7	25.8	25.7	28.2	34.9	29.5
Kodiak	26.9	32.3	36.6	30.9	40.5	26.3	28.3
South Central	15.5	18.3	25.0	18.1	18.1	24.3	23.9
Southeastern	32.2	33.6	39.5	30.9	29.6	34.7	35.0
TOTAL	163.6	211.2	280.6	263.2	291.2	293.4	282.7

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, 1998-2004. (percent)

	1998	1999	2000	2001	2002	2003	2004
Bering Sea Pollock	56.6	56.2	77.1	81.5	77.9	75.1	74.3
AK Peninsula/Aleutians	11.2	10.2	16.1	22.1	23.1	21.0	16.1
Kodiak	39.8	40.1	48.0	45.3	55.8	40.6	39.4
South Central	18.8	15.2	23.1	19.6	18.8	20.9	17.5
Southeastern	22.4	18.6	23.3	18.9	22.5	24.1	18.7
TOTAL	27.6	25.5	38.3	40.8	44.6	40.2	34.6

Note: 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 the EEZ and State waters.
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. 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, 2000-04 (1,000 metric tons product weight and million dollars).

		2000		2001		2002		2003		2004	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Pollock	Whole fish	2.63	$1.3	1.59	$1.0	1.79	$2.4	4.30	$2.9	3.57	$2.7
	Head & gut	7.11	$5.9	10.58	$9.6	10.50	$8.9	8.34	$9.3	18.25	$17.9
	Roe	15.58	$285.7	24.99	$383.7	26.49	$298.5	22.80	$256.8	26.31	$344.7
	Deep-skin fill.	25.41	$62.3	27.06	$71.5	26.59	$63.2	47.08	$117.1	46.71	$120.5
	Other fillets	33.35	$60.9	87.65	$163.9	97.94	$211.3	112.53	$241.0	115.45	$242.3
	Surimi	188.77	$339.2	200.17	$323.3	204.81	$324.8	203.56	$320.8	186.72	$289.8
	Minced fish	8.99	$11.5	21.54	$30.0	24.92	$30.2	15.53	$18.7	19.86	$25.9
	Fish meal	49.89	$30.1	54.69	$39.7	55.07	$38.1	47.24	$35.5	56.11	$43.2
	Other products	7.00	$2.9	12.70	$5.7	21.35	$9.5	20.49	$10.9	18.52	$11.3
	All products	338.73	$799.8	440.97	$1,028.2	469.45	$987.0	481.87	$1,013.0	491.51	$1,098.3
Pacific cod	Whole fish	3.13	$3.7	2.28	$2.5	2.26	$1.8	4.13	$4.8	2.33	$2.5
	Head & gut	66.65	$172.0	72.39	$170.0	72.73	$155.6	72.40	$178.2	90.14	$214.7
	Salted/split	-	-	3.29	$10.3	-	-	-	-	-	-
	Fillets	17.35	$85.7	10.06	$40.1	12.31	$58.2	16.61	$80.4	9.41	$44.2
	Other products	11.01	$24.4	11.89	$30.0	15.82	$30.2	17.74	$25.3	10.59	$20.3
	All products	98.14	$285.9	99.90	$253.0	103.12	$245.8	110.88	$288.7	112.47	$281.7
Sablefish	Head & gut	9.02	$85.9	9.36	$79.5	9.23	$80.8	10.18	$93.0	11.05	$93.7
	Other products	.19	$1.2	.25	$1.8	.24	$.7	.21	$.8	.21	$1.1
	All products	9.21	$87.1	9.61	$81.3	9.47	$81.5	10.39	$93.8	11.27	$94.8

Table 25. Continued.

		2000		2001		2002		2003		2004	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Flatfish	Whole fish	15.15	$16.2	11.64	$12.2	16.53	$14.8	14.27	$15.2	13.88	$14.2
	Head & gut	46.92	$62.9	39.66	$45.7	50.00	$60.9	54.61	$62.1	56.26	$78.7
	Kirimi	6.39	$5.9	6.60	$4.5	2.86	$3.5	3.68	$4.4	1.81	$2.5
	Fillets	1.77	$6.0	1.10	$3.7	1.33	$5.8	1.02	$4.0	1.01	$2.8
	Other products	.81	$.4	.54	$.4	.83	$1.1	.74	$1.0	1.39	$1.6
	All products	71.04	$91.5	59.55	$66.5	71.55	$86.1	74.32	$86.8	74.34	$99.9
Rockfish	Whole fish	1.25	$2.0	1.48	$1.5	1.85	$3.1	1.67	$4.0	2.37	$2.9
	Head & gut	8.31	$12.7	8.93	$12.4	9.78	$14.1	11.09	$15.5	10.76	$18.2
	Other products	1.87	$4.3	3.48	$3.9	1.71	$5.3	2.06	$5.9	1.40	$4.1
	All products	11.42	$19.0	13.89	$17.8	13.35	$22.5	14.83	$25.4	14.53	$25.1
Atka mackerel	Whole fish	2.92	$1.2	5.02	$4.0	3.27	$2.3	7.13	$4.1	5.00	$3.1
	Head & gut	22.57	$20.0	27.48	$42.0	18.55	$22.5	20.89	$18.6	24.76	$25.9
	All products	25.49	$21.2	32.51	$46.1	21.82	$24.9	28.02	$22.8	29.76	$28.9
All species	Total	570.50	$1,331.0	674.14	$1,517.2	704.01	$1,483.3	736.36	$1,556.9	756.75	$1,661.1

Notes: Total includes additional species not listed in the production details as well as confidential data from Tables 28 and 29. For shoreside processors, these estimates include production resulting from catch from federal and state of Alaska fisheries. For at-sea processors, they include production only from catch counted against federal TACs.

Source: Weekly processor report 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, 2000-04 (dollars).

		2000		2001		2002		2003		2004	
		At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Pollock	Whole fish	$.23	$.27	$.24	$.48	$.64	$.32	$.33	$.26	$.34	$.38
	H&G	$.37	-	$.40	$.45	$.36	$.52	$.51	-	$.45	$.44
	Roe	$9.31	$7.28	$8.30	$5.54	$6.16	$3.94	$5.67	$4.31	$6.68	$4.91
	Deep-skin	$1.11	-	$1.20	-	$1.08	-	$1.13	$1.11	$1.21	$1.04
	Other fillets	$.70	$.88	$.87	$.83	$.88	$1.06	$1.01	$.94	$.97	$.94
	Surimi	$.79	$.84	$.82	$.66	$.81	$.64	$.73	$.70	$.75	$.66
	Minced fish	$.58	-	$.63	-	$.53	$.59	$.54	-	$.59	-
	Fish meal	$.30	$.26	$.38	$.29	$.32	$.31	$.34	$.34	$.37	$.33
	Other products	$.16	$.20	$.35	$.17	$.30	$.19	$.48	$.22	$.17	$.29
	All products	$1.16	$.99	$1.21	$.90	$1.09	$.82	$1.04	$.86	$1.16	$.87
Pacific cod	Whole fish	$.50	$.55	$.46	$.51	$.29	$.41	$.44	$.56	$.43	$.54
	H&G	$1.17	$1.13	$1.09	$.87	$.97	$.99	$1.13	$.98	$1.09	$1.04
	Salted/split	-	-	-	$1.42	-	-	-	-	-	-
	Fillets	$2.33	$2.22	$1.49	$1.86	$1.58	$2.28	$2.29	$2.18	$2.20	$2.13
	Other products	$1.25	$.91	$1.39	$1.04	$1.03	$.79	$.90	$.56	$1.02	$.80
	All products	$1.21	$1.56	$1.11	$1.24	$.98	$1.31	$1.14	$1.26	$1.09	$1.26
Sablefish	H&G	$4.02	$4.39	$3.50	$3.92	$3.59	$4.05	$3.57	$4.26	$3.41	$3.93
	Other products	$1.90	$3.34	$1.16	$3.97	$1.09	$1.52	$1.30	$1.94	$1.63	$2.63
	All products	$3.94	$4.37	$3.40	$3.92	$3.48	$4.00	$3.48	$4.22	$3.35	$3.91
Deep-water flatfish	Whole fish	-	-	-	-	-	-	$.20	-	-	-
	H&G	$.56	-	$.81	-	$1.09	-	$.32	-	-	-
	Fillets	-	$1.83	-	$1.61	-	$1.57	-	$1.52	-	-
	All products	$.56	$1.83	$.81	$1.61	$1.09	$1.57	$.32	$1.52	-	-

Table 26. Continued.

		2000		2001		2002		2003		2004	
		At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Shallow-water flatfish	Whole fish	-	$.44	$.40	$.41	$.29	$.36	-	$.36	-	$.56
	H&G	$.37	-	$.52	-	$.49	-	$.34	-	$.54	-
	Fillets	-	$1.61	-	$1.55	-	$2.13	-	$2.02	-	$2.10
	Other products	$1.03	-	$1.20	-	-	-	$1.10	-	$.88	-
	All products	$.80	$1.48	$.47	$1.43	$.40	$1.64	$.37	$1.82	$.55	$1.21
Other flatfish	Whole fish	$1.26	-	$.95	-	$.83	-	$.98	-	$.97	-
	H&G	$.31	-	$.88	-	$.15	-	$.24	-	$.43	-
	Other products	$.28	-	$.34	-	$.31	-	$.30	-	$.32	-
	All products	$.92	-	$.92	-	$.78	-	$.91	-	$.92	-
Arrowtooth	Whole fish	-	-	-	-	-	-	$.25	-	-	-
	H&G	$.52	-	$.27	-	$.38	-	$.39	-	$.54	-
	Fillets	-	-	-	-	-	-	-	-	-	$.72
	Other products	$.25	-	$.30	-	$.31	-	$.15	-	$.32	$.48
	All products	$.52	-	$.27	-	$.38	-	$.39	-	$.54	$.60
Flathead sole	Whole fish	-	-	$.40	-	$.40	$.36	-	$.44	-	-
	H&G	$.53	-	$.47	-	$.56	-	$.57	-	$.68	-
	Fillets	-	$1.31	-	$1.67	-	$1.87	-	$2.00	-	$2.16
	Other products	$.82	-	$1.06	-	$.90	-	$.89	-	$.83	-
	All products	$.60	$1.31	$.58	$1.67	$.67	$1.73	$.62	$1.58	$.73	$2.16
Rock sole	Whole fish	$.49	-	$.40	-	$.27	-	-	-	-	-
	H&G	$.47	-	$.41	-	$.42	-	$.44	-	$.52	-
	H&G with roe	$1.06	-	$1.20	-	$1.07	-	$1.10	-	$1.04	-
	Kirimi	-	-	$.79	-	-	-	-	-	-	-
	Other products	$.24	-	$.30	-	$.33	-	$.30	-	$.46	-
	All products	$.81	-	$.74	-	$.80	-	$.77	-	$.84	-

Table 26. Continued.

		2000		2001		2002		2003		2004	
		At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside	At-sea	Shoreside
Rex sole	Whole fish	$1.18	-	$.99	-	$.85	-	$.95	-	$1.03	$.50
	H&G	-	-	$.77	-	-	-	$.42	-	-	-
	Fillets	-	$2.37	-	$1.64	-	$1.59	-	-	-	-
	All products	$1.18	$2.37	$.99	$1.64	$.85	$1.59	$.95	-	$1.03	$.50
Yellowfin sole	Whole fish	$.20	-	$.28	-	$.29	-	$.29	-	$.35	-
	H&G	$.37	-	$.39	-	$.39	-	$.40	-	$.47	-
	Kirimi	$.42	-	$.30	-	$.55	-	$.54	-	$.63	-
	Other products	$.24	-	$.30	-	$.26	-	$.36	-	$.35	-
	All products	$.33	-	$.34	-	$.37	-	$.39	-	$.45	-
Greenland turbot	H&G	$1.65	$1.37	$.73	$1.09	$1.05	-	$1.32	-	$1.46	-
	Other products	$.44	-	$.37	-	$.84	-	$.86	-	$.77	-
	All products	$1.65	$1.37	$.70	$1.09	$1.01	-	$1.21	-	$1.29	-
Rockfish	Whole fish	$.69	$.76	$.32	$.65	$.85	$.66	$1.00	$1.36	$.69	$.47
	H&G	$.62	$1.70	$.53	$1.85	$.58	$2.17	$.60	$1.22	$.75	$.88
	Other products	$1.12	$1.04	$1.07	$.51	$1.09	$1.40	$1.00	$1.30	$.75	$1.33
	All products	$.63	$1.13	$.52	$.71	$.61	$1.31	$.65	$1.29	$.75	$.88
Atka mackerel	Whole fish	$.18	-	$.36	-	$.33	-	$.26	-	$.28	-
	H&G	$.40	-	$.69	-	$.55	-	$.40	-	$.47	-
	Other products	-	-	$.78	-	$.50	-	$.30	-	$.32	-
	All products	$.38	-	$.64	-	$.52	-	$.37	-	$.44	-

Note: Prices based on confidential data have been excluded.

Source: Weekly production reports and Commercial Operators Annual Reports (COAR). 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, 2000-04, (dollars).

		Bering Sea and Aleutians					Gulf of Alaska				
		2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Motherships	Pacific cod	1,407	1,261	981	830	1,045	1,352	-	-	-	-
	Pollock	591	689	619	529	594	-	-	-	-	-
Catcher/ processors	Atka mackerel	476	806	662	510	600	471	1,170	1,243	815	370
	Flatfish	606	563	669	666	847	1,180	1,028	713	760	1,364
	Other species	373	280	359	471	350	322	184	524	553	339
	Pacific cod	1,204	1,127	978	1,172	1,132	1,269	1,196	1,047	1,161	1,202
	Pollock	696	809	697	740	812	345	502	329	350	346
	Rockfish	578	614	640	697	795	696	499	702	867	869
	Sablefish	5,421	4,564	4,925	4,735	5,099	5,146	4,509	4,213	4,804	4,944
Shoreside processors	Flatfish	192	178	66	100	-	876	410	699	619	521
	Other species	1,463	-	-	2,064	1,535	411	649	553	483	215
	Pacific cod	945	1,097	1,101	1,077	959	1,539	1,596	1,881	1,275	1,248
	Pollock	703	648	635	624	681	652	741	795	794	750
	Rockfish	2,247	3,241	562	1,236	664	670	754	856	743	774
	Sablefish	6,983	6,643	6,007	6,036	5,870	5,346	5,920	5,953	5,990	5,233

Notes: For shoreside processors, these estimates include the product value of catch from both federal and state of Alaska fisheries. For at-sea processors, they include only the product value of catch counted against federal TACs. A dash indicates that data were not available or were withheld to preserve confidentiality.

Source: Weekly processor reports, commercial operators annual report (COAR), blend (2000-02) and catch accounting system (2000-04) estimates of retained catch. 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, 2000-04 (1,000 metric tons product weight).

		Bering Sea and Aleutians					Gulf of Alaska				
		2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Pollock	Whole fish	2.54	1.39	1.67	3.37	3.33	.09	.20	.12	.92	.25
	Head & gut	7.01	8.23	8.96	8.16	11.04	.10	2.34	1.54	.18	7.21
	Roe	14.24	22.65	24.99	21.73	25.30	1.34	2.34	1.50	1.08	1.00
	Fillets	54.00	109.68	121.15	154.71	156.22	4.77	5.03	3.38	4.90	5.94
	Surimi	178.21	190.45	195.19	194.89	179.55	10.56	9.72	9.62	8.67	7.17
	Minced fish	8.99	21.54	24.92	15.53	19.86	-	-	-	-	-
	Fish meal	49.89	54.69	55.07	47.24	56.11	-	-	-	-	-
	Other products	7.00	12.07	20.46	19.43	17.72	-	.64	.89	1.06	.81
Pacific cod	Whole fish	.76	.49	1.22	1.95	1.53	2.36	1.79	1.05	2.18	.80
	Head & gut	58.31	63.35	65.65	67.93	79.87	8.34	9.03	7.08	4.46	10.26
	Salted/split	-	3.29	-	-	-	-	-	-	-	-
	Fillets	7.71	4.02	5.60	8.03	2.89	9.64	6.04	6.71	8.58	6.52
	Other products	7.23	7.63	9.69	10.37	5.52	3.78	4.26	6.13	7.37	5.06
Sablefish	Head & gut	1.09	1.27	1.37	1.14	1.30	7.93	8.09	7.86	9.04	9.76
	Other products	.01	.01	.01	.06	.01	.18	.24	.23	.14	.21
Flatfish	Whole fish	11.60	8.75	13.10	10.41	11.83	3.55	2.89	3.42	3.86	2.05
	Head & gut	42.19	37.63	45.84	49.20	54.89	4.74	2.03	4.16	5.41	1.37
	Kirimi	6.39	6.60	2.86	3.68	1.81	-	-	-	-	-
	Fillets	-	-	-	.00	-	1.77	1.10	1.33	1.02	1.01
	Other products	.81	.54	.74	.74	.83	-	-	.09	-	.55
Rockfish	Whole fish	.17	.49	.71	.67	.33	1.08	.99	1.14	1.00	2.04
	Head & gut	4.30	3.86	4.58	6.02	5.00	4.00	5.07	5.20	5.08	5.76
	Other products	.01	2.14	.00	.04	.02	1.86	1.34	1.71	2.02	1.38
Atka mackerel	Whole fish	2.92	5.02	3.27	7.13	5.00	-	-	-	-	-
	Head & gut	22.49	27.44	18.53	20.72	24.60	.08	.04	.02	.18	.15

Notes: For shoreside processors, these estimates include production resulting from catch from federal and state of Alaska fisheries. For at-sea processors, they include production only from catch counted against federal TACs. A dash indicates that data were not available or were withheld to preserve confidentiality. Confidential data withheld from this table are included in the grand totals in Table 25.

Source: Weekly processor report and commercial operators annual report. 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, 2000-04 (1,000 metric tons product weight).

		At-sea					On-shore				
		2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Pollock	Whole fish	2.54	1.39	1.67	2.90	3.34	.09	.20	.12	1.40	.24
	Head & gut	7.11	8.29	9.05	8.34	11.15	-	2.29	1.45	-	7.10
	Roe	7.96	12.92	13.95	13.40	15.36	7.62	12.07	12.55	9.40	10.95
	Fillets	34.99	61.50	70.29	86.48	81.80	23.77	53.20	54.24	73.13	80.37
	Surimi	84.28	94.37	97.77	99.04	92.91	104.48	105.81	107.04	104.53	93.81
	Minced fish	8.99	21.54	17.13	15.53	19.86	-	-	7.79	-	-
	Fish meal	16.85	23.76	21.08	22.84	21.97	33.04	30.93	33.98	24.40	34.13
	Other products	.94	2.15	1.71	1.82	2.00	6.06	10.56	19.64	18.67	16.52
Pacific cod	Whole fish	.59	.24	.94	1.09	1.22	2.54	2.04	1.32	3.04	1.11
	Head & gut	61.16	65.02	63.94	66.32	73.72	5.49	7.37	8.79	6.07	16.41
	Salted/split	-	-	-	-	-	-	3.29	-	-	-
	Fillets	2.36	1.43	2.35	2.56	.61	14.99	8.63	9.96	14.05	8.80
	Other products	3.16	3.58	4.73	4.75	3.43	7.86	8.31	11.09	13.00	7.16
Sablefish	Head & gut	1.69	1.51	1.64	1.67	1.87	7.33	7.86	7.59	8.51	9.18
	Other products	.07	.07	.07	.07	.06	.12	.18	.17	.14	.15
Flatfish	Whole fish	14.95	11.51	16.02	13.93	12.91	.19	.13	.51	.34	.97
	Head & gut	46.90	39.55	50.00	54.61	56.26	.03	.10	-	-	-
	Kirimi	6.39	6.60	2.86	3.68	1.81	-	-	-	-	-
	Fillets	-	-	-	.00	-	1.77	1.10	1.33	1.02	1.01
	Other products	.81	.54	.75	.74	.83	-	-	.08	-	.55
Rockfish	Whole fish	.84	.80	1.06	1.26	.90	.41	.67	.79	.41	1.47
	Head & gut	7.75	8.29	9.35	10.48	9.67	.55	.64	.43	.61	1.09
	Other products	.03	.02	.02	.09	.03	1.84	3.46	1.69	1.97	1.37
Atka mackerel	Whole fish	2.92	5.02	3.27	7.13	5.00	-	-	-	-	-
	Head & gut	22.57	27.48	18.55	20.89	24.76	-	-	-	-	-
	Other products	-	.00	.00	.00	.00	-	-	-	-	-

Notes: For shoreside processors, these estimates include production resulting from catch from federal and state of Alaska fisheries. For at-sea processors, they include production only from catch counted against federal TACs. A dash indicates that data were not available or were withheld to preserve confidentiality. Confidential data withheld from this table are not included in the totals in Table 25.

Source: Weekly processor report and commercial operators annual report. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 30. Production and gross value of non-groundfish products in the commercial fisheries of Alaska by species group and area of processing, 2002-04 (1,000 metric tons product weight and millions of dollars).

		Bering Sea & Aleutians		Gulf of Alaska		All Alaska	
		Quantity	Value	Quantity	Value	Quantity	Value
2002	Salmon	22.6	103.0	152.9	400.4	175.5	503.5
	Halibut	4.9	25.1	16.5	111.2	21.4	136.3
	Herring	17.3	17.7	7.5	13.0	24.8	30.7
	Crab	12.2	146.7	4.5	47.4	16.7	194.1
	Other	.1	.9	2.1	12.8	2.2	13.7
	Total	57.0	293.4	183.5	584.9	240.5	878.3
2003	Salmon	32.6	137.1	173.4	446.6	206.0	583.7
	Halibut	4.3	31.7	15.1	124.8	19.4	156.5
	Herring	19.9	21.0	6.9	11.7	26.8	32.7
	Crab	12.3	174.2	3.7	48.1	16.1	222.3
	Other	.1	.8	3.9	15.1	4.0	15.9
	Total	69.3	364.7	202.9	646.4	272.3	1,011.1
2004	Salmon	50.1	202.7	181.0	524.4	231.1	727.1
	Halibut	3.4	27.8	17.8	148.7	21.2	176.5
	Herring	16.9	18.7	11.5	19.5	28.4	38.2
	Crab	11.4	158.4	4.0	50.1	15.4	208.5
	Other	11.7	16.3	3.5	16.8	15.1	33.2
	Total	93.5	423.9	217.7	759.6	311.2	1,183.5

Note: These estimates include production resulting from catch in both federal and state of Alaska fisheries. Complete estimates are not available for earlier years because catcher-processors that process only their own catch were not required to file the Commercial Operators Annual Report before 2002.

Source: ADF&G Commercial Operators Annual Report. 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, 1998-2004 ($ millions).

	Gulf of Alaska		Bering Sea and Aleutians			All Alaska
	At-sea	Shoreside	Motherships	Catcher/ processors	Shoreside	Total
1998	28.3	237.2	58.8	539.8	160.7	1,024.8
1999	43.0	207.6	58.1	579.9	289.4	1,178.1
2000	41.8	199.1	79.6	611.0	399.4	1,331.0
2001	31.0	176.9	101.8	774.9	432.6	1,517.2
2002	36.5	170.0	99.0	711.2	466.5	1,483.3
2003	39.5	180.6	89.9	775.4	471.5	1,556.9
2004	32.1	194.5	89.2	859.5	485.7	1,661.1

Note: For shoreside processors, these estimates include production resulting from catch from federal and state of Alaska fisheries. For at-sea processors, they include production only from catch counted against federal TACs. Catcher/processors that at times during a year act like motherships are classified as catcher/processors for the entire year. For shoreside processors the area represents the location of the plant, not necessarily the area of the catch.

Source: NMFS weekly production reports and ADFG Commercial Operators Annual Reports (COAR). 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, 1998-2004 ($ millions).

		Gulf of Alaska		Bering Sea and Aleutians		
		Vessel length		Vessel length		
		<125	>=125	<125	125-165	>165
Fixed Gear	1998	6.7	1.7	18.0	46.4	39.3
	1999	11.4	8.5	21.8	51.6	46.3
	2000	11.9	3.8	24.9	55.9	52.1
	2001	9.7	3.9	23.5	57.3	51.1
	2002	11.3	5.5	20.1	51.7	38.4
	2003	9.0	5.9	27.0	69.0	45.3
	2004	9.4	5.6	27.7	69.9	43.4
Fillet Trawl	1998	-	2.6	-	-	116.1
	1999	-	-	-	-	68.8
	2000	-	-	-	-	74.6
	2001	-	-	-	-	86.7
	2002	-	-	-	-	74.3
	2003	-	-	-	-	82.2
	2004	-	-	-	-	93.0
H&G Trawl	1998	6.8	10.5	17.0	17.3	70.2
	1999	9.2	13.3	19.9	23.6	70.8
	2000	9.5	15.7	24.1	24.0	85.3
	2001	6.7	10.7	19.4	22.0	103.5
	2002	5.6	14.1	26.3	25.8	93.8
	2003	8.0	16.3	27.2	24.4	92.4
	2004	4.0	13.0	28.4	36.4	116.9
Surimi Trawl	1998	-	-	-	-	215.5
	1999	-	-	-	-	277.1
	2000	-	-	-	-	270.1
	2001	-	-	-	-	411.3
	2002	-	-	-	-	380.8
	2003	-	-	-	-	407.9
	2004	-	-	-	-	443.9
All Trawl	1998	6.8	13.1	17.0	17.3	401.8
	1999	9.2	13.3	19.9	23.6	416.8
	2000	9.5	15.7	24.1	24.0	430.0
	2001	6.7	10.7	19.4	22.0	601.6
	2002	5.6	14.1	26.3	25.8	549.0
	2003	8.0	16.3	27.2	24.4	582.5
	2004	4.0	13.0	28.4	36.4	653.8

Note: These estimates include only catch counted against federal TACs.

Source: NMFS weekly production reports, Commercial Operators Annual Reports (COAR), and NMFS permits. 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 1998-2004 ($ millions).

		Gulf of Alaska		Bering Sea and Aleutians		
		Vessel length		Vessel length		
		<125	>=125	<125	125-165	>165
Fixed Gear	1998	.7	.3	1.0	2.6	3.3
	1999	.6	.4	1.3	2.7	3.9
	2000	.8	.4	1.8	2.7	3.7
	2001	.8	.4	1.5	3.0	3.4
	2002	.9	.5	1.4	2.6	3.0
	2003	.8	.4	2.1	3.6	4.1
	2004	.9	.6	2.5	3.5	3.9
Fillet Trawl	1998	-	.4	-	-	9.7
	1999	-	-	-	-	17.2
	2000	-	-	-	-	18.7
	2001	-	-	-	-	21.7
	2002	-	-	-	-	18.6
	2003	-	-	-	-	20.6
	2004	-	-	-	-	23.2
H&G Trawl	1998	1.0	1.0	2.1	4.3	6.4
	1999	1.5	1.2	2.2	5.9	6.4
	2000	1.9	1.2	3.0	6.0	7.8
	2001	1.1	.9	2.8	5.5	9.4
	2002	1.4	1.2	3.8	6.5	8.5
	2003	1.1	1.2	3.9	6.1	8.4
	2004	1.0	1.1	4.1	7.3	10.6
Surimi Trawl	1998	-	-	-	-	13.5
	1999	-	-	-	-	23.1
	2000	-	-	-	-	24.6
	2001	-	-	-	-	34.3
	2002	-	-	-	-	29.3
	2003	-	-	-	-	31.4
	2004	-	-	-	-	34.1
All Trawl	1998	1.0	.8	2.1	4.3	10.3
	1999	1.5	1.2	2.2	5.9	15.4
	2000	1.9	1.2	3.0	6.0	16.5
	2001	1.1	.9	2.8	5.5	22.3
	2002	1.4	1.2	3.8	6.5	19.6
	2003	1.1	1.2	3.9	6.1	20.8
	2004	1.0	1.1	4.1	7.3	23.3

Note: These estimates include only catch counted against federal TACs.

Source: NMFS weekly production 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, 1998-2004. ($ millions)

	1998	1999	2000	2001	2002	2003	2004
Bering Sea Pollock	214.6	293.0	396.7	421.8	450.5	454.3	468.0
AK Peninsula/Aleutians	38.4	59.0	46.3	49.6	61.8	67.9	65.6
Kodiak	67.1	71.0	73.9	69.1	58.9	53.5	66.3
South Central	27.2	24.9	29.5	28.0	24.4	29.7	27.7
Southeastern	50.6	49.2	52.1	41.1	41.0	46.7	52.6
TOTAL	397.9	497.1	598.6	609.5	636.5	652.1	680.2

Table 35. Groundfish gross product value as a percentage of all-species gross product value by shoreside processor group, 1998-2004. (percent)

	1998	1999	2000	2001	2002	2003	2004
Bering Sea Pollock	66.3	70.4	86.8	89.0	87.3	86.0	86.3
AK Peninsula/Aleutians	12.1	12.8	15.2	20.4	24.3	21.8	18.3
Kodiak	40.7	42.1	46.4	44.6	48.1	39.8	41.1
South Central	15.1	11.3	13.8	15.2	12.2	15.0	12.0
Southeastern	16.3	13.4	16.4	12.8	14.5	16.0	14.5
TOTAL	29.7	29.4	40.0	43.3	45.6	43.9	40.2

Note: The data are for catch from the EEZ and State waters. 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. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 36. Number of vessels that caught or caught and processed more than $3.5 million ex-vessel value or product value of groundfish by area, vessel type and gear, 1998-2004.

		Gulf of Alaska		Bering Sea and Aleutians			All Alaska		
		Catcher/ Process	Total	Catcher Vessels	Catcher/ Process	Total	Catcher Vessels	Catcher/ Process	Total
1998	All gear	26	26	0	58	58	0	58	58
	Hook & line	7	7	0	14	14	0	14	14
	Pot	0	0	0	1	1	0	1	1
	Trawl	19	19	0	44	44	0	44	44
1999	All gear	29	29	1	57	58	1	57	58
	Hook & line	13	13	0	22	22	0	22	22
	Pot	1	1	0	3	3	0	3	3
	Trawl	15	15	1	36	37	1	36	37
2000	All gear	27	27	4	56	60	4	56	60
	Hook & line	12	12	0	25	25	0	25	25
	Pot	0	0	0	2	2	0	2	2
	Trawl	15	15	4	33	37	4	33	37
2001	All gear	21	21	6	50	56	6	50	56
	Hook & line	7	7	0	17	17	0	17	17
	Trawl	14	14	6	33	39	6	33	39
2002	All gear	23	23	10	54	64	10	54	64
	Hook & line	10	10	0	18	18	0	18	18
	Trawl	13	13	10	36	46	10	36	46
2003	All gear	34	34	6	65	71	6	65	71
	Hook & line	16	16	0	28	28	0	28	28
	Trawl	18	18	6	37	43	6	37	43
2004	All gear	28	28	5	65	70	5	65	70
	Hook & line	15	15	0	28	28	0	28	28
	Pot	0	0	0	1	1	0	1	1
	Trawl	13	13	5	37	42	5	37	42

Note: Includes only vessels that fished part of federal TACs.

Source: CFEC fish tickets, weekly processor reports, NMFS permits, Commercial Operators Annual Report (COAR), ADFG intent-to-operate listings. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 37. Number of vessels that caught or caught and processed less than $3.5 million ex-vessel value or product value of groundfish by area, vessel type and gear, 1998-2004.

		Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
		Catcher Vessels	Catcher/ Process	Total	Catcher Vessels	Catcher/ Process	Total	Catcher Vessels	Catcher/ Process	Total
1998	All gear	973	21	994	243	41	284	1,052	41	1,093
	Hook & line	708	15	723	75	29	104	726	29	755
	Pot	188	1	189	70	7	77	231	7	238
	Trawl	170	5	175	115	7	122	207	7	214
1999	All gear	980	29	1,009	271	31	302	1,087	34	1,121
	Hook & line	699	17	716	67	19	86	720	22	742
	Pot	231	10	241	88	11	99	281	11	292
	Trawl	159	3	162	123	4	127	203	4	207
2000	All gear	987	17	1,004	269	32	301	1,134	34	1,168
	Hook & line	716	9	725	79	18	97	746	19	765
	Pot	252	5	257	88	10	98	302	11	313
	Trawl	125	3	128	108	6	114	199	7	206
2001	All gear	851	20	871	278	40	318	1,011	41	1,052
	Hook & line	649	14	663	91	28	119	680	28	708
	Pot	154	4	158	74	7	81	212	9	221
	Trawl	119	4	123	117	6	123	195	7	202
2002	All gear	781	20	801	247	32	279	909	33	942
	Hook & line	619	13	632	78	24	102	633	24	657
	Pot	127	4	131	59	5	64	169	6	175
	Trawl	107	3	110	114	3	117	182	3	185
2003	All gear	782	13	795	259	18	277	922	21	943
	Hook & line	640	9	649	72	12	84	662	14	676
	Pot	133	1	134	80	3	83	190	3	193
	Trawl	89	3	92	114	3	117	157	4	161
2004	All gear	774	8	782	234	17	251	908	18	926
	Hook & line	611	4	615	60	12	72	633	13	646
	Pot	148	1	149	78	3	81	199	3	202
	Trawl	77	3	80	104	3	107	146	3	149

Note: Includes only vessels that fished part of federal TACs.

Source: CFEC fish tickets, weekly processor reports, NMFS permits, Commercial Operators Annual Report (COAR), ADFG intent-to-operate listings. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 38. Average revenue of vessels that caught or caught and processed more than $3.5 million ex-vessel value or product value of groundfish by area, vessel type and gear, 1998-2004. ($ millions)

		Gulf of Alaska		Bering Sea & Aleutians			All Alaska		
		Catcher/ Process	All Vessels	Catcher Vessels	Catcher/ Process	All Vessels	Catcher Vessels	Catcher/ Process	All Vessels
1998	All gear	6.41	6.41	-	8.64	8.64	-	8.64	8.64
	Hook & line	4.46	4.46	-	4.51	4.51	-	4.51	4.51
	Trawl	7.12	7.12	-	9.95	9.95	-	9.95	9.95
1999	All gear	5.53	5.53	-	10.09	10.00	-	10.09	10.00
	Hook & line	4.69	4.69	-	4.70	4.70	-	4.70	4.70
	Trawl	6.36	6.36	-	13.23	13.00	-	13.23	13.00
2000	All gear	6.68	6.68	4.66	10.75	10.34	4.66	10.75	10.34
	Hook & line	4.93	4.93	-	5.15	5.15	-	5.15	5.15
	Trawl	8.08	8.08	4.66	14.82	13.72	4.66	14.82	13.72
2001	All gear	7.76	7.76	4.99	14.59	13.57	4.99	14.59	13.57
	Hook & line	4.82	4.82	-	4.85	4.85	-	4.85	4.85
	Trawl	9.23	9.23	4.99	19.61	17.36	4.99	19.61	17.36
2002	All gear	6.97	6.97	4.91	12.77	11.54	4.91	12.77	11.54
	Hook & line	4.28	4.28	-	4.26	4.26	-	4.26	4.26
	Trawl	9.03	9.03	4.91	17.02	14.39	4.91	17.02	14.39
2003	All gear	6.50	6.50	4.24	12.00	11.34	4.24	12.00	11.34
	Hook & line	4.52	4.52	-	4.55	4.55	-	4.55	4.55
	Trawl	8.27	8.27	4.24	17.64	15.77	4.24	17.64	15.77
2004	All gear	7.29	7.29	4.83	13.16	12.57	4.83	13.16	12.57
	Hook & line	4.54	4.54	-	4.51	4.51	-	4.51	4.51
	Trawl	10.46	10.46	4.83	19.71	17.94	4.83	19.71	17.94

Notes: Includes only vessels that fished part of federal 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.

Source: CFEC fish tickets, weekly processor reports, NMFS permits, commercial operators annual report (COAR), ADFG intent-to-operate listings. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 39. Average revenue of vessels that caught or caught and processed less than $3.5 million ex-vessel value or product value of groundfish by area, vessel type and gear, 1998-2004. ($ millions)

		Gulf of Alaska			Bering Sea & Aleutians			All Alaska		
		Catcher Vessels	Catcher/ Process	Total	Catcher Vessels	Catcher/ Process	Total	Catcher Vessels	Catcher/ Process	Total
1998	All gear	.15	1.77	.18	.44	1.63	.61	.16	1.63	.22
	Hook & line	.08	1.59	.11	.18	1.57	.57	.08	1.57	.13
	Pot	.11	-	.12	.24	.84	.29	.15	.84	.17
	Trawl	.52	2.40	.57	.77	2.58	.88	.54	2.58	.61
1999	All gear	.20	1.44	.23	.58	1.51	.68	.21	1.38	.25
	Hook & line	.09	1.48	.12	.18	1.79	.53	.09	1.55	.13
	Pot	.17	1.23	.21	.16	1.16	.27	.16	1.16	.20
	Trawl	.77	-	.79	1.10	1.59	1.12	.79	1.59	.80
2000	All gear	.16	1.46	.18	.67	1.48	.76	.24	1.47	.28
	Hook & line	.11	1.49	.12	.23	1.71	.50	.10	1.63	.14
	Pot	.16	1.03	.18	.16	.48	.19	.17	.62	.18
	Trawl	.57	-	.61	1.40	2.01	1.43	.92	2.07	.96
2001	All gear	.14	1.80	.18	.58	1.85	.74	.23	1.86	.29
	Hook & line	.10	1.83	.13	.16	2.05	.60	.09	2.05	.17
	Pot	.12	1.82	.17	.13	.78	.18	.12	1.13	.16
	Trawl	.48	1.94	.52	1.18	1.84	1.21	.83	1.90	.87
2002	All gear	.15	1.71	.18	.65	1.82	.78	.24	1.77	.30
	Hook & line	.10	1.90	.14	.19	1.97	.61	.10	1.97	.17
	Pot	.15	.38	.16	.18	.62	.22	.14	.52	.15
	Trawl	.45	-	.51	1.18	-	1.22	.83	-	.86
2003	All gear	.17	1.54	.19	.66	1.74	.73	.27	1.65	.30
	Hook & line	.12	1.55	.14	.23	2.17	.51	.12	1.92	.16
	Pot	.16	-	.16	.23	-	.24	.17	-	.18
	Trawl	.59	-	.63	1.21	-	1.20	.97	1.45	.98
2004	All gear	.16	1.63	.18	.64	2.07	.74	.25	2.01	.29
	Hook & line	.12	1.53	.13	.20	2.07	.51	.11	1.98	.15
	Pot	.16	-	.16	.21	-	.29	.16	-	.20
	Trawl	.62	-	.67	1.20	-	1.23	.97	-	.99

Notes: Includes only vessels that fished part of federal 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.

Source: CFEC fish tickets, weekly processor reports, NMFS permits, commercial operators annual report (COAR), ADFG intent-to-operate listings. 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, 1998-2004.

		Gulf of Alaska		Bering Sea and Aleutians		All Alaska	
		Number of Vessels	Registered net tons	Number of Vessels	Registered net tons	Number of Vessels	Registered net tons
Hook & Line	1998	730	27,413	118	15,970	769	34,507
	1999	729	28,546	108	15,019	764	33,409
	2000	737	24,595	122	17,242	790	34,735
	2001	670	23,880	136	16,194	725	32,545
	2002	642	24,227	120	16,033	675	32,200
	2003	665	26,102	112	14,575	704	32,243
	2004	630	24,079	100	14,416	674	31,408
Pot	1998	189	11,792	78	12,070	239	20,184
	1999	242	19,001	102	16,373	295	26,968
	2000	257	19,729	100	15,200	315	27,951
	2001	158	8,705	81	11,471	221	18,291
	2002	131	7,766	64	8,764	175	14,259
	2003	134	7,574	83	10,598	193	15,528
	2004	149	8,806	82	10,458	203	16,722
Trawl	1998	194	31,339	166	68,074	258	74,557
	1999	177	26,384	164	55,367	244	60,816
	2000	143	19,510	151	53,294	243	59,758
	2001	137	18,537	162	51,959	241	57,491
	2002	123	16,535	163	52,590	231	57,150
	2003	110	17,719	160	54,488	204	57,902
	2004	93	15,193	149	52,411	191	55,740
All gear	1998	1,020	65,014	342	92,692	1,151	120,116
	1999	1,038	66,315	360	83,293	1,179	110,994
	2000	1,031	57,396	361	83,365	1,228	113,494
	2001	892	46,807	374	79,198	1,108	103,461
	2002	824	44,418	343	77,195	1,006	99,394
	2003	829	47,487	348	79,225	1,014	101,263
	2004	810	44,723	321	76,166	996	99,317

Note: These estimates include only vessels fishing federal TACs. Registered net tons totals exclude mainly smaller vessels for which data were unavailable. The percent of vessels missing are: 1998 - 2%, 1999 - 4%, 2000 - 6%, 2001 - 5%, 2002 - 4%, 2003 - 2%, 2004 - 2%.

Source: Blend estimates, Catch Accounting System, fish tickets, Norpac data, federal permit file, CFEC vessel data, 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, 2000-04.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Catcher vessels	Catcher/ processors	Total	Catcher vessels	Catcher/ processors	Total	Catcher vessels	Catcher/ processors	Total
All Gear	All groundfish	2000	987	44	1,031	273	88	361	1,138	90	1,228
		2001	851	41	892	284	90	374	1,017	91	1,108
		2002	781	43	824	257	86	343	919	87	1,006
		2003	782	47	829	265	83	348	928	86	1,014
		2004	774	35	809	239	82	321	913	83	996
Hook & Line	Sablefish	2000	397	16	413	48	17	65	411	23	434
		2001	392	15	407	53	9	62	414	18	432
		2002	392	12	404	48	12	60	405	17	422
		2003	370	15	385	51	9	60	386	17	403
		2004	354	13	367	40	7	47	368	15	383
	Pacific cod	2000	331	14	345	39	41	80	357	42	399
		2001	280	13	293	54	42	96	304	42	346
		2002	240	18	258	36	40	76	255	41	296
		2003	270	16	286	31	39	70	289	39	328
		2004	261	11	272	29	39	68	279	39	318
	Flatfish	2000	0	0	0	6	29	35	6	29	35
		2001	0	1	1	12	21	33	12	21	33
		2002	0	1	1	1	17	18	1	17	18
		2003	1	1	2	7	13	20	7	13	20
		2004	0	0	0	1	13	14	1	13	14
	Rockfish	2000	138	2	140	5	4	9	142	5	147
		2001	113	3	116	8	1	9	120	4	124
		2002	120	3	123	5	2	7	123	5	128
		2003	112	1	113	4	3	7	115	4	119
		2004	113	0	113	1	2	3	114	2	116
	All groundfish	2000	716	21	737	79	43	122	746	44	790
		2001	649	21	670	91	45	136	680	45	725
		2002	619	23	642	78	42	120	633	42	675
		2003	640	25	665	72	40	112	662	42	704
		2004	611	18	629	60	40	100	633	41	674
Pot	Pacific cod	2000	251	5	256	87	10	97	300	11	311
		2001	150	4	154	70	6	76	205	8	213
		2002	126	4	130	56	5	61	167	6	173
		2003	133	1	134	70	3	73	180	3	183
		2004	148	1	149	67	3	70	189	3	192

Table 41. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Catcher vessels	Catcher/ processors	Total	Catcher vessels	Catcher/ processors	Total	Catcher vessels	Catcher/ processors	Total
Trawl	Pollock	2000	92	1	93	99	26	125	167	27	194
		2001	95	0	95	106	29	135	172	29	201
		2002	80	0	80	97	31	128	154	31	185
		2003	74	0	74	91	19	110	141	19	160
		2004	69	0	69	93	19	112	139	19	158
	Pacific cod	2000	95	6	101	82	27	109	171	27	198
		2001	95	6	101	67	21	88	151	22	173
		2002	82	5	87	69	22	91	140	22	162
		2003	65	6	71	77	20	97	118	21	139
		2004	59	6	65	60	21	81	109	21	130
	Flatfish	2000	39	11	50	5	29	34	44	30	74
		2001	41	11	52	0	26	26	41	27	68
		2002	40	9	49	1	26	27	40	26	66
		2003	30	16	46	1	26	27	31	27	58
		2004	29	8	37	3	27	30	32	27	59
	Rockfish	2000	31	11	42	0	6	6	31	12	43
		2001	33	12	45	1	8	9	33	15	48
		2002	34	12	46	0	8	8	34	15	49
		2003	33	13	46	1	11	12	33	17	50
		2004	33	13	46	1	10	11	33	16	49
	Atka mackerel	2000	0	0	0	0	12	12	0	12	12
		2001	0	0	0	0	12	12	0	12	12
		2002	0	0	0	0	11	11	0	11	11
		2003	0	0	0	0	15	15	0	15	15
		2004	0	0	0	1	19	20	1	19	20
	All groundfish	2000	125	18	143	112	39	151	203	40	243
		2001	119	18	137	123	39	162	201	40	241
		2002	107	16	123	124	39	163	192	39	231
		2003	89	21	110	120	40	160	163	41	204
		2004	77	16	93	109	40	149	151	40	191

Note: 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.

Source: Blend estimates, Catch Accounting System, fish tickets, Norpac data, federal permit file, CFEC vessel data, 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, 2000-04 (excluding catcher-processors).

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Number of vessels	Hook & Line	2000	632	84	0	50	28	1	655	90	1
		2001	570	79	0	70	21	0	597	83	0
		2002	537	82	0	61	17	0	550	83	0
		2003	560	80	0	58	14	0	578	84	0
		2004	534	77	0	47	12	1	552	80	1
	Pot	2000	151	90	11	3	60	25	152	119	31
		2001	116	37	1	6	52	16	119	77	16
		2002	97	29	1	8	37	14	100	55	14
		2003	101	29	3	10	55	15	105	70	15
		2004	105	42	1	14	49	15	110	73	16
	Trawl	2000	56	66	3	3	80	29	57	116	30
		2001	51	68	0	15	81	27	59	115	27
		2002	48	58	1	17	82	25	55	112	25
		2003	30	58	1	13	82	25	31	107	25
		2004	22	54	1	4	79	26	23	102	26

Note: If the permit files do not report a length for a vessel, the vessel is counted in the "less than 60 feet" class.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Mean vessel length (feet)	Hook & Line	2000	44	72	-	45	73	177	44	72	177
		2001	45	72	-	44	77	-	45	73	-
		2002	46	74	-	47	73	-	46	74	-
		2003	45	73	-	48	75	-	45	74	-
		2004	45	74	-	49	74	177	45	74	177
	Pot	2000	53	93	137	54	103	137	53	96	137
		2001	53	87	134	46	103	133	53	97	133
		2002	54	90	126	54	101	134	53	97	134
		2003	53	89	132	52	102	133	53	98	133
		2004	53	94	126	57	102	135	53	98	134
	Trawl	2000	57	91	172	55	104	156	57	98	158
		2001	56	90	-	54	105	158	55	99	158
		2002	56	89	149	51	105	158	55	99	158
		2003	57	91	155	58	105	158	57	100	158
		2004	58	91	149	58	107	158	58	101	158

Table 42. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			<60	60-125	>=125	<60	60-125	>=125	<60	60-125	>=125
Mean registered net tons	Hook & Line	2000	24	61	-	27	68	380	23	63	380
		2001	25	62	-	25	81	-	25	65	-
		2002	26	65	-	29	74	-	26	65	-
		2003	25	64	-	30	81	-	25	66	-
		2004	25	66	-	33	73	172	25	67	172
	Pot	2000	40	108	199	42	125	160	40	112	168
		2001	39	99	119	30	131	164	39	119	164
		2002	41	108	134	53	124	158	40	116	158
		2003	39	101	178	44	120	166	39	113	166
		2004	40	104	134	50	119	163	40	113	161
	Trawl	2000	56	104	317	53	125	229	55	115	237
		2001	55	106	-	50	124	234	54	115	234
		2002	56	95	130	52	118	238	54	111	238
		2003	62	97	267	66	117	238	61	111	238
		2004	67	98	130	69	119	241	66	113	241

Note: These estimates include only vessels that fished part of federal TACs.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), ADFG fish tickets, Norpac, NMFS permits. 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), 2000-04 (excluding catcher-processors).

			Vessel length class							
			<26	26-30	30-35	35-40	40-45	45-50	50-55	55-60
Number of vessels	Gulf of Alaska	2000	30	18	62	79	152	94	63	134
		2001	21	11	55	53	137	104	59	130
		2002	21	4	49	54	120	101	66	122
		2003	15	4	58	54	128	107	67	127
		2004	12	5	70	50	106	104	65	122
	Bering Sea and Aleutian Islands	2000	6	0	7	6	5	1	7	18
		2001	7	1	14	7	13	4	4	20
		2002	4	0	11	3	5	8	7	23
		2003	0	0	12	4	7	4	4	27
		2004	0	0	9	3	4	4	4	23
	All Alaska	2000	35	18	68	83	154	94	66	137
		2001	27	12	64	56	141	104	62	131
		2002	24	4	54	54	121	101	68	124
		2003	15	4	63	56	131	108	68	133
		2004	12	5	75	52	107	106	67	128

Note: If the permit files do not report a length for a vessel, the vessel is counted in the "<26" class.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), ADFG fish tickets, Norpac, NMFS permits. 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, 2000-04.

			Gulf of Alaska					Bering Sea and Aleutians					All Alaska				
			Vessel length class					Vessel length class					Vessel length class				
			<125	125-164	165-234	235-259	>260	<125	125-164	165-234	235-259	>260	<125	125-164	165-234	235-259	>260
Number of vessels	Hook & Line	2000	14	1	6	0	0	15	16	12	0	0	16	16	12	0	0
		2001	13	3	5	0	0	15	16	13	1	0	15	16	13	1	0
		2002	12	5	6	0	0	12	18	12	0	0	12	18	12	0	0
		2003	11	6	8	0	0	11	18	11	0	0	13	18	11	0	0
		2004	9	3	7	0	0	10	19	11	0	0	11	19	11	0	0
	Pot	2000	1	3	1	0	0	2	6	4	0	0	2	7	4	0	0
		2001	1	2	1	0	0	2	4	1	0	0	2	6	1	0	0
		2002	2	1	1	0	0	2	2	1	0	0	2	3	1	0	0
		2003	1	0	0	0	0	2	1	0	0	0	2	1	0	0	0
		2004	1	0	0	0	0	1	2	1	0	0	1	2	1	0	0
	Trawl	2000	4	4	8	1	1	8	4	11	3	13	9	4	11	3	13
		2001	6	2	8	1	1	8	4	10	3	14	9	4	10	3	14
		2002	4	2	8	1	1	7	4	10	3	15	7	4	10	3	15
		2003	7	3	9	1	1	7	4	10	3	16	8	4	10	3	16
		2004	4	2	8	1	1	7	5	10	3	15	7	5	10	3	15

Note: If the permit files do not report a length for a vessel, the vessel is counted in the "less than 125 feet" class.

Table 44. Continued.

			Gulf of Alaska					Bering Sea and Aleutians					All Alaska				
			Vessel length class					Vessel length class					Vessel length class				
			<125	125-164	165-234	235-259	>260	<125	125-164	165-234	235-259	>260	<125	125-164	165-234	235-259	>260
Mean vessel length (feet)	Hook & Line	2000	106	141	175	-	-	107	144	178	-	-	108	144	178	-	-
		2001	100	141	175	-	-	103	144	177	245	-	103	144	177	245	-
		2002	107	140	175	-	-	107	145	178	-	-	107	145	178	-	-
		2003	104	146	176	-	-	111	145	178	-	-	107	145	178	-	-
		2004	103	158	175	-	-	112	145	178	-	-	107	145	178	-	-
	Pot	2000	116	149	180	-	-	118	149	174	-	-	118	146	174	-	-
		2001	116	146	180	-	-	118	146	180	-	-	118	146	180	-	-
		2002	96	126	180	-	-	96	163	180	-	-	96	150	180	-	-
		2003	76	-	-	-	-	96	165	-	-	-	96	165	-	-	-
		2004	76	-	-	-	-	76	165	174	-	-	76	165	174	-	-
	Trawl	2000	111	152	205	238	295	116	152	204	245	308	114	152	204	245	308
		2001	113	155	211	238	295	117	152	207	245	305	116	152	207	245	305
		2002	113	155	211	238	295	117	152	207	245	303	117	152	207	245	303
		2003	115	150	208	238	295	117	152	207	245	306	116	152	207	245	306
		2004	111	146	207	238	295	116	148	207	245	303	116	148	207	245	303

Table 44. Continued.

			Gulf of Alaska					Bering Sea and Aleutians					All Alaska				
			Vessel length class					Vessel length class					Vessel length class				
			<125	125-164	165-234	235-259	>260	<125	125-164	165-234	235-259	>260	<125	125-164	165-234	235-259	>260
Mean registered net tons	Hook & Line	2000	121	470	454	-	-	122	265	633	-	-	123	265	633	-	-
		2001	123	153	583	-	-	125	262	508	200	-	125	262	508	200	-
		2002	130	223	454	-	-	130	302	508	-	-	130	302	508	-	-
		2003	159	233	481	-	-	128	302	442	-	-	153	302	442	-	-
		2004	133	261	513	-	-	134	296	442	-	-	136	296	442	-	-
	Pot	2000	130	579	243	-	-	128	390	250	-	-	128	352	250	-	-
		2001	130	129	243	-	-	128	348	243	-	-	128	275	243	-	-
		2002	132	147	243	-	-	132	546	243	-	-	132	413	243	-	-
		2003	134	-	-	-	-	132	793	-	-	-	132	793	-	-	-
		2004	134	-	-	-	-	134	464	414	-	-	134	464	414	-	-
	Trawl	2000	138	194	754	533	1085	147	194	670	1130	1830	141	194	670	1130	1830
		2001	115	256	732	533	1085	139	194	724	1130	1620	133	194	724	1130	1620
		2002	123	256	732	611	1085	143	194	724	1156	1590	143	194	724	1156	1590
		2003	144	214	735	611	1085	150	194	724	1156	1598	143	194	724	1156	1598
		2004	125	256	702	611	1085	144	181	724	1156	1590	144	181	724	1156	1590

Note: These estimates include only vessels that fished part of federal TACs.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), NMFS permits. 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, 1998-2004.

		Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
		Tonnage caught			Tonnage caught			Tonnage caught		
		Less than 2t	2t to 25t	More than 25t	Less than 2t	2t to 25t	More than 25t	Less than 2t	2t to 25t	More than 25t
Hook & Line	1998	144	352	234	15	47	56	143	358	268
	1999	164	337	228	20	36	52	168	343	253
	2000	153	344	240	28	38	56	167	352	271
	2001	127	297	246	28	43	65	138	308	279
	2002	121	288	233	24	36	60	121	291	263
	2003	102	301	262	24	34	54	110	311	283
	2004	94	276	260	18	31	51	99	286	289
Pot	1998	14	46	129	14	18	46	28	56	155
	1999	21	56	165	7	20	75	26	55	214
	2000	13	57	187	5	17	78	16	51	248
	2001	11	35	112	3	10	68	10	42	169
	2002	6	20	105	2	5	57	7	22	146
	2003	5	21	108	3	10	70	7	27	159
	2004	3	15	131	3	13	66	5	22	176
Trawl	1998	0	5	189	1	0	165	0	2	256
	1999	2	4	171	0	5	159	1	3	240
	2000	0	10	133	1	2	148	1	9	233
	2001	0	7	130	0	3	159	0	5	236
	2002	0	10	113	0	1	162	0	8	223
	2003	2	1	107	1	3	156	0	2	202
	2004	1	1	91	0	3	146	0	2	189
All gear	1998	139	376	505	20	59	263	143	381	627
	1999	163	365	510	24	57	279	166	366	647
	2000	149	377	505	30	51	280	163	372	693
	2001	125	314	453	29	54	291	134	328	646
	2002	115	296	413	24	41	278	114	299	593
	2003	96	289	444	24	45	279	100	304	610
	2004	95	261	454	18	42	261	100	272	624

Note: These estimates include only vessels fishing part of federal TACs.

Source: Blend estimates, Catch Accounting System, fish tickets, Norpac data, federal permit file, CFEC vessel data. 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, 2000-04.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Alaska	Other	Unk.	Alaska	Other	Unk.	Alaska	Other	Unk.
All Gear	All groundfish	2000	721	281	29	86	272	3	749	447	32
		2001	627	246	19	104	258	12	662	417	29
		2002	581	221	22	90	245	8	604	373	29
		2003	604	225	0	91	257	0	630	384	0
		2004	593	216	1	75	246	0	618	377	1
Hook & Line	Sablefish	2000	280	130	3	34	31	0	294	137	3
		2001	281	121	5	37	25	0	300	127	5
		2002	286	113	5	30	28	2	294	121	7
		2003	269	116	0	33	27	0	280	123	0
		2004	261	106	0	26	21	0	273	110	0
	Pacific cod	2000	285	51	9	34	45	1	305	84	10
		2001	240	49	4	46	47	3	260	80	6
		2002	205	44	9	33	43	0	219	68	9
		2003	239	47	0	26	44	0	253	75	0
		2004	228	44	0	21	47	0	242	76	0
	Flatfish	2000	0	0	0	13	22	0	13	22	0
		2001	0	1	0	13	18	2	13	18	2
		2002	0	1	0	4	14	0	4	14	0
		2003	1	1	0	4	16	0	4	16	0
		2004	0	0	0	4	10	0	4	10	0
	Rockfish	2000	120	18	2	5	3	1	124	20	3
		2001	98	18	0	6	3	0	103	21	0
		2002	105	18	0	4	3	0	107	21	0
		2003	98	15	0	4	3	0	101	18	0
		2004	100	13	0	2	1	0	102	14	0
	All groundfish	2000	550	173	14	59	61	2	575	199	16
		2001	498	163	9	71	60	5	524	188	13
		2002	477	151	14	58	60	2	490	169	16
		2003	515	150	0	53	59	0	533	171	0
		2004	492	138	0	43	57	0	512	162	0
Pot	Pacific cod	2000	187	61	8	18	78	1	193	109	9
		2001	119	28	7	18	57	1	128	78	7
		2002	107	21	2	17	43	1	114	56	3
		2003	117	17	0	24	49	0	126	57	0
		2004	121	27	1	23	47	0	125	66	1
	All groundfish	2000	188	61	8	19	80	1	195	111	9
		2001	122	29	7	18	62	1	131	83	7
		2002	108	21	2	18	45	1	115	57	3
		2003	117	17	0	27	56	0	129	64	0
		2004	121	27	1	25	57	0	127	75	1

Table 46. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Alaska	Other	Unk.	Alaska	Other	Unk.	Alaska	Other	Unk.
Trawl	Pollock	2000	41	47	5	12	113	0	44	145	5
		2001	39	55	1	12	116	7	40	153	8
		2002	33	45	2	11	114	3	37	143	5
		2003	30	44	0	8	102	0	32	128	0
		2004	26	43	0	7	105	0	27	131	0
	Pacific cod	2000	57	44	0	3	106	0	58	140	0
		2001	49	50	2	7	81	0	51	120	2
		2002	46	38	3	6	83	2	49	108	5
		2003	27	44	0	12	85	0	30	109	0
		2004	26	39	0	4	77	0	27	103	0
	Flatfish	2000	17	31	2	2	32	0	18	54	2
		2001	17	35	0	1	25	0	17	51	0
		2002	18	30	1	2	25	0	18	47	1
		2003	14	32	0	2	25	0	14	44	0
		2004	12	25	0	2	28	0	12	47	0
	Rockfish	2000	18	24	0	1	5	0	18	25	0
		2001	13	32	0	1	8	0	14	34	0
		2002	17	29	0	0	8	0	17	32	0
		2003	17	29	0	1	11	0	17	33	0
		2004	14	32	0	1	10	0	14	35	0
	Atka mackerel	2000	0	0	0	1	11	0	1	11	0
		2001	0	0	0	1	11	0	1	11	0
		2002	0	0	0	0	11	0	0	11	0
		2003	0	0	0	2	13	0	2	13	0
		2004	0	0	0	2	18	0	2	18	0
	All groundfish	2000	62	74	7	12	139	0	63	173	7
		2001	56	78	3	16	139	7	57	174	10
		2002	53	64	6	15	143	5	56	165	10
		2003	40	70	0	16	144	0	40	164	0
		2004	32	61	0	10	139	0	33	158	0

Note: 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.

Source: Blend estimates, Catch Accounting System, fish tickets, Norpac data, federal permit file, CFEC vessel data. 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, 2000-04.

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	Catcher-vessels (excluding C/Ps)	Hook & line	2000	140	160	171	253	342	232	120	97	136	69	60	16	716
			2001	127	130	103	207	268	273	99	86	159	94	71	9	649
			2002	90	73	157	234	234	200	98	102	158	78	76	7	619
			2003	83	71	172	288	305	134	98	117	139	79	82	1	640
			2004	125	92	223	291	232	120	116	99	156	113	48	1	611
		Pot	2000	142	157	179	145	43	4	1	0	5	8	11	21	252
			2001	37	74	109	96	28	11	0	0	23	16	9	14	154
			2002	36	68	95	36	29	5	0	0	19	12	25	17	127
			2003	53	87	102	15	0	0	0	0	38	5	0	0	133
			2004	86	114	60	17	15	0	0	0	29	24	22	6	148
		Trawl	2000	77	98	96	34	20	4	31	49	43	45	15	4	125
			2001	76	99	99	38	14	8	35	45	66	69	4	0	119
			2002	32	78	78	33	21	0	35	58	34	56	15	0	107
			2003	63	62	37	37	16	8	35	50	43	47	0	0	89
			2004	58	47	50	27	16	9	32	49	58	46	1	0	77
		All gear	2000	346	404	401	425	399	240	151	146	184	122	86	40	987
			2001	239	300	282	334	309	289	134	129	247	179	84	23	851
			2002	155	213	308	301	281	205	133	160	209	145	116	24	781
			2003	191	218	296	338	321	142	133	167	218	130	82	1	782
			2004	255	244	324	335	261	129	148	148	241	179	71	7	774
	Catcher/ Processors	Hook & line	2000	12	10	14	12	3	10	8	3	1	1	2	0	21
			2001	9	6	10	10	7	10	3	3	3	1	1	0	21
			2002	6	9	14	11	9	2	4	4	3	5	5	0	23
			2003	9	6	16	8	10	4	4	5	5	1	1	0	25
			2004	8	2	9	11	11	6	3	3	5	5	1	0	19
		Pot	2000	2	3	2	1	3	2	1	0	0	1	1	0	5
			2001	0	0	0	4	3	0	0	0	0	0	1	1	4
			2002	0	0	2	1	0	0	0	0	2	3	1	0	4
			2003	1	1	1	0	0	0	0	0	1	0	0	0	1
			2004	1	1	0	0	0	0	0	0	0	0	1	1	1
		Trawl	2000	4	5	5	9	10	1	15	7	0	3	2	0	18
			2001	2	3	4	7	9	0	13	2	4	5	0	0	18
			2002	1	2	4	6	8	1	14	7	0	6	1	0	16
			2003	0	3	2	10	9	0	13	6	7	13	0	0	21
			2004	1	1	4	6	4	2	15	2	6	0	0	0	16
		All gear	2000	18	18	21	22	16	13	24	10	1	5	5	0	44
			2001	11	9	14	21	19	10	16	5	7	6	2	1	41
			2002	7	11	20	18	17	3	18	11	5	14	7	0	43
			2003	10	10	19	18	19	4	17	11	13	14	1	0	47
			2004	10	4	13	17	15	8	18	5	11	5	2	1	36

Table 47. Continued.

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Bering Sea & Aleutian Islands	Catcher-vessels (excluding C/Ps)	Hook & line	2000	2	2	6	10	23	25	29	26	23	19	8	8	79
			2001	2	3	2	9	16	39	42	46	32	18	12	5	91
			2002	2	3	4	12	27	37	26	35	20	9	5	0	78
			2003	0	0	6	9	26	34	27	30	27	17	6	0	72
			2004	0	8	9	14	24	23	28	22	15	11	8	1	60
		Pot	2000	37	70	81	1	2	2	1	1	5	1	1	0	88
			2001	3	4	57	3	7	7	3	4	25	16	6	3	74
			2002	5	20	40	6	7	8	5	5	20	19	6	1	59
			2003	7	47	46	10	6	8	10	8	28	37	21	5	80
			2004	19	49	10	16	18	9	7	5	27	28	8	0	78
		Trawl	2000	62	89	90	68	0	2	43	72	78	52	22	0	112
			2001	45	94	105	50	6	8	58	79	91	51	0	0	123
			2002	63	106	105	55	6	19	60	90	80	51	6	0	124
			2003	60	108	111	65	13	31	73	90	75	47	0	0	120
			2004	77	99	98	42	1	39	70	79	78	58	15	0	109
		All gear	2000	101	161	176	79	25	29	73	99	105	72	31	8	273
			2001	50	101	164	62	29	54	103	129	148	85	17	8	284
			2002	70	129	149	73	40	64	91	130	120	79	17	1	257
			2003	67	155	163	84	45	73	109	126	130	100	27	5	265
			2004	96	156	115	72	43	71	105	106	120	97	31	1	239
	Catcher/ Processors	Hook & line	2000	35	34	37	20	31	14	5	11	37	36	38	35	43
			2001	33	37	41	17	25	12	9	37	39	40	38	35	45
			2002	34	35	37	13	11	6	11	37	39	40	39	18	42
			2003	32	39	39	14	11	11	15	36	36	36	37	31	40
			2004	34	37	37	13	12	9	16	38	39	39	38	37	40
		Pot	2000	7	9	9	1	1	0	0	0	0	0	1	0	12
			2001	1	1	5	1	1	0	0	0	3	3	2	0	7
			2002	0	3	4	0	0	0	0	0	3	3	3	0	5
			2003	0	2	2	0	0	0	0	0	3	2	2	1	3
			2004	2	2	3	0	1	0	0	0	1	1	1	0	4
		Trawl	2000	35	37	37	34	20	13	29	37	37	31	12	3	39
			2001	35	37	38	35	9	15	33	35	36	34	14	5	39
			2002	35	38	37	22	18	22	32	37	36	26	6	0	39
			2003	36	38	38	24	16	29	34	37	37	14	3	1	40
			2004	38	39	39	24	23	32	37	31	32	17	3	0	40
		All gear	2000	77	80	82	54	51	27	34	48	73	67	51	38	88
			2001	69	75	84	53	35	27	42	72	78	77	54	40	90
			2002	69	76	78	35	29	28	43	74	78	69	48	18	86
			2003	68	79	79	38	27	40	49	73	76	52	42	33	83
			2004	74	78	78	37	35	41	53	69	72	57	42	37	82

Table 47. Continued.

				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
All Alaska	Catcher-vessels (excluding C/Ps)	Hook & line	2000	142	162	177	262	361	252	146	117	150	86	67	23	746
			2001	129	133	105	216	279	300	138	128	184	109	82	14	680
			2002	92	76	160	242	257	229	119	127	175	85	79	7	633
			2003	83	71	177	295	327	166	118	139	160	93	88	1	662
			2004	125	99	231	303	250	139	138	117	166	118	54	2	633
		Pot	2000	176	207	244	146	45	6	2	1	10	9	12	21	302
			2001	40	78	161	98	34	18	3	4	46	32	14	17	212
			2002	41	86	133	42	36	12	5	5	39	31	31	18	169
			2003	60	130	142	25	6	8	10	8	60	40	21	5	190
			2004	103	152	70	33	33	9	7	5	51	49	30	6	199
		Trawl	2000	138	183	179	99	20	6	69	116	114	92	37	4	203
			2001	117	178	188	87	20	16	85	119	144	118	4	0	201
			2002	95	167	167	88	27	19	88	129	107	103	21	0	192
			2003	122	150	134	98	28	39	98	125	112	90	0	0	163
			2004	133	139	134	68	17	47	91	116	127	100	16	0	151
		All gear	2000	443	541	554	500	420	264	216	234	272	187	115	47	1,138
			2001	285	386	425	394	332	331	226	249	371	259	99	31	1,017
			2002	225	323	438	367	317	259	212	261	319	218	131	25	919
			2003	257	349	438	416	361	213	225	270	330	221	109	6	928
			2004	347	381	424	404	297	195	236	238	342	263	100	8	913
	Catcher/ Processors	Hook & line	2000	39	39	40	24	31	21	10	13	38	37	40	35	44
			2001	34	40	43	22	26	18	11	38	40	41	39	35	45
			2002	36	38	39	19	15	8	15	38	40	41	39	18	42
			2003	40	39	40	19	16	14	17	38	38	37	38	31	42
			2004	36	37	38	19	18	14	18	39	40	40	39	37	41
		Pot	2000	8	10	10	2	4	2	1	0	0	1	2	0	13
			2001	1	1	5	5	4	0	0	0	3	3	2	1	9
			2002	0	3	5	1	0	0	0	0	4	4	3	0	6
			2003	1	3	3	0	0	0	0	0	3	2	2	1	3
			2004	2	2	3	0	1	0	0	0	1	1	2	1	4
		Trawl	2000	38	39	39	37	24	13	34	38	37	34	14	3	40
			2001	37	39	39	37	15	15	35	36	37	35	14	5	40
			2002	35	39	39	25	21	22	37	37	36	27	6	0	39
			2003	36	39	39	28	19	29	37	38	38	26	3	1	41
			2004	39	39	39	26	23	32	38	32	34	17	3	0	40
		All gear	2000	85	88	88	62	58	36	45	51	74	72	55	38	90
			2001	72	80	87	64	45	33	46	74	80	79	55	41	91
			2002	71	80	83	45	36	30	52	75	80	72	48	18	87
			2003	77	81	82	47	35	43	54	76	79	65	43	33	86
			2004	77	78	79	45	41	46	56	71	75	58	44	38	83

Note: These estimates include only vessels fishing part of federal TACs.

Source: Blend estimates, Catch Accounting System, fish tickets, Norpac data, federal permit file, CFEC vessel data. 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, 2000-04.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			<60	60-124	>=125	<60	60-124	>=125	<60	60-124	>=125
Hook & line	Sablefish	2000	1022	323	-	99	58	-	1121	381	-
		2001	1026	345	-	142	50	-	1168	395	-
		2002	1051	303	-	143	50	1	1194	353	1
		2003	1058	314	-	174	26	-	1232	340	-
		2004	1065	328	-	114	24	2	1179	352	2
	Pacific cod	2000	1624	35	-	126	11	3	1750	46	3
		2001	1309	21	-	164	25	-	1473	45	-
		2002	1066	19	-	98	9	-	1164	28	-
		2003	1061	22	-	89	8	1	1150	30	1
		2004	1337	45	-	147	5	1	1484	50	1
	Flatfish	2000	-	-	-	5	6	-	5	6	-
		2001	-	-	-	21	3	-	21	3	-
		2002	-	-	-	1	-	-	1	-	-
		2003	1	-	-	6	5	-	6	5	-
		2004	-	-	-	1	-	-	1	-	-
	Rockfish	2000	257	11	-	5	2	-	262	13	-
		2001	236	15	-	5	2	-	242	17	-
		2002	241	26	-	4	1	-	245	27	-
		2003	213	15	-	3	1	-	216	16	-
		2004	244	13	-	1	-	-	245	13	-
	All groundfish	2000	2908	370	-	233	77	3	3141	447	3
		2001	2585	381	-	333	80	-	2918	461	-
		2002	2358	348	-	246	60	1	2604	407	1
		2003	2489	360	-	272	41	1	2761	401	1
		2004	2710	389	-	263	28	3	2974	417	3
Pot	Pacific cod	2000	1115	530	44	2	229	136	1116	759	180
		2001	724	203	-	27	227	63	750	430	63
		2002	749	200	3	35	159	56	784	359	59
		2003	605	143	10	41	201	64	646	344	74
		2004	816	211	4	87	166	60	903	377	64
	All groundfish	2000	1117	532	44	2	253	137	1118	785	181
		2001	748	203	1	32	263	65	780	466	66
		2002	750	202	3	48	215	56	798	417	59
		2003	605	143	10	56	302	64	661	445	74
		2004	816	217	4	88	280	67	904	497	71

Table 48. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			<60	60-124	>=125	<60	60-124	>=125	<60	60-124	>=125
Trawl	Pollock	2000	126	365	1	3	801	487	129	1165	488
		2001	211	426	-	1	1001	501	212	1427	501
		2002	87	289	0	3	955	477	90	1243	478
		2003	69	259	0	-	997	524	69	1255	525
		2004	92	309	-	-	1005	533	92	1314	533
	Pacific cod	2000	185	179	1	1	391	55	186	570	56
		2001	177	234	-	7	259	19	184	492	19
		2002	117	159	-	61	341	15	178	501	15
		2003	53	160	-	64	380	24	117	540	24
		2004	33	139	-	17	201	25	50	340	25
	Flatfish	2000	19	208	-	-	7	3	19	215	3
		2001	21	172	-	-	-	-	21	172	-
		2002	10	211	-	-	0	-	10	212	-
		2003	4	149	-	2	0	-	6	149	-
		2004	5	145	-	-	3	-	5	148	-
	Rockfish	2000	-	96	-	-	-	-	-	96	-
		2001	-	89	-	-	0	-	-	89	-
		2002	1	87	-	-	-	-	1	87	-
		2003	3	110	-	-	1	-	3	111	-
		2004	2	94	0	-	1	-	2	95	0
	All groundfish	2000	331	852	2	4	1199	545	335	2052	547
		2001	409	921	-	8	1260	520	417	2181	520
		2002	216	746	0	64	1297	492	280	2043	493
		2003	129	692	0	66	1382	549	195	2073	549
		2004	133	695	0	17	1234	558	150	1929	558
All gear	All groundfish	2000	4356	1754	46	239	1530	685	4595	3284	731
		2001	3742	1505	1	373	1602	585	4115	3107	586
		2002	3324	1296	3	358	1572	549	3682	2867	553
		2003	3223	1194	10	394	1725	614	3617	2920	624
		2004	3659	1302	4	368	1542	628	4027	2843	632

Notes: 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.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), fish tickets, Norpac data, federal permit file, CFEC vessel data, 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, 2000-04.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			<60	60-124	125-230	<60	60-124	125-230	<60	60-124	125-230
Hook & line	Sablefish	2000	13	41	20	-	40	16	13	81	36
		2001	14	45	15	-	30	7	14	75	22
		2002	13	37	18	1	34	6	14	71	25
		2003	7	44	25	-	28	9	7	72	34
		2004	11	53	21	-	30	6	11	83	27
	Pacific cod	2000	-	63	2	-	225	726	-	287	728
		2001	-	42	2	21	250	852	21	291	854
		2002	-	52	21	22	186	775	22	238	797
		2003	7	31	23	5	240	846	12	271	869
		2004	4	24	16	7	226	841	11	249	857
	Flatfish	2000	-	-	-	4	35	71	4	35	71
		2001	-	0	-	2	23	49	2	23	49
		2002	-	-	1	2	24	34	2	24	35
		2003	-	0	-	-	12	45	-	12	45
		2004	-	-	-	-	23	32	-	23	32
	All groundfish	2000	13	104	23	4	299	814	17	403	837
		2001	14	88	17	23	305	908	37	393	925
		2002	13	89	41	25	245	817	38	334	858
		2003	14	78	49	5	280	903	19	358	952
		2004	16	77	37	7	279	885	23	356	921
Pot	Pacific cod	2000	-	12	19	-	2	56	-	14	75
		2001	-	8	23	-	5	35	-	13	58
		2002	-	3	9	-	14	24	-	17	33
		2003	-	7	-	-	12	13	-	19	13
		2004	-	10	-	-	6	20	-	16	20
	All groundfish	2000	-	12	19	-	2	58	-	14	77
		2001	-	8	23	-	5	39	-	13	62
		2002	-	3	9	-	14	24	-	17	33
		2003	-	7	-	-	12	13	-	19	13
		2004	-	10	-	-	6	21	-	16	21

Table 49. Continued.

			Gulf of Alaska			Bering Sea and Aleutians			All Alaska		
			Vessel length class			Vessel length class			Vessel length class		
			60-124	125-230	>230	60-124	125-230	>230	60-124	125-230	>230
Trawl	Pollock	2000	-	0	-	2	35	302	2	35	302
		2001	-	-	-	1	45	380	1	45	380
		2002	-	-	-	2	42	332	2	42	332
		2003	-	-	-	0	24	331	0	24	331
		2004	-	-	-	0	26	328	0	26	328
	Pacific cod	2000	4	5	-	43	45	17	47	50	17
		2001	12	7	-	32	48	14	44	54	14
		2002	4	0	-	61	57	16	65	57	16
		2003	5	1	-	66	55	17	71	56	17
		2004	8	4	-	89	101	14	97	104	14
	Flatfish	2000	86	25	4	140	323	55	227	348	59
		2001	57	14	3	126	283	47	183	297	49
		2002	57	24	5	121	286	47	177	310	53
		2003	72	38	4	100	243	41	172	281	45
		2004	29	8	0	87	256	44	116	264	44
	Rockfish	2000	0	23	1	-	10	6	0	33	7
		2001	4	18	0	0	8	6	4	26	6
		2002	3	20	0	-	8	6	3	29	6
		2003	2	22	0	0	15	8	3	37	8
		2004	3	20	1	-	9	4	3	28	5
	Atka mackerel.	2000	-	-	-	0	64	30	0	64	30
		2001	-	-	-	0	81	26	0	81	26
		2002	-	-	-	0	54	16	0	54	16
		2003	-	-	-	2	66	22	2	66	22
		2004	-	-	-	4	74	23	4	74	23
	All groundfish	2000	91	53	4	185	477	412	276	530	416
		2001	73	39	3	160	465	473	233	504	476
		2002	63	44	5	184	448	418	247	492	423
		2003	83	61	4	168	405	419	252	466	423
		2004	41	31	2	180	466	413	221	497	415

Table 49. Continued.

			Gulf of Alaska				Bering Sea and Aleutians				All Alaska			
			Vessel length class				Vessel length class				Vessel length class			
			<60	60-124	125-230	>230	<60	60-124	125-230	>230	<60	60-124	125-230	>230
All gear	All groundfish	2000	13	207	95	4	4	486	1349	412	17	693	1444	416
		2001	14	170	78	3	23	469	1413	474	37	639	1491	477
		2002	13	155	95	5	25	442	1288	418	38	598	1383	423
		2003	14	168	109	4	5	460	1322	419	19	628	1431	423
		2004	16	128	68	2	7	465	1371	413	23	593	1439	415

Notes: 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.

Source: Blend estimates (2000-02), Catch Accounting System (2003-04), fish tickets, Norpac data, federal permit file, CFEC vessel data, 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, 2000-04.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Gulf of Alaska	2000	747	943	562	941	615	349	1,437	375	-	224	83	-	6,301
	2001	339	388	274	997	945	333	941	84	85	274	-	-	4,770
	2002	234	431	582	783	790	-	1,425	311	88	426	189	-	5,287
	2003	470	265	493	991	1,023	101	922	417	279	631	-	-	5,591
	2004	452	155	348	629	366	95	1,097	96	304	33	-	-	3,599
Bering Sea and Aleutian Islands	2000	6,805	16,004	13,585	7,650	3,481	1,452	4,053	9,779	14,920	8,841	4,028	1,935	92,533
	2001	5,628	16,364	19,578	7,691	1,672	2,282	7,893	12,019	16,210	9,525	4,525	2,043	105,428
	2002	5,639	16,502	16,514	3,634	1,785	3,593	9,680	15,570	12,997	7,028	3,607	894	97,440
	2003	5,830	16,110	18,259	3,771	2,255	5,263	10,479	15,807	12,408	5,579	4,236	1,778	101,775
	2004	9,596	16,032	12,849	3,855	4,393	5,098	13,020	11,495	11,468	6,877	3,450	1,446	99,577
All Alaska	2000	7,552	16,947	14,148	8,591	4,095	1,801	5,490	10,154	14,945	9,065	4,111	1,935	98,833
	2001	5,966	16,752	19,852	8,687	2,616	2,615	8,833	12,103	16,295	9,798	4,589	2,091	110,197
	2002	5,872	16,933	17,095	4,417	2,575	3,606	11,104	15,880	13,085	7,453	3,795	912	102,727
	2003	6,300	16,375	18,751	4,761	3,278	5,364	11,400	16,224	12,687	6,210	4,236	1,778	107,365
	2004	10,047	16,187	13,196	4,484	4,758	5,192	14,117	11,590	11,772	6,910	3,465	1,458	103,175

Note: 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 accounted for the following proportions of the total crew weeks in all areas: 2000 - 90%, 2001 - 90%, 2002 - 89%, 2003 - 92%, 2004 - 91%.

Source: Weekly Processor Reports. National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 51. Numbers of vessels and plants with observers, observer-deployment days, and estimated observer costs ($1,000) by year, type of operation, gear and vessel length, 2003-04.

			2003			2004		
			Count	Obs. days	Cost	Count	Obs. days	Cost
Catcher vessels	Hook & line	60-125	48	737	258	43	665	233
	Pot	60-125	53	991	347	54	950	333
		>=125	14	159	56	14	193	68
		Total	67	1,150	403	68	1,143	400
	Trawl	60-125	99	4,192	1,467	95	3,930	1,376
		>=125	26	3,985	1,395	27	4,058	1,420
		Total	125	8,177	2,862	122	7,988	2,796
CV Total			240	10,064	3,522	233	9,796	3,429
Catcher/ processors	Hook & line	60-125	10	1,798	629	9	1,679	588
		>=125	29	7,669	2,684	30	7,395	2,588
		Total	39	9,467	3,313	39	9,074	3,176
	Pot	>60	3	117	41	-	-	-
	Surimi trawler	>=125	13	4,286	1,500	12	3,798	1,329
	Fillet trawler	>=125	4	1,223	428	5	1,520	532
	H&G trawler	60-125	7	603	211	7	640	224
		>=125	16	4,785	1,675	16	4,647	1,626
		Total	23	5,388	1,886	23	5,287	1,850
	Trawl Total		40	10,897	3,814	40	10,605	3,712
C/P Total			82	20,481	7,168	79	19,679	6,888
Motherships			3	1,128	395	3	1,111	389
All vessels			325	31,673	11,086	315	30,586	10,705
Shore plants			21	4,224	1,478	21	4,312	1,509
Grand totals			346	35,897	12,564	336	34,898	12,214

Note: The cost estimates are based on an estimated average cost per day of $350. This includes the payment to observer providers and the cost of transportation and board.

Source: Fisheries Monitoring and Analysis Division (FMA) observer data, Alaska Fisheries Science Center, National Marine Fisheries Service, P.O. Box 15700, Seattle, WA 98115-0070.

Table 52. Monthly Japanese landing market price of selected groundfish by species, 1990-2004, in yen/kilogram (weighted average).

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flatfish, fresh	1990	674	704	701	665	497	515	615	629	597	637	687	801
	1991	695	840	785	640	548	598	684	699	535	737	752	688
	1992	739	799	749	687	567	558	605	584	556	587	600	570
	1993	638	746	681	611	487	515	475	651	486	576	512	490
	1994	603	592	534	573	585	467	541	542	508	474	454	505
	1995	499	510	485	540	478	473	523	511	464	362	415	424
	1996	501	556	543	472	431	385	477	550	419	403	418	490
	1997	473	500	424	417	472	405	445	605	438	476	387	474
	1998	434	482	403	337	391	432	505	567	451	397	404	486
	1999	433	446	427	397	372	394	417	506	366	346	365	467
	2000	447	469	474	391	335	323	446	497	436	464	441	490
	2001	567	587	565	459	398	401	452	506	466	495	483	572
	2002	596	531	523	477	417	441	541	526	405	532	547	499
	2003	643	562	508	420	335	314	379	349	327	366	395	445
	2004	484	573	451	346	344	268	265	373	316	359	465	459
Cod, fresh	1990	282	230	180	148	123	124	153	113	151	192	242	343
	1991	296	279	216	148	124	137	136	128	173	261	398	366
	1992	332	316	180	164	128	119	135	134	175	221	366	299
	1993	281	285	207	167	118	128	154	215	175	305	319	366
	1994	261	272	170	132	98	129	117	115	204	311	288	287
	1995	244	185	188	103	64	110	146	146	197	257	401	315
	1996	296	235	153	83	68	72	176	149	205	273	304	289
	1997	235	174	157	111	105	82	192	177	134	330	269	311
	1998	234	167	150	104	88	94	173	172	115	211	289	368
	1999	284	276	180	153	109	115	148	154	103	225	315	352
	2000	299	256	205	146	104	103	169	162	143	238	329	370
	2001	418	246	176	134	96	91	124	254	195	305	387	499
	2002	453	398	253	156	135	142	216	185	223	434	542	476
	2003	407	335	293	203	126	166	218	180	232	309	306	462
	2004	402	261	200	151	130	95	215	247	202	341	358	447
Cod, frozen	1990	374	427	326	347	411	-	-	373	353	-	320	300
	1991	331	290	307	325	312	342	-	332	391	410	456	440
	1992	369	324	281	251	264	270	298	322	339	348	315	163
	1993	278	148	171	164	206	288	259	148	329	387	260	278
	1994	309	258	112	245	264	124	217	258	258	246	264	228
	1995	232	182	154	177	196	109	135	184	138	134	259	249
	1996	265	220	183	211	146	201	247	326	213	292	299	262
	1997	199	210	200	184	131	211	223	133	214	225	195	148
	1998	185	137	137	217	138	231	239	401	333	296	266	249
	1999	298	257	215	302	220	237	218	266	315	266	283	243
	2000	241	202	179	203	199	211	208	283	247	298	273	212

Note: Prices for frozen cod are not reported after year 2000.

Table 52. Continued.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alaska pollock, fresh	1990	121	121	76	64	57	58	55	57	50	53	66	94
	1991	150	172	168	108	81	87	91	111	89	115	135	146
	1992	144	201	132	68	35	33	59	64	51	57	64	74
	1993	107	157	141	91	54	56	51	51	37	60	62	72
	1994	76	125	118	88	45	46	52	51	44	55	67	74
	1995	104	132	131	101	40	38	66	59	40	47	74	72
	1996	90	120	110	77	33	27	63	46	42	41	54	91
	1997	126	122	110	97	69	65	55	48	33	45	51	70
	1998	80	85	91	86	35	26	37	35	26	33	56	52
	1999	73	86	76	78	42	36	40	24	21	31	46	53
	2000	96	79	96	87	51	51	81	55	27	46	109	129
	2001	109	127	91	90	60	46	60	80	34	62	105	111
	2002	93	108	104	64	56	56	100	106	36	60	93	105
	2003	114	99	71	61	59	69	116	82	35	46	55	79
	2004	91	112	64	48	46	48	141	119	36	49	76	95
Atka mackerel, fresh	1990	42	54	45	50	42	48	59	61	57	64	79	85
	1991	65	93	111	90	101	120	168	143	93	79	80	57
	1992	47	36	65	85	88	91	136	95	87	94	84	48
	1993	66	41	33	33	24	44	57	56	40	66	46	26
	1994	25	28	21	20	28	30	49	50	42	49	35	30
	1995	35	31	29	29	37	49	109	98	39	36	27	19
	1996	21	22	29	40	51	40	95	69	40	46	69	28
	1997	36	40	40	44	55	59	114	79	48	44	27	30
	1998	23	31	23	22	26	26	25	28	23	32	35	27
	1999	43	44	32	36	38	57	78	88	40	35	29	17
	2000	26	23	22	20	27	34	52	44	42	43	47	49
	2001	44	38	32	32	51	58	106	75	54	35	34	31
	2002	28	28	29	38	57	60	67	66	32	30	36	28
	2003	30	28	28	26	40	47	55	32	20	21	20	15
	2004	16	21	20	26	37	33	26	28	33	17	25	27
Rockfish, fresh	1990	2058	1975	1919	1896	1803	2049	2316	1961	1643	1948	2017	2231
	1991	2328	2054	2074	1937	2035	2145	2553	2328	2003	2320	2513	2630
	1992	2992	2653	3281	2204	1951	2174	2383	2307	1786	2177	2808	2613
	1993	2847	2987	2452	2480	2053	2004	2050	2140	1783	2010	2445	2633
	1994	2687	2861	1944	2363	2205	2433	2230	2118	2069	2075	2323	2778
	1995	3214	2725	2360	2545	2142	1993	2234	2189	2149	2373	3179	3119
	1996	3471	3586	3510	2630	2321	2188	2234	2374	2419	3012	3073	3414
	1997	3770	4240	3281	2699	2760	2384	2472	2475	2873	3117	2943	3433
	1998	3348	3753	3365	2721	2729	2790	2675	2574	2636	2831	2238	2181
	1999	4518	3750	3872	2935	2992	3041	3324	2634	2951	2512	1736	3035
	2000	4049	3932	2934	3061	2645	2620	3292	2419	2734	2777	3112	3270

Note: Prices for fresh rockish are not reported after year 2000.

Source: Monthly Statistics of Agriculture, Forestry & Fisheries, Stat. and Info. Dept., Ministry of Agriculture, Forestry & Fisheries, Government of Japan. Available from Alaska Fisheries Science Center P.O. Box 15700, Seattle, WA 98115-0070.

Table 53. Monthly Tokyo wholesale prices of selected products, 1991-2004, in yen/kilogram (weighted average).

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flatfish, frozen	1991	449	512	572	570	520	541	565	573	509	543	482	485
	1992	499	486	517	511	530	491	423	433	499	437	460	413
	1993	412	386	404	427	431	447	431	406	418	423	407	414
	1994	423	426	403	450	460	433	470	394	414	433	422	455
	1995	446	435	450	455	427	443	447	464	440	466	475	500
	1996	478	478	467	520	532	544	575	550	562	550	565	580
	1997	538	535	535	536	506	533	512	530	509	508	528	540
	1998	482	473	511	505	519	514	509	544	524	518	457	447
	1999	471	460	475	516	516	490	524	533	469	484	507	514
	2000	468	467	456	491	483	483	522	448	492	470	476	509
	2001	464	466	470	486	478	477	505	530	513	499	509	521
	2002	467	493	516	521	527	531	507	547	546	504	521	530
	2003	544	522	563	551	580	606	603	607	610	600	626	632
	2004	579	593	567	604	610	586	585	612	596	578	602	599
Cod, frozen	1991	702	681	694	704	737	694	764	771	780	800	721	742
	1992	798	741	774	770	764	741	750	726	734	665	658	647
	1993	643	663	670	671	666	707	614	602	604	587	639	644
	1994	610	612	635	648	625	614	665	700	633	652	656	656
	1995	644	646	628	649	623	583	571	605	614	527	458	567
	1996	586	603	636	689	657	677	715	561	584	624	545	590
	1997	484	539	598	613	651	560	610	638	609	555	484	503
	1998	452	469	508	532	578	596	589	616	598	571	520	565
	1999	603	574	624	678	691	751	728	667	567	559	520	542
	2000	477	545	616	629	610	621	628	555	641	516	508	512
	2001	489	501	582	609	634	573	606	627	619	573	618	530
	2002	579	589	641	756	674	625	761	806	814	714	671	710
	2003	670	679	591	599	657	620	706	796	717	684	669	719
	2004	216	442	558	719	252	314	712	737	733	655	515	603
Surimi	1992	683	624	591	541	576	555	504	438	443	438	445	415
	1993	360	340	347	348	364	350	367	326	332	295	295	309
	1994	322	315	309	302	311	320	309	316	310	319	333	350
	1995	340	337	332	335	338	341	356	343	368	353	348	335
	1996	334	319	314	330	303	342	334	286	308	309	347	321
	1997	356	345	340	351	374	388	383	381	402	391	401	402
	1998	389	339	354	337	329	339	333	328	313	313	319	334
	1999	315	331	328	339	340	346	337	323	339	351	339	330
	2000	321	312	298	307	303	297	304	275	289	276	286	294
	2001	276	281	282	273	271	272	275	267	268	290	297	298
	2002	301	299	303	299	311	317	303	316	302	318	324	339
	2003	313	294	295	296	285	272	276	274	272	272	282	271
	2004	275	275	262	258	269	266	278	262	257	275	273	297

Note: From 1991-95 prices are for six large cities wholesale market, and from 1996-2004 prices are for ten large cities wholesale market.

Source: Monthly Statistics of Agriculture, Forestry & Fisheries, Stat. and Info. Dept., Ministry of Agriculture, Forestry & Fisheries, Government of Japan. Available from Alaska Fisheries Science Center P.O. Box 15700, Seattle, WA 98115-0070.

Table 54. U.S. imports of groundfish fillets, steaks and blocks, 1976-2004, quantity in million lb. product weight and value in million dollars.

Year	Fillets & Steaks		Blocks		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
1976	337	$273	379	$211	716	$484
1977	321	305	385	292	706	597
1978	333	341	406	325	739	666
1979	340	385	408	337	748	722
1980	297	341	336	289	633	630
1981	346	415	344	301	690	716
1982	371	458	319	274	690	732
1983	355	449	384	339	739	788
1984	373	459	316	263	689	722
1985	388	500	334	275	722	775
1986	366	542	364	380	730	922
1987	408	759	403	539	812	1,298
1988	323	568	303	382	626	950
1989	333	578	282	325	616	903
1990	262	482	264	373	526	856
1991	255	526	290	444	545	970
1992	221	437	229	304	450	741
1993	236	452	212	219	447	671
1994	229	433	200	184	428	617
1995	232	437	210	213	442	650
1996	223	407	234	213	457	620
1997	219	426	234	231	453	657
1998	236	460	233	271	469	731
1999	272	550	214	250	486	801
2000	284	545	204	209	488	753
2001	243	462	147	159	389	621
2002	283	531	147	165	430	695
2003	292	531	129	139	422	670
2004	326	571	135	153	462	724

Source: National Marine Fisheries Service, Office of Science and Technology, Fisheries Statistics Division. www.st.nmfs.noaa.gov/st1/trade/documents/TRADE2004.pdf

Table 55. U.S. per capita consumption of fish and shellfish, 1974-2004, population in millions and consumption in pounds, edible weight.

Year	Total civilian population	Per capita consumption			
		Fresh and Frozen	Canned	Cured	Total
1974	211.6	6.9	4.7	.5	12.1
1975	213.8	7.5	4.3	.4	12.2
1976	215.9	8.2	4.2	.5	12.9
1977	218.1	7.7	4.6	.4	12.7
1978	220.5	8.1	5.0	.3	13.4
1979	223.0	7.8	4.8	.4	13.0
1980	225.6	7.9	4.3	.3	12.5
1981	227.8	7.8	4.6	.3	12.7
1982	230.0	7.9	4.3	.3	12.5
1983	232.1	8.4	4.7	.3	13.4
1984	234.1	9.0	4.9	.3	14.2
1985	236.2	9.8	5.0	.3	15.1
1986	238.4	9.8	5.4	.3	15.5
1987	240.6	10.7	5.2	.3	16.2
1988	242.8	10.0	4.9	.3	15.2
1989	245.1	10.2	5.1	.3	15.6
1990	247.8	9.6	5.1	.3	15.0
1991	250.5	9.7	4.9	.3	14.9
1992	253.5	9.9	4.6	.3	14.8
1993	256.4	10.2	4.5	.3	15.0
1994	259.2	10.4	4.5	.3	15.2
1995	261.4	10.0	4.7	.3	15.0
1996	264.0	10.0	4.5	.3	14.8
1997	266.4	9.9	4.4	.3	14.6
1998	269.1	10.2	4.4	.3	14.9
1999	271.5	10.4	4.7	.3	15.4
2000	280.9	10.2	4.7	.3	15.2
2001	283.6	10.3	4.2	.3	14.8
2002	287.1	11.0	4.3	.3	15.6
2003	289.6	11.4	4.6	.3	16.3
2004	292.4	11.8	4.5	.3	16.6

Note: Per capita consumption represents pounds of edible meat consumed from domestically caught and imported fish and shellfish adjusted for beginning and ending inventories (through 2002) and exports, divided by the civilian resident population of the United States as of 1 July of each year. Population estimates for 1980-91 were revised to reflect changes from the 1990 decennial population enumeration. Changes did not significantly alter pounds per capita.

Source: U.S. Department of Commerce, Bureau of the Census, Washington, D.C. 20233; and Fisheries of the United States, National Marine Fisheries Service, Fisheries Statistics Division, 1315 East-West Highway, Silver Spring, MD 20910, various issues.

Table 56. U.S. consumption of all fillets and steaks, and fish sticks and portions, total in 1,000 lb. and per capita in pounds, product weight, 1980-2004.

Year	Fillets and steaks[1]		Fish sticks and portions	
	Total[2]	Per capita	Total[2]	Per capita
1980	541,440	2.4	451,200	2.0
1981	546,720	2.4	410,040	1.8
1982	575,000	2.5	391,000	1.7
1983	626,670	2.7	417,780	1.8
1984	702,300	3.0	421,380	1.8
1985	755,840	3.2	425,160	1.8
1986	810,560	3.4	429,120	1.8
1987	866,160	3.6	409,020	1.7
1988	776,960	3.2	364,200	1.5
1989	759,810	3.1	367,650	1.5
1990	768,180	3.1	371,700	1.5
1991	751,500	3.0	300,600	1.2
1992	735,150	2.9	228,150	0.9
1993	743,560	2.9	256,400	1.0
1994	803,520	3.1	233,280	0.9
1995	758,060	2.9	313,680	1.2
1996	792,000	3.0	264,000	1.0
1997	799,200	3.0	266,400	1.0
1998	861,120	3.2	242,190	0.9
1999	868,800	3.2	271,500	1.0
2000	1,011,240	3.6	252,810	0.9
2001	1,049,320	3.7	226,880	0.8
2002	1,177,110	4.1	229,680	0.8
2003	1,245,280	4.3	202,720	0.7
2004	1,345,040	4.6	204,680	0.7

[1]Series revised in 1993 to reflect deduction of fillet production used to produce blocks, exports of foreign fillets and steaks, and changes in population estimates from 1990 decennial population enumeration.

[2]Per capita multiplied by total U.S. population.

Source: Computed from data from U.S. Department of Commerce, Bureau of the Census; and Fisheries of the United States, National Marine Fisheries Service, Fisheries Statistics Division, 1315 East-West Highway, Silver Spring, MD 20910, various issues.

Table 57. Annual U.S. economic indicators: Selected producer and consumer price indexes and gross domestic product implicit price deflator, 1976-2004.

Year	Producer Price Index[1]					Consumer Price Index[2]				GDP Deflator[3]
	All items	Meat	Poultry	Fish	Petrol. Products	All Items	Meat	Poultry	Fish	
1976	61.1	69.3	93.0	64.5	36.3	56.9	66.4	76.4	60.2	40.39
1977	64.9	68.1	97.0	69.7	40.5	60.6	64.9	76.9	66.6	42.92
1978	69.9	83.6	108.6	74.1	42.2	65.2	77.0	84.9	73.0	46.07
1979	78.7	93.3	105.6	90.9	58.4	72.6	90.1	89.1	80.1	50.12
1980	89.8	94.1	108.2	87.8	88.6	82.4	92.7	93.7	87.5	54.56
1981	98.0	95.4	108.2	89.4	105.9	90.9	96.0	97.5	94.8	59.64
1982	100.0	100.0	100.0	100.0	100.0	96.5	100.7	95.8	98.2	63.18
1983	101.3	94.3	103.7	105.4	89.9	99.6	99.5	97.0	99.3	65.52
1984	103.7	94.5	115.3	112.7	87.4	103.9	99.8	107.3	102.5	67.95
1985	103.2	90.9	110.4	114.6	83.2	107.6	98.9	106.2	107.5	69.84
1986	100.2	93.9	116.8	124.9	53.2	109.6	102.0	114.2	117.4	71.43
1987	102.8	100.4	103.5	140.0	56.8	113.6	109.6	112.6	129.9	73.43
1988	106.9	99.9	111.6	148.7	53.9	118.3	112.2	120.7	139.4	76.14
1989	112.2	104.8	120.4	142.9	61.2	124.0	116.7	132.7	143.6	78.88
1990	116.3	117.0	113.6	147.2	74.8	130.7	128.5	132.5	146.7	82.03
1991	116.5	113.5	109.9	149.5	67.2	136.2	132.5	131.5	148.3	84.76
1992	117.2	106.7	109.0	156.1	64.7	140.3	130.7	131.4	151.7	86.58
1993	118.9	110.6	111.7	156.5	62.0	144.5	134.6	136.9	156.6	88.57
1994	120.4	104.7	114.7	161.4	59.1	148.2	135.4	141.5	163.7	90.53
1995	124.7	102.9	114.2	170.8	60.8	152.4	135.5	143.5	171.6	92.29
1996	127.7	109.0	119.7	165.9	70.1	156.9	140.2	152.4	173.1	93.95
1997	127.6	111.6	117.4	178.1	68.0	160.5	144.4	156.6	177.1	95.53
1998	124.4	101.3	120.8	183.2	51.3	163.0	141.6	157.1	181.7	96.60
1999	125.5	104.6	114.0	190.9	60.9	166.6	142.3	157.9	185.3	98.01
2000	132.7	114.3	112.9	198.1	91.3	172.2	150.7	159.8	190.4	100.26
2001	134.2	120.3	116.8	190.8	85.3	177.1	159.3	164.9	191.1	102.68
2002	131.1	113.4	111.3	191.2	79.5	179.9	160.3	167.0	188.1	104.33
2003	138.1	128.2	116.6	195.3	97.7	184.0	169.0	169.1	190.0	106.50
2004	146.7	134.9	130.2	206.3	119.9	188.9	183.2	181.7	194.3	109.34

[1]Index 1982 = 100.
[2]Index 1982-84 = 100.
[3]Index 2000 = 100. GDP deflators are the values published for 1 July (second quarter) of each year.

Source: Producer prices and price indexes, and consumer price indexes: U.S. Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/data/sa.htm; GDP deflators: U.S. Department of Commerce, Bureau of Economic Analysis, http://research.stlouisfed.org/fred2/series/GDPDEF

Table 58. Monthly U.S. economic indicators: Selected producer and consumer price indexes, 2002-04.

	Producer Price Index[1]					Consumer Price Index[2]			
Month	All Items	Meat	Poultry	Fish	Petrol. Products	All Items	Meat	Poultry	Fish
2002									
Jan	128.5	113.2	115.5	184.2	61.3	177.1	160.0	166.8	189.2
Feb	128.4	116.9	114.4	203.8	62.9	177.8	159.9	167.8	186.0
Mar	129.8	118.3	112.4	185.2	72.5	178.8	161.3	168.0	185.6
Apr	130.8	115.2	110.5	187.6	82.4	179.8	160.6	166.9	189.2
May	130.8	112.9	112.1	192.6	80.9	179.8	160.6	167.0	191.0
Jun	130.9	113.5	112.1	184.3	79.6	179.9	160.5	165.6	188.1
Jul	131.2	114.2	111.7	191.3	81.2	180.1	160.2	167.2	191.2
Aug	131.5	112.0	109.9	189.1	82.3	180.7	160.7	166.1	187.2
Sep	132.3	110.1	111.1	192.0	88.2	181.0	159.9	167.8	186.9
Oct	133.2	109.9	108.7	204.6	95.6	181.3	159.5	166.6	187.4
Nov	133.1	110.3	108.6	199.7	85.8	181.3	159.7	168.1	187.4
Dec	132.9	114.0	109.0	180.1	81.2	180.9	160.3	166.6	187.4
2003									
Jan	135.3	118.0	109.6	190.5	93.1	181.7	159.5	165.4	187.8
Feb	137.6	119.6	112.8	192.6	110.6	183.1	163.2	167.2	189.4
Mar	141.2	120.4	113.9	197.6	118.4	184.2	163.6	167.6	186.8
Apr	136.8	121.6	113.1	214.5	95.7	183.8	164.1	168.2	187.3
May	136.7	123.9	114.4	199.7	88.1	183.5	164.0	165.9	189.6
Jun	138.0	131.3	115.6	196.0	92.3	183.7	166.6	167.7	191.2
Jul	137.7	126.5	116.8	192.9	95.1	183.9	168.0	168.9	189.5
Aug	138.0	128.1	118.3	194.5	100.0	184.6	169.2	169.0	191.8
Sep	138.5	131.2	120.0	197.2	97.8	185.2	171.0	169.7	191.0
Oct	139.3	144.4	120.6	190.5	96.3	185.0	174.6	172.5	190.5
Nov	138.9	138.8	121.2	185.7	91.6	184.5	181.3	172.5	192.5
Dec	139.5	134.4	122.2	191.7	92.8	184.3	182.7	174.4	192.5
2004									
Jan	141.4	124.8	122.5	208.5	103.6	185.2	180.6	174.5	194.1
Feb	142.1	124.5	130.9	207.2	103.7	186.2	180.2	174.1	193.2
Mar	143.1	128.6	132.5	215.8	108.0	187.4	179.0	177.8	190.6
Apr	144.8	134.5	133.6	201.2	114.2	188.0	179.0	178.1	192.8
May	146.8	141.8	137.8	197.2	123.4	189.1	182.1	181.6	193.9
Jun	147.2	143.8	137.7	189.9	115.7	189.7	184.2	182.6	193.4
Jul	147.4	138.6	136.7	198.6	122.2	189.4	185.8	184.9	195.6
Aug	148.0	136.5	132.7	206.6	122.9	189.5	185.7	186.8	194.1
Sep	147.7	133.7	127.5	205.6	125.2	189.9	185.9	186.4	195.1
Oct	150.0	137.5	123.8	207.3	142.8	190.9	185.0	186.9	195.8
Nov	151.4	136.0	123.1	219.2	136.6	191.0	185.2	183.4	196.5
Dec	150.2	138.8	124.1	218.9	120.8	190.3	185.6	183.3	196.9

[1]Index 1982 = 100.
[2]Index 1982-84 = 100.

Source: U.S. Department of Labor, Bureau of Labor Statistics, http://www.bls.gov/data/sa.htm

Table 59. Annual foreign exchange rates for selected countries, 1976-2004, in national currency units per U.S.dollar.

Year	Canada (dollar)	Denmark (kroner)	Japan (yen)	ROK (won)	New Zealand (dollar)	Iceland (kronur)	Norway (kroner)	U.K. (pound)
1976	0.9860	6.0450	296.55	484.00	1.0036	1.822	5.4565	0.5536
1977	1.0635	6.0032	268.51	484.00	1.0301	1.989	5.3235	.5729
1978	1.1407	5.5146	210.44	484.00	.9636	2.711	5.2423	.5210
1979	1.1714	5.2610	219.14	484.00	.9776	3.526	5.0641	.4713
1980	1.1692	5.6359	226.74	607.43	1.0265	4.798	4.9392	.4299
1981	1.1989	7.1234	220.54	681.03	1.4194	7.224	5.7395	.4931
1982	1.2337	8.3324	249.08	731.08	1.3300	12.352	6.4540	.5713
1983	1.2324	9.1450	237.51	775.75	1.4952	24.843	7.2964	.6592
1984	1.2951	10.3566	237.52	805.98	1.7286	31.694	8.1615	.7483
1985	1.3655	10.5964	238.54	870.02	2.0064	41.508	8.5970	.7714
1986	1.3895	8.0910	168.52	881.45	1.9088	41.104	7.3947	.6971
1987	1.3260	6.8400	144.64	822.57	1.6886	38.677	6.7375	.6102
1988	1.2307	6.7320	128.15	731.47	1.5244	43.104	6.5170	.5614
1989	1.1840	7.3100	137.96	671.46	1.6708	57.042	6.9045	.6099
1990	1.1668	6.1890	144.79	707.76	1.6750	58.284	6.2597	.5603
1991	1.1457	6.3960	134.71	733.35	1.7265	58.996	6.4829	.5652
1992	1.2087	6.0360	126.65	780.65	1.8580	57.546	6.2145	.5664
1993	1.2901	6.4840	111.20	802.67	1.8494	67.603	7.0941	.6658
1994	1.3656	6.3610	102.21	803.44	1.6844	69.944	7.0576	.6529
1995	1.3724	5.6020	94.06	771.27	1.5235	64.692	6.3352	.6335
1996	1.3635	5.7990	108.78	804.45	1.4540	66.500	6.4498	.6400
1997	1.3849	6.6092	121.06	950.77	1.5094	70.904	7.0857	.6106
1998	1.4835	6.7008	130.91	1401.44	1.8683	70.958	7.5451	.6038
1999	1.4858	6.9900	113.73	1189.84	1.8889	72.474	7.8071	.6184
2000	1.4855	8.0953	107.80	1130.90	2.1805	78.896	8.8131	.6598
2001	1.5487	8.3323	121.57	1292.01	2.3798	97.690	8.9964	.6946
2002	1.5704	7.8862	125.22	1250.31	2.1529	91.669	7.9839	.6656
2003	1.4013	6.5800	115.97	1192.08	1.7185	76.780	7.0819	.6120
2004	1.3017	5.9891	108.15	1145.24	1.5053	70.261	6.7399	.5456

ROK – Republic of Korea; U.K. – United Kingdom.

Source: Through 1998: International Financial Statistics, International Monetary Fund, Washington, D.C.; 1999-2004 (except Iceland): U.S. Federal Reserve Board, www.federalreserve.gov; Iceland, 1999-2004: www.oanda.com

Table 60. Monthly foreign exchange rates for selected countries, 2002-04, in national currency units per U.S. dollar.

Month	Canada (dollar)	Denmark (kroner)	Japan (yen)	ROK (won)	New Zealand (dollar)	Iceland (kronur)	Norway (kroner)	U.K. (pound)
2002								
Jan	1.600	8.42	132.7	1316.3	2.356	102.61	8.97	0.698
Feb	1.596	8.53	133.6	1320.6	2.388	101.60	8.95	.703
Mar	1.588	8.48	131.1	1322.9	2.308	100.42	8.81	.703
Apr	1.582	8.39	130.8	1318.1	2.258	97.46	8.61	.693
May	1.550	8.11	126.4	1262.2	2.169	92.06	8.21	.685
Jun	1.532	7.78	123.3	1219.7	2.047	89.54	7.75	.674
Jul	1.546	7.48	117.9	1180.0	2.079	85.70	7.47	.643
Aug	1.569	7.59	119.0	1197.5	2.158	86.08	7.60	.651
Sep	1.576	7.58	121.1	1211.6	2.127	87.69	7.50	.643
Oct	1.578	7.57	123.9	1240.2	2.076	87.86	7.49	.642
Nov	1.572	7.42	121.6	1210.2	2.011	86.23	7.32	.637
Dec	1.559	7.29	121.9	1206.6	1.958	83.54	7.16	.630
2003								
Jan	1.541	7.00	118.8	1176.5	1.853	79.87	6.91	.618
Feb	1.512	6.89	119.3	1190.4	1.805	77.76	7.00	.622
Mar	1.476	6.88	118.7	1237.2	1.806	78.22	7.28	.632
Apr	1.458	6.84	119.9	1231.1	1.812	76.97	7.20	.635
May	1.384	6.43	117.4	1201.2	1.737	73.23	6.81	.616
Jun	1.353	6.36	118.3	1194.1	1.720	74.06	7.01	.602
Jul	1.382	6.54	118.7	1181.2	1.705	77.19	7.29	.616
Aug	1.396	6.67	118.7	1178.6	1.716	79.76	7.41	.627
Sep	1.363	6.60	114.8	1165.4	1.711	79.16	7.28	.619
Oct	1.322	6.34	109.5	1169.3	1.661	76.27	7.03	.596
Nov	1.313	6.35	109.2	1186.4	1.591	75.81	7.01	.592
Dec	1.314	6.06	107.8	1192.4	1.546	73.14	6.72	.571
2004								
Jan	1.2958	5.8952	106.27	1183.4	1.484	69.71	6.81	.548
Feb	1.3299	5.8956	106.71	1167.5	1.446	68.73	6.95	.536
Mar	1.3286	6.0757	108.52	1166.3	1.514	71.28	6.96	.548
Apr	1.3420	6.2104	107.66	1152.9	1.559	72.91	6.93	.555
May	1.3789	6.2021	112.20	1177.9	1.626	73.48	6.84	.560
Jun	1.3578	6.1220	109.43	1159.0	1.591	72.12	6.83	.547
Jul	1.3225	6.0631	109.49	1158.7	1.546	71.56	6.91	.542
Aug	1.3127	6.1007	110.23	1158.0	1.524	71.50	6.84	.549
Sep	1.2881	6.0866	110.09	1148.7	1.517	71.83	6.84	.558
Oct	1.2469	5.9486	108.78	1141.6	1.461	70.10	6.58	.553
Nov	1.1968	5.7178	104.70	1086.4	1.427	67.09	6.27	.537
Dec	1.2189	5.5449	103.81	1050.4	1.399	62.83	6.14	.519

ROK – Republic of Korea; U.K. – United Kingdom.

Source: U.S. Federal Reserve Board, www.federalreserve.gov, except that exchange rates for Iceland are from www.oanda.com

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APPENDIX

The Economics and Social Sciences Research Program at the Alaska Fisheries Science Center

The primary mission of the Economic and Social Sciences Research Program (ESSRP) is to provide economic and sociocultural information that assists the National Marine Fisheries Service in meeting its stewardship responsibilities. Activities in support of our mission include: (1) collecting economic and sociocultural data relevant for the conservation and management of living marine resources; (2) developing statistical and mathematical models to use that data both to monitor changes in economic and sociocultural indicators and to estimate the economic and sociocultural impacts of alternative management measures; (3) preparing peer-reviewed publications and reports; (4) participating in working groups with staff from the North Pacific Fisheries Management Council, Alaska Department of Fish and Game, and other state and federal agencies; (5) collaborating with researchers at universities and NGOs; (6) preparing and reviewing research proposals and programs; and (7) preparing analyses of proposed management measures.

The aim of our current research projects is to improve the analytical tools and information available to analysts working on fisheries issues, and cover a broad range of research germane to Alaska fisheries. Project topics include the development of regional economic and ecological-economic impact models; behavioral models of fishing operations that allow one to assess the welfare impacts of spatial fishery closures; indicators of economic performance to assist in monitoring the effects of rationalization programs; the non-market valuation of living marine resources; development of a Traditional Environmental Knowledge database; building community profiles for Alaska and West Coast communities engaged in fishing activity; investigating management systems that provide improved habitat protection in cost-effective ways; examining the costs and benefits of real-time bycatch management systems; conducting a saltwater sport fishing survey to estimate demand for recreational fishing trips in Alaska; estimating supply and demand models for Alaskan pollock; and analyzing the effects of ITQ programs on emigration from small, remote fishing communities.

The following pages contain descriptions of ongoing research that is being undertaken by members of the ESSRP at the AFSC. For further information on this research please contact the authors; their contact information is contained within each contribution. In addition, the final section of this appendix provides a list of publications (and abstracts) that have arisen out of work undertaken by the AFSC ESSRP over the past few years, as well as a list of manuscripts that are currently under review at peer-reviewed journals.

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Communities Research at the Alaska Fisheries Science Center

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The Alaska Fisheries Science Center's (AFSC) Economics and Social Sciences Research Program has several ongoing research projects related to communities in Alaska, of which two will be described in this presentation. The first involves compiling and assessing quantitative data on involvement in fisheries by each community. The second is an effort to profile fishing communities with baseline social and economic data and descriptions of fisheries involvement by community members.

The emphasis of this discussion is on the data that we have been using to facilitate the large scale approach needed to assess hundreds of communities at once. This approach is intended to complement finer-grained approaches that look more closely at particular communities that have been or will be impacted by particular policy changes. In other words, the projects described here are not social impact assessments, but are meant to provide baseline descriptive information about a large number of communities involved in fishing in the North Pacific.

The focus on the community as a unit of study is generated by the language of the Magnuson Stevens Fishery Conservation and Management Act (MSA), which defines a fishing community as:

> …a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.

The National Marine Fisheries Service has not yet designated a list of fishing communities as defined by the MSA. The assessment of communities in terms of quantitative indicators, and selection (or not) of communities for profiling, is not necessarily indicative of how such a designation will eventually be conducted.

Fisheries Indicator Data

In order to assess communities in Alaska and elsewhere in terms of their involvement in North Pacific fisheries, the AFSC compiled quantitative data on a variety of fishing indicators. Based on the databases available to us, we collected information for the following indicators:

a) Landings in tons
b) Landings by value
c) Number of processing plants
d) Number of vessels delivering to local plants
e) Number of vessels owned by residents
f) Number of crew licenses issued to community residents
g) Number of federal permits and permit holders residing in the community

h) Number of state permits and permit holders residing in the community
i) Number of recreational licenses issued to community residents
j) Number of vessels homeported in the community

Assembling these data is a huge task. The information must be compiled from many separate state and federal agencies, including the Alaska Department of Fish and Game (ADF&G) Fish Ticket Database, the Alaska Commercial Fisheries Entry Commission records, Federal and State fishing vessel registration files, the ADF&G Sport License Database, the ADF&G Crew License database, the NMFS Restricted Access Management Division files, and the ADF&G Commercial Operators Report. When the scope is broadened to include communities in other states (particularly Washington, Oregon, and California) the complexity of data sources grows exponentially.

Once compiled, the indicators data must be processed. In addition to entering everything into compatible databases, the data must be tabulated by community. In other words, raw data rows representing individuals must be added up by community of residence as declared in their address information. To do this, community designations must first be standardized to correct for spelling and data entry errors. In addition, the data must be processed to create uniform community boundaries.

The final major aspect of data processing is recalculating certain values so that the indicator more meaningfully expresses fishery participation. For example, indicators that count individual persons are often best understood as a ratio to the population of the community. As raw numbers, large communities such as Anchorage and Fairbanks will almost always have higher values than smaller places like Kasaan or even Kodiak. By dividing the raw indicator by the population of the community, the result shows a scaled rate of participation that makes it possible to assess the relative importance of that participation by community.

Selecting Communities for Profiling

Once compiled and processed, the data can be used to select which communities to profile. For this process we used year 2000 data to correspond with the year 2000 Census population data. We established a method for selecting communities based on the numerical criteria. If a community had any processing activity (indicated by a number greater than zero for landings, processing plants, or vessels delivering) it would be selected. If the number of vessels homeported, or vessel owners, or crew license holders, or recreational license holders, or gear operator permit holders was greater than 15% of the total population of the community, then the community was selected. And finally, if a community was not selected based on any single value, we developed an aggregate indicator that assessed communities for a medium level of activity across the range of indicators. Of 396 communities in Alaska for which we had data, we selected 136 by this method.

The selection process was focused on commercial fisheries participation. Sport fisheries and subsistence fisheries are very important, but were not quantified in the selection process. In the case of sport fisheries, we did not receive the data in time for making selections, but we added sport fishing information to each of the profiles, including number of licenses sold in a community and number of license holders residing in a community. For subsistence, we only had data available for some communities, and could not use it to assess all communities. Where available, we included subsistence harvest and household participation data in the profiles.

Unfortunately, due to budget and time constraints, we could not profile every community in Alaska, and had to make some difficult choices using the available information. Of the places in Alaska, only the top 35% most involved in commercial fisheries (according to our indicators) were selected. Many of the remaining 65% are involved in commercial fisheries in some way, as well as subsistence and sport fisheries, and would have been appropriate places to profile. The limitations of our time and funding required us to develop a threshold for profiling, and we believe that using quantitative criteria allowed for an even-handed approach.

It is also very important to note that communities which were not selected for profiling will still be considered in agency decisions. It only means that if a community is expected to be significantly affected by a regulatory change, the persons preparing the social impact analysis would have to draft a profile themselves from scratch, rather than start with ours.

Also important is the fact that many communities outside of Alaska participate in North Pacific fisheries in significant ways. These communities are being profiled in a separate project conducted jointly with the Northwest Fisheries Science Center and the Southwest Fisheries Science Center. In that project, 129 communities in Washington, Oregon, California, and other states were selected based on participation in North Pacific and/or West Coast fisheries.

Finally, selection for profiling in this project does not necessarily mean that a community is a “Fishing Community” under the terms of the MSA.

Alaska Community Profiles

The Alaska communities selected by the above method and profiled for the profiles project are: Adak, Akhiok, Akiachak, Akutan, Aleknagik, Alitak Bay, Anchor Point, Anchorage/Chugiak/Eagle River/Girdwood, Angoon, Atka, Bethel, Chefornak, Chignik (Bay), Chignik Lagoon, Chignik Lake, Clam Gulch, Clark’s Point, Cordova, Craig, Dillingham, Edna Bay, Eek, Egegik, Ekuk, Ekwok, Elfin Cove, Elim, Emmonak, Excursion Inlet, Fairbanks, False Pass, Fritz Creek, Galena, Goodnews Bay, Gustavus, Haines, Halibut Cove, Hobart Bay, Homer, Hoonah, Hooper Bay, Hydaburg, Igiugig, Iliamna, Ivanof Bay, Juneau/Douglas/Auke Bay, Kake, Karluk, Kasilof, Kenai, Ketchikan/Ward Cove, King Cove, King Salmon, Kipnuk, Klawock, Kodiak, Kokhanok, Koliganek, Kongiganak, Kotlik, Kwillingok, Larsen Bay, Levelock, Manokotak, Marshall, Mekoryuk, Metlakatla, Meyers Chuck, Naknek, Napakiak, Nelson Lagoon, New Stuyahok, Newhalen, Newtok, Nightmute, Nikiski, Nikolaevsk, Ninilchik, Nome, Old Harbor, Ouzinkie, Palmer, Pedro Bay, Pelican, Perryville, Petersburg, Pilot Point, Pilot Station, Platinum, Point Baker, Port Alexander, Port Alsworth, Port Graham, Port Heiden, Port Lions, Port Moller, Port Protection, Portage Creek, Prudhoe Bay, Quinhagak, Saint George, Saint Mary's, Saint Paul, Sand Point, Scammon Bay, Seldovia, Seward, Shaktoolik, Sitka, Skwentna, Soldotna, South Naknek, Sterling, Tenakee Springs, Thorne Bay, Togiak, Toksook Bay, Tuntutuliak, Tununak, Twin Hills, Ugashik, Unalakleet, Unalaska/Dutch Harbor, Valdez, Wasilla, Whale Pass, Whittier, Willow, Wrangell, and Yakutat.

The profiles are given in a narrative format that includes three sections: *People and Place, 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. *Community Infrastructure* covers current economic activity, governance (including city classification, taxation, Native organizations, and proximity to fisheries management and immigration offices) and facilities (transportation options and connectivity, water, waste, electricity, schools, police, and public accommodations). *Involvement in North Pacific Fisheries* details community activities in commercial fishing (processing, permit holdings, and aid receipts), recreational fishing, and subsistence fishing.

A rough draft of the profiles was completed in 2004 and sent out for review. In addition to seeking feedback within NOAA and academic circles, a substantial attempt was made to solicit comments from community members. A list was formulated of official contacts within each community, including governmental bodies (city governments, Native village councils) and quasi-governmental resource management organizations (village and regional Native corporations and Community Development Quota groups). The profiles were mailed to 296 such organizations. We also took comments from other organizations and individuals that had received the draft by other means.

The Alaska community profiles document is currently in final revisions and copyediting. We expect the final report to be released this year. The first draft of community profiles from other states involved in West Coast and North Pacific fisheries is underway, and will be available for review when completed.

Applications, Benefits and Drawbacks of the Large-scale Approach

One of the primary applications of the community profiles is to provide baseline data for social impact assessment. Almost all of the data are available elsewhere, most of it publicly, but it is very useful to analysts to have it compiled by community in a single document. Further, the profiles can provide "cut-and paste" text for the "Affected Human Environment" section of NEPA documents. Since this part of an Environmental

Assessment or an Environmental Impact Statement is descriptive (the analytical part comes later), the profiles are appropriate. For use under NEPA, the profiles should be updated, and sections relevant to the environmental policy under consideration should be added.

The profiles are also part of a broader national project that will put together a large database of information on fishing communities throughout the United States. Both quantitative information from the selection process and quantitative and qualitative information from the narrative profiles will become part of the database.

Benefits of this large-scale approach to fishing communities include the fact that many communities were profiled that have not previously been attended to in fisheries management documents. Often these are small communities in which fisheries are very important. Such broad coverage is usually not possible during issue-driven assessments, which often take place under a great deal of time pressure and allow only for accounts of the top few most-likely-to-be affected communities.

Additionally, this type of profiling provides a uniform approach to assessment. This will allow for comparisons between fishing communities, both within the region and nationally. We would eventually be able to show, for example, how dependent Alaska communities are on fishing, and what a high percentage of communities are dependent on fishing, compared to other areas of the country.

Drawbacks to the large-scale approach include the fact that there was no fieldwork conducted in conjunction with this project. The profiles were sent to each community for feedback, but without an actual presence in the community, there is going to be a lack of ethnographic depth. As stated above, time and resources make it impossible to apply that sort of method to so many communities.

Another drawback is that even though the approach covered many communities, it did not cover all communities. As noted above, only about a third of the potential list of communities were selected for profiling because of time and resources. We would like to continue with additional profiles should the resources become available.

Finally, the profiles and the selection process both rely heavily on large-scale databases for information about the communities. This can be a challenge, when those databases do not accurately reflect what community members know to be the case. Issues such as seasonal population fluctuations or disagreements on community boundaries can confound the accurate portrayal of a community, especially with quantitative data.

Despite these drawbacks, the large-scale approach is a worthwhile complement to other aspects of communities research. It contributes information on a wider group of communities than is normally considered. It cannot capture the nuances of living in and fishing from these communities, but it does not pretend to do that. It can help analysts, policy makers, and others get a good sense of where they should look closer when considering fishery management issues.

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Commercial Fishing Crew Demographics & Trends in the North Pacific: 1993-2003

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More than half of the nation's fish harvest passes through the hands or under the eyes of crew members aboard commercial fishing vessels in the North Pacific, yet until now, very little information has been available about the individuals that make up this work force. This research analyzes primary demographic characteristics of the crew population over the past decade, focusing on such elemental features as age, gender, and residency as are recorded in the State of Alaska crew member license application. Further, it derives additional information such as crew member tenure, temporal trends, and population distributions. Crew populations, while often strongly affected by regulatory changes, are frequently absent from social impact analyses because of a lack of basic information. Summarizing essential demographic characteristics represents a crucial first step in addressing this data gap.

This report is a brief summary of some highlights from our research on crew demographics. A full report with much more detailed analysis, specific numbers, supporting statistics and methodological information will be forthcoming from the Alaska Fisheries Science Center.

Our primary source of data for this demographic profile of fishing crews in the North Pacific is the Alaska Department of Fish and Game (ADF&G) Commercial Crew Member License database. This data source is the most comprehensive set of information available on individuals that are legally able to work as fishing crew in Alaska. Because Alaska is one of the few states to require a license for commercial fishing crew and has complete records for the last decade, we have a unique opportunity to profile recent demographic trends in fishing crew for this region. The ADF&G collects information on age, gender, citizenship, and residency. These characteristics form the basis of our analysis. The license form does not collect information about the specific fisheries in which licensed individuals participate, nor is this information collected by any other available source. Therefore, it is not possible to analyze these data by specific fishery in a reliable manner. Unlike the harvesting crew on deck, processing workers on board catcher-processors or floating processors are not required to have a crew license and are not part of the population analyzed here. Also, holders of State of Alaska Gear Operator Permits are not required to purchase a crew license to work as crew in other Alaska fisheries. The information below is for all State of Alaska crew license holders.

Crew Population

Over 272,000 crew licenses were issued between 1993 and 2003. The total annual crew member population has decreased by about 50% over the past decade from a high of over 30,000. The number of crew member license holders steadily decreased over the study period at an average rate of 5.7% per year. The most drastic decreases in annual licenses issued occurred between 2000 and 2001 (15% decrease), and 2001 and 2002 (another 15% decrease). Economic factors (such as drastic declines in Pacific salmon prices) and management factors (such as fishery rationalization) have both exerted a downward pressure on the number of crew jobs.

License Tenure
Of the 31% of license holders for whom a unique identifier was available, the mean number of years that an individual held a crew license is 1.8 years. This finding suggests that most crew members either do not seek or are not ensured continuity in their participation in this work sector. Less than one percent of the total population bought licenses in eight or more years. Of those long time crew members, over 98% are from either Alaska (81%) or Washington (17%). Social and economic impacts on crew members will clearly be different in scope and magnitude for long-term crew than for short-term crew. Further research is needed to explore how the demographics of long-term crew members differ from those that hold licenses only for one or two seasons.

Age & Gender Distribution
Over the study period, the mean age of all commercial crew member license holders is 30.2 years. The mean age of crew member license holders shows a slight but statistically significant upward trend of approximately one year over the study time period. With fewer crew jobs available, boat captains may be more selective in hiring, likely favoring age and experience. Compared to the age distribution of the total population of crew, the female subpopulation shows a bimodal distribution, with a greater proportion of younger and older participants than the male population. Alaska resident license holders also exhibit a different distribution compared to non-residents. For example, a larger proportion of Alaska resident crew members are children compared to very few non-resident child crew members.

The distribution of crew member licenses demonstrates the marked dominance of male labor in this work force. For the combined years of 1993 to 2003, men make up 86% of all license holders. Overall the distribution of licenses by gender has not changed much over this time period. The majority of female crew members are residents of Alaska (74%), compared to about 50% of male crew members.

Geographic Distribution
The geographic breadth of crew member residency spans all 50 states and 48 countries. Overall, residents of Alaska and Washington make up a large proportion of the crew member workforce in North Pacific fisheries. Many crew members also come from other western states, including California, Oregon, and Idaho. Crew members come from over 7,800 unique communities across the country. The majority of these communities (83%) draw ten or fewer license holders. About 1,300 communities have more than ten crew members; just over 300 have more than 100. Over the course of the study period, only 66 unique communities have supplied over 100 crew member license holders in any single year. Of these, Anchorage, Kodiak, and Seattle consistently rank as the top three home communities for crew members.

Comparison of License Data to an Actual Sample of Working Crew
Some crew may not purchase licenses (although they are required to), and some may

purchase a license and then not work. The crew license database was long thought to be unreliable because of these and other factors. We checked our results against a sample of crew from actual working boats, taken from U.S. Coast Guard records of fishing vessel search and rescue incidents. By supplementing the Search and Rescue records with media reports that contain demographic information on crew members onboard, we create a demographic picture of a sample of crew members who were actually serving on vessels, to compare with the population that purchased licenses. The results from the working-boat sample were statistically similar to the license database results. The details of the comparison between the working boat sample and the crew license data, as well as the details of all of the individual topics analyzed above, will be available in reports forthcoming from the Alaska Fisheries Science Center.

Without a more nuanced understanding of who makes up the population of North Pacific commercial fisheries crew, it is difficult for agencies like National Marine Fisheries Service and the regional councils to take account of this important work sector in their regulatory analyses and decision-making. Recording fishery-specific crew participation would allow for a detailed analysis of the general trends noted in this study. Until data are available on a fishery specific basis, it will be more challenging to predict the impacts of regulatory change on crew members.

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Estimating the Economic Impact of the Steller Sea Lion Conservation Area: Developing and Applying New Methods for Evaluating Spatially Complex Area Closures

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Abstract: Economists and biologists have recognized that spatial and temporal area-closures may provide an effective means of managing the impact that fisheries have on one another and upon threatened species. To date, however, little work has been done to estimate the economic impact of protected areas on commercial fishing. One significant protected area in the Bering Sea is the Steller sea lion Conservation Area (SCA). The benefits of the SCA consist of improvements to Steller sea lion populations as excluding commercial fishing leaves more prey for sea lions. The primary cost of the SCA is the potential reduction in profits that occurs as boats incur additional costs as they travel to more distant locations and/or experience lower levels of catch in alternative fishing areas. Estimating the economic impacts of the SCA thus requires explicit modeling of fishing location choice as location choice is the aspect of behavior that is directly affected. A substantial literature has developed over recent decades which explores the factors that influence location choice. This literature has utilized discrete choice econometric models to estimate the probability that fishers choose to fish within a specific area or zone. New protected areas will generally not conform to existing statistical areas, making analysis of the economic impacts of an area closure difficult. With our development of an improved discrete choice model, specifically designed to model fishing location choice, we are able to develop ex-ante and ex-post estimates of the economic impacts of the SCA upon the Bering Sea Pollock fishery. Here we do not present welfare estimates, but present estimation results and discuss future research.

Introduction

Marine Protected Areas (MPAs) have become an important instrument for marine preservation. MPAs have different purposes: many are created to encourage economic spillovers to neighboring fisheries, while others, including the Steller Sea Lion Conservation Area (SCA) in the Bering Sea, have been created to provide additional prey for endangered or threatened species. How do fishermen respond to closures and what are the welfare implications? This paper uses conventional and new methods to assess the impact of the closures.

From 1999-2002, Bering Sea pollock (*Theragra chalcogramma*) accounted for 73 percent of the groundfish caught off of Alaska. The fishery is broken up into 3 primary sectors: catcher boats that deliver fish to an inshore processing sector (50 percent of total catch), catcher processors (40 percent) and motherships (10 percent).

For more than three decades, the population of the Western stock of Steller sea lions has declined substantially, and was declared endangered in 1990. Most of the area that makes up the SCA was designated as Steller sea lion critical habitat in the early 1990's, but the SCA as we define it came to exist and to restrict fishing effort in 1999. Figure 1 illustrates the boundaries of the SCA, inside of which the primary fishing grounds of the inshore pollock fishery reside. Biologists and economists have debated the degree to which reserves create sources for fish (see for example Sanchirico and Wilen 1999), but the SCA is not designed to increase catch, but to ensure that the pollock are locally abundant seasonally for Steller sea lions.

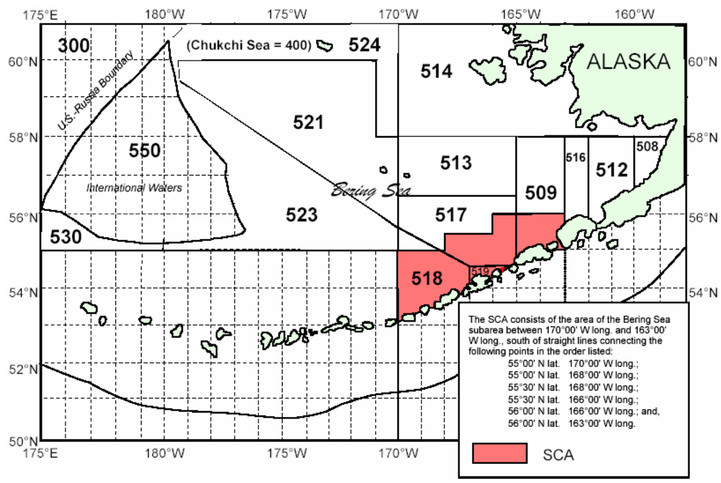

Figure 1: Steller Sea Lion Conservation Area (SCA) and the Bering Sea (Source: NOAA)

This paper focuses upon the impact that closures and area-specific catch limitations of the SCA have had upon the pollock catcher boat fleet. We focus here on this sector because it allows us to model the fisher location decision as a function of the miles from port to a fishing site, which is less of a constraint for the offshore sectors of the fishery (catcher processors and motherships).

In the following section of this paper, we discuss the primary approaches that have been taken to model fisher location choice, and then set up our approach this problem. We then present a description of our data and preliminary results. Finally, we offer conclusions and a discussion of future research. Many caveats are offered throughout the paper about the preliminary nature of this work, and in the concluding section we offer a discussion of how we will address many of these issues.

Modeling Fisher Location Choice

Our approach to this problem builds upon the literature which assesses how fishermen make site location choices. The literature in this area is quite substantial, and is typically traced to the work of Bockstael and Opaluch (1982) and Eales and Wilen (1986). Bockstael and Opaluch (1982) employ a discrete choice model to assess the factors that cause fishers to switch fisheries. Eales and Wilen (1986) introduce the idea of using a two-stage model where in the first stage the expected catch of an area is estimated using the average catch from that area in previous periods, and in the second stage, location choice is modeled as a function of expected catch in each area. This literature has used variations of logit models (conditional logit, nested logit, etc.) to model how fishers make location choices. The more recent work in this literature has included much more complex covariates (e.g. Dupont 1993; Holland and Sutinen, 1999, 2000; Campbell and Hand, 1999; Curtis and Hicks, 2000; Smith 2000, 2001). Numerous interesting issues have been addressed in this literature, including the effort by Curtis and Hicks to place a value on the closure of a large area of the Pacific Ocean for turtle protection.

What is the right type of model to measure the economic impact of MPA's such as the SCA? The problem lies within a continuum of models from extremely simple but not fully utilizing the information available to models that more efficiently use information but at the cost of increasing complexity of estimation. In future work we will address the range of these models in greater detail, but here we consider three models that capture important aspects of the problem: 1) a zonal conditional logit, 2) a 2-stage average catch model ("Y-Average"), and 3) the Expected Profit Model, our new model which jointly estimates catch and choice parameters.

The zonal logit is simple but in some sense elegant in regards to evaluating area closures. The zonal logit and the Y-average model are both conditional logit models where the fisher chooses a location to maximize utility where utility is a function of fisher and area characteristics, subject to random error:

$$U_{ij} = \beta x_{ij} + \varepsilon_{ij} \tag{1}$$

$$P(j = k) = \frac{\exp \beta' x_{ik}}{\sum_{j=1}^{J} \exp \beta' x_{ij}} \tag{2}$$

The area chosen (k) comes from a discrete number of available zones (j=1…J). For the zonal logit that we examine here, we estimate zone-specific constants (α_j) (with an appropriate normalization) and a parameter on the miles required to travel to the chosen zone (β_{miles}). While this is a quite very basic model, it provides a simple means to turn zones "on" and "off" with area closures.

The Y-average model is also a conditional logit, but we replace the zone-specific constants with a parameter on average catch for the zone, which we calculate prior to estimating the choice model. Variations on this model are the standard model for this type of analysis, though it is often employed in a nested logit and with finer temporal resolution (not just the seasonal average, but the daily or monthly average, for example). The most common model in the literature is a nested logit which most commonly involves a first stage decision of what fishery to fish in, followed by a second stage of where to fish.[1]

[1] Because of the AFA, we are taking the decision to fish for pollock in the Bering Sea as given. We recognize with the presence of sideboards for other species there are a small percentage of trips that are not

The Expected Profit Model (EPM) is a joint discrete-continuous model. In the EPM, we simultaneously estimate the expected catch (or revenue) for each zone, and a logit choice model. This work builds upon several earlier discrete-continuous models (e.g. Duncan 1980 and Hanemann 1984) as well as the recent work of Morey and Waldeman (1998, 2000).[2] In unpublished Monte Carlo simulations, this model has outperformed the other models included here.

Our initial assumption is that fishers choose zones to maximize expected variable profits from the trip, where variable profits are defined as revenues minus travel costs.[3] A fisher's expected profits are formulated as follows (with Y representing catch and C costs):

$$E(\pi_{ij}) = E(P\,Y_{ij} - C_{ij}) = E(P\,Y_{ij}) - E(C_{ij}) \qquad \textbf{(3)}$$

$E(Y_{ij}) = E(Y_j) = \alpha_j$.

We model the fisher's expected profit as function of expected catch, cost coefficients to be estimated, and an additive error (similar in spirit to work by Chicchetti and Dubin 1994 in another context):

$$E(\pi_{ij}) = P\alpha_j - X_{ij}\beta + \varepsilon_{ij} \qquad \textbf{(4)}$$

$$\varepsilon_{ij} \sim TYPE\ I\ EV\,(0, \sigma_\varepsilon)$$

$$Y_{ij} = \alpha_j + \eta_{ij}$$

Thus the model has two error terms and two types of variances that can be estimated. Because of the nature of the joint estimation and the fact that we observe the catch from a trip as well as the choice of a zone, we are able to identify the scale parameters, which we describe as sigmacatch (σ_j) and sigmachoice (σ_ε). Sigmacatch can be restricted so that it is equal for all zones, but here we estimate a separate sigmacatch for each zone.

As in a standard Random Utility Model, we assume that for individual *i* and zone *j*:

for pollock, but for the time-being we are assuming that these are not significant.

[2] A more thorough description of this model is available in the proceedings of the Agricultural Economics meetings in Montreal in 2003 (Layton, Haynie, Huppert 2003).

[3] It may be the case that they have other objectives in the short term (e.g. catch maximization to establish catch history or information for future trips), so this assumption will be loosened and tested in future work.

$$E\left(\pi_{ij}\right) > E\left(\pi_{ik}\right) \ \forall \ k \neq j \Rightarrow$$

$$P\alpha_j - X\beta_{ij} + \varepsilon_{ij} > P\alpha_k - X\beta_{ik} + \varepsilon_{ik} \ \forall \ k \neq j$$

The model is estimated using full-information maximum likelihood (FIML). For example, for a trip to zone 1, we maximize the logarithm of the following expression:

$$\ell_1 = \underbrace{\frac{1}{\sigma_1\sqrt{2\pi}} \exp\left[-\frac{1}{2}\left(\frac{Y_{i1} - \alpha_1}{\sigma_1}\right)^2\right]}_{continuous} \times \underbrace{\frac{e^{\left(\frac{P\alpha_1 - X_{i1}\beta}{\sigma_\varepsilon}\right)}}{\sum_{j=1}^{J} e^{\left(\frac{P\alpha_j - X_{ij}\beta}{\sigma_\varepsilon}\right)}}}_{discrete} \qquad \textbf{(5)}$$

Here Y is the actual catch and X is the miles from the centroid of the chosen and alternative areas to the landing port of the trips. In the results presented here, P is the yearly average annual ex-vessel pollock price.

Because all of the parameters are identified, including scale, we are able to actually calculate the welfare impact of closing a zone. What we calculate might be called 'variable profits' or 'net revenues,' in that it ignores fixed costs and calculates the expected difference in revenues and travel costs for each zone.

Description of Data

The data used in this analysis are from fish ticket data reported by fishers and NOAA observer data that comes from the NOAA observer program. All of these data are protected by confidentiality agreements so no data are presented which reveal trade secrets or any information about particular vessels or processors.

The data that we utilize here have the following characteristics:

- Summer trips only
- Catcher boat trips only
- Catch quantity and location data are based upon observer data from 1995-2002
- Fish ticket data are used to determine when trips start and begin
- Price data are taken from the NMFS Economic SAFE documents.

Data are recorded by the NOAA Observer Program in three different scales/resolutions: NMFS area, ADF&G 'STAT6' statistical areas, and the latitude and longitude where a haul starts and ends. The vast majority of trips take place just a few of the NMFS areas, so we have used the STAT6 areas, which have a finer resolution than the NMFS area, as the discrete choice used in this model. This scale allows us to distinguish meaningfully among choice opportunities and to continue to use the discrete choice framework.

For each trip, the centroid of each haul is calculated. Using ArcGIS, the STAT6 area of the centroid is determined. The one-way distance from the landing port to the centroid of the STAT6 area is then used as the distance of the trip. For 1995-1998, there were a total of 2268 trips to 29 zones. We only included those zones that had more than 5 trips to them for these years, which resulted in a model with 18 zones and 2247 trips (the deleted 11 zones collectively accounted for less than 1% of all trips). In future work, we will re-insert these additional zones. Table 1 illustrates how during the restriction/closure periods in 1999 and 2000, a number of trips were taken outside of the 18 zones included in the model. We recognize the omissions of the extra zones for 2000 may be significant, and we will include those zones in future work.

Table 1: Number of trips in and out of the model's estimation areas

	95-98	1999	2000c	2000d	2001-02
trips in included zones	2247	538	133	413	1617
total trips	2268	577	182	558	1638
% of trips included	99%	93%	73%	74%	99%

During 1999 and 2000, NOAA Fisheries established spatially explicit TACs for the SCA. In 1999, the summer catch was split equally between the "C" and "D" seasons. In the C and D season, the average SCA TAC was 56% of the total TAC. In 2000, the C Season SCA TAC was 13.5% of the total TAC, and the D season TAC was set at 22.5% of the seasonal TAC. On August 9, 2000, prior to the end of the C season, however, the SCA was closed by judicial mandate to all trawling. Thus the 2000 D Season there was no fishing inside the SCA.

Table 2 illustrates how SCA restrictions impacted the fishery (in terms of trips, not catch). 1999 and 2000 are the years in which the SCA was partially or totally closed.

Table 2: Catcher boat trips in and out of the SCA, by year

SCA	1995	1996	1997	1998	1999	2000	2001	2002
Outside	1	3	0	60	253	654	30	0
Inside	583	543	539	539	324	86	761	847
% Inside	99.8	99.5	100.0	90.0	56.2	11.6	96.2	100.0

Results

Computation of the EPM is difficultly without careful scaling. Here the model is run with catch in 1000's of tons, miles in 100's of miles and prices per ton divided 100. Thus "variable profits" are being measured in$100,000 units.

In Table 3, we present results here for three models: zonal logit, Y-AVG model, and the EPM. For the EPM, an alpha and sigmacatch parameter are estimated for each of the 18 zones for a total of 38 parameters, while for the zonal logit, no scale parameter can be estimated, and results are presented relative to the base zone, which is arbitrarily chosen here as zone 1(for a total of 18 parameters).

Table 3: Estimation Results for 3 Models

MODEL 1: EPM					*MODEL 2: Zonal Conditional Logit*			
	Estimate	SE	Est./SE			Estimate	SE	Est./SE
alpha1	0.188	0.013	14.26		Zone 1	**0**		
alpha2	0.211	0.004	54.70		zone 2	3.08	0.290	10.61
alpha3	0.194	0.011	18.14		zone 3	0.94	0.382	2.45
alpha4	0.195	0.011	17.11		zone 4	1.33	0.387	3.44
alpha5	0.214	0.003	61.92		zone 5	3.19	0.290	10.99
alpha6	0.180	0.017	10.49		zone 6	-1.15	0.482	-2.38
alpha7	0.220	0.005	46.58		zone 7	4.20	0.279	15.07
alpha8	0.210	0.004	51.30		zone 8	2.89	0.286	10.11
alpha9	0.200	0.008	25.65		zone 9	1.67	0.338	4.94
alpha10	0.191	0.013	15.18		zone 10	0.77	0.456	1.69
alpha11	0.198	0.008	25.05		zone 11	1.07	0.312	3.42
alpha12	0.186	0.014	13.21		zone 12	-0.50	0.373	-1.35
alpha13	0.199	0.008	25.44		zone 13	1.17	0.309	3.80
alpha14	0.189	0.013	14.80		zone 14	0.19	0.383	0.49
alpha15	0.188	0.014	13.37		zone 15	0.30	0.427	0.71
alpha16	0.193	0.011	17.72		zone 16	1.08	0.415	2.59
alpha17	0.192	0.012	16.49		zone 17	0.44	0.378	1.17
alpha18	0.188	0.013	14.08		zone 18	0.33	0.443	0.76
miles	-0.016	0.007	-2.12		miles	-1.48	0.186	-7.99
sigmachoice	0.014	0.007	2.05					
sigma1	0.142	0.034	4.24		initial LL	-6494.7		
sigma2	0.118	0.006	20.34		LL	-3753.3		
sigma3	0.129	0.024	5.30		pseudo R	0.422		
sigma4	0.158	0.039	4.04					
sigma5	0.209	0.007	29.66		*MODEL 3: Exogenous Average Catch*			
sigma6	0.127	0.045	2.81			Estimate	SE	Est./SE
sigma7	0.146	0.003	42.08		miles	-2.61	0.08	-34.85
sigma8	0.105	0.004	24.84		YAVG	-7.59	0.34	-22.29
sigma9	0.136	0.017	8.03					
sigma10	0.124	0.030	4.18					
sigma11	0.331	0.029	11.25		initial LL	-6494.7		
sigma12	0.385	0.092	4.16		LL	-5720.3		
sigma13	0.152	0.027	5.68		pseudo R	0.119		
sigma14	0.201	0.037	5.42					
sigma15	0.087	0.019	4.70		*NOTES:*			
sigma16	0.078	0.022	3.51		Data: 1995-1998 summer season			
sigma17	0.164	0.047	3.49		>5 trips per zone			
sigma18	0.061	0.016	3.82					

Comparison of Model Predictions

In Table 3 we display the pseudo-R^2 for the zonal logit and Y-average models. The zonal logit does much better (0.422) by this comparison. For the EPM, because of the nature of its joint estimation, a pseudo-R^2 cannot be calculated for the complete likelihood. For the choice portion of the EPM likelihood, the pseudo-R^2 is slightly better than the zonal logit (0.423). In Table 4, we show a comparison of the predictive abilities of the three models for the different periods of study. Here is a brief description of the characteristics of the different time periods:

- **1995-98** – during this period, there were no substantial SCA closures. The model is estimated with pooled data from these years (summer season only), then predictions are made for the other years.
- **1999** – during the summer season only 56 percent of the TAC could be taken from the SCA
- **2000C** – during all but the last 10 days of this period, the SCA TAC was 13.5%; during the last 10 days, the SCA was closed.
- **2000D** – the SCA was closed to pollock trawling.
- **2001-2002** – the SCA is open during the summer season.

Predictions are made here for 1999, 2000C, and 2000D by making the SCA TAC binding and reallocating probabilities accordingly. For the complete closure in the 2000D season, all of the trips were attributed to the non-SCA zones that made up a small number of the trips in the 1995-98 period. Through another Steller sea lion protective measure, virtually all of zone 5 is closed in 1999 and 2000, and no trips were taken to this zone. We closed the area for this analysis.

In Table 4 we present the estimated percentage of trips to each zone and the mean-squared-errors (MSE) for each time period and each model. The MSE is the sum of the squared difference of the predicted and actual number of trips for each zone.

The next step that we will pursue with these results is to calculate the welfare impacts of the area closures from the SCA. Using the α's estimated for the EPM in Table 3, we can calculate the expected variable profit using Equation 4. By using prices for the time-period when the closure is in effect and the miles per trip from each homeport to centroid, we can calculate the variable profits for each zone. With this information, we can then calculate the welfare implications of closing the SCA.

Table 4: Comparison of model predictions

	1995-1998							1999						
Zone	% of Actual Trips	Logit estimate % trips	EPM estimate % trips	Y-AVG estimate % trips	Logit 9598 MSE	EPM 9598 MSE	YAVG 9598 MSE	% of Actual Trips	Logit estimate % trips	EPM estimate % trips	YAVG estimate % trips	Logit 1999 MSE	EPM 1999 MSE	YAVG 1999 MSE
1	0.53	0.52	0.15	7.96	0.000	0.2	55	0.0	0.4	0.3	5.5	0.16	0.08	30.45
2	8.19	7.56	6.72	4.95	0.394	2.2	10	3.3	5.8	6.0	3.4	6.21	6.90	0.01
3	0.67	0.60	0.26	3.26	0.005	0.2	7	1.1	0.5	0.4	2.3	0.43	0.51	1.30
4	0.67	0.60	0.22	0.83	0.005	0.2	0	0.9	12.4	12.9	4.7	130.8	143.2	14.52
5	24.17	25.34	23.69	11.49	1.379	0.2	161		0.0	0.0	0.0			
6	0.27	0.27	0.05	17.13	0.000	0.0	284	0.2	0.2	0.1	11.9	0.00	0.00	136.57
7	46.19	46.32	58.09	8.52	0.016	141.4	1419	26.2	35.8	37.6	5.9	91.3	129.9	412.30
8	8.32	7.77	6.24	6.66	0.302	4.3	3	17.5	6.0	5.8	4.6	131.6	136.4	165.27
9	1.56	1.44	0.78	1.97	0.014	0.6	0	7.6	1.1	1.0	1.4	42.4	43.8	39.15
10	0.40	0.36	0.11	0.64	0.001	0.1	0	7.2	7.5	7.4	3.7	0.06	0.02	12.95
11	3.29	3.51	1.56	7.31	0.046	3.0	16	0.0	2.7	2.1	5.1	7.33	4.51	25.66
12	0.85	0.92	0.18	7.55	0.006	0.4	45	0.0	0.7	0.4	5.2	0.51	0.14	27.35
13	2.40	2.45	1.27	8.74	0.002	1.3	40	0.2	1.9	1.7	6.1	2.92	2.27	34.47
14	0.58	0.56	0.15	4.39	0.000	0.2	14	2.4	0.4	0.3	3.0	3.94	4.59	0.39
15	0.40	0.35	0.09	3.80	0.003	0.1	12	15.2	7.2	7.0	21.8	64.5	68.4	42.58
16	0.53	0.49	0.17	0.75	0.002	0.1	0	6.9	10.1	10.5	4.3	10.2	12.8	6.56
17	0.62	0.60	0.21	2.38	0.000	0.2	3	1.7	0.5	0.4	1.6	1.46	1.71	0.00
18	0.36	0.33	0.08	1.67	0.001	0.1	2	9.5	6.9	6.3	9.5	6.85	10.20	0.00
Total	100	100	100	100	2.2	154.8	2072	100	100	100	100	501	565	950

Zone	2000c (pre-closure)							2000d (post-closure)							2001-2002						
	% of Actual Trips	Logit estimate % trips	EPM estimate % trips	Y-AVG estimate % trips	Logit 2000c MSE	EPM 2000c MSE	YAVG 2000c MSE	% of Actual Trips	Logit estimate % trips	EPM estimate % trips	Y-AVG estimate % trips	Logit 2000d MSE	EPM 2000d MSE	YAVG 2000d MSE	% of Actual Trips	Logit estimate % trips	EPM estimate % trips	Y-AVG estimate % trips	Logit 0102 MSE	EPM 0102 MSE	Y-AVG 0102 MSE
1		0.10	0.03	1.33	0.01	0.00	1.77		0	0	0					0.52	0.15	7.96	0.27	0	55
2	19.5	1.41	1.20	0.83	329	337	350.51		0	0	0				3.59	7.56	6.72	4.95	15.80	9.82	7
3	3.0	0.11	0.05	0.54	8.39	8.77	6.07		0	0	0				0.37	0.60	0.26	3.26	0.05	0.01	7
4	14.3	24.31	28.17	9.32	101	193	24.67	23.5	28.11	32.6	10.8	21	82	163		0.60	0.22	0.83	0.36	0.05	0
5		0.00	0.00	0.00	0.00	0.00	0.00		0	0	0				29.81	25.34	23.69	11.49	19.97	37.49	192
6		0.05	0.01	2.86	0.00	0.00	8.19		0	0	0				0.56	0.27	0.05	17.13	0.08	0.26	284
7	12.0	8.62	10.37	1.42	11.6	2.8	112.51		0	0	0				47.99	46.32	58.09	8.52	2.79	102.0	1429
8	13.5	1.45	1.11	1.11	146	154	154.28		0	0	0				5.50	7.77	6.24	6.66	5.15	0.54	1
9	2.3	0.27	0.14	0.33	3.95	4.48	3.71		0	0	0				0.19	1.44	0.78	1.97	1.57	0.35	0
10	10.5	14.74	13.98	7.18	18	12	11.22	51.0	17.04	16.2	8.3	1152	1212	1822	0.31	0.36	0.11	0.64	0.00	0.04	0
11		0.65	0.28	1.22	0.43	0.08	1.49		0	0	0				1.18	3.51	1.56	7.31	5.44	0.15	14
12		0.17	0.03	1.26	0.03	0.00	1.59		0	0	0				0.25	0.92	0.18	7.55	0.46	0.00	44
13		0.46	0.23	1.46	0.21	0.05	2.13		0	0	0				5.81	2.45	1.27	8.74	11.29	20.65	40
14		0.10	0.03	0.73	0.01	0.00	0.54		0	0	0				1.42	0.56	0.15	4.39	0.74	1.63	15
15	5.3	14.17	12.02	42.79	79	46	1408	0.5	16.39	13.9	49.5	253	180	2399	0.06	0.35	0.09	3.80	0.08	0.00	12
16	18.8	19.79	21.48	8.48	0.99	7.20	106.35	19.9	22.88	24.8	9.8	9	25		0.80	0.49	0.17	0.75	0.10	0.41	0
17		0.11	0.04	0.40	0.01	0.00	0.16		0.0	0	0				2.16	0.60	0.21	2.38	2.44	3.81	3
18	0.8	13.49	10.85	18.73	162	102	323.14	5.1	15.59	12.5	21.7	109	55	272		0.33	0.08	1.67	0.11	0.01	2
Total					860.7	866.6	2516.7	100	100	100	100	1544	1553	4656	100	100	100	100	67	177	2105

Discussion and Directions for Future Research

Key findings from this work include:

- The zonal logit and EPM provide similar levels of prediction, though the zonal logit provides at least a slightly lower MSE for most of the periods estimated.
- The average catch (Y-Average) model does much worse than the other two models for all time periods. We are investigating the nature of the negative coefficient on the Y-average term. This may be due to model misspecification, or it may represent something more fundamental.
- Predictions are best when we are looking at well-fished zones. The models do the worst when trying to predict what happens when the SCA is completely closed. In particular, the models completely miss the mark on zone 15 in the 2000D season, when the areas representing over 97 percent of previous catch were closed.

- The zonal model gives a relatively good fit, despite the absence of a large number of variables that we would expect affect location choice.
- The EPM allows us to directly calculate the welfare losses of closures. The zonal logit will allow us to evaluate the relative costs of closing different areas.

The results included here are preliminary, but lay the groundwork for a new method that will allow us to explicitly calculate the welfare implications of area closures such as the SCA. There are a number of caveats that should be added to this work.

- The impact of bycatch closures is not included here. Certain zones were voluntarily avoided by fishers during different years due to bycatch “hotspots” that could close down the fishery. We are cataloging and including all of these closures.
- After 1999 (for catcher boats), the American Fisheries Act (AFA) has gone into affect, which ended the race for fish in this fishery. This may affect location choice for 2000-2002, and is not accounted for here. Note that because of this, our models are estimated using the data from 1995-1998 only.
- We have attempted to include boat characteristics in the model, but this has not increased the performance of the model.
- Although we include in the model the 18 zones that make up 99.8 percent of the trips from 1995-98, the 11 omitted zones are the location for more than 25 percent of the trips in 2000. We will include these deleted zones in future work.
- We focus here upon the summer season, largely because the winter season is the roe season, and we do not observe the quantity of roe caught per trip (we observe the quantity of pollock, but not the quantity or value of the roe in the pollock). Whereas in the summer there is not a difference in price between areas, in the winter some area provide roe for which fishers receive roe bonuses that we do not observer. We are attempting to create a function of expected roe content, which will potentially address this issue. Another approach might be to model roe content as an additional latent variable which would result in the discrete choice component having a mixed-logit like structure. Seasonal TAC limitations in the winter continue and have a large impact on all three sectors of the fishery.
- For simple seasonal closures our model has good predictive performance. Modeling intra-season closures is far more challenging.
- In examining the results above, we can see the difficulty of assessing how trips are redistributed to infrequently visited zones. In the ‘2000D’ period in Table 4, after the SCA zones are closed, we are predicting from a very small number of trips made to the non-SCA zones how trips will be distributed. There are a number of different ways to address this issue. We have worked extensively to develop a functional model of the EPM, in which alpha is estimated as a function of latitude and longitude. This would allow us to predict what would happen with any closure, but to date we have not been able to establish a strong functional relationship in this fishery. This may be due to the omission of other closures from the model, or other environmental variables that could also be included in such a functional model.

This preliminary work shows the potential for the EPM and a zonal logit to provide meaningful information about area closures. We are currently attempting to resolve the challenges outlined above and will address these issues as we finalize this work.

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Market Analysis: A Review and Prospectus

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1. Introduction

The impetus for this research review and prospectus was the need to conduct market studies on Alaskan groundfish fisheries. Research categorized as a market study covers, to put it modestly, a very broad scope of analyses. Therefore, the first step of this project has been to more narrowly define the issues to be addressed in the course of this investigation. To that end, I have been focusing my efforts on finding suitable and achievable methods to quantify the effects of changing the total allowable catch (TAC) in the Alaskan pollock fishery. This topic also, admittedly, encompasses a wide range of approaches, but it does give a much more centered vision for my current and future research agenda.

Thus far, my work has been split among two tasks. First, in an attempt to see what has been done in this field, I have been reviewing the relevant existing supply and demand literature. This review has encompassed theoretical production economics papers and demand theory papers, as well as applied papers. Where possible, I have focused on the applied supply and demand models for Alaskan pollock and other fisheries. Second, I have been trying to familiarize myself with the actual make up of the pollock market at various stages along the market chain and to assess what data are available. The purpose of this task is to discover market peculiarities and data restrictions that will guide future modeling efforts.

This report was written to present my findings to date. The following section gives a brief literature review, addressing the common econometric modeling techniques that have been used in supply and demand studies for fisheries or fish products. Next, I devote a section to commenting on the data availability, as well as some data shortcomings. The subsequent section outlines some of the modeling considerations particular to the Alaska pollock fishery. In the final section, I describe some of the research topics germane to Alaska pollock fisheries, and fisheries in general, that I intend on pursuing in the future.

2. Market Studies Literature Review

2.1 Demand Systems

Most of the empirical market studies of fish and/or fish products concentrate on market demand estimation. There are two likely reasons that demand studies tend to dominate this field. First, supply is often assumed to be an exogenously determined fixed variable. The second is that cost data for suppliers at various stages of the market chain is not available, making it difficult to impossible to estimate theoretically consistent supply functions derived from profit maximization.

A common approach to the demand estimation is the system of demand equations approach using consumer-level data. The estimation of these demand systems has the desirable property of being derived from consumer theory, namely utility maximization. The demand equations are estimated as a part of a system of equations based on the assumption of weak separability of the utility function. With weak separability assumed, the utility function can be divided into the utility derived from separate groups of goods. The demand functions for the goods within a group are then specified as a system of equations. Another advantage of the estimation of the demand equations in system form is that homogeneity and symmetry restrictions can be either tested or imposed.

The most common functional forms for the system of demand equations approach are the Rotterdam System of Theil (1965) and Barten (1966, 1967, 1968), the Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980), and the Translog System proposed by Christensen, Jorgenson, and Lau (1971, 1973). The respective demand equations, written with the budget share as the dependent variable, estimated under each system approach and the corresponding restrictions are given below:

a) Translog System-

$$w_{it} = \frac{\alpha_i + \sum_j \beta_{ij} \ln\left(\frac{p_{jt}}{X_t}\right)}{1 + \sum_i \sum_j \beta_{ij} \ln\left(\frac{p_{jt}}{X_t}\right)}$$

with restrictions:

$$\sum_i \alpha_i = 1, \qquad \sum_i \beta_{ij} = 0, \qquad \beta_{ij} = \beta_{ji}, \qquad \sum_j \beta_{ij} = 0$$

b) Rotterdam System-

$$w_{it} \Delta \ln q_{it} = b_i \sum_j w_{jt} \Delta \ln q_{jt} + \sum_j c_{ji} \Delta \ln p_{jt}$$

with restrictions:

$$\sum_i b_i = 1, \qquad \sum_i c_{ij} = 0, \qquad c_{ij} = c_{ji}, \qquad \sum_j c_{ij} = 0$$

c) Almost Ideal Demand System (AIDS)-

$$w_{it} = \alpha_i + \sum_j \gamma_{ij} \ln p_{jt} + \beta_i \ln\left(\frac{X_t}{P_t}\right)$$

where

$$\ln P_t = \alpha_0 + \sum_i \alpha_i \ln p_{it} + \frac{1}{2} \sum_i \sum_j \gamma_{ij} \ln p_{jt}$$

with restrictions:

$$\sum_i \alpha_i = 1, \qquad \sum_i \gamma_{ij} = 0, \qquad \gamma_{ij} = \gamma_{ji}, \qquad \sum_j \gamma_{ij} = 0$$

There are several examples of the demand systems modeling approach applied to fish markets. Klonaris and Hallam (2003) use an AIDS model to estimate the Greek demand for fish, incorporating lagged budget shares to add a dynamic component to the model. Fousekis and Ravell (2004) calculate Hicksian and Marshallian price elasticities for several species of fish, as well as for several fish products, using retail data from the UK in an AIDS model framework. Eales, Durham, and Wessells (1997) estimate the Japanese demand for fish, where fish products were aggregated into six different categories based on fish types and values, using the Rotterdam System, AIDS, and two Rotterdam-AIDS hybrid models (the Central Bureau of Statistics model and the National Bureau of Research model). They compared the elasticity estimates of each of these systems when estimated in ordinary demand form and inverse demand form. Wessells and Wilen (1993) estimate Japanese household demand for fish in an AIDS model, paying particular attention to the effect of seasonality and regional location on demand.

2.2 Simultaneous Supply and Demand Models

In the examples given above, the demand is often estimated for a fish species or for a more general designation of fish. This is typical of other fish-related demand system estimations found in the literature. The likely cause is that such aggregation makes the assumption of a fixed supply more plausible; if one is taking a more detailed look at fish products (such as deriving the demand of a specific product made from a particular species) the assumption of a fixed supply is most likely inappropriate because it is expected that processors will adjust product mixes to maximize profits. In this instance, simultaneous supply and demand equations estimation might be more appropriate.

Simultaneous equations estimation has the desirable property of alleviating possible endogeneity, provided enough instrumental variables exist to make all equations identifiable. However, unlike the demand system approaches described above, the demand equations estimated in a simultaneous equations framework are not derived directly from a utility maximization problem. Likewise, the supply functions will not be derived from a profit or revenue maximization problem.

While examples of these jointly estimated demand and supply models in the fishery economics literature do not appear to be as numerous as studies utilizing a demand systems approach, there are several often cited papers. Hermann and Greenberg (1993) estimated an international market model for Alaskan salmon, which included 48 simultaneous equations. The results from that model were then used to project revenue and ex-vessel price impacts under different salmon hatchery production scenarios. Greenberg, Herrmann, and McCracken (1995) simultaneously estimated the demand and supply for Alaska snow crab in both the U.S. and Japan. In a structurally similar model, Herrmann, Criddle, Feller, and Greenberg (1996) estimated the Japanese demand and U.S. supply of surimi from Alaska pollock. Mazany, Roy, and Schrank (1996) estimate simultaneously a multi-product supply equation and individual product demand equations for frozen and fresh products derived from Canadian landed cod. The originality of their model is to assume that the ex-vessel price of cod does not accurately reflect the scarcity of the factor input, so they estimate the multi-product supply equation as a function of both ex-vessel price and quantity landed.

2.3 Cointegration Approach

The limited availability of data, both on the supply side and the demand side, may make the more structural models described above difficult to impossible to estimate. In addition to data limitation problems, the above described models may also be econometrically inappropriate. Because the data used for these studies is often given in a time series format, both the simultaneous equations models and demand systems models can include lagged variables to at least partially account for the dynamic behavior of both consumers and suppliers. A major assumption, however, when using this time series data is that the series are stationary. If the data are not stationary, the parameters estimated in the above described models will be consistent under certain conditions, but the asymptotic behavior of the parameters will be non-standard.[4] With data of this type, estimation through time series specific econometric approaches would appear to be more advisable. Due to these reasons, a growing body of literature in fish-related market studies have taken a more non-structural modeling approach through the use of a cointegration analysis.

Cointegration analysis seeks to identify a linear relationship among series that are non-stationary such that the linear combination of these non-stationary series results in a weakly- or covariance-stationary series. The cointegrating relationship is often referred to as the long-run relationship between the non-stationary series. This long-run relationship can be used in a regression analysis with lagged values of the differenced non-stationary series, as well as other stationary series, in a vector error correction model (VECM) to determine both the short-run and long-run dynamics of the system.[5] The specification of the VECM with *k-lags* of the vector $\boldsymbol{Z_t}$, which contains the *n* potentially endogenous non-stationary series, is:

$$\Delta Z_t = \Pi Z_{t-1} + \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + ... + \Gamma_{k-1} \Delta Z_{t-k+1} + \Phi X_t + \varepsilon_t$$

$$\Pi = \alpha \beta'$$

X_t is a vector of stationary and exogenous variables

ε_t is a stationary process

Here, the β matrix is the long-run relationship between the variables, and α represents the speed of adjustment parameters. Having knowledge of the long-run relationship estimates give insight into the elasticities or flexibilities, depending upon the model specification. The β matrix is estimated in a separate estimation procedure.[6] Knowing the speed of adjustment can give information regarding the speed at which the market will react to disturbances from the equilibrium relationship, which may give one information about the effects of contractual obligations, cost of adjusting output types, information asymmetries, and habit formations. The α is estimated directly in the

[4] If the estimated parameters are asymptotically distributed with a non-standard distribution, the usual Wald statistics and their associated critical values are invalid.

[5] The error correction model was most notably introduced by Engle and Granger (1987) and estimation of the extended systems approach in VECM form is widely attributed to Johansen (1988).

[6] The long-run relationship is estimated in a variety of ways. Common procedures include vector autoregressive (VAR) estimation, dynamic ordinary least squares (DOLS), and fully modified (FM) least squares.

VECM. The other parameters estimated in the VECM are used to describe the short-run dynamics of the system.

Two accessible illustrations of the use of VECMs in fish market studies are Asche (1997) and Jaffry, Pascoe, and Ronbinson (1999). Asche estimates two single-equation error correction models for the European import demand of fresh and frozen salmon using the two-step method described in Engle and Granger (1987). In this study, Asche finds that the instantaneous adjustment to a price change in both fresh and frozen salmon is quite small, but the majority of the demand adjustment takes place over the next three months. Jaffry *et al.* uses a VECM to estimate the long-run price flexibilities for high valued species landed in the UK.

3. Data Availability

The most important data required for market analysis is price and quantity data. Because the three most important processed products derived from Alaskan pollock, in terms of produced quantities and total value, are roe, surimi, and fillets, I have dedicated most of my time looking for price and quantity information for these three products. Below is a description of relevant data I have found for each product type:

Table 3.1 – Surimi Price and Quantity Data:

Type	Description	Available at	Frequency & Range	General
Japanese Price	Average wholesale price among 10 major markets in Japan	NMFS - Southwest Regional Offices, available online	monthly from 11/96 to 12/04	Frozen surimi & salted surimi-based products quoted. Not specified as AK pollock surimi.
Japanese Price	Average wholesale price among 10 major markets in Japan	Monthly Statistics of Agriculture, Forestry & Fisheries – Govt. of Japan, AFSC hardcopies	monthly from 01/82 to 12/04, missing 1993 data in AFSC collection	Not specified as surimi from AK pollock. Hardcopy only.
Japanese Price	Wholesale prices at Tokyo Central Wholesale Market	NMFS – Southwest Regional Offices, available online	twice a month from 5/97 to 03/05	Frozen surimi of 3 different grades quoted. Not specified as AK pollock surimi.
Implicit Export Price	Price derived from (export value)/(export quantity)	NOAA Fisheries – Office of Science & Technology, U.S. Foreign Trade, available online	monthly from 01/92 to 02/05	Gives destination country. Not specified as AK pollock surimi until 1995, all NSPF before that.
Japanese Implicit Import Price	Price derived from (Japanese import value)/(Japanese import quantity)	NMFS – Southwest Regional Offices, available online	monthly from 11/96 to 12/04	Specifies Pollock surimi import value (yen) and import quantity (mt) for Japan.
Quantity Exported	U.S. Export data from U.S. Census Bureau	NOAA Fisheries – Office of Science & Technology, U.S. Foreign Trade, available online	monthly from 01/92 to 02/05	Gives destination country. Not specified as AK pollock surimi until 1995, all NSPF before that.
Quantity Produced	Processors' production reports	NMFS - AFSC, Weekly Processing Reports	weekly from 01/92 to 12/04	Gives production in mt and tons. Gives name of processor and sector.

Table 3.2 – Roe Price and Quantity Data:

Type	Description	Available at	Frequency & Range	General
Japanese Price	Average wholesale price among 10 major markets in Japan	NMFS - Southwest Regional Offices, available online	monthly from 11/96 to 12/04	Only salted roe quoted. Quantity sold also given. Specified as AK pollock.
Japanese Price	Wholesale prices at Tokyo Central Wholesale Market	NMFS - Southwest Regional Offices, available online	twice a month from 5/97 to 03/05	Gives salted AK pollock roe of varying grade. High & low prices given.
Implicit Export Price	Price derived from (export value)/(export quantity)	NOAA Fisheries - Office of Science & Technology, U.S. Foreign Trade, available online	monthly from 01/91 to 02/05	Gives destination country. NSPF roe might add error to data. Given in current dollar terms.
Japanese Implicit Import Price	Price derived from (Japanese import value)/(Japanese import quantity)	NMFS - Southwest Regional Offices, available online	monthly from 11/96 to 12/04	Gives Pollock roe import value (yen) and import quantity (mt) for Japan.
Quantity Exported	U.S. Export data from U.S. Census Bureau	NOAA Fisheries - Office of Science & Technology, U.S. Foreign Trade, available online	monthly from 01/91 to 02/05	Gives destination country. NSPF roe might add error to data. Given in metric tons.
Quantity Produced	Processors' production reports	NMFS - AFSC, Weekly Processing Reports	weekly from 01/92 to 12/04	Gives production in mt and tons. Gives name of processor and sector.

Table 3.3 – Fillet Price and Quantity Data:

Type	Description	Available at	Frequency & Range	General
Japanese Price	Average wholesale price among 10 major markets in Japan	NMFS - Southwest Regional Offices, available online	monthly from 11/96 to near present	Frozen surimi & salted surimi-based products quoted. Not specified as AK pollock surimi. Yen/kg.
Japanese Price	Wholesale prices at Tokyo Central Wholesale Market	NMFS - Southwest Regional Offices, available online	twice a month from 5/97 to present	Frozen surimi of 3 different grades quoted. Not specified as AK pollock surimi.
Implicit Export Price	Price derived from (export value)/(export quantity)	NOAA Fisheries - Office of Science & Technology, U.S. Foreign Trade, available online	monthly from 01/92 to present	Gives destination country. Not specified as AK pollock surimi until 1995, all NSPF before that.
Japanese Implicit Import Price	Price derived from (Japanese import value)/(Japanese import quantity)	NMFS - Southwest Regional Offices, available online	monthly from 11/96 to near present	Specifies Pollock surimi import value (yen) and import quantity (mt) for Japan.
U.S. Wholesale Prices	Boston Frozen Market prices for various fillet products	NMFS - Economic Data, Boston MA, hard copies only	weekly from 01/90 to present	Gives block and shatter pack prices to first wholesalers. Specifies AK pollock.
U.S. Wholesale Prices	Wholesale prices for various fillet products	Urner Barry's Comtell - available online for a fee	varies, most weekly 01/94 to present	Prices determined from markets and direct talks to wholesalers. Price of subscription is $99/mo
Quantity Exported	U.S. Export data from U.S. Census Bureau	NOAA Fisheries - Office of Science & Technology, U.S. Foreign Trade, available online	monthly from 01/92 to 02/05	Gives destination country. Not specified as AK pollock surimi until 1995, all NSPF before that.
Quantity Produced	Processors' production reports	NMFS - AFSC, Weekly Processing Reports	weekly from 01/92 to 12/04	Gives production in mt and tons. Gives name of processor and sector.

In addition to the price and quantity data given for these three products, other relevant data has been identified. Monthly U.S. cold storage holdings data from 1990 to 2002 for fillets and surimi can be obtained online through NOAA Fisheries. Monthly Japanese inventory data for roe and surimi from 1996 to 2004 is available online through NMFS – Southwest Regional Office. The Monthly Statistics of Agriculture, Forestry & Fishery gives an averaged wholesale price for fresh and frozen Alaska pollock. Bill Atkinson's News Report contains various useful statistics, notably roe auction prices and selected inventory. However, there does not appear to be a consistent presentation of the data. Many of the sources given in the tables above also include price and quantity data for other species which may be useful when modeling the roles of substitute products.

Other data that will be necessary, such as exchange rates, consumer price indices, and interest rates, have not been identified, but it should be relatively easy to obtain. Also, it may be possible to obtain data for Japanese prices, imports, and inventories prior to what is listed in the tables. Hermann *et al*. (1996) uses quarterly data from 1987 to 1993 to estimate Japanese demand for Alaska pollock surimi imports and they list their data sources. However, I have been unable to locate those sources online or within the NMFS network.

The availability of data will dictate the formation of the models to be estimated and the appropriate estimation techniques to use. Obviously, estimation possibilities will increase with as more relevant data are available.

4. Additional Model Considerations

In addition to standard supply and demand modeling considerations, there are several market specific aspects that must be accounted for in attempting to create a robust model. I have identified three such important aspects to include in an Alaska pollock market model: seasonal production adjustments, differences in inshore and offshore fishery sectors, and the effects of the 1998 American Fisheries Act (AFA).

4.1 Seasonal Adjustments

Seasonal considerations are common to fish market models, both on the demand and supply side. This effect can be seen most starkly on the production side where biological cycles and fishery management plans will have as much, or more, of an impact on production than demand forces. The Alaska pollock fisheries are no exception to this rule. The figures below give quarterly production of the three chief Alaska pollock products, based upon the weekly production reports of inshore and offshore processors.

Figure 4.1: Quarterly Roe Production (mt)

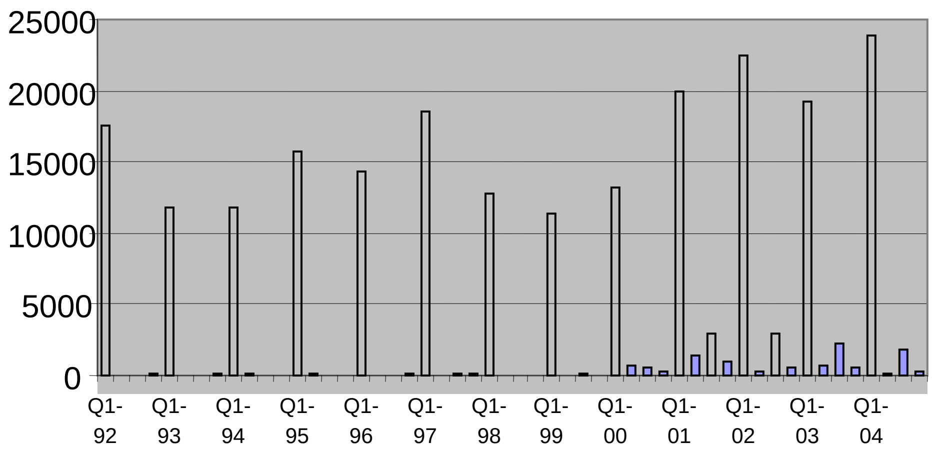


Figure 4.2: Quarterly Surimi Production (mt)

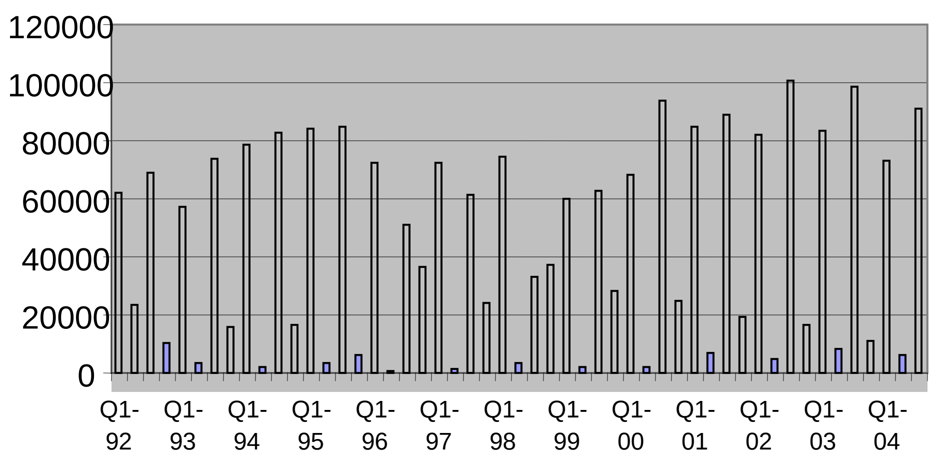
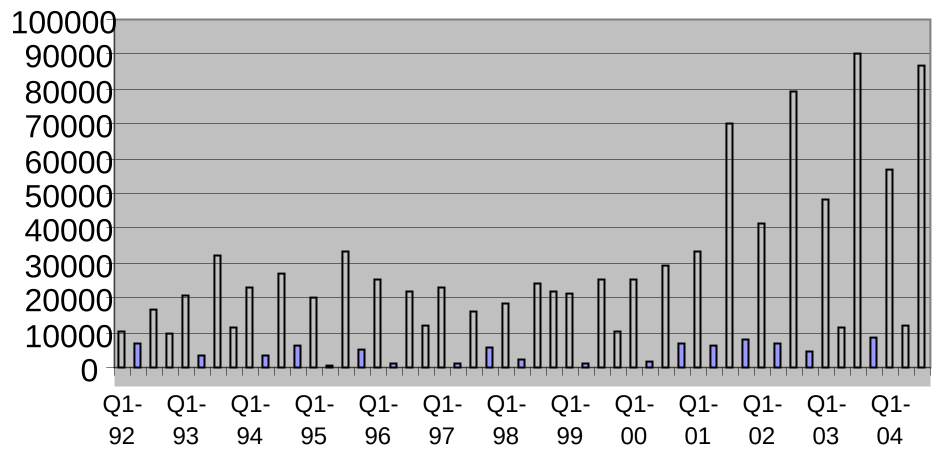


Figure 4.3: Quarterly Fillet Production (mt)



As can be seen from the tables above, within each year production exhibits strong seasonal patterns. Almost all roe production occurs in the first quarter of the year, while most surimi and fillet production occurs in the first and third quarters of the year, with more of each usually being produced in the third quarters. These production patterns are in line with the management plan of the Bering Sea and Aleutian Islands (BSAI) pollock fishery. The BSAI pollock fishery is divided into two seasons, A and B. 40 percent of the total allowable catch is allocated to season A, which runs from mid-late January until roughly the end of March. Given the biological cycle of pollock, this is the prime season for roe. The other 60 percent of the catch is allocated to season B, which runs from early-mid June until approximately the beginning of October. In this season, processors focus on pollock flesh products.[7]

From an econometric modeling standpoint, the seasonality problem is most often resolved with seasonal dummy variables. Herrmann *et al*. (1996) uses quarterly dummy variables in the Japanese surimi demand equation, the U.S. surimi supply equations, and in the inventory equations. Mazany *et al*. (1996) uses monthly dummy variables in both the supply and demand functions. However, seasonal dummies are not the only solution. If lower frequency data are used, such as the aggregated yearly data used in the Huppert and Best (2004) sablefish market study, the use of seasonal dummy variables is unnecessary. Also, the use of seasonal dummies implies that the seasonal pattern is strictly deterministic, as opposed to a stochastic seasonal pattern. If an analysis is conducted with monthly data, it is likely that at least some of the series will exhibit this stochastic seasonal trend or what is often referred to as seasonally-integrated data. If the series are seasonally integrated, the seasonal integration can cause inconsistency in estimation. It is therefore recommended that one checks for seasonal integration and applies the appropriate seasonal adjustment to the data before estimation.[8]

[7] There is also a Gulf of Alaska (GOA) pollock fishery, where the catch is allocated among four seasons. However, this fishery lands only a small fraction of the total Alaska pollock caught in the U.S.
[8] The standard test for seasonal integration in quarterly data is the HEGY test developed by Hylleberg, Engle, Granger and Yoo (1990). The test is extended to monthly data by Beaulieu and Miron (1993).

4.2 Inshore and Offshore Sectors

The catch of the BSAI Alaska pollock fishery is basically divided among two sectors: inshore and offshore. The inshore consists of catcher vessels and the shoreside processing plants to which they deliver. The offshore sector is primarily made up of catcher/processor vessels, but also includes motherships and the catcher vessels that deliver to them. If these two sectors react differently to market conditions, then one must consider the allocation of the TAC when considering the effects of changing the TAC.

There are numerous reasons why the processors of the inshore and offshore sectors may differ in their respective market reactions. One of those reasons is the difference in ownership structure. There are eight major inshore processors (six shoreside and two floating). Three of these facilities are owned by two major Japanese based seafood companies, Maruha and Nippon Suisan, and these facilities collectively processes approximately 50 percent of the inshore TAC allocation.[9] The significance of the Japanese ownership is the role those two companies play in the Japanese surimi market. Both Maruha and Nippon Suisan are extremely vertically integrated, with ownership of firms all along the surimi supply chain. Because they are the chief suppliers of surimi, it has been speculated that exert market power at levels throughout the supply chain. Wilen (1998) claims that "these two firms are notorious for exercising price leadership aimed at disciplining the markets for raw and semi-finished products in order to keep input prices low." Furthermore, the processors owned by these Japanese firms may be more likely to continue to make surimi during periods of depressed surimi wholesale prices in order to feed the Maruha and Nipon Suisan secondary production systems. If these statements are true, then a significant portion of the inshore processing is not being conducted according to the standard firm-level profit maximizing model.

The next apparent question to ask is if there is a similar vertically integrated ownership problem in the offshore sector. From my initial review, the industry does appear to operate in that manner. Currently, eight companies own the 19 catcher/processor vessels that are actively involved in the BSAI pollock fishery. Most of these firms are involved only in harvesting and first-level processing. The fully integrated Trident Seafoods is an exception. However, Trident likely lacks the market power to suppress wholesale prices.

Differences in processors ability to vary product mix may also lead to differences market reactions. It may be the case that it is more difficult to process a variety of products at sea compared to a shore-based processor. If so, it may be easier for an inshore processor to change its product mix in reaction to wholesale demand conditions.

4.3 AFA Effects

Undoubtedly, the 1998 AFA has affected the BSAI pollock fishery in many ways and there will most likely be an increase in literature dedicated to investigating those effects as the post-AFA data sets grow. For the purpose of attempting to model this fishery, I see two major structural changes to the harvesting/first-stage processing sectors brought about by the AFA. The first is the formation of co-ops, both inshore and offshore, and the second is a reallocation of the TAC. Effectively modeling both changes via some regime switching consideration will be crucial to developing an accurate market model.

[9] Maruha owns or has controlling interest in Westward Seafoods facility at Dutch Harbor and the Alyeska Seafoods facility. Nippon Suisan owns the Unisea, Inc. processing plant.

4.3.1 Cooperative Effects

Catcher/processors have operated under a cooperative system since 1999, while the inshore sector and motherships began the cooperative system in 2000. For the offshore sector, two catcher/processor co-ops were formed, the Pollock Conservation Cooperative (PCC) and the High Seas Catchers' Cooperative (HSCC), and one mothership coop was formed.[10] The inshore sector has formed seven coops, each one associated with the specific inshore processor to which they deliver their catch.[11]

The formation of the cooperatives has ended the race for fish. Theoretically, ending the race for fish should have several effects on the supply from the processors. First, it has been observed that since the race for fish has ended, vessels are making fewer tows per day and fewer fish per tow. This should reduce bruising and other harvest related damage to fish, thereby increasing the quality of the landed fish and presumably the subsequent fish products, particularly roe. For the processor, slower harvesting and processing has appeared to greatly improve recovery rates. The National Marine Fisheries Service (2004) reported that for members of the PCC the 1998 recovery rate per metric ton landed was 0.195, while in 2003 that measure jumped to 0.304.[12] The slower processing may also contribute to changing the product mix by allowing the processor the time needed to change product forms when necessary. Finally, with a longer season, the processors can introduce their products onto the market at a more constant pace, rather than dumping all of their products onto the wholesale market in a very short interval as was more likely the case during the pre-coop years. This should reduce variability in wholesale prices. The extent to which the longer seasons have dampened price variability may be reduced for the pollock fisheries because there is essentially no fresh fish market for pollock. However, a quick investigation of the implicit export and (European) import prices for fillets (figures 4.4 and 4.5, respectively) shows that the variance in the data has decreased since 2000.

4.3.2 Allocation Change

Prior to the AFA, the offshore was allocated 65 percent of the TAC, while the inshore garnered the other 35 percent. The AFA changed this allocation, starting in 1999. First, 10 percent of the TAC was allocated as a directed fishing allowance to the western community development quota program. Of the remaining TAC, 50 percent went to the inshore sector and 50 percent went to the offshore sector. The offshore sector allocation was broken down further, giving 40 percent to the catcher/processor sector and 10 percent to the mothership sector. In compensation for the reduced TAC allocation, the catcher/processor sector was given a $95 million buyout payment, which is paid for by the inshore sector.

The effect that this reallocation has on the supply of products from the BSAI pollock fishery, and thus the revenue generated by the fishery, depends primarily on the potential difference between the ability of the processors in the inshore and offshore sectors to react to wholesale markets (i.e. price elasticities of supply). If the inshore sector's price responses are hampered by concerns related to vertical integration (as described in section 4.2), they could generate less first-wholesale value from the fishery resource than if they were fully responsive to price signals.

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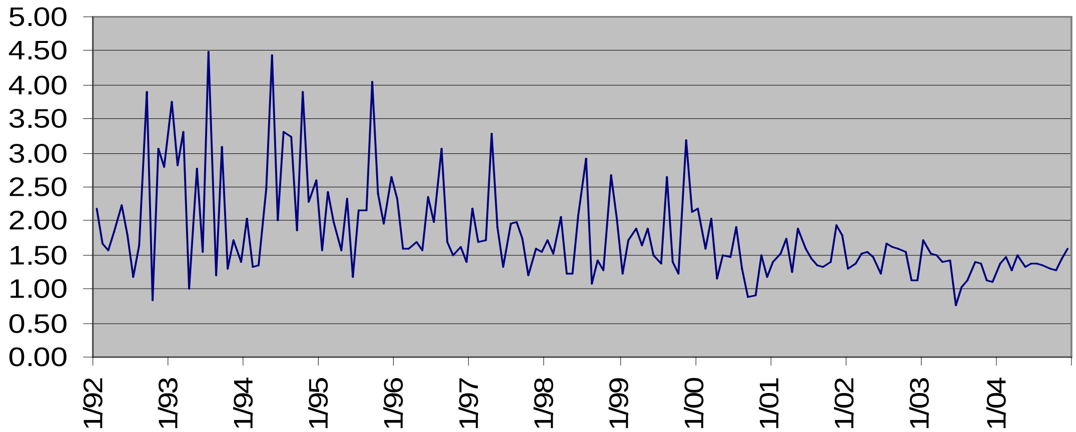
[10] The HSCC is a cooperative of the catcher vessels eligible in the catcher/processor sector. Through an inter-coop agreement with the PCC, individual members of the HSCC have transferred all of their pollock allocation to individual members of the PCC.

[11] Of the eight inshore processors, only the Trident Seafoods – Sand Point facility does not have an associated cooperative.

[12] The extent to which the slower processing has increased recovery rate has not been quantified, but according to Levis Kochin, contracted economist for Trident Seafoods, he suggests it is the major factor behind the improvement.

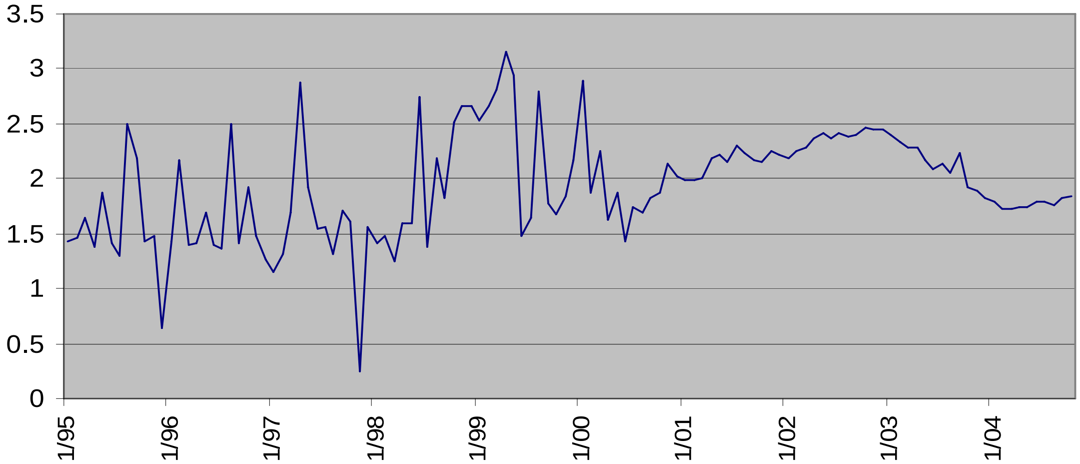
Alternatively, certain production characteristics of the inshore processors may allow them to adjust more quickly to changing wholesale markets, thus offsetting some of the value loss that could arise from the vertical integration concerns discussed above.

Figure 4.4 - Alaska Pollock Monthly Implicit Export Price* ($/kg)



*base year 1982, price calculated as monthly value of exports divided by quantity exported

Figure 4.5-Alaska Pollock Fillet Monthly Implicit European Import Price*(€/kg)



*price calculated as monthly value of EU import divided by quantity imported

5. Proposed Research

Given that the purpose of this research is to examine the effect of a change in the TAC, some measure of elasticity must be estimated. If most of the products from Alaska pollock were sold in one region, say Japan, then it may be possible to estimate the demand for pollock for that region using the methods described in section 2.2. Getting a price elasticity of demand estimate would then allow one to quantify the price response, and subsequently the revenue response, to a change in the TAC. However, given the relevance of Alaska pollock products in several different markets, such an approach might not accurately describe the effects of a TAC change. If one believed that the supply of products from the BSAI and GOA pollock fisheries did not affect the various market prices for pollock products, then perhaps estimating supply curves would be a useful study. With an estimated supply curve for the processors that is a function of the TAC, it could be determined how a change in the TAC affects product mix. If it is assumed that the supply from these processors doesn't affect market prices, one could also estimate how changes in the TAC affects revenue. This approach would be difficult because cost data are generally unavailable -- making it difficult to create theoretically consistent supply curves and the assumption that the supply from the processors does not affect market prices most likely does not hold. That leaves the supply and demand simultaneous equation estimation approach and cointegration approaches, both of which I believe are most appropriate for obtaining elasticity measures in this situation.

5.1 Supply and Demand Systems Approach

The simultaneous demand/supply model that I wish to develop will be focused on the processor-to-wholesalers link of the market chain. It will be an extension of the Herrmann *et al*. (1996) paper. Their study focused on the wholesale market for surimi, and estimated a Japanese import demand equation, a U.S. export supply equation, and inventory demand equations. I too plan to model, in a similar fashion, the surimi market, but I will also attempt to incorporate demand and supply equations for roe and fillets. Roe is primarily sold to Japanese markets, so I will include Japanese import demand and U.S. supply equations for roe in the system. Traditionally, most fillet production has been supplied to domestic markets, but the importance of European markets has grown substantially over the past few years. Therefore, I will include U.S. supply and demand equations in the system, and possibly a European demand equation. Inventory equations for both fillet and roe will also be included.[13]

Beyond adding the fillet and roe markets to the Herrmann *et al.* model, I also plan to extend their work by controlling for sector-specific processing effects from the inshore and offshore.[14] As discussed above, there are several reasons to believe that the two processing sectors might react differently to changes in the wholesale markets. Quantifying the differences will help policy makers in determining TAC allocations.

After the model has been estimated, I plan to make revenue projections under scenarios of varying TAC levels, wholesale market conditions, and TAC allocation regimes. These projections are meant to answer the underlying questions motivating this research.

I feel comfortable with the general structure of this approach in that it attempts to model the important products of Alaska pollock in the most significant markets, and provides a means to project revenues under various TAC scenarios (while remaining tractable). However, several key issues must be addressed before estimating the model. Below is a synopsis of some of these issues.

1. I need to determine the time span and frequency of the data that will be examined. Given the production data available through the processors' weekly production reports and the various price data, I would like to use monthly data from 1992 through 2004. Unfortunately, this span may create some missing data problems. Japanese import data, wholesale market prices data, and cold storage data are only available back to 1996 on the NMFS website. Based on other studies, it appears data on these variables does exist prior to 1996, but I have been unable to locate it as of yet. U.S. storage data does not exist after 2002. Possible solutions to this problem may be to stop the sample at 2002 or to create some inventory distribution and project the last two years of data. Using monthly data frequency might also create problems. The higher the frequency of data used, the more important seasonal effects will be. Using more dummy variables to

[13] It will not be possible to estimate an inventory demand equation for roe in the U.S. due to a lack of data.

[14] It is also possible to break the data down even further, for instance controlling for sector specific effects from the inshore, catcher/processor, and mothership sectors. Different decompositions will most likely be tested.

explain this will use many degrees of freedom. On the other hand, if lower frequency data are used, the sample size will become alarmingly small.

2. Functional forms for the equations need to be determined. The literature offers no set guidelines for this problem. Given the lack of theoretical underpinnings for the specific equations being estimated in the simultaneous equation models, the solution to this problem will most likely be trial and error. Also, in lieu of choosing specific forms, it may be possible to use a model averaging approach.
3. The estimation technique has not yet been determined. Initially, I planned on employing a multiple equation GMM estimation procedure because of the modest distributional assumptions that need to be made with it. However, the small-sample performance of GMM estimators has been called into question as of late, making the use of this technique much less desirable for this study.[15] Further distributional assumptions could be imposed, making equation-by-equation two-stage least squares or three-stage least squares estimation approaches possible. When the assumptions are correct, these techniques outperform GMM estimators. Another advantage of these techniques is that either could easily be applied; the procedures are built in to many regression software packages. The disadvantage is that the distributional assumptions may be indefensible.

5.3 Cointegration Model

I also plan on using cointegration analysis to model this market. Of course, the use of this modeling technique is contingent upon data being I(1).[16] If this is the case, there are many advantages of using a cointegration analysis over techniques based on the assumption of stationary data, as outlined in section 3.3. Furthermore, the cointegration approach may allow one to side-step some of the structural modeling problems that would plague the simultaneous equation approach.

Again, I would like to quantify the differences, if any exist, between the inshore and offshore sectors. In particular, I plan to estimate the cointegrating relationship between prices and quantities produced by the inshore processors and the offshore processors. Other grouping considerations will also be considered, with the goal being to determine the long-run relationship between prices and quantities for the producers, and to estimate how quickly each sector reverts to these long-run relationships. With these estimates it will be possible to get a better understanding of the dynamic effects of a change in the TAC.

Certainly, there will be data issues, market specific issues, and general econometric estimation issues that will arise in the course of this modeling approach. I have identified several of these problems already, which include:

1. Obtaining reliable fillet product prices for the entire time period.
2. Appropriately modeling both the deterministic seasonality and stochastic seasonality.
3. Accounting for the possibility of a break in the estimated long-run relationship due to AFA considerations.

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[15] Despite the poor performance of GMM estimators in small samples, other moment based estimation techniques may be appropriate. Minimum divergence estimators, for example, are often used in place of GMM estimators in smaller samples.

[16] I have run preliminary tests that indicate that relevant price and production series are in fact I(1); some of the series also appear to have seasonal unit roots.

5.4 Other Research

The proposed research I have described above looks at addressing how changes in the TAC affects the revenue at the processor level. However, this neglects a very important segment of the fishery -- the catcher vessels of the inshore sector. It is unclear how changes in inshore processors' revenues will propagate down to the catcher vessels. The mutual interdependence between the catcher vessels and processors makes using tools taken from game theory and bargaining theory to describe their relationship more appropriate than analysis under common perfect competition assumptions. Therefore, I would also like to pursue a research agenda dedicated to better describing the catcher vessel and processor relationships in the inshore sector. Below is a list of several more specific ideas I would like to pursue in looking at this interaction:

1. Some have speculated that the inshore processors have colluded to some extent and are exerting near monopsonistic power over catcher vessels. To my knowledge, there has been no study that has officially tested the degree of market power that processors may possess. I think that an empirical test for market power would be a much needed first step in exploring this market.
2. As discussed above, with the passing of the 1998 AFA, inshore catcher vessels have formed cooperatives. Clearly, the formation of these coops have changed the dynamics of the relationship between processors and catcher vessels. I would like to inspect more closely what impact, if any, this has had on the ex-vessel pricing and to what extent, if any, the proportion of processor controlled catcher vessels in the coop affects the ex-vessel pricing.
3. Coop formation has also changed the way in which fishing is conducted, beyond just ending the race for fish. The cost of sharing information has been drastically reduced. Furthermore, when roe bonuses are awarded, management schemes have been developed by processors to reward skippers for information sharing. I would like to more formally model the effects of the coops on information dissemination using a principal/agent contract theory approach.
4. The formation of the coops have also drastically changed the property rights of the inshore sector. Again, to my knowledge, no one has formally modeled this ownership structure. Formally modeling this property right regime might help policy makers in determining which, if either, of the two parties this system favors.

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The Demand for Halibut Sport Fishing Trips in Alaska

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The National Marine Fisheries Service (NMFS) is the agency responsible for collecting and analyzing scientific data on the Nation's living marine resources, and for managing the Alaska halibut sport fishery. Under the Magnuson-Stevens Fishery Conservation and Management Act (see Section 303), Executive Order 12962 (Marine Recreational Fishery Statistics, Section 1(h)), and Executive Order 12866 (Section 1(b)(6)), NMFS is required to provide economic analyses of Federal management actions and policies to improve the Nation's fisheries. This data collection project will meet these statutory and administrative requirements by providing resource managers with the information necessary to understand the likely future impacts of management actions on the Alaska halibut sport fishery.

The halibut sport fishery in Alaska is quite large. In 2000, for instance, over 400,000 halibut were harvested by sport anglers in the state (Walker, et al., 2003). In recent years, several regulatory changes have been proposed that could significantly impact the sport fishery. In August 2003, a guideline harvest limit (GHL) policy was implemented to regulate the Pacific halibut guided recreational fishery in Alaska. This policy sets a limit on the amount of halibut that can be harvested by the guided recreational fishery and establishes a process for the North Pacific Fishery Management Council (Council) to initiate harvest restrictions in the event that the limit is met or exceeded. Numerous harvest restrictions may be adopted by the Council in the event the GHL is surpassed, including reducing the allowable catch. Catch by non-charter boat recreational halibut anglers are not subject to the GHL and are accommodated through reductions in the commercial TAC. In addition in April 2001, the Council approved an individual fishing quota (IFQ) program for the halibut sport fishing charter fleet in Alaska that would supersede the GHL policy if implemented. The IFQ program is currently under review by the Secretary of Commerce. If implemented, the charter IFQ program would be integrated into the commercial IFQ program, and limited quota shares would be allowed to be voluntarily traded into the charter sector from the commercial sector. To assess the impacts of pending and potential regulatory changes on sport angler behavior, it is necessary to have estimates of the baseline demand for halibut fishing trips and an understanding of the factors that affect it.

To this end, a project is currently underway to develop and implement a survey that collects information about saltwater recreational fishing trips in Alaska. The project consists of three major phases. The first phase involves developing and pre-testing the survey instrument. This phase includes testing the survey instrument using focus groups, cognitive interviews, and a formal pretest survey implementation. These activities are anticipated to be complete in 2006, pending OMB approval. Once the survey has been developed and tested, it will be implemented through a mail survey of Alaska sport anglers during the second phase of the project. The survey implementation will follow a modified Dillman Tailored Design Method to maximize response. In the final phase of the project, data will be analyzed and results reported.

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The Nonconsumptive Value of Steller Sea Lion Protection

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Steller sea lions (*Eumetopias jubatus*) live in the North Pacific Ocean and consist of two distinct populations, the Western stock and Eastern stock, which are separated at 144° W longitude. As a result of large declines in the populations since at least the early 1970s, in April 1990 the Steller sea lion (SSL) was listed as threatened throughout its range under the Endangered Species Act (ESA) of 1973 (16 U.S.C. 35). The decline has continued for the Western stock in Alaska, which was declared endangered in 1997, while the Eastern stock remains listed as threatened. Both the Western and Eastern stocks are also listed as depleted under the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1362).

NMFS is the primary agency responsible for the protection of marine mammals, including Steller sea lions. Multiple management actions have been taken (e.g., 68 FR 204, 68 FR 24615), and are being contemplated, by NMFS to protect and aid the recovery of the SSL populations. These actions differ in the form they take (limits on fishing to increase the stock of fish available for Steller sea lions to eat, area restrictions to minimize disturbances, etc.), which stock is helped, when and how much is done, and their costs. In deciding between these management actions, policy makers must balance the ESA and MMPA goals of protecting Steller sea lions from further declines with providing for sustainable and economically viable fisheries under the Magnuson-Stevens Fishery Conservation Act (P.L. 94-265). Since Steller sea lion protection is linked to fishery regulations, decision makers must comply with several federal laws and executive orders in addition to the ESA and MMPA, including Executive Order 12866 (58 FR 51735), which requires regulatory agencies to consider costs and benefits in deciding among alternative management actions, including changes to fishery management plans made to protect Steller sea lions.

Public preferences for providing protection to the endangered Western and threatened Eastern stocks of Steller sea lions are primarily the result of the non-consumptive value people attribute to such protection. Little is known about these preferences, yet such information is needed for decision makers to more fully understand the trade-offs involved in choosing between management alternatives. How much the public is willing to pay for increased Steller sea lion stock sizes or changes in listing status, as well as preferences for geographic distribution, is information that can aid decision makers to evaluate protection actions and more efficiently manage and protect these resources, but is not currently known.

NMFS is currently conducting a study to collect information that can provide insights into public values for protecting Steller sea lions (see the survey instrument that follows this description). During 2004 and 2005, a survey instrument was developed with the assistance of experts in non-market valuation, environmental economics, and survey research, as well as fisheries scientists and researchers who study Steller sea lions. It was extensively tested using qualitative focus groups and one-on-one cognitive interviews conducted in Seattle, WA, Denver, CO, Sacramento, CA, Rockville, MD, and Anchorage, AK. A formal pretest implementation is currently underway and is expected to be completed by 2006. The final survey implementation will follow upon Office of Management and Budget (OMB) approval.

Since threatened and endangered (T&E) species, like Steller sea lions, are not traded in observable markets, standard market-based approaches to estimate their economic value cannot be applied. As a result, studies that attempt to estimate these values must rely on survey-based non-market valuation methods, which involve asking individuals to reveal their preferences or values for non-market goods, such as the protection of T&E species, through their responses to questions in hypothetical market situations.

This study employs a choice experiment (CE), or stated choice, approach for eliciting economic values for

Steller sea lions.[17] CE methods are relatively new to the valuation of environmental goods, despite having a long history in the marketing and transportation fields (e.g., Louviere [1992]).[18] A typical CE involves presenting respondents with two or more choice questions, each having a set of alternatives that differ in attributes. For each question, respondents are asked to select the alternative they like best. The choice responses are used to estimate a preference function that depends upon the levels of the attributes. Adamowicz, Louviere, and Swait (1994) were the first to apply the method in non-market valuation in a study of recreational opportunities in Canada. Since then, CE has been used in a number of studies to estimate use values for activities like hunting (Adamowicz, et al., 1997; Bullock, Elston, and Chalmers, 1998) and climbing (Hanley, Wright, and Koop, 2002). The approach has also been used to estimate non-consumptive use values associated with forests in the UK (Hanley, Wright, and Adamowicz, 1998) and Woodland caribou habitat (Adamowicz, et al., 1998).

Stated choice data collected through the survey will be used by NMFS to estimate a preference function for explaining choices between protection programs that differ in the levels of population sizes, ESA listing status, geographic distribution, and costs. This estimated function will provide NMFS and the NPFMC with information on public preferences and values for alternative Steller sea lion protection programs, and how several factors affect these values. This information can then be compared with program costs and other impacts when evaluating protection alternatives.

The current survey instrument is included below the following references.

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The Future of Steller Sea Lions
What is Your Opinion?

Your participation in this survey is voluntary. All responses are confidential and any material identifying you will be destroyed at the end of the study.

This survey is funded by the National Oceanic and Atmospheric Administration, a U.S. government agency charged with making decisions about Steller sea lion management activities.

The material in this survey is based on the best available information from government, university and industry scientists.

OMB Control #: 0648-0511

Expiration Date: July 31, 2008

The Issue: Threatened and Endangered Steller Sea Lions

The Steller sea lion is protected as a threatened and endangered species under the U.S. Endangered Species Act. According to the act:

> An endangered species is a plant or animal species that is in danger of going extinct in the areas where it normally lives.
>
> A threatened species is a species that is at risk of becoming endangered in the areas where it normally lives.

There currently are 74 mammals, 92 birds, 115 fish, 236 other species such as reptiles and insects, and 746 plants listed as threatened or endangered under the Endangered Species Act.

The Endangered Species Act requires the federal government to take reasonable actions to protect threatened and endangered species, such as banning hunting or protecting the places where they live.

Q1 ***When you think of the Endangered Species Act, how positive or negative is your general reaction?*** Circle the number of the best answer.

1 Mostly positive
2 Somewhat positive
3 Neutral
4 Somewhat negative
5 Mostly negative
9 Don't know

Q2 **Protecting threatened and endangered species is just one of many issues facing the U.S. For each of the issues below, do you think we should be doing less, doing about the same, or doing more?** *Mark* the *box* ☒ *of your response for each item.*

	Do less	Do about the same	Do more
Make government more efficient	1 ☐	2 ☐	3 ☐
Improve education	1 ☐	2 ☐	3 ☐
Protect threatened and endangered species	1 ☐	2 ☐	3 ☐
Improve roads and highways	1 ☐	2 ☐	3 ☐
Encourage economic growth and jobs	1 ☐	2 ☐	3 ☐
Clean up air and water pollution	1 ☐	2 ☐	3 ☐

Some people are interested in protecting threatened and endangered species because:

- They may be a source of enjoyment and learning for people now and in the future.
- They may help to maintain a healthy ecosystem.
- They exist and should not be endangered by man's actions.

Some people are concerned about the costs of protecting threatened and endangered species because the protection activities may:

- Place restrictions on what people can do, such as limiting recreation, forestry, and fishing activities.
- Increase the cost of producing and providing goods such as food, drinking water, and lumber.

Q3 **How much do you agree or disagree with the following statements?** *Mark the box ☒ of your response for each statement.*

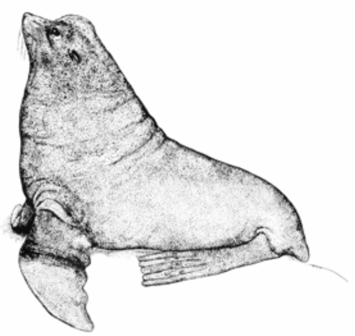
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Protecting threatened and endangered species is important to me............................	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Protecting jobs is more important than protecting threatened and endangered species..	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Seals and Sea Lions in the U.S.

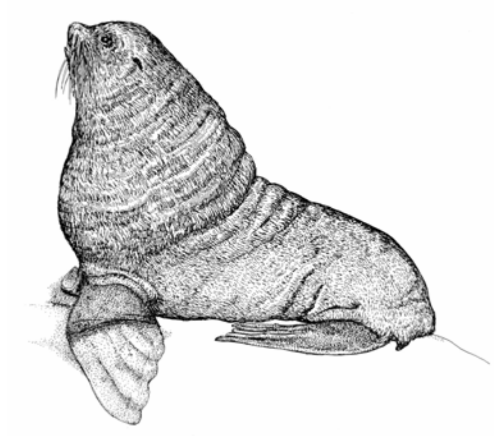
- Today, most seals and sea lions in U.S. waters are found in the Pacific Ocean. The figure on the next page shows pictures of seal and sea lion species found along the Pacific Coast from California to Alaska and in Hawaii.
- About 50 to 100 years ago, several seal and sea lion species in U.S. waters were nearly hunted to extinction, but with bans on hunting and other protection actions, these species have rebounded.

Seals and Sea Lions found along the Pacific Coast from California to Alaska and in Hawaii

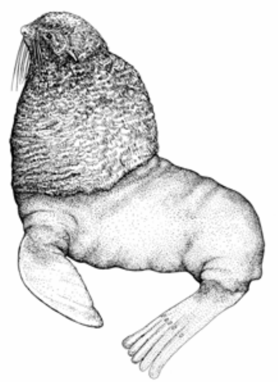
Almost 2 million total



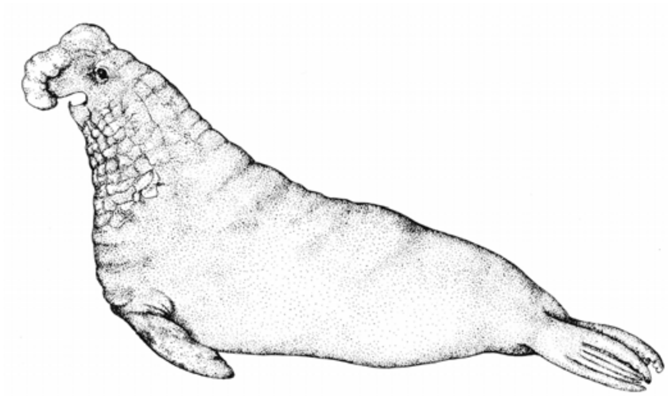
CALIFORNIA SEA LION
About 200,000 and increasing.
Many in California.



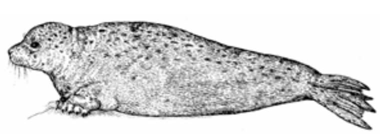
STELLER SEA LION
About 80,000 and decreasing.
Listed as endangered in most of Alaska.



NORTHERN FUR SEAL
About 800,000 and decreasing.



NORTHERN ELEPHANT SEAL
About 150,000 and stable.
Once nearly extinct.



HARBOR SEAL
About 300,000 and stable.

OTHERS
Guadalupe fur seal (listed as threatened), Hawaiian monk seal (listed as endangered), ringed seal, spotted seal, bearded seal, and ribbon seal.
About 300,000 and slowly decreasing.

Today, three seal and sea lion species in U.S. waters are listed as threatened or endangered.

- *The Guadalupe fur seal (found mostly in Mexico, with a few in Southern California) is listed as threatened. Since hunting was banned, its population has been increasing.*
- *The Hawaiian monk seal, found only in Hawaii, is listed as endangered. With protection efforts over the past 20 years, its population remains small but is no longer decreasing.*
- *The Steller sea lion is listed as endangered and its population continues to decline. It is the only seal or sea lion species where additional protection efforts are now being considered under the Endangered Species Act.*

Q4 ***Have you personally observed seals or sea lions in nature (outside of zoos and aquariums)?*** Circle the number of the best answer.

1 Yes
2 No
9 Don't know

Some Steller Sea Lion Facts

- Steller sea lions are the largest sea lions. They can grow to 11 feet long and weigh up to 2400 pounds.
- An adult Steller sea lion eats about 10 tons of food per year, mostly fish like pollock, mackerel, herring, cod, and salmon that commercial fishermen catch for people to eat.
- They do not migrate and generally stay within a few hundred miles of where they are born.
- Aside from the fish they eat, scientists have not identified any species that are greatly affected by how many Steller sea lions there are.

Q5 Before today, had you ever seen, heard, or read about Steller sea lions? *Circle best answer.*

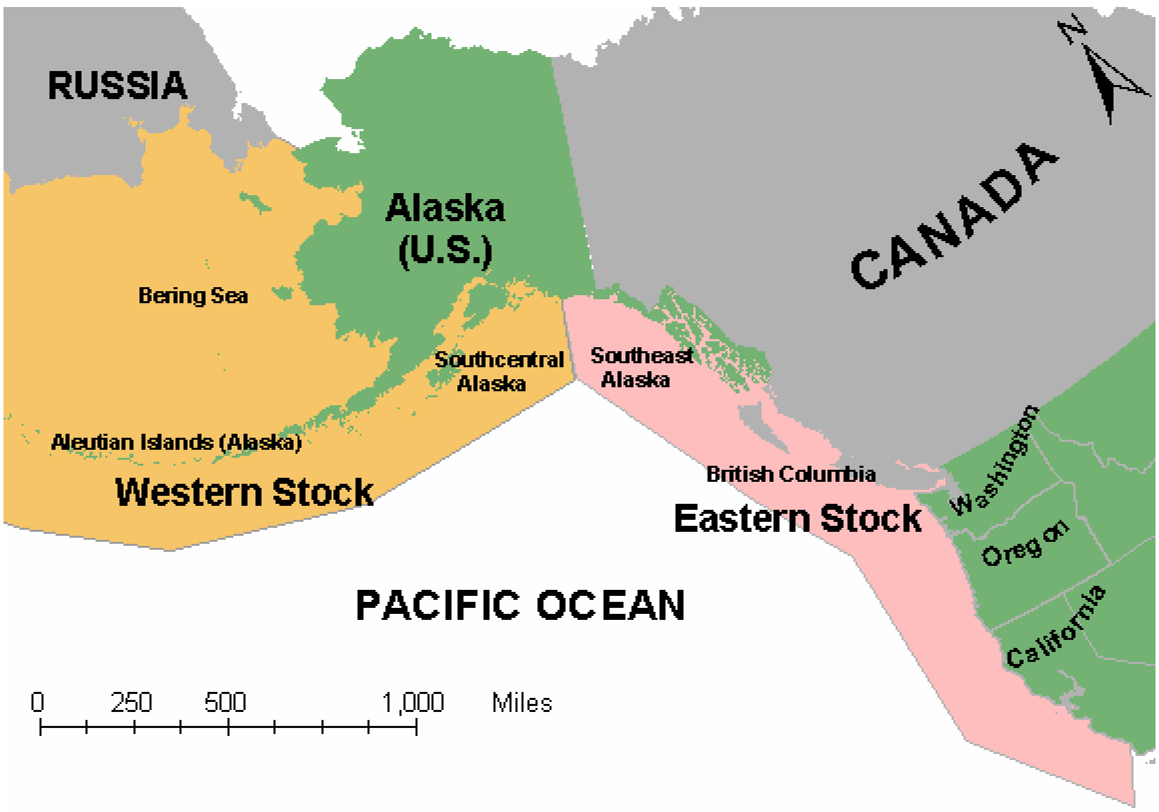
1 Yes
2 No
9 Don't know

The Western and Eastern Stocks of Steller Sea Lions

Scientists divide the Steller sea lion species into two groups, called "stocks". These stocks have small genetic differences, live in different areas, and rarely mix. The map below shows the areas where each stock swims and fishes.

Western stock: From Southcentral Alaska to the Aleutian Islands of Alaska

Eastern stock: From California to Southeast Alaska

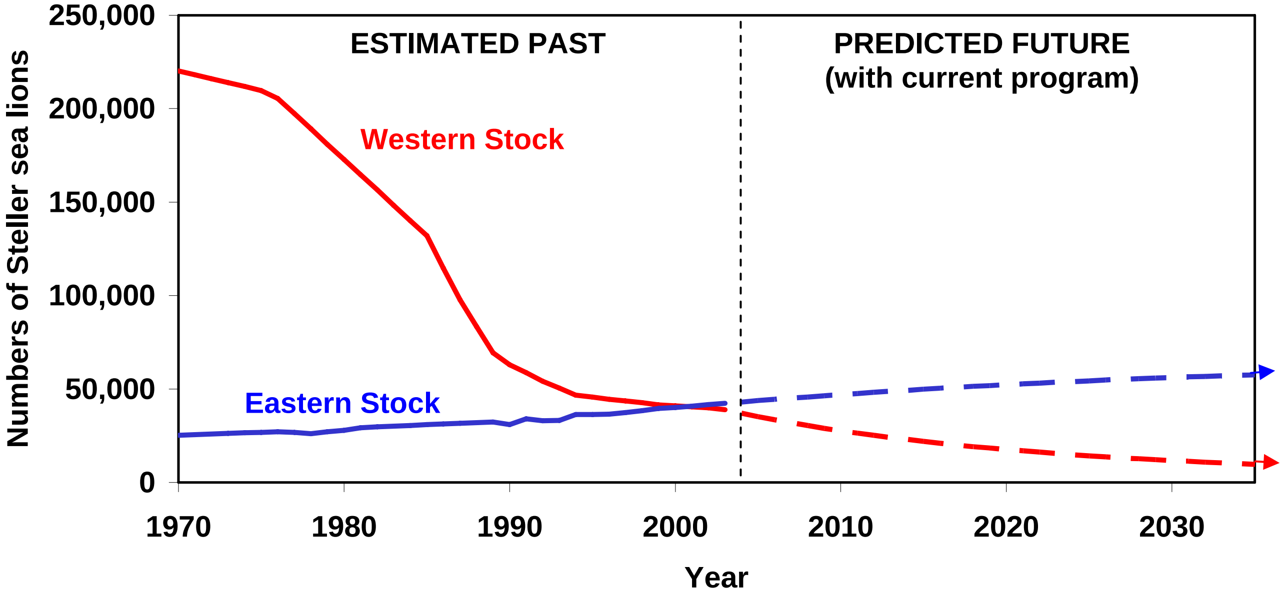


Most Steller sea lions live in U.S. waters, where activities like hunting and fishing are subject to U.S. laws. Russia (where only a few Steller sea lions live) and Canada also protect Steller sea lions with laws similar to those in the U.S.

Q6 **Have you ever lived in or visited coastal areas of Alaska where the <u>Western stock</u> live?**
Circle the number of the best answer.

1 Yes
2 No

The figure below shows the <u>estimated past</u> population of Steller sea lions from 1970 to 2003. The figure also shows the <u>predicted future</u> population if recent trends continue.



Over the past 15 years, the federal government has taken actions to protect Steller sea lions, such as banning shootings of Steller sea lions and starting restrictions on commercial fishing.

With these actions:

- The <u>Western stock</u> currently is listed as <u>endangered</u>. The population continues to decrease but at a slower rate than before these actions were taken.
- The <u>Eastern stock</u> currently is listed as <u>threatened</u>. The population is slowly increasing in most areas. Scientists believe the Eastern stock may no longer be threatened in about 20 years.

Q7 **After looking at the information on this page, how concerned are you, if at all, about the Western and Eastern stocks of Steller sea lions?** *Mark the box ☒ of your response.*

	Not at all concerned	A little concerned	Somewhat concerned	Very concerned	Extremely concerned
Western stock...	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Eastern stock.................................	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Steller Sea Lions and Commercial Fishing

Scientists believe a major threat to the Western stock of Steller sea lions is commercial fishing catching the same fish that Steller sea lions eat.

- Few people know that in the last 30 years there has been a large increase in commercial fishing where the Western stock live. Now, nearly half of all U.S. commercial fish are caught in these waters.
- Commercial fishing is not considered a major problem where the Eastern stock live.

The federal government has started restricting commercial fishing in areas where the Western stock of Steller sea lions live so that more fish are available for them to eat.

- The current program of fishing restrictions limits where and how often boats can fish and the amount and type of fish they can catch.
- Even with the current program, scientists believe the Western stock will remain endangered, and in 60 years will decrease in population from today's 40,000 to less than 1,000 (they would be nearly extinct).

Q8 **Commercial fishing restrictions to help Steller sea lions have made fishing more costly. The result has been some loss of jobs and income to commercial fishermen (estimated to be 5% or less so far). This has also led to higher fish prices.**

How concerned are you, if at all, about each of the following? *Mark the box ☒ of your response.*

	Not at all concerned	A little concerned	Somewhat concerned	Very concerned	Extremely concerned
Lost commercial fishing jobs due to Steller sea lion protection………….............................	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
Higher prices for fish you buy due to Steller sea lion protection…………………	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Additional Steller Sea Lion Protection

To prevent the Western stock of Steller sea lions from going extinct, the federal government is considering more fishing restrictions, more enforcement of the fishing restrictions, and more monitoring of Steller sea lions. Depending on what is done, the Western stock may even recover.

- "Recover" means the population increases enough so that it is no longer endangered or threatened.
- Some of the Eastern stock may also be helped by additional fishing restrictions.
- But, scientists believe the additional actions will have little impact (good or bad) on other species.

Doing more to protect the Western stock of Steller sea lions will cost every U.S. household more money.

- Your household's costs increase through <u>higher prices for fish and fish products you buy</u> and through <u>increases in your federal taxes</u>.
- Most of the increased cost will occur in the first 20 years while commercial fishing adjusts to more restrictions, and to fund government monitoring and enforcement.

Q9 **How much do you agree or disagree with the following statements?** *Mark the box ☒ of your response for each statement.*

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Even if it costs us more money, we should do more so that the Western stock never goes extinct..	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
So long as the Eastern stock recovers, it doesn't matter to me if the Western stock goes extinct..	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Q10 The 15,000 Steller sea lions living near the Aleutian Islands (see map on page 5) are the most affected by commercial fishing and will be the first to go extinct. Protecting Steller sea lions living near the Aleutian Islands would require doing more and spending more than protecting Steller sea lions that live in other Western stock areas.

Which of the following options do you prefer for protecting areas where the Western stock of Steller sea lions live? *Circle number of best response.*

1 Protect the Western stock in <u>most areas</u> where they currently live, even if it costs more.

2 Protect the Western stock in <u>most areas</u> where they currently live, <u>except</u> along the Aleutian Islands. This would cost less.

3 Don't do or spend any more to protect the Western stock, even though they may become nearly extinct and live in <u>very few areas</u> where they currently live.

What Alternatives Do You Prefer?

As we have discussed, alternatives are being considered to do more to protect Steller sea lions. Your opinions are important to help understand what alternatives the public prefers.

The next several questions compare the expected results after 60 years under alternative programs of fishing restrictions and government enforcement and monitoring. In each question:

- Alternative A presents the expected results after 60 years under the <u>current program</u>. Continuing the current program would not increase the costs to your household.

- Alternatives B and C present the expected results after 60 years under two of the many possible alternatives that <u>do more and cost more</u> to protect Steller sea lions.
  - The added cost to your household each year for 20 years above the cost of the current program is also listed.
  - Remember, if you spend money for this, it won't be available to buy other things.

Since scientists are still working on the alternatives and the costs, we are asking you several questions (Q11, Q13, Q14) that cover a range of possible alternatives and costs.

Q11 Below the table, indicate which of these three alternatives you most prefer, and which you least prefer.

	Results in 60 years for each alternative		
	Alternative A **Current program**	**Alternative B**	**Alternative C**
Western Stock Population status……………. (Endangered now)	Endangered	Endangered	Endangered
Population size……………… (40,000 now)	Nearly extinct Less than 1,000	30,000	40,000
Areas where they will live….. (Compared to where they now live)	Very few areas	Most areas except along the Aleutian Islands	Most areas
Eastern Stock Population status……………. (Threatened now)	Recovered	Recovered	Recovered
Population size……………… (40,000 now)	60,000	60,000	60,000
Added cost to your household each year for 20 years…………	$0	$15	$25

	<u>**Alternative A**</u>	<u>**Alternative B**</u>	<u>**Alternative C**</u>
Which alternative do you <u>prefer the most</u>? *Check one box------>*	☐	☐	☐
Which alternative do you <u>prefer the least</u>? *Check one box------>*	☐	☐	☐

Q12 Please write a comment that helps us understand your responses in Q11.

____

____

____

Q13 Here again is the current program and two other alternatives. Below the table, indicate which of these three alternatives you most prefer, and which you least prefer.

	Results in 60 years for each alternative		
	Alternative A Current program	**Alternative B**	**Alternative C**
Western Stock Population status……………. (Endangered now)	Endangered	Threatened	Recovered
Population size……………… (40,000 now)	Nearly extinct Less than 1,000	75,000	200,000
Areas where they will live….. (Compared to where they now live)	Very few areas	Most areas	Most areas
Eastern Stock Population status……………. (Threatened now)	Recovered	Recovered	Recovered
Population size……………… (40,000 now)	60,000	80,000	80,000
Added cost to your household each year for 20 years…………	$0	$45	$75

	<u>Alternative A</u>	**<u>Alternative B</u>**	**<u>Alternative C</u>**
Which alternative do you <u>prefer the most</u>? *Check one box------>*	☐	☐	☐
Which alternative do you <u>prefer the least</u>? *Check one box------>*	☐	☐	☐

Q14 Below the table, indicate which of these three alternatives you most prefer, and which you least prefer.

	Results in 60 years for each alternative		
	Alternative A **Current program**	**Alternative B**	**Alternative C**
Western Stock Population status……………. (Endangered now)	Endangered	Endangered	Recovered
Population size……………… (40,000 now)	Nearly extinct Less than 1,000	20,000	200,000
Areas where they will live….. (Compared to where they now live)	Very few areas	Most areas except along the Aleutian Islands	Most areas
Eastern Stock Population status……………. (Threatened now)	Recovered	Recovered	Recovered
Population size……………… (40,000 now)	60,000	60,000	60,000
Added cost to your household each year for 20 years…………	$0	$10	$65

	<u>**Alternative A**</u>	<u>**Alternative B**</u>	<u>**Alternative C**</u>
Which alternative do you <u>prefer the most</u>? *Check one box------>*	☐	☐	☐
Which alternative do you <u>prefer the least</u>? *Check one box------>*	☐	☐	☐

Q15 The following are statements some people tell us about their answers to Q11, Q13, and Q14. How much do you agree or disagree with each of the following statements? *Mark the box ☒ of your response for each statement.*

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I did not feel it was my responsibility to pay for the protection of Steller sea lions…	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
There was not enough information for me to make an informed choice between the alternatives……………………………...	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
The added costs I was willing to pay were just to protect Steller sea lions, and not to protect other species……………………….	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
I was concerned that the federal government will not effectively protect Steller sea lions……………………………	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
I should not have to pay more federal taxes for any reason……………………………...	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

Q16 These questions were asked to obtain public input for decision makers to consider along with information from scientists and planners. People feel differently about how confident they are with their selection of alternatives and the costs they would have to pay.

How confident are you that your answers in Q11, Q13, and Q14 accurately reflect how you feel about the alternatives for protecting Steller sea lions? *Check the best answer.*

Not at all confident	Slightly confident	Somewhat confident	Very confident	Extremely confident
1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

About You and Your Household

This information is used to compare our survey respondents with the U.S. population. Your responses will be kept confidential and separate from your name and address. Material identifying you will be destroyed at the end of the study.

H1 **Are you male or female?** 1 Male 2 Female

H2 **In what year were you born?** 19_____

H3 **How many people do you live with in each of the following age groups?**
If none for a category please write "0".

_____ Under 18 _____ 18 to 35 _____ 36 to 60 _____ Over 60

H4 **Which of the following best describes your employment status?** *Circle number of the best answer.*

1 Employed full-time
2 Employed part-time
3 Homemaker
4 Student
5 Retired
6 Currently unemployed
7 Other (*please specify)*_____________________

H5 **Have you or a family member been employed in the commercial fishing industry?**
Circle the best answer.

1 Yes
2 No
9 Don't know

H6 **What is the highest grade or level of school you have completed?** *Circle number of the best answer.*

1 Some high school or less
2 High school diploma or equivalent
3 Some college
4 Two year college degree (AA, AS) or technical school
5 Four year college graduate (BA, BS)
6 Some graduate work but did not receive a graduate degree
7 Graduate degree (MA, MS, MBA, PhD, JD, MD, etc.)

H7 ***Do you own or rent your residence?*** Circle the number of your answer.

1 Own *2 Rent*

(Please continue to the next page)

H8 **How many listed telephone numbers does your household have?**

__________ listed telephone numbers

H9 **Are you Hispanic or Latino?** *Circle number of the best answer.*

1 Yes
2 No

H10 **Which of the following best describes you?** *Circle one or more.*

1 Asian
2 American Indian or Alaska Native
3 Black or African American
4 Native Hawaiian or Other Pacific Islander
5 White

H11 **What was your household income (before taxes) in 2003?** *Circle one number.*

1 Less than $10,000
2 $10,000 to $19,999
3 $20,000 to $29,999
4 $30,000 to $39,999
5 $40,000 to $49,999
6 $50,000 to $59,999
7 $60,000 to $79,999
8 $80,000 to $99,999
9 $100,000 to $124,999
10 $125,000 to $149,999
11 $150,000 to $200,000
12 $200,000 or more

Is there anything we overlooked?
Please use the space below to provide us with any other comments you would like to make.

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AFSC Economics and Social Sciences Research Program
Publication List for Full-Time Staff (names in bold), 2002-2005

Carothers, C. and **Sepez, J**. 2005. "Commercial Fishing Crew Demographics and Trends in the North Pacific: 1993-2003." Poster presented at Managing Our Nation's Fisheries II Conference sponsored by NOAA Fisheries, Washington, DC, March, 2005. Poster available online at ftp://ftp.afsc.noaa.gov/posters/pCarothers01_comm-fish-crew-demographics.pdf.

More than half of the nation's fish harvest passes through the hands or under the eyes of crew members aboard commercial fishing vessels in the North Pacific, yet until now, very little has been known about the individuals that make up this work force. This research analyzes primary demographic characteristics of the crew population over the past decade, focusing on such elemental features as age, gender, and residency as are recorded in the State of Alaska license application. Further, it derives additional information such as crew member tenure, temporal trends, and population distributions. Crew populations, while often strongly affected by regulatory changes, are frequently absent from social impact analyses because of a lack of basic information. Summarizing essential demographic characteristics represents a crucial first step in addressing this data gap.

Felthoven, Ronald G. 2005. "Methods for Estimating Fishing Capacity with Routinely Collected Data: A Comparison." *Review of International Fisheries Law and Policy*, forthcoming.

In the past three years, the National Marine Fisheries Service (NMFS) has assembled both an internal task force and an external expert panel to suggest methods for computing fishing capacity in U.S. fisheries. The primary difficulty in choosing a suggested methodology has been the lack of economic data required for many of the capacity models developed in the economic literature. In most U.S. fisheries, the available data are limited to catch records, vessel numbers and characteristics, and some indicators of fishing effort, necessitating the use of "primal" models, and measures of "technical" fishing capacity. This paper describes two of the suggested frontier methods for measuring capacity: data envelopment analysis (DEA) and the stochastic production frontier (SPF). We discuss how to implement these models, and various notions of "capacity" that can be computed, depending on the assumptions made regarding potential increases in effort.

Felthoven, Ronald G. and C.J. Morrison Paul. 2004. "Multi-Output, Non-Frontier Primal Measures of Capacity and Capacity Utilization." *American Journal of Agricultural Economics,* Vol. 86(3): 615-629.

This paper offers and implements an econometric approach for generating primal capacity output and utilization measures for fisheries. In situations where regulatory, environmental, and resource conditions affect catch levels but are not independently identified in the data, frontier-based capacity models may interpret such impacts as production inefficiency. However, if such inefficiencies are unlikely to be eliminated, the implied potential output increases may be unrealistic. We develop a multi-output, multi-input stochastic transformation function framework that permits various assumptions about how output composition may change when operating at full capacity. We apply our model to catcher-processor vessels in the Alaskan pollock fishery.

Felthoven, Ronald G., Terry Hiatt, and Joseph M. Terry. 2004. "Measuring Fishing Capacity and Utilization with Commonly Available Data: An Application to Alaskan Fisheries." *Marine Fisheries Review* Vol. 64(4): 29-39.

Due to a lack of data on vessel costs, earnings, and input use, many of the capacity assessment models developed in the economics literature cannot be applied in U.S. fisheries. This incongruity between available data and model requirements underscores the need for developing applicable methodologies. This paper presents a means of assessing fishing capacity and utilization (for both vessels and fish stocks) with commonly available data, while avoiding some of the shortcomings associated with competing "frontier" approaches (such as data envelopment analysis).

Felthoven, Ronald G. and C.J. Morrison Paul. 2004. "Directions for Productivity Measurement in Fisheries." *Marine Policy*, Vol. 28: 161-169.

Fisheries policy is often aimed at sustaining and improving economic performance, but the use of traditional productivity measurement to assess performance over time has been quite limited. In this paper we review the currently sparse literature on productivity in fisheries, and suggest ways to better account for many of the relevant issues unique to the industry. Specifically, we discuss the need to incorporate bycatch levels, to better account for environmental and stock fluctuations, and to relax some of the restrictive economic assumptions that have been imposed in the research to date. A methodological framework that may be used to incorporate these factors is proposed.

Felthoven, Ronald G. 2002. "Effects of the American Fisheries Act on Capacity, Utilization and Technical Efficiency." *Marine Resource Economics*, Vol. 17(3): 181-205.

The American Fisheries Act (AFA) of 1998 significantly altered the Bering Sea and Aleutian Islands pollock fishery by allowing the formation of harvesting and processing cooperatives and defining exclusive fishing rights. This paper uses data envelopment analysis and stochastic production frontier models to examine effects of the AFA on the fishing capacity, technical harvesting efficiency (TE), and capacity utilization (CU) of pollock catcher-processors. Results from multi-input, multi-output models indicate that fishing capacity fell by more than 30% and that harvesting TE and CU measures increased relative to past years. This work provides examples of how existing data, which is currently devoid of operator costs and provides only general indicators of earnings, may be used to analyze changes in elements of fleet and vessel performance in response to management actions.

Lew, Daniel K. and Douglas M. Larson. 2005. "Accounting for Stochastic Shadow Values of Time in Discrete-Choice Recreation Demand Models." *Journal of Environmental Economics and Management,* 50(2): 341-361.

In this paper, a discrete-choice recreation demand model that explicitly accounts for a stochastic shadow value of time function is proposed. Using data from a survey of San Diego beach users, the stochastic shadow value of time, labor supply, and beach choice are jointly estimated. Results from this joint estimation approach are compared with the familiar two-step approach that estimates labor supply first and uses predicted values of time in the recreational site choice model. The approaches produce markedly different welfare measures, with the two-step model, which does not account for unobserved variability of time values, predicting significantly higher values. A Monte Carlo simulation illustrates how ignoring the stochastic nature of shadow value of time in discrete-choice recreation demand models can bias model parameters, and hence, welfare estimates.

Larson, Douglas M. and **Daniel K. Lew**. 2005. "Measuring the Utility of Ancillary Travel: Results from a Study of Recreation Demand." *Transportation Research Part A*, 39(2-3): 237-255.
The issues involved in determining economic values of travel as a component of away-from-home trips are discussed. Four distinct concepts are relevant and useful depending on circumstances: marginal and total values of travel, and gross versus net values. A utility-theoretic inverse demand systems approach is implemented to estimate the separate demands for recreation trips and time onsite at the destination, and implemented using data on pink salmon fishing in Alaska. The distance function underlying the demand system is used to determine the net values of travel ancillary to fishing. Some 64% of fishermen had positive net values of travel, and the value of travel per hour traveled averaged \$1.64/hour with a median of \$3.18/hour.

Lazrus, H. and **Sepez, J**., 2005. "The NOAA Fisheries Alaska Native Traditional Knowledge Database," *Practicing Anthropology* 27(1):33-37.

Applications of the Alaska Native Traditional Environmental Knowledge Database were critically examined by Lazrus and Sepez based on interviews with intended users at the AFSC and elsewhere. Comprised of information from pre-existing sources in the literature, the database was a partial response to public comments about the lack of TEK in the Draft Groundfish Programmatic Supplemental Environmental Impact Statement (PSEIS). Lazrus and Sepez review ways in which authors of the revised PSEIS found the database helpful and the challenges they faced using the information. Lazrus and Sepez discuss several issues surrounding how TEK is compiled and cited in agency documents. Because it is passed from one generation to another, TEK can lend a great deal of place-specific temporal depth to scientific investigations that may only have data for a short period of time. Such temporal depth lends historical perspective to environmental phenomena and can facilitate the construction of baselines or indicate rates of change. It can also point to issues that may not have been considered by the agency. However, TEK offers very localized information that does not always correspond to the geographic scope of regional agency interests. Additionally, the Alaska Native Traditional Environmental Knowledge Database does not offer users an easy way to assess the authority of the information source, so it may be difficult to judge the validity of a claim. The article discusses the ways in which TEK and scientific investigation have different paradigms that entail different ways of observing and drawing conclusions about how the world works. This disparity may at times complicate applying information from both paradigms to a single issue. On the other hand, this may also lead to a more multidimensional examination of an issue and a more robust analysis. Of course, ethical issues arise when expert information is taken from a community without addressing issues of compensation and co-management of resources. Lazrus and Sepez also discuss the problem of treating TEK as a series of facts or observations that can be extracted from cultural context. Without the context in which they are developed and understood, fragments of information may be misinterpreted or misapplied. Despite the challenges, NOAA scientists were generally very interested in understanding and incorporating TEK in agency efforts to analyze and manage North Pacific marine resources.

Lew, Daniel K. and Douglas M. Larson. 2005. "Valuing Recreation and Amenities at San Diego County Beaches." *Coastal Management,* 33(1): 71-86.

Policymakers and analysts concerned with coastal issues often need economic value information to evaluate policies that affect beach recreation. This paper presents economic values associated with beach recreation in San Diego County generated from a recreation demand model that explains a beach user's choice of which beach to visit. These include estimates of the economic values of a beach day, beach closures, and beach amenities.

Package, C. and Sepez, J. 2004. "Fishing Communities of the North Pacific: Social Science Research at the Alaska Fisheries Science Center." *AFSC Quarterly Reports* April-May-June 2004, available online at http://www.afsc.noaa.gov/Quarterly/amj2004/amj04featurelead.htm

NOAA Fisheries is involved in a nationwide effort to profile fishing communities for the purpose of expanding baseline knowledge of people who may be affected by changes in fishery regulations. In 2003 a team of graduate students at the Alaska Fisheries Science Center (AFSC) completed draft short-form profiles for 130 communities located in the state of Alaska. These profiles have been compiled in the upcoming publication Fishing Communities of the North Pacific, Volume I: Alaska. Longer profiles based on in-depth research also are being developed at the AFSC for a more select group of Alaska fishing communities. In mid-2004, the AFSC team joined with a team from the Northwest Fisheries Science Center to begin developing short-form profiles for West Coast communities, many of which are very involved in Alaska fisheries.

Sepez, J. 2003. "Makah." In *Dictionary of American History, 3rd Edition.* Charles Scribner's Sons: New York.

This dictionary article briefly describes the history of the Makah Indian Tribe of northwest Washington State, including population history, early contact with European explorers, cultural and subsistence patterns, the excavation of the Ozette archaeological site, and the modern resumption of subsistence whaling.

Sepez, J. 2002. "Treaty Rights and the Right to Culture: Native American Subsistence Issues in US Law." *Cultural Dynamics* 14(2): 143-159.

The interplay of treaty rights with the right to culture has produced a variety of results for Native American subsistence hunting and fishing rights in the United States. Where allocation and conservation measures fail to account for cultural considerations, conflict ensues. This paper discusses three examples: waterfowl hunting in Alaska, Northwest salmon fishing, and Inuit and

Makah whaling. Each demonstrates that treaty rights are a more powerful force than cultural rights in the law, but that both play important roles in actual policy outcomes. A more detailed examination of whaling indicates how the insertion of needs-based criteria into a framework of cultural rights shifts the benefit of presumption away from indigenous groups. The cultural revival issues and conflicting paradigms involved in Makah whaling policy debates indicate how notions of tradition, authenticity, and self-determination complicate the process of producing resource policies that recognize cultural diversity.

Sepez, J. 2005. "Introduction to Traditional Environmental Knowledge in Federal Natural Resource Management Agencies," *Practicing Anthropology* 27(1):2-5.

This introduction summarizes the articles and issues in the special theme issue on traditional environmental knowledge in Federal natural resource management agencies (see issue abstract).

Sepez, J. and Lazrus, H. (eds.). 2005. *Traditional Environmental Knowledge in Federal Natural Resource Management Agencies,* Special theme issue of *Practicing Anthropology* 27(1):1-48.

"Traditional Environmental Knowledge (TEK) in Federal Natural Resource Management Agencies" is the theme of this special issue of the journal Practicing Anthropology. The issue features articles from NOAA/NMFS contributors, as well as articles by (or about) other federal agencies, including the Bureau of Land Management, Environmental Protection Agency (EPA), National Park Service, and the U.S. Fish and Wildlife Service. The issue includes two important articles by NMFS authors. Lazrus and Sepez critically examine the application of the Alaska Native Traditional Environmental Knowledge Database developed at the Alaska Fisheries Science Center. They conclude that agency scientists are interested in using traditional environmental knowledge in their work, but that both practical and theoretical issues present serious challenges to meaningful incorporation (see article abstract). The issue also includes an article by Jennifer Isé and Susan Abbott-Jamieson of NMFS describing the Local Fisheries Knowledge Pilot Project http://www.st.nmfs.noaa.gov/lfkproject/, which takes place in two lobstering communities in Maine, and may be expanding to Alaska in the coming years. The project involves high school students in collecting cultural, environmental, and historical knowledge from local fishing families. Other articles in the issue discuss understanding Huna Tlingit traditional harvest management techniques for gull eggs in Glacier Bay National Park, incorporating Swinomish cultural values into wetland valuations, integrating TEK into subsistence fisheries management in Alaska, considering traditional tribal lifeways in EPA decision making, conserving wild medicinal plants that have commercial value, and including TEK in planning processes for the National Petroleum Reserve. The compilation concludes with a cautionary commentary from Preston Hardison of the Indigenous Biodiversity Information Network about international protocols, government-to-government relationships, rules of disclosure for tribal proprietary information, and the spiritual contexts of knowledge production and knowledge sharing. The issue is an important source of information on TEK program possibilities and lessons learned for federal resource scientists and managers interested in incorporating traditional environmental knowledge into their work.

Seung, Chang and Edward Waters. 2005. "A Review of Regional Economic Models for Alaska fisheries." *Alaska Fisheries Science Center Processed Rep. 2005-01.*

There are many regional economic models in the literature, and a limited number have been used to investigate the impacts of fishery management policies on communities. However, there is no formal study in the literature that provides a thorough, comparative evaluation of the regional economic models that have been, or can be, used for regional impact analysis for fisheries. In Part I, we describe the Alaska seafood industry, discuss the importance of the industry to the state economy, and indicate the importance of regional economic analysis for the Alaska seafood industry. Next a theoretical overview of regional economic models is provided. Specifically, we discuss major features of each type of regional economic model – economic base model (EB), input-output model (IO), social accounting matrix model (SAM), supplied-determined model, and computable general equilibrium model (CGE). Finally, a comparative discussion of these models is also provided. While Part I focuses on a theoretical review of regional economic models, Part II discusses applications of those regional economic models to fisheries. These include input-output (IO) models, which have been used in many previous studies of regional economic impacts for fisheries, the Fisheries Economic Assessment Model (FEAM), which has been one of the major analytical tools used to examine the impacts of fisheries on the West Coast and in Alaska, and the first regional computable general equilibrium (CGE) model used for fisheries in a U.S. region. In addition, some issues related to specifying such models for Alaska fisheries, data needs and availability for modeling regional economic impacts for Alaska fisheries, and perspectives on regional economic modeling for Alaska fisheries are discussed.

Seung, Chang and Edward Waters. 2005. "The Role of the Alaska Seafood Industry: A Social Accounting Matrix (SAM) Model Approach to Economic Base Analysis." Forthcoming in *The Annals of Regional Science*.

A social accounting matrix (SAM) model for Alaska is constructed to investigate the role of the state's seafood processing industry. The SAM model enables incorporation of the unique features of Alaska economy such as (i) the existence of a large nontraditional economic base, (ii) a large leakage of labor income, and (iii) a very large share of intermediate inputs imported from outside the state. The role of an industry in an economy with these features can not be examined correctly within an input-output framework, which is the method most often used for examining the importance of an industry to a region. Taking an export base view of the economy, we found seafood processing to be an important industry, generating 4.5% of the state's total employment. While an important driver of the state's economy, the industry has the smallest SAM multiplier mainly due to a large leakage of labor earnings and a large share of imported intermediate inputs. We also found that non-traditional economic base components such as (i) federal transfers to state and local governments, and (ii) federal transfers, permanent fund dividend (PFD) payments, and other extra-regional income received by households generate about 26 % of the state's total employment and earnings.

Vaccaro, I. and **Sepez, J**. 2003. "Understanding Fishing Communities: Three Faces of North Pacific Fisheries," pp. 220-221 in Witherall, D. (Ed.) *Managing Our Nation's Fisheries: Past, Present, and Future.* Proceedings of a Conference on Fisheries Management in the United States Held in Washington, DC, November 13-15, 2003.

Understanding and managing the impacts of fisheries means understanding fishing, and fishing communities, as much as understanding fish. Fishing communities are human settlements with a substantial level of dependence on or engagement in extraction of living marine resources. In the

North Pacific, these communities are shaped by the interaction of productive and consumptive practices, resource availability, markets, and regulatory policies. The protection of these communities and their way of life depends on a careful appraisal of multi-faceted relationships with marine resources. At the Alaska Fisheries Science Center, this means developing techniques for social analyses that recognize how fishing is articulated around three different types of activities: commercial, subsistence, and recreational. Public policy and science have often considered fisheries management to be almost exclusively concerned with commercial fishing. This perspective is understandable if we consider that commercial fishing accounts for 95% of the catch in Alaska, while subsistence accounts for just 4% and recreational 1%. The implications of this distribution for concerns such as biomass, ecological dynamics, and production of wealth are unambiguous. However, in the terrain of the social landscape, the much smaller catch percentages of subsistence and recreational fishing do not necessarily translate into insignificant social impacts. For example, in some communities, 100% of local households are participating in subsistence fishing, while only a small portion of residents are connected to the commercial fishing industry. In fact, leakage of wealth produced by the commercial fishing industry – through both imported labor forces and externalized corporate functions – is a significant factor attenuating the local impact of the commercial sector. Our analysis of the fishing communities of Alaska, their social context and the productive implications of marine natural resources, indicates that an approach which prioritizes commercial fishing to the exclusion of these other sectors is insufficient, and potentially misleading as to the social dynamics of both the complementary and conflicting interests which make up human communities. Subsistence and recreational fishing are fundamental parts of the social structure, and also the economy of many Alaskan communities, often supplying different segments of the population than commercial fisheries. At the Alaska Fisheries Science Center, anthropologists in the Economics and Social Sciences Research Program are involved in compiling profiles of North Pacific Fishing Communities. For communities located in Alaska, we have endeavored to describe and analyze the triadic relationship between commercial, subsistence and recreational fishing sectors. This is accomplished by characterizing the participation by community members in each type of fishery, and where possible, indicating the kinds of interrelationships that make the triad a dynamic and evolving social framework: competition for fisheries allocation; economic diversification of rural communities; joint production efficiencies; seasonal complementarities and conflicts; ethnicity and immigration issues; and local responses to the forces of globalization. Fisheries management or public policy impact assessment that does not take into account this multiple and complex nature of the relation between fishing communities and marine resources may create substantial unintended impacts on the very same communities they are intending to protect.

Vaccaro I. and **Sepez , J**. 2003. “Understanding Fishing Communities: The Three Faces of North Pacific Fisheries” Poster presented at Managing Our Nation’s Fisheries: Past, Present and Future, Conference sponsored by NOAA Fisheries, Washington, DC, November, 2003. Poster available online at ftp://ftp.afsc.noaa.gov/posters/pVaccaro01_3-faces.pdf

Fishing communities are human settlements dependent on or engaged in one or more of three types of fishing: commercial, recreational, and subsistence. Understanding these communities depends on a careful appraisal of their involvement with fisheries. In Alaska, federal fisheries science, policy, and management have focused most efforts on commercial fishing activities. This is understandable if we consider that commercial fishing accounts for approximately 5 billion pounds of landings in Alaska, while subsistence fishing accounts for approximately 40 million pounds and recreational fishing for around 7 million pounds. However, when considering fisheries from the perspective of human communities, the smaller catch numbers of recreational and subsistence fisheries understate their economic and social importance. Although commercial fishing is responsible for a disproportionately large amount of the wealth produced by the relationship between fishing communities and marine resources, subsistence and recreational fishing are fundamental parts of the economy and social dynamics of many Alaskan communities. In order to understand the relationship between communities and fisheries, it is necessary to explore these different modes of fishing and their interrelationships.

Submitted Papers Under Review:

Etnier, M. and **Sepez, J**. 2005. Ecological, Political, and Cultural Explanations for Changing Patterns of Sea Mammal Exploitation among the Makah. *In review.*

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.

Felthoven, Ronald G. and Daniel Holland. 2005. “Performance Measures for Fishery Rationalization Programs: Data and Other Considerations.” Submitted to *Marine Resource Economics.*

The North Pacific Fishery Management Council (NPFMC) has developed a plan to “rationalize” the Bering Sea and Aleutian Islands (BSAI) crab fisheries. A mandatory data collection program has been implemented to assess the effects on both the harvesting and processing sectors. Monitoring the performance of the rationalization program will allow an assessment of whether rationalization is achieving its objectives and may aid the design of future rationalization programs in other fisheries. This paper discusses various measures that may be used to monitor the impacts of rationalization programs on plant and vessel performance, identifies the data required to adequately construct the measures, and discusses some hurdles that must be overcome to properly interpret and use such data. The concepts discussed are applicable in fisheries other than BSAI crab, and may serve as a useful guide to those tasked with collecting and assessing the data needed to analyze the effects of rationalization.

Felthoven, Ronald G. and C.J. Morrison Paul. 2005. “Measuring Productivity Change and its

Components for Fisheries: The Case of the Alaskan Pollock Fishery, 1994-2003." Submitted to the *Journal of Environmental Economics and Management*.

Economic and biological performance have been important focal points in fisheries economics, while traditional productivity measurement has played an ancillary role. In the past two decades, however, it has been increasingly recognized that modeling and measuring fisheries' production relationships is central to understanding, and ultimately correcting, imbalances from market failures and biological constraints. In this paper we use a transformation function production model to estimate productivity and its components for the Bering Sea and Aleutian Islands pollock fishery. We explicitly recognize the roles of externalities present in pollock harvesting by incorporating data on environmental conditions, bycatch, and biomass stock, and capture regulatory impacts through fixed effects and quality indicators. Our approach also relaxes assumptions regarding constant returns to scale, marginal cost pricing, Hicks-neutrality, and homothetic separability that are maintained in the limited literature on fisheries productivity. We find that the productive contributions of environmental conditions, bycatch, and discretionary production processes are statistically significant; that restrictive assumptions common in previous fisheries productivity studies are not supported by our data; and that regulatory changes have had both direct and indirect impacts on catch patterns.

Sepez, J. 2005. If Middens Could Talk: Comparing Ancient, Historic and Contemporary Makah Subsistence Foraging Patterns. *In review.*

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, such as post-colonial extirpation. 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.

Sepez, J., K. Norman, A. Poole, and B. Tilt. 2005. Fish Scales: Scale, and Method in Social Science Research for North Pacific and West Coast Fishing Communities. *In review.*

Driven by the requirements of the Magnuson-Stevens Fishery Conservation and Management Act and the demand among stakeholders for social science to inform fisheries policy, the need for NMFS to conduct social science research is widely accepted. But how such research should be carried out is not at all well established. This article describes the development of a research program at NMFS--led by anthropologists--designed to understand the interaction between fisheries and communities in the North Pacific and West Coast regions. Specific conceptual and methodological challenges are discussed, including the vast number of communities involved in fishing in these regions, limited government resources, competing definitions of what constitutes a community, and the need for indicators which are comparable across communities and regions. The research program described here takes a multi-method, multi-scale approach, combining social indicators research with ethnographic fieldwork and Rapid Assessment Procedures (RAP). We argue that such an approach is necessary to understand the social and economic aspects of fishery management. As fishery managers and policy makers increasingly recognize that humans play an important role in natural resource issues, the experiences of this research program will influence the course of social science research at NMFS in the years to come.

Sepez, J. A., B. Tilt, **C. Package**, H. Lazarus, and I. Vaccaro. In prep. Community Profiles for North Pacific Fisheries (Alaska). U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-XXX, xxx p.

This document profiles 136 fishing communities in Alaska 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 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 Alaska. The profiles are given in a narrative format that includes three sections: People and Place, 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. Community Infrastructure covers current economic activity, governance (including city classification, taxation, Native organizations, and proximity to fisheries management and immigration offices) and facilities (transportation options and connectivity, water, waste, electricity, schools, police, and public accommodations). 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 128 individual profiles. Regional characteristics and issues are briefly described in regional introductions. The communities were selected by a process which assessed involvement in commercial fisheries using quantitative data from the year 2000, in order to coordinate with 2000 Census data. The quantitative indicators looked at communities that have commercial fisheries landings (indicators: landings, number of processors, number of vessels delivering to a community), communities that are the registered homeports of vessels participating in the fisheries, and communities that are home to documented participants in the fisheries (indicators: crew license holders, state and federal permit holders, and vessel owners). Where appropriate, the indicators were assessed as a ratio to the community's population. Selection of a community was triggered by its surpassing a certain threshold in any one of the indicator categories, or in an aggregated category made up of the individual indicators. The Alaska communities selected and profiled in this document are: Adak, Akhiok, Akiachak, Akutan, Aleknagik, Alitak Bay, Anchor Point, Anchorage/Chugiak/Eagle River/Girdwood, Angoon, Atka, Bethel, Chefornak, Chignik (Bay), Chignik Lagoon, Chignik Lake, Clam Gulch, Clark's Point, Cordova, Craig, Dillingham, Edna Bay, Eek, Egegik, Ekuk, Ekwok, Elfin Cove, Elim, Emmonak, Excursion Inlet, Fairbanks, False Pass, Fritz Creek, Galena, Goodnews Bay, Gustavus, Haines, Halibut Cove, Hobart Bay, Homer, Hoonah, Hooper Bay, Hydaburg, Igiugig, Iliamna, Ivanof Bay, Juneau/Douglas/Auke Bay, Kake, Karluk, Kasilof, Kenai, Ketchikan/Ward Cove, King Cove, King Salmon, Kipnuk, Klawock, Kodiak, Kokhanok, Koliganek, Kongiganak, Kotlik, Kwillingok, Larsen Bay, Levelock, Manokotak, Marshall, Mekoryuk, Metlakatla, Meyers Chuck, Naknek, Napakiak, Nelson Lagoon, New Stuyahok, Newhalen, Newtok, Nightmute, Nikiski, Nikolaevsk, Ninilchik, Nome, Old Harbor, Ouzinkie, Palmer, Pedro Bay, Pelican, Perryville, Petersburg, Pilot Point, Pilot Station, Platinum, Point Baker, Port Alexander, Port Alsworth, Port Graham, Port Heiden, Port Lions, Port Moller, Port Protection, Portage Creek, Prudhoe Bay, Quinhagak, Saint George, Saint Mary's, Saint Paul, Sand Point, Scammon Bay, Seldovia, Seward, Shaktoolik, Sitka, Skwentna, Soldotna, South Naknek, Sterling, Tenakee Springs, Thorne Bay, Togiak, Toksook Bay, Tuntutuliak, Tununak, Twin Hills, Ugashik, Unalakleet, Unalaska/Dutch Harbor, Valdez, Wasilla, Whale Pass, Whittier, Willow, Wrangell, and Yakutat.

Seung, Chang and Edward Waters. 2005. "A Review of Regional Economic Impact Models for Fisheries in the U.S." Submitted to *Marine Resource Economics.*

In 1986 Andrews and Rossi reviewed input-output (IO) studies of U.S. fisheries. Since then many more fisheries studies have appeared using IO and other types of regional economic models, such as Fishery Economic Assessment Models, Social Accounting Matrices, and Computable General Equilibrium models. However no updated summary of these studies or models has appeared since 1986. This paper attempts to fill this gap by briefly reviewing the types of regional economic models that have been applied to fisheries; reviewing studies using these models that have been conducted for U.S. fisheries; and identifying data and modeling issues associated with regional economic analysis of fisheries in the U.S. The authors conclude that although economic impact analysis of fisheries policy is required under federal law, development of more representative regional economic models for this purpose is not likely to be forthcoming without increased information obtained through some type of comprehensive data collection program.

Seung, Chang. 2005. "Dynamic Economic Base Modeling of Regional Economies: An Application to Alaska Fisheries." Submitted to *The North American Journal of Fisheries Management.*

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 within 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.