American Fisheries Act Program Review

Initial Review Draft

Prepared for

North Pacific Fishery Management Council

January 2017

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Please cite as: Northern Economics, Inc. *American* Fisheries Act Program Review. Prepared for North Pacific Fishery Management Council. January 2017.

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Abbreviations

ADF&G	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	NMFS Alaska Fisheries Science Center
ANCSA	Alaska Native Claims Settlement Act
BS	Bering Sea
BSAI	Bering Sea and Aleutian Islands
CGOA	central Gulf of Alaska
CDQ	Western Alaska Community Development Quota
COBLZ	*C. opilio* bycatch limitation zone
CP	catcher/processor
CV	catcher vessel
DFA	directed fishery allocation
ESSRP	NMFS Economic and Social Sciences Research Program
FMP	fishery management plan
FRAM	NMFS Fisheries Monitoring and Analysis Program
GAPP	Genuine Alaska Pollock Producers
GOA	Gulf of Alaska
H&G	headed and gutted
HSCC	High Seas Catchers' Cooperative
IA	intercooperative agreement
ISD	NMFS Information Services Division
IPA	incentive plan agreement
Kg	kilogram
MARAD	Maritime Administration
MFC	Mothership Fleet Cooperative
MRA	maximum retainable amount
MSC	Marine Stewardship Council
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
mt	metric tons
NMFS	National Marine Fisheries Service
NPFMC	North Pacific Fishery Management Council
OMD	NMFS Operations and Management Division

PCC	Pollock Conservation Cooperative
PSC	prohibited species catch
PSMFC	Pacific States Marine Fisheries Commission
RAM	NMFS Restricted Access Management
RFM	Responsible Fisheries Management
SFD	NMFS Sustainable Fisheries Division
TAC	total allowable catch
TLA	trawl limited access
USDA	U.S. Food and Drug Administration

1 Introduction

The American Fisheries Act (AFA or Act), which was signed into law in October 1998, substantially modified the conservation and management program of the directed pollock fishery in the Bering Sea and Aleutian Islands (BSAI) Management Area (BS pollock fishery).[1] Anticipating that these modifications would result in significant changes to many of the businesses and communities that rely on Alaska fisheries, as well as the natural resources that support those fisheries, the Act directed the North Pacific Fishery Management Council (Council or NPFMC) to submit a report to the Secretary of Commerce and Congress on the implementation and effects of the American Fisheries Act Pollock Cooperatives Program (AFA Program). The report was to describe the impacts on fishery conservation and management, bycatch levels, fishing communities, business and employment practices of participants in any fishery cooperatives, the western Alaska community development quota (CDQ) program, any fisheries outside of the authority of the Council, and such other matters as the Council deemed appropriate. The Council's report was published in 2002 (North Pacific Fishery Management Council 2002).

Since completion of the Council's 2002 report, there has been no new review of the effects of the AFA. However, the National Marine Fisheries Service (NMFS) manages the AFA Program as a limited access privilege program, and the 2006 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires a formal and detailed review of a limited access privilege program five years after the implementation of the program, and thereafter to coincide with scheduled regional fishery management council review of the relevant fishery management plan (FMP) (but no less frequently than once every 7 years).

The purpose of the current review is to describe the progression of the BS pollock fishery under the AFA Program since the period covered by the Council's 2002 report. The review begins with a brief evolution of the management of the BS pollock fishery, including a summary of amendments to the AFA and management measures to limit salmon prohibited species catch (PSC) in the BS pollock fishery that have incorporated elements of the AFA Program. The review then presents a brief overview of the development of AFA cooperatives and a description of their contractual structure and annual reporting requirements. The remainder of the review provides indicators of changing conditions in the BS pollock fishery. These indicators include the volume and value of harvest, vessel participation levels, PSC and incidental catch, excessive shares, fish retention and utilization, pollock product markets and prices, sideboard limits, fishing vessel safety, and management costs and cost recovery.

[1] Although the AFA provided management directives for the pollock fisheries in both the Bering Sea and Aleutian Islands subareas, there was no directed pollock fishery in the Aleutian Islands from 1999–2004 due to Stellar sea lion protection measures, and in 2005, Amendment 82 to the BSAI groundfish FMP allocated the Aleutian Islands directed pollock fishery to the Aleut Corporation (Section 2.4).

2 Evolution of Bering Sea Pollock Fishery Management

2.1 Overview of Pre-AFA Management Regime and Major Provisions of the AFA

Before the passage of the AFA, the BS pollock fishery was managed under the inshore/offshore regime. Under this management regime, 7.5 percent of the BSAI pollock fishery annual total allowable catch (TAC) was allocated to the CDQ program. The remaining TAC was allocated between the inshore sector (shoreside processors, stationary floating processors, and catcher vessels delivering to these inshore processors) and offshore sector (catcher/processors, motherships, and catcher vessels delivering to these at-sea processors) at 35 percent and 65 percent, respectively. Vessel participation in the fishery was restricted by the existing license limitation program, which endorsed BSAI groundfish licenses by gear type, but not species. Any trawl vessel owner that held a BSAI groundfish license could potentially enter the BS pollock fishery even if they never had a history of participating in the fishery. In addition, there were no access restrictions in place for inshore processors or motherships. These conditions led to an Olympic-style “race-for-fish” wherein vessels competed to catch as many fish as possible before the TAC was attained and the pollock fishing season closed.

The Council submitted to NMFS the third iteration of the inshore/offshore regime for approval in September 1998, just a month before the passage of the AFA. The revised regime would have allocated 61 percent of the TAC remaining after the CDQ allocation to the offshore sector and 39 percent to the inshore sector. However, in November 1998, the Council withdrew the revision recommendations because they were inconsistent with the new statutory requirements of the recently passed AFA.

The following is a summary of the major provisions of the AFA. Some the provisions of the Act cannot be altered by the Council, while others required Council actions to implement.

Ownership Requirements. The AFA requires a 75 percent minimum U.S. ownership for a vessel to be eligible to participate in the fisheries off Alaska, with certain exemptions for processing vessels already in operation. It also establishes maximum length, tonnage, and horsepower limits for replacement vessels eligible to participate in the BS pollock fishery under the Act.

Allocation Percentages by Sector. The AFA specifies the allocation of the BSAI pollock fishery TAC among the CDQ program, an incidental catch allowance for BS pollock taken in other fisheries, and the various AFA sectors. The inshore sector was retained as defined by the inshore/offshore regime, but the offshore sector was divided into the catcher/processor sector and mothership sector. Under the AFA, 10 percent of the annual TAC is allocated to the CDQ program, while the incidental catch allowance has varied.[2] The remaining TAC, which is referred to as the pollock directed fishery allocation (pollock DFA), is divided among the inshore sector, catcher/processor sector, and mothership sector at 50 percent, 40 percent, and 10 percent, respectively.

Buyout Provisions and Eligible Participants. The Act specifically retires nine catcher/processors from further participation in the BS pollock fishery or any other U.S. fishery. The AFA specifies by name 20 catcher/processors that are eligible to participate in the catcher/processor sector.[3] Additionally, the Act

[2] In 1999, the incidental catch allowance was effectively 4.68 percent of the TAC. The incidental catch allowance is currently set at 4 percent of the TAC.

[3] In addition, one catcher/processor, the *Ocean Peace*, met the minimum historic harvest level to qualify under the AFA.

lists seven catcher vessels eligible to participate in this sector. Not less than 8.5 percent of the catcher/processor sector allocation is available for harvest only by these catcher vessels.

The Act further specifies 3 motherships which are eligible to process the mothership sector allocation under the Act, and lists 19 catcher vessels which are eligible to fish and deliver that sector's allocation.[4] For the inshore sector, the Act does not list the eligible shoreside processors, stationary floating processors, and catcher vessels by name; rather, it stipulates the landing/processing history necessary for eligibility.[5]

Fishery Cooperatives. The AFA set up a structure for the formation of fishing cooperatives to help end the race-for-fish. The AFA authorized fishery cooperatives in the catcher/processor sector beginning in 1999, but did not provide for the formation of fishery cooperatives in the mothership and inshore sectors until 2000.

Excessive Shares. The Act specifies that no particular individual, corporation, or other entity may harvest, through a fishery cooperative or otherwise, a total of more than 17.5 percent of the pollock DFA. However, it does not specify the limits for other species, or for pollock processing; rather, it mandates that the Council establish such caps.

Sideboard Provisions. The AFA provides generic direction to the Council to develop "measures it deems necessary" to protect other fisheries from adverse impacts of the Act or fishery cooperatives. This includes harvesters and processors of Bering Sea non-pollock groundfish and crab, as well as non-pollock groundfish and pollock harvested or processed in the Gulf of Alaska (GOA).

The following sections highlight the adaptive management of the Council by describing amendments to the AFA, together with management measures to limit salmon PSC in the BS pollock fishery that have incorporated elements of the AFA.

2.2 Amendments 61/61/13/8

After the passage of the AFA, NMFS and the Council took steps to incorporate the relevant provisions of the AFA into various FMPs and establish a comprehensive management program under the new management regime. These steps included development of Amendment 61 to the *Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area* (BSAI groundfish FMP), Amendment 61 to the *Fishery Management Plan for Groundfish of the Gulf of Alaska*, Amendment 13 to the *Fishery Management Plan for the King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands*, and Amendment 8 to the *Fishery Management Plan for the Scallop Fishery off Alaska* (collectively referred to as Amendments 61/61/13/8).

In February 2002, NMFS partially approved Amendments 61/61/13/8—it disapproved the December 31 sunset date originally contained in Section 213 of the AFA authorizing the Council to review and extend the AFA management program in 2004. The removal of the sunset date aligned Amendments

[4] In addition, one catcher vessel that was not listed in the AFA, the *Vanguard*, met the minimum historic delivery level to qualify as a catcher vessel for delivery to motherships under the AFA.

[5] Fifty-six catcher vessels met the AFA eligibility criteria to participate in the inshore sector. In addition, 14 of the catcher vessels eligible to participate in the mothership sector are also eligible to participate in the inshore sector. Eight inshore processors met the AFA eligibility criteria to participate in the inshore sector, of which six are shoreside processors—UniSea Seafoods, Westward Seafoods, and Alyeska Seafoods in Dutch Harbor; Trident Seafoods in Akutan, Trident Seafoods in Sand Point, and Peter Pan Seafoods in King Cove—and two are floating processors: the *Arctic Enterprise* and *Northern Victor*.

61/61/13/8 with legislation enacted in 2002 that eliminated the sunset date and replaced it with a reauthorization date. Amendments 61/61/13/8 became effective in January 2003.[6]

Amendments 61/61/13/8 included restrictions on the formation and operation of cooperatives (including the formula for determining the allocation of pollock to each inshore cooperative and the qualifications for a catcher vessel to join such a cooperative), harvesting sideboards for catcher/processors, catch weighing and monitoring requirements, crab and groundfish processing sideboard limits, and excessive processing share caps. A complete discussion of these recommendations and the two-year public process through which NMFS and the Council developed Amendments 61/61/13/8 is available in North Pacific Fishery Management Council (2002). The final rule implementing Amendments 61/61/13/8 was published in December 2002, and became effective in January 2003.

2.3 Amendment 69

The AFA established a system of inshore cooperatives under which the owners of catcher vessels that deliver to a particular processor may form a cooperative and receive an exclusive allocation of BS pollock. The Council developed Amendment 69 to the BSAI groundfish FMP to revise the structure of these cooperatives to allow an inshore cooperative to contract with a non-member AFA inshore catcher vessel to harvest a portion of the cooperative's allocation. The intent of the amendment is to provide greater flexibility to inshore cooperatives to arrange for the harvest of their pollock allocation, and to address potential emergency situations, such as vessel breakdowns, that would prevent a cooperative from harvesting its entire allocation. The final rule implementing Amendment 69 was published in February 2003, and became effective in March 2003.

2.4 Amendment 82

The AFA allocated the Aleutian Islands subarea directed pollock fishery to eligible harvesters and processors specified in the Act. The AFA was amended by the Consolidated Appropriations Act of 2004, which reallocated the Aleutian Islands directed pollock fishery to the Aleut Corporation, an Alaska Native Claims Settlement Act (ANCSA) regional corporation, for the purpose of economic development of the coastal community of Adak, Alaska. The legislation further specified that the Aleut Corporation could only contract either with vessels under 60 feet in length or with AFA vessels to harvest their allowance in the area. Amendment 82 revised the BSAI groundfish FMP to establish a management framework for the Aleutian Islands directed pollock fishery consistent with the requirements of the AFA as amended by the Consolidated Appropriations Act of 2004. The final rule implementing Amendment 82 was published in March 2005, and became effective in February 2005. In the ensuing years, NMFS has reallocated the projected unused amounts of the Aleut Corporation pollock directed fishing allowance from the Aleutian Islands subarea to the Bering Sea subarea.

2.5 Amendment 106

The AFA prohibited the replacement of AFA vessels except under conditions specified in the Act. The most stringent restriction was that an owner of an AFA vessel could only replace an AFA vessel in the event of an ''actual total loss or a constructive total loss'' of the vessel. Thus, a vessel owner could not

[6] While the permanent management program proposed under Amendments 61/61/13/8 was under analysis and development by the Council and NMFS, the statutory deadlines in the AFA were met on an interim basis through several emergency interim rules.

replace an AFA vessel until the vessel sank or was so damaged that it could not economically be repaired. If an AFA vessel was lost, the Act limited the length, tonnage, and horsepower of a replacement vessel to statutory thresholds set out in the Act. If the lost AFA vessel exceeded the thresholds, the replacement vessel could not exceed the length, tonnage, or horsepower of the AFA vessel; if the lost AFA vessel was less than any of the thresholds, the replacement vessel could exceed the length, weight, or horsepower of the lost AFA vessel by ten percent, but only up to the statutory limits.

As for rebuilding or removing a AFA vessel, the AFA had no explicit provisions that allowed the owner of an AFA vessel to rebuild the vessel and maintain the vessel's AFA permit and the vessel's federal fishery endorsement, nor did the AFA provide a mechanism for the removal of an AFA catcher vessel from an inshore cooperative, even if the catcher vessel was doing no or little actual fishing for the cooperative.

In 2010, the AFA was amended by the Coast Guard Authorization Act of 2010, which addressed issues pertaining to the replacement, rebuilding, and retiring of AFA vessels. Amendment 106 to the BSAI groundfish FMP was developed by the Council to bring the BSAI groundfish FMP into conformity with the AFA as amended by the Coast Guard Authorization Act. Amendment 106 allows the owner of an AFA vessel to rebuild or replace the vessel without limitation on the length, weight, or horsepower of the rebuilt or replacement vessel when the vessel is operating in the BS pollock fishery. The amendment also allows the owner of an AFA catcher vessel that is a member of an inshore cooperative to remove the vessel from the BS pollock fishery and assign the pollock catch history of the removed vessel to one or more vessels in the inshore cooperative to which the removed vessel belonged. The final rule implementing Amendment 106 was published in September 2014, and became effective in October 2014.

2.6 Management of Salmon Prohibited Species Catch

Over the past 20 years, the Council and NMFS have implemented several management measures to limit salmon PSC in the BS pollock fishery. The following discussion highlights the relationship between these measures and provisions of the AFA. Additional information about these measures is provided in 81 FR 5681, February 3, 2016.

Management measures have focused on minimizing PSC of Chinook salmon and non-Chinook salmon (a category that includes all salmon species except Chinook salmon, but is comprised predominantly of chum salmon). The initial measures identified areas of historically high salmon PSC, established PSC limits, and closed the areas of high salmon PSC to trawling once the PSC limits were reached. In 1995, NMFS approved Amendments 21b and 35 to the BSAI groundfish FMP, which established a Chinook Salmon Savings Area and Chum Salmon Savings Area, respectively. Amendment 35 closed the Chum Salmon Savings Area to all trawling from August 1 through August 31 and established a 42,000 non-Chinook salmon PSC limit. Amendment 21b set the PSC limit for Chinook salmon in the Chinook Salmon Savings Area at 48,000 fish between January 1 and April 15. In 2000, NMFS approved Amendment 58, which revised the boundaries of the Chinook Salmon Savings Area, reduced the PSC limit in the area to 29,000 fish, and established new closure periods.

On November 28, 2007, NMFS implemented Amendment 84 to enhance the effectiveness of salmon measures. The amendment exempted AFA vessels from Chinook Salmon Savings Area and Chum Salmon Savings Area closures if they participate in a NMFS-approved intercooperative agreement (IA) to reduce salmon PSC. The IA allowed AFA vessels to use the internal cooperative structure established by the AFA to reduce salmon PSC using a method called the voluntary rolling hotspot system. Among the required parties to the IA are all AFA cooperatives and a third party retained to facilitate salmon avoidance behavior and information sharing.[7] The IA requires the third party to compare the salmon PSC rate of an AFA cooperative to a predetermined PSC rate (base rate). Vessels in the cooperative are assigned to certain tiers based on the salmon PSC rates of vessels in that cooperative relative to the base rate, and large area closures are implemented for vessels in tiers associated with higher PSC rates. Monitoring and enforcement are accomplished through private contractual arrangements (Section 3.2). All AFA vessels participate in the currently approved IA except for the *Ocean Peace*, which is not a member of an AFA cooperative.

On September 29, 2010, NMFS implemented Amendment 91, which removed Chinook salmon from the Amendment 84 regulations. However, Amendment 84 continues to apply to non-Chinook salmon PSC. Amendment 91 included a Chinook salmon PSC limit along with an industry-developed contractual arrangement, called an incentive plan agreement (IPA). IPAs are designed to prevent salmon PSC from reaching the PSC limit in most years, while providing the fleet the flexibility to harvest the pollock DFA in high-encounter years when catching salmon is difficult to avoid. If IPAs are developed, Amendment 91 establishes a total Chinook salmon PSC limit of 60,000, with a performance standard of 47,591 Chinook. Currently, each AFA sector has a NMFS-approved IPA agreement in place.[8] The sector-level performance standard ensures that each IPA is effective and that sectors do not fully harvest the Chinook salmon PSC allocations under the 60,000 Chinook salmon PSC limit in most years. For a sector to continue to receive Chinook salmon PSC allocations under the 60,000 Chinook salmon PSC limit, that sector may not exceed its annual threshold amount in any three years within seven consecutive years. If a sector fails this performance standard, it will permanently be allocated a portion of a 47,591 Chinook salmon PSC limit. While participation in an IPA is voluntary, any vessel that chooses not to participate in an IPA is subject to a restrictive opt-out allocation. Since Amendment 91 was implemented, all AFA vessels have participated in an IPA.

In June 2016, NMFS implemented Amendment 110, which created a comprehensive salmon catch avoidance program. The amendment achieved the following:

- Incorporated chum salmon avoidance into the IPAs established under Amendment 91, and removes the non-Chinook salmon PSC reduction IA established under Amendment 84.
- Modified the requirements for the content of the IPAs to increase the incentives for fishermen to avoid Chinook salmon.
- Changed the seasonal apportionments of the pollock DFA to allow more pollock to be harvested earlier in the year when Chinook salmon PSC use tends to be lower.
- Reduced the Chinook salmon PSC limit and performance standard in years with low Chinook salmon abundance in western Alaska. In a low abundance year the Chinook salmon PSC limit is reduced to 45,000 Chinook if at least one NMFS-approved IPA is in place and that AFA sector has not exceeded its annual threshold amount.
- Improved the monitoring of salmon PSC in the BS pollock fishery.

[7] Since the inception of AFA cooperatives, Sea State, Inc., a company that provides catch accounting services, has been contracted by the cooperatives to facilitate PSC avoidance behavior and information sharing as well as provide harvest data for cooperative annual reports (Section 3.3). Sea State works on a data release agreement between the industry and NMFS as follows: 1) NMFS observers sample hauls and estimate PSC; 2) each vessel electronically transmits its observer data to Sea State, which checks the data and performs statistical extrapolations to factor in any hauls that were not sampled; 3) position-specific data for each vessel are used to create a chart of vessel-specific PSC rates that is faxed to participating vessels within 24 hours; and 4) vessels move away from areas with high PSC rates and exert peer pressure on any vessel that is reluctant to move (U.S. Office of Management and Budget 2011).

[8] The three IPAs are the Inshore Chinook Salmon Savings Incentive Plan Agreement, the Mothership Salmon Savings Incentive Plan Agreement, and the Catcher/processor Chinook Salmon Bycatch Reduction Incentive Plan and Agreement.

3 Cooperative Contracts and Reports

One of the primary goals of the AFA was to alleviate the race-for-fish in the BS pollock fishery through the establishment of cooperatives. Consequently, a focus of this AFA Program review is to describe the effects of this goal on various aspects of fishing operations, including the level of PSC (Section 6); retention and utilization rates (Section 9); product mix and markets (Section 10); "spillover" of excess harvesting capacity into other fisheries (Section 11); and fishing vessel safety (Section 12). The current section prefaces these effects discussions with a brief overview of the development of AFA cooperatives and a description of their contractual structure and annual reporting requirements.

3.1 Overview of AFA Cooperatives

As described in Section 2.1, the AFA allows for the formation of fishery cooperatives within each AFA sector. A purpose of these cooperatives is to further subdivide each sector's or inshore cooperative's pollock allocation among participants in the sector or cooperative through private contractual agreements. The cooperatives manage these allocations to ensure that individual vessels and companies do not harvest more than their agreed-upon share. The cooperatives also facilitate transfers of pollock among the cooperative members, enforce contract provisions, and participate in an IA to minimize non-Chinook salmon PSC and an IPA to minimize Chinook salmon PSC (Section 2.6). Catcher/processor and mothership sector catcher vessel cooperative membership is discretionary, while admission of eligible applicants is mandatory for inshore cooperatives (Sullivan 2007).

Under the AFA, the catcher/processor sector was allowed to choose one of two options: 1) all participants could form a single cooperative that includes both catcher/processors and catcher vessels delivering to catcher/processors, 2) or catcher/processors and catcher vessels could form separate cooperatives and enter into an IA. The latter structure was adopted—the Pollock Conservation Cooperative (PCC) contains all eligible catcher/processors in the BS pollock fishery, and the High Seas Catchers' Cooperative (HSCC) contains all catcher vessels eligible to deliver pollock to catcher/processors. The AFA requires NMFS to make a separate allocation of no less than 8.5 percent of the catcher/processors sector's allocation available to catcher vessels delivering to catcher/processors. While catcher vessels formed their own cooperative, it has generally been more profitable for members of the HSCC to lease or sell their pollock quota to the PCC and its members (Strong and Criddle 2013).

All catcher vessels delivering to AFA motherships have formed a cooperative called the Mothership Fleet Cooperative (MFC). The three AFA motherships have elected not to participate as members of this cooperative despite an exemption to the Sherman Anti-Trust Act contained within the AFA that allowed them to participate if at least 80 percent of the eligible catcher vessels are members of the cooperative. Under the contractual terms of the MFC, catcher vessels are free to deliver their share to any of the eligible motherships, although catcher vessel ownership in a particular mothership often dictates where they deliver their harvests (Strong and Criddle 2013).

Under the AFA, cooperatives are authorized to form in the inshore sector, but unlike the PCC, HSCC, and MFC, inshore cooperatives may form around each AFA-qualified inshore processor. However, these cooperatives can only form if an annual contract is signed by the owners of 80 percent or more of the catcher vessels that delivered the majority of their pollock for processing to an inshore processor in the prior year. Inshore processors must agree to process the pollock of the members of the cooperative with which they have partnered. In return, cooperative members must deliver 90 percent of their allocation to the inshore processor tied to their cooperative. The intent of allowing inshore processors to partner with a cooperative was to provide a structure for processors to share in the expected economic benefits of the AFA, including shifts to higher value products and improved utilization (Baker 2006). The amount of pollock allocated to each inshore cooperative is based on the member vessel's historical pollock catch during the AFA base years. Since the inshore sector began operating under the cooperative system in 2000, there have been seven inshore cooperatives formed by eligible inshore catcher vessels and their partner inshore processors: Northern Victor Fleet Cooperative, Peter Pan Fleet Cooperative, Unalaska Fleet Cooperative, UniSea Fleet Cooperative, Akutan Catcher Vessel Association, Arctic Enterprise Association, and Westward Fleet Cooperative.[9]

Inshore catcher vessels are not required to join an inshore cooperative; those that do not join are managed by NMFS under the ''inshore open access fishery.'' Inshore catcher vessels entering open access are free to deliver to the inshore processor of their choice, but they are exposed to the hazards of the race-for-fish both for target catches of pollock and small PSC allocations (Strong and Criddle 2013). Inshore catcher vessels are also free to change cooperatives, but a vessel that wishes to do so must fish in the inshore open access fishery for one year before it can join a new cooperative. The rules also permit other approaches to switching cooperatives. For example, a cooperative (as a whole) can deliver up to 10 percent of its pollock to another processor in any year. If the cooperative designates a single vessel to make those deliveries, it is possible that the vessel could deliver the majority of its product to another processor and could switch processors in the following year without having to first participate in the open-access fishery (National Marine Fisheries Service 2002).

3.2 Cooperative Contracts

All AFA cooperatives must comply with regulations governing filing deadlines, representative designation, agent appointment, and contract elements, but depending on the sector and type of cooperative, cooperatives may have slightly different stipulations. For instance, cooperatives operating in the catcher/processor or mothership sectors have a deadline to file as a cooperative 30 days before the start of any fishing activity. However, cooperatives operating in the inshore sector are required to file December 1 of the year before the year in which fishing under the contract will occur. The December 1 deadline is necessary because inshore sector cooperative allocations must be included in the BSAI interim harvest specifications that are usually published before January 1 of each year. This is an important nuance, as NMFS makes suballocations of pollock to each inshore cooperative. The catcher/processor and mothership sectors are allocated pollock at the sector level, and thus do not need to be included in the BSAI interim harvest specifications.

Cooperative contracts are binding agreements among members that govern harvest share allocations, harvest share and vessel/license use and transfers, and sideboard compliance. Harvest share allocations are generally consistent with catch history proportions during the AFA base years. They are subject to negotiation, and equitable adjustments are made in some cases. Harvest shares are typically freely transferable among cooperative members. Harvest share enforcement is typically based on liquidated damages for overharvest, with damages amounts set at a multiple of ex-vessel value of product and adjusted as necessary to provide adequate disincentive (Sullivan 2007).

All AFA cooperative contracts must:

- list parties to the contract;
- List all vessels and processor that will harvest and process pollock harvested under the cooperative;
- specify the amount or percentage of pollock allocated to each party to the contract; and

[9] The Arctic Enterprise Association has not been active since 2008.

- include a contract clause under with the parties to the contract agree to make payments to the State of Alaska for any pollock harvested in the BS pollock fishery which is not landed in the state subject to any landing taxes established under Alaska law.

If a cooperative contains AFA catcher vessels, additional regulations mandate the contract include adequate provisions to prevent each non-exempt member catcher vessel from exceeding an individual vessel sideboard limit for each BSAI or GOA sideboard species or species group that is issued to the vessel by the cooperative in accordance with the following criteria:

- The aggregate individual vessel sideboard limits issued to all member vessels in a cooperative must not exceed the aggregate contributions of each member vessel towards the overall groundfish sideboard amount as announced by NMFS.
- In the case of two or more cooperatives that have entered into an IA, the aggregate individual vessel sideboard limits issued to all member vessels subject to the inter-cooperative agreement must not exceed the aggregate contributions of each member vessel towards the overall groundfish sideboard as announced by NMFS.

3.3 Cooperative Reporting Requirements

Section 210(a)(1)(B) of the AFA requires the Council and NMFS to "make available to the public in such manner as the Council and NMFS deem appropriate information about the harvest by vessels under a fishery cooperative of all species (including prohibited species) in the [BSAI] directed pollock fishery on a vessel-by-vessel basis." This section summarizes the AFA cooperative reporting requirements; more detailed information is available in North Pacific Fishery Management Council (2013).

All cooperatives are also required to provide preliminary and annual written reports on fishing activity to the Council. These reports must contain at a minimum:

- the cooperative's allocated catch of pollock and sideboard species, and any sub-allocation of pollock and sideboard species made by the cooperative to individual vessels on a vessel-by-vessel basis;
- the cooperative's actual retained and discarded catch of pollock, sideboard species, and PSC on an area-by-area and vessel-by-vessel basis;
- a description of the method used by the cooperative to monitor fisheries in which cooperative vessels participated;
- a description of any actions taken by the cooperative to penalize vessels that exceed their allowed catch and PSC in pollock and all sideboard fisheries;
- the total weight of pollock landed outside the State of Alaska on a vessel-by-vessel basis; and
- the number of salmon taken by species and season, and list of each vessel's number of appearances on the weekly "dirty 20" lists for non-Chinook salmon.

According to North Pacific Fishery Management Council (2013), there has been variation in the content and depth of each report. All reports include some information that is above what the requirements stipulate. Some reports fail to include particular elements of the regulations, including initial allocation and transfer of sideboard species; discarded catch of pollock and sideboard species; area-by-area harvest information; and total weight of pollock landed outside the State of Alaska. Moreover, North Pacific Fishery Management Council (2013) notes that elements of the regulations have been interpreted in different ways. With respect to the regulation requiring that harvests of pollock, sideboard species, and PSC be presented "on an area-by-area and vessel-by-vessel basis", some cooperatives present this information first on an area-by-area basis for their full fleet and then a vessel-by-vessel basis, while other cooperatives present this harvest information for one vessel, area, and species at a time. In addition, some cooperatives understand the requirement to specify the number of salmon taken by species and season to mean the A and B season, while other cooperatives report the whole fishing season.

With regard to reporting requirements related to measures to limit salmon PSC, AFA representatives from the IA for chum catch avoidance are required to provide a report on PSC avoidance as part of Amendment 84. The IA annual report must include the following:

- An estimate of the number of non-Chinook salmon avoided as demonstrated by the movement of fishing effort away from Chum salmon Savings Areas.
- The results of the compliance audit required at 50 § 679.21(g)(2)(v).

Under Amendment 91, IPA representatives are required to provide an overview of their Chinook salmon PSC reduction efforts under IPAs. The IPA annual report must include the following:

- Incentive measures in effect in the previous year.
- How incentive measures affected individual vessels.
- How incentive measures affected salmon savings beyond current levels.
- IPA amendments approved by NMFS since the last annual report and the reasons for amendments.
- Sub-allocation to each participating vessel.
- Number of Chinook PSC and amount of pollock (mt) at the start of each fishing season.
- Number of Chinook PSC and amount of pollock (mt) caught at the end of each season.
- In-season transfers among entities of Chinook salmon PSC or pollock among AFA cooperatives.
- Transfers among IPA vessels.
- Amount of pollock (mt) transferred.

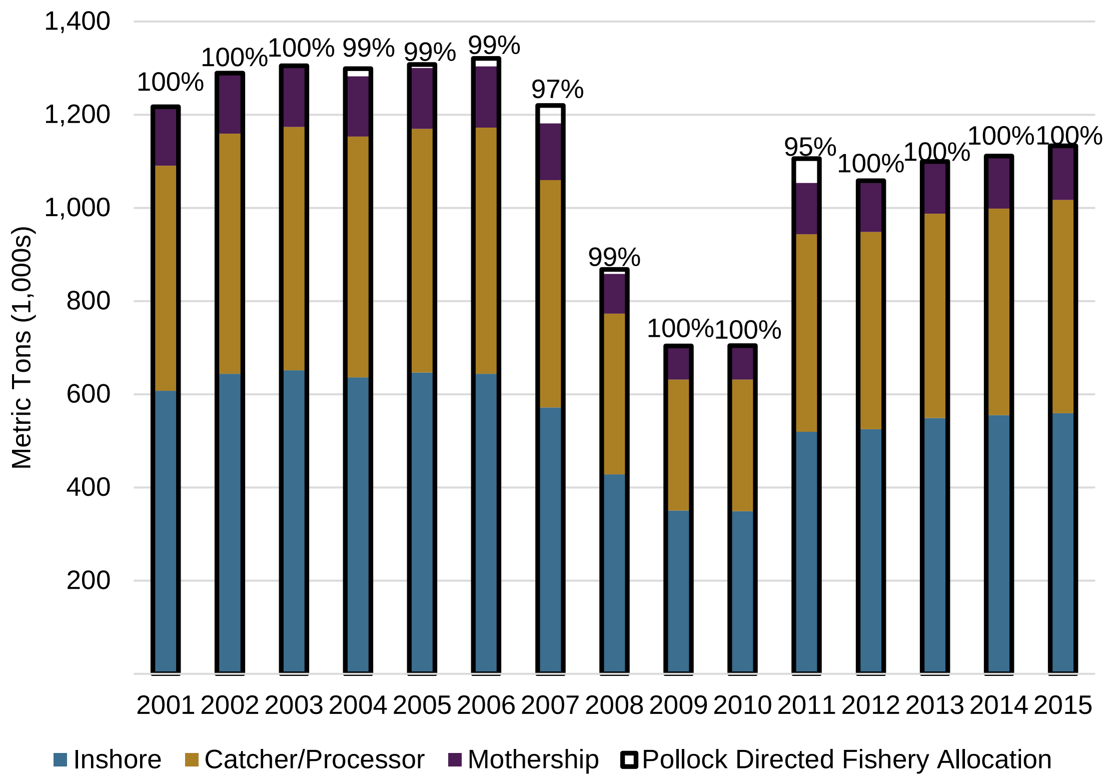
Amendment 110 added reporting requirements to the IPA annual report—it requires IPA representatives to describe how an IPA addresses the goals and objectives in the IPA provisions related to chum salmon.

While not a reporting requirement under the AFA, the United Catcher Boats Association, a trade association of trawl catcher vessel owners, annually prepares the AFA catcher vessel intercooperative report, which is a summary of the eight catcher vessel cooperative reports. While the individual cooperative reports track the annual activities of each cooperative at the vessel level, a summary of AFA catcher vessel harvests in the BSAI and GOA fisheries is useful, as NMFS allocates catcher vessel sideboard limits and PSC limits in the aggregate, not by individual cooperatives. The catcher vessel intercooperative report provides the Council, and the public, with a simple means of evaluating the AFA catcher vessel fleets' aggregate fishing performance under the AFA regulations. Additionally, this report provides information beyond the required regulatory elements of the individual co-op reports to provide a broader understanding of catcher vessel cooperative activities (Gruver 2016).

4 Allocation and Harvest

This section describes the distribution of the annual pollock DFA among the cooperatives in each AFA sector and the amount of BS pollock harvested by each cooperative, along with ex-vessel and wholesale revenue estimates. An overall summary of the BS pollock harvest by AFA sectors is provided in Figure 1. As a result of the end of the race-for-fish, the sectors have been able to harvest all or nearly all of the pollock DFA. The decrease in the pollock DFA between 2008 and 2010 was due to a substantial drop in the Acceptable Biological Catch in the BS pollock that the Council and NMFS implemented as a precautionary measure to protect the fishery. Stock assessments conducted by NMFS at that time showed a decline in the pollock biomass in the eastern Bering Sea. The BSAI pollock fishery TAC is set at or below the Acceptable Biological Catch level recommended. In 2011, the TAC increased significantly, reflecting strong growth in the fish population.

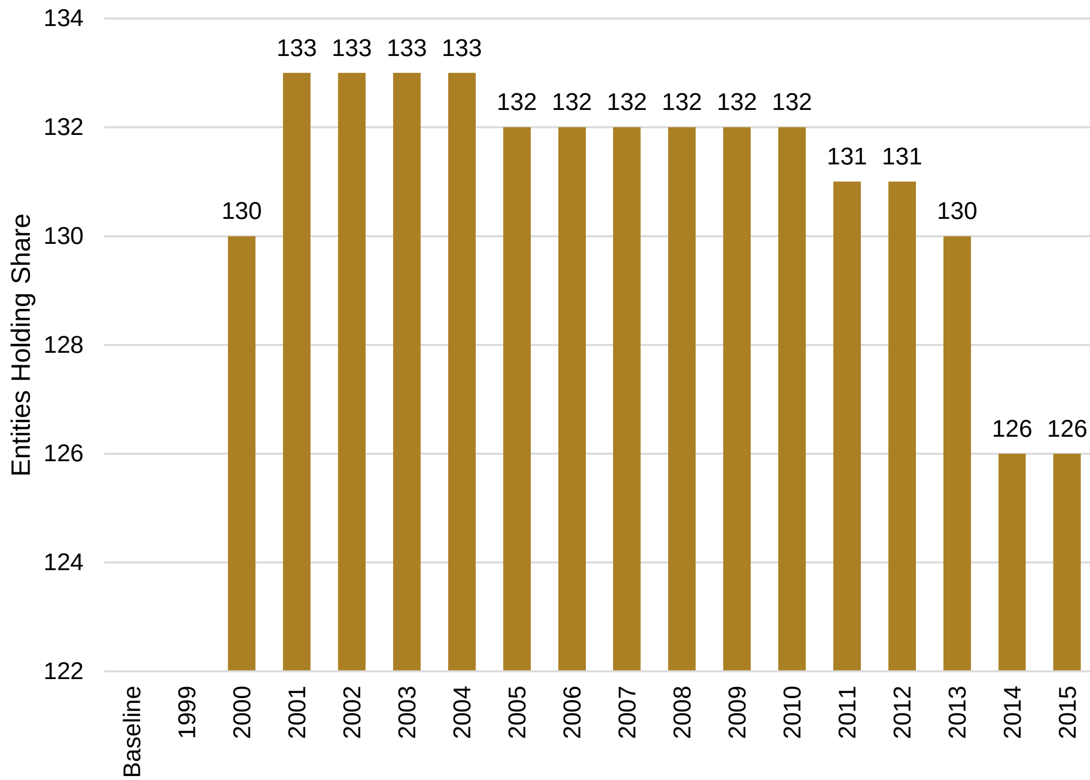
Figure 1. Bering Sea Pollock Harvest, by AFA Sector, 2001–2015



Source: Developed by Northern Economics, Inc. using data from catcher vessel intercooperative reports and Pollock Conservation Cooperative reports (National Marine Fisheries Service 2016e).

The number of entities receiving an exclusive harvest privilege in the AFA Program, defined as the number of unique AFA permits for catcher/processors and catcher vessels, remained nearly constant at 130–133 entities up until 2014, when it declined to 126 (Figure 2). The decrease is likely due to the fairly restrictive provisions in the original AFA regarding replacement of vessels, but the number may increase to prior levels with the implementation of revised AFA vessel replacement provisions (Section 2.5).

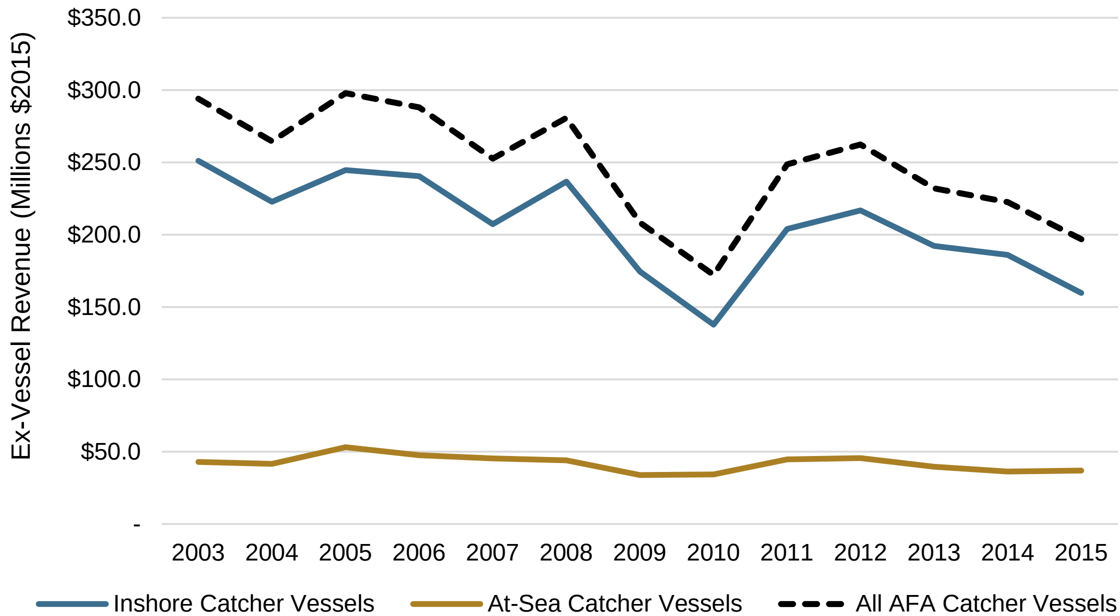
Figure 2. Number of AFA Catcher/Processors and Catcher Vessels Receiving an Exclusive Harvest Privilege, 2000–2015



Source: Fissel et al. (2016)

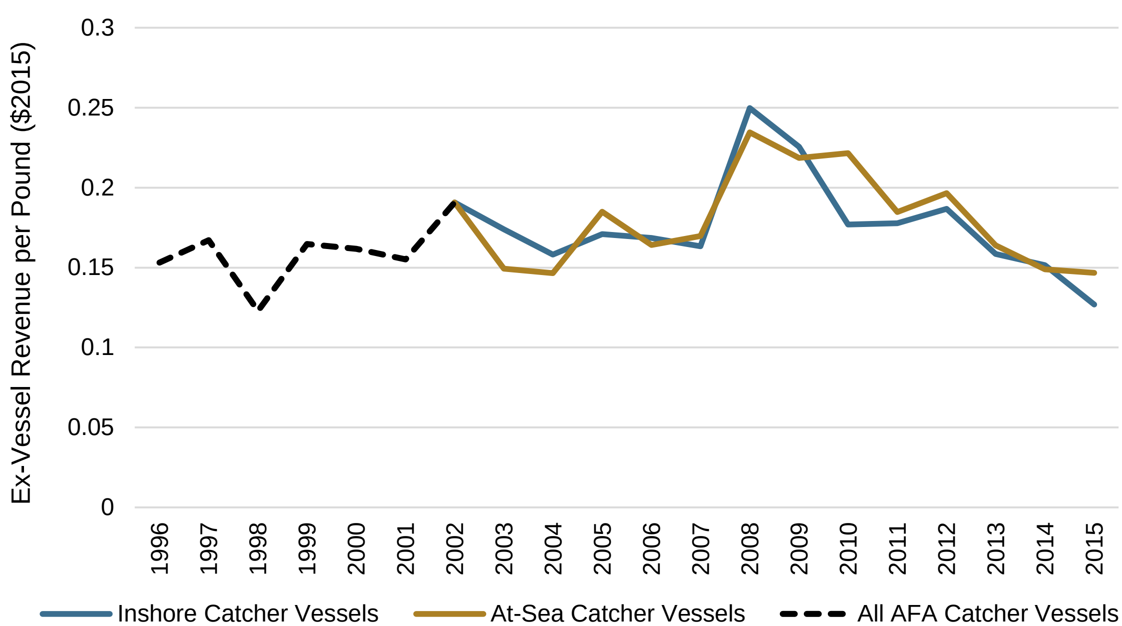
Figure 3 through Figure 6 summarize inflation-adjusted ex-vessel and wholesale product revenues generated in the BS pollock fishery by AFA sector. Ex-vessel revenue is the amount paid to catcher vessel operators by processors for their harvest. The ex-vessel revenue for both inshore AFA catcher vessels and AFA catcher vessels delivering to motherships was estimated. Figure 3 shows ex-vessel revenue amounts from 2003 to 2015, and Figure 4 shows estimated ex-vessel price per pound. Ex-vessel price estimates back to 1996 are displayed in order to capture the pre-AFA period and to better address the question of whether management of the pollock fishery under the AFA led to higher ex-vessel prices. Ex-vessel prices increased noticeably in 2008–2010 due to supply shortages caused by lower pollock harvests in those years (Figure 1), but the overall price trend for both inshore and offshore vessels was generally flat from 1996-2015. Over the 2003–2015 period, ex-vessel revenue has shown an overall decreasing trend as a result of a decline in the Bering Sea pollock harvest (Figure 1). Estimated ex-vessel prices do not appear to favor either inshore or offshore vessels.

Figure 3. Ex-vessel Revenues of AFA Catcher Vessels in the Bering Sea Pollock Fishery, 2003–2015



Source: Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

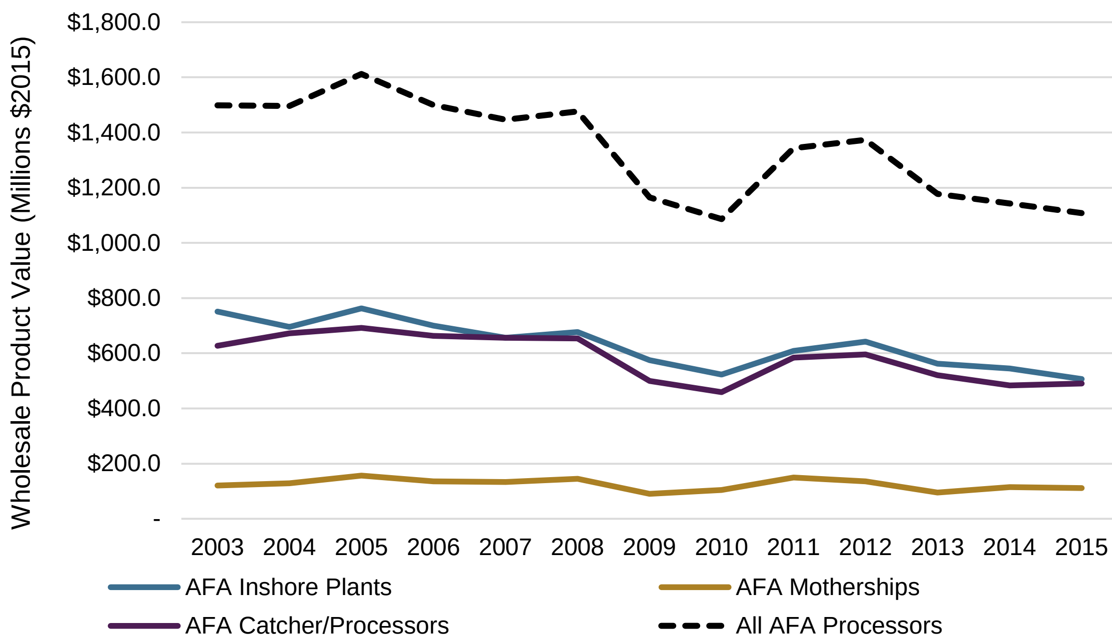
Figure 4. Ex-vessel Prices for Bering Sea Pollock, by AFA Sector, 1996–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016) and, for years prior to 2003, data from Fissel et al. (2016).

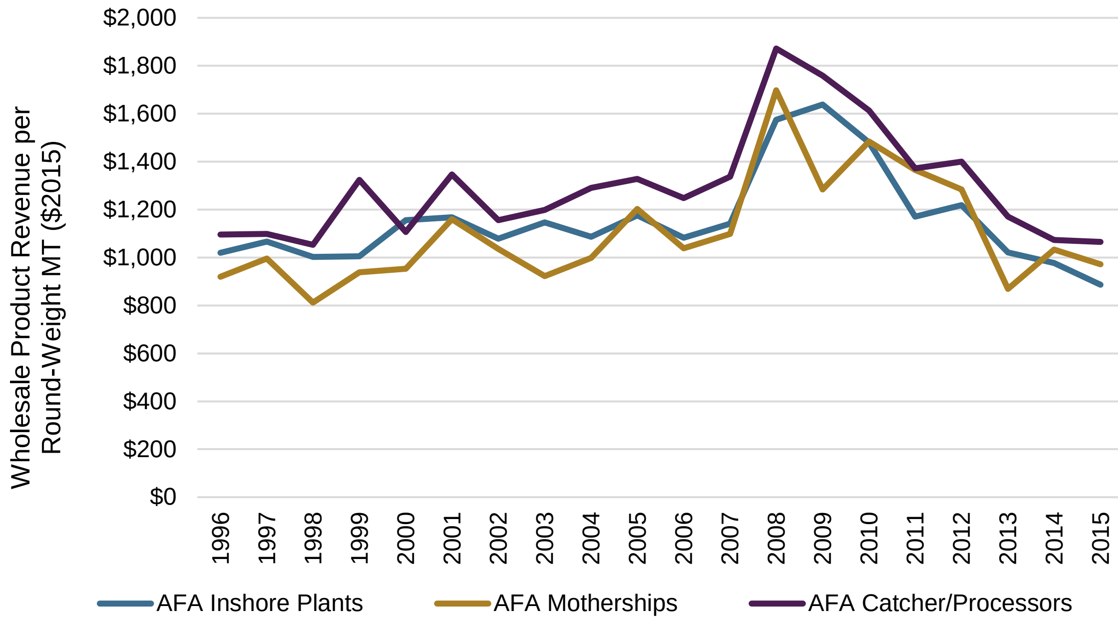
Wholesale revenue represents the value of a processed product when sold by a processor to an entity outside of their affiliate network. From 2003-2015, inflation-adjusted wholesale product revenue in the BS pollock fishery showed a trend similar to that of ex-vessel revenue. Overall, wholesale revenues have been declining with the general downward trend in BS pollock harvest. Wholesale revenue per ton has been fairly stable with the exception of the noticeable increase in 2008–2010 due the sharp drop in pollock harvests during those years. In general, catcher/processors generated an average of 12 percent more revenue per round-weight ton of pollock than the inshore processors and 17 percent more than motherships.

Figure 5. Wholesale Revenues of AFA Processors in the Bering Sea Pollock Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 6. Estimated Wholesale Revenue per Round-Weight (Metric Tons) of Bering Sea Pollock, 1996–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016) and, for years prior to 2003, data from Fissel et al. (2016).

4.1 Catcher/Processor Sector

Table 1 shows the allocation of the annual pollock DFA to the PCC and HSCC and the amount of BS pollock harvested by the PCC. The AFA required that no less than 8.5 percent of the catcher/processor sector's allocation be made available for harvest by the seven catcher vessels authorized to deliver to catcher/processors. However, as discussed in Section 3.1, the catcher vessels in the HSCC generally find it more profitable to lease or sell their quota to the PCC and its members. It wasn't until 2008 that a HSCC vessel fished its quota. At that time, American Seafoods needed another vessel to harvest its quota to avoid exceeding the 17.5 percent harvesting cap (Strong and Criddle 2013).

Table 1. AFA Catcher/Processor Sector Pollock Allocation and Harvest, 2000–2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pollock Conservation Cooperative																
% Catcher/Processor Sector Allocation	91.1	91.5	91.5	91.5	91.5	91.5	91.5	91.2	91.5	91.5	91.5	91.5	91.5	91.5	91.1	91.5
Coop Allocation (1,000 mt)	356.5	444.7	471.3	478.0	475.5	478.6	483.4	445.4	317.2	256.9	258.7	404.6	387.3	401.0	403.7	418.8
Transfers from HSCC (1,000 mt)	34.7	41.5	43.9	44.4	44.2	44.5	44.9	43.2	28.1	23.9	24.0	37.6	36.0	37.5	39.4	38.9
Final Allocation (1,000 mt)	391.2	486.2	515.3	522.4	519.7	523.0	528.3	488.6	345.2	280.8	282.7	442.2	423.2	438.4	443.1	457.8
% Caught	100.0	99.4	100.0	100.0	99.4	100.0	100.0	100.0	99.9	100.0	100.0	95.8	100.0	100.0	100.0	100.0
High Seas Catchers' Cooperative																
% Catcher/Processor Sector Allocation	8.9	8.5	8.5	8.5	8.5	8.5	8.5	8.8	8.5	8.5	8.5	8.5	8.5	8.5	8.9	8.5
Coop Allocation (1,000 mt)	34.7	41.5	43.9	44.4	44.2	44.5	44.9	43.2	29.5	23.9	24.0	37.6	36.0	37.5	39.4	38.9
Transfers to PCC (1,000 mt)	-34.7	-41.5	-43.9	-44.4	-44.2	-44.5	-44.9	-43.2	-28.1	-23.9	-24.0	-37.6	-36.0	-37.5	-39.4	-38.9
Final Allocation (1,000 mt)	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-	-	-
% Caught	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

Source: Pollock Conservation Cooperative reports (National Marine Fisheries Service 2016e).
"-" indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

4.2 Mothership Sector

Table 2 shows the allocation of the annual pollock DFA to the MFC and the amount of BS pollock harvested by the cooperative.

Table 2. AFA Mothership Sector Allocation and Harvest, 2000–2015

Item	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Coop Allocation (1,000 mt)	N/A	122.2	129.2	130.6	129.9	130.8	132.1	122.1	86.8	70.4	70.7	110.6	105.8	110.2	111.3	114.4
% Caught	N/A	99.3	100.0	100.0	99.5	99.9	99.5	99.5	98.3	99.8	99.8	99.4	99.6	99.9	99.7	100.0

Source: Mothership Fleet Cooperative reports (National Marine Fisheries Service 2016e).
Notes: "N/A" indicates that data are unavailable.

4.3 Inshore Sector

Table 3 shows the allocation of the annual pollock DFA to each inshore cooperative and the amount of BS pollock harvested by the cooperative. In addition, the table presents the percent distribution of the inshore sector allocation across cooperatives. Cooperatives have generally succeeded in utilizing nearly all of the allocations of their member vessels. In 2008, however, the Peter Pan Fleet Cooperative harvested or leased only 76 percent of its quota, presumably due to a combination of high fuel prices and low product prices that summer (Strong and Criddle 2013).

Table 3. Pollock Allocations and Harvest of Inshore Cooperatives, 2000–2015

Item	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All Inshore Cooperatives Combined																
% Inshore Sector Allocation	N/A	N/A	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	N/A	100.0	100.0	100.0
Coop Allocation (1,000 mt)	N/A	N/A	643.8	651.9	649.3	653.8	659.9	610.4	434.2	352.1	350.7	552.7	N/A	550.8	556.6	560.9
% Caught	N/A	N/A	100.1	99.7	96.7	95.9	95.8	91.5	96.4	96.3	96.7	92.8	N/A	97.4	97.4	97.2
% Leased	N/A	N/A	0.0	0.2	1.3	3.0	1.8	2.2	2.1	3.3	2.7	1.2	N/A	2.3	2.4	2.6
% Total Harvest	N/A	N/A	100.1	99.9	98.0	98.9	97.6	93.7	98.5	99.6	99.4	94.0	N/A	99.7	99.8	99.7
Akutan Catcher Vessel Association																
% Inshore Sector Allocation	N/A	29.4	28.2	28.1	28.1	28.1	31.2	31.1	31.1	32.8	32.3	32.3	32.3	32.3	32.3	32.9
Coop Allocation (1,000 mt)	N/A	175.2	181.4	183.4	182.4	183.9	205.7	189.9	135.2	115.5	113.2	178.3	170.7	177.7	179.6	184.6
% Caught	N/A	99.8	99.9	99.0	95.6	93.4	95.5	94.0	98.6	97.6	98.0	96.5	98.1	97.4	97.8	98.6
% Leased	N/A	-	-	0.9	2.3	5.2	0.3	0.1	0.4	2.0	1.0	0.1	0.1	2.2	2.0	1.4
% Total Harvest	N/A	99.8	99.9	99.9	97.9	98.6	95.8	94.1	99.0	99.7	99.0	96.6	98.2	99.6	99.9	100.0
Arctic Enterprise Association																
% Inshore Sector Allocation	N/A	6.0	4.2	4.2	4.2	4.2	1.1	1.1	1.1							
Coop Allocation (1,000 mt)	N/A	35.8	27.2	27.5	27.3	27.5	7.6	7.0	5.0							
% Caught	N/A	99.9	99.8	99.9	96.3	96.8	-	-	7.2				Inactive			
% Leased	N/A	-	-	-	3.5	3.0	99.9	93.0	92.7							
% Total Harvest	N/A	99.9	99.8	99.9	99.8	99.9	99.9	93.0	99.9							
Peter Pan Fleet Cooperative																
% Inshore Sector Allocation	1.6	N/A	2.1	2.1	2.1	2.7	2.8	2.9	2.9	2.9	2.9	2.3	2.3	2.3	2.3	2.4
Coop Allocation (1,000 mt)	3.5	N/A	13.7	13.8	13.9	17.8	18.8	17.6	12.5	10.2	10.2	13.0	12.4	12.9	13.0	13.4
% Caught	100.1	N/A	99.4	99.7	92.3	96.9	80.2	72.8	48.7	52.8	69.3	77.5	N/A	56.2	54.8	58.4
% Leased	-	N/A	-	-	7.4	-	10.3	23.3	28.2	44.6	23.6	13.3	N/A	39.6	41.0	36.0
% Total Harvest	100.1	N/A	99.4	99.7	99.7	96.9	90.5	96.1	76.9	97.4	92.8	90.8	N/A	95.8	95.7	94.4
Northern Victor Fleet Cooperative																
% Inshore Sector Allocation	15.8	8.5	8.5	8.4	8.4	8.4	8.4	8.4	9.5	9.0	9.5	9.4	9.7	9.7	10.7	10.9
Coop Allocation (1,000 mt)	33.6	50.9	54.5	55.0	54.7	55.1	55.3	51.4	41.2	31.5	33.1	51.8	51.2	53.3	59.5	61.2
% Caught	99.1	99.7	99.7	99.9	98.9	99.1	96.2	96.0	98.6	98.6	99.9	99.9	99.7	99.7	99.4	99.0
% Leased	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.6	0.2
% Total Harvest	99.1	99.7	99.7	99.9	98.9	99.1	96.2	96.0	98.6	98.6	99.9	99.9	99.7	99.8	100.0	99.3
UniSea Fleet Cooperative																
% Inshore Sector Allocation	55.6	24.7	23.0	23.1	23.2	24.4	25.3	25.3	24.3	24.3	26.2	26.5	26.5	26.5	26.5	25.0
Coop Allocation (1,000 mt)	118.4	147.6	147.9	150.6	150.4	159.7	167.2	154.7	105.3	85.4	91.7	146.4	140.1	145.9	147.4	140.2
% Caught	100.0	100.9	100.7	99.9	99.8	95.0	99.7	96.1	99.4	100.0	100.0	91.1	100.0	99.9	99.7	99.8
% Leased	-	-	-	-	-	4.3	-	-	-	-	-	-	-	0.1	0.2	0.2
% Total Harvest	100.0	100.9	100.7	99.9	99.8	99.3	99.7	96.1	99.4	100.0	100.0	91.1	100.0	100.0	100.0	100.0

Item	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Westward Fleet Cooperative																
% Inshore Sector Allocation	N/A	18.8	21.8	21.8	21.7	19.9	18.9	18.9	18.9	18.9	18.6	18.5	18.2	18.2	18.2	18.5
Coop Allocation (1,000 mt)	N/A	112.4	140.1	141.9	141.1	129.9	124.8	115.5	82.1	66.6	65.3	102.2	96.2	100.2	101.2	104.0
% Caught	N/A	99.5	99.9	99.9	97.1	98.0	96.9	87.0	98.4	92.6	91.2	84.1	94.1	96.5	96.6	93.6
% Leased	N/A	-	-	-	-	-	0.8	1.7	0.4	6.9	8.8	4.6	5.9	3.4	3.3	6.3
% Total Harvest	N/A	99.5	99.9	99.9	97.1	98.0	97.7	88.7	98.8	99.4	100.0	88.7	100.0	100.0	100.0	99.9
Unalaska Cooperative																
% Inshore Sector Allocation	26.9	12.5	12.3	12.2	12.2	12.2	12.2	12.2	12.2	12.2	10.6	11.0	11.0	11.0	10.0	10.2
Coop Allocation (1,000 mt)	57.3	74.9	78.9	79.7	79.3	79.8	80.5	74.5	52.9	42.9	37.1	61.0	58.4	60.8	55.8	57.4
% Caught	99.7	99.9	100.0	100.0	91.9	96.9	99.2	92.7	99.6	100.0	99.3	97.9	100.0	99.3	99.2	99.8
% Leased	-	-	-	-	3.2	3.1	0.7	0.4	0.4	-	0.7	-	-	0.1	0.4	-
% Total Harvest	99.7	99.9	100.0	100.0	95.2	100.0	100.0	93.1	100.0	100.0	100.0	97.9	100.0	99.5	99.6	99.8

Source: Inshore cooperative reports (National Marine Fisheries Service 2016e).
Notes: “N/A“ indicates that data are unavailable.
“-“ indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

5 Participation and Consolidation

Since the passage of the AFA, transfers and consolidation of ownership have occurred among eligible participants in the BS pollock fishery as these participants seek greater efficiencies in their operations. In addition to these organizational changes, consolidation has occurred through the leasing of BS pollock harvest quota. This leasing enables less efficient operations to contract with more efficient ones to harvest their pollock allotment, with the net result being that fewer vessels participate overall. This section describes participation trends within the three AFA sectors, and summarizes information from AFA cooperative reports and industry news sources regarding major changes in asset ownership.[10]

The participation discussion includes a measure of the evenness of the distribution of BS pollock catch among active vessels in a given cooperative. The statistical measure selected was the Gini coefficient, which varies between zero and one, where a value of zero indicates that all vessels harvested exactly the same amount, while a value of one indicates that a single vessel accounted for 100 percent of the harvest. Therefore, as harvest becomes more concentrated over fewer vessels, the Gini coefficient increases. In addition, a tertile analysis was performed, whereby a cooperative's harvest is divided into bottom, middle, and top tertiles, each containing a third of the active vessels in the cooperative. The portion of the cooperative's total catch is then reported for each tertile. If the percentage harvested in each tertile is similar across the three tertiles, the distribution of harvest across vessels is relatively uniform and the Gini coefficient will be relatively close to zero. If the percentage harvested is dissimilar across the three tertiles, the distribution in less uniform and the Gini coefficient will be higher.

5.1 Catcher/Processor Sector

5.1.1 Overview of Changes in Ownership

Information regarding the ownership of AFA catcher/processors is available from the annual reports of the PCC (National Marine Fisheries Service 2016e). Before the 2000 fishing season, the catcher/processor *Endurance* left the BS pollock fishery, sold its quota share to the PCC, and reflagged to another country. At that time, the remaining 19 catcher/processors listed in the AFA were owned by eight companies. By 2015, the AFA catcher/processors were owned by seven companies. Table 4 shows the change in company ownership between 2000 and 2015, together with the percentage of the catcher/processor sector allocation apportioned to each company. In 2008, American Seafoods acquired the catcher/processor *Highland Light,* and Glacier Fish Company acquired Alaska Ocean Seafood, thereby adding the catcher/processor *Alaska Ocean* to its fleet. In 2010, American Seafoods transferred ownership of the catcher/processor *Northern Hawk* to Coastal Villages Region Fund, a CDQ group.

Apart from Coastal Villages, other CDQ groups have ownership interests in many AFA catcher/processors. Based on information from CDQ group annual reports and web pages, together with information obtained from interviews with key informants, it appears that in 2015, Bristol Bay Economic Development Corporation was a 30 percent owner in the Arctic Fjord, Central Bering Sea Fishermen's Association was a 9.9 percent owner of the AFA catcher/processors in American Seafoods' fleet, Aleutian-Pribilof Islands Community Development Association was a 20 percent owner in the

[10] While regulations implementing the AFA require owners of U.S.-flagged fishing vessels greater than 100 feet to submit vessel ownership information to the Maritime Administration, this information was unavailable for the current AFA Program review.

Starbound, and Norton Sound Economic Development Corporation was a 50 percent owner in Glacier Fish Company's three AFA catcher/processors (National Marine Fisheries Service 2016d).[11] Such investments are made with the expectation of financial gain or expanding equity in the fishing fleet. Investments in subsidiaries, such as limited liability corporations, allow CDQ groups to wholly or partially own vessels directly related to fisheries. These vessels provide revenue through the direct catch and sale of target species, and vessel ownership increases a subsidiary's holdings of BS pollock quota (National Marine Fisheries Service Undated).

At the time the HSCC was formed, two of the seven catcher vessels in it were owned by companies owning catcher/processors. Later, two more of the independent catcher vessels were sold to companies owning catcher/processors. The three remaining catcher vessels are thought to be independently owned.

Table 4 summarizes changes in ownership percentages of catcher/processors in the PCC, along with the ownership percentages of members of the HSCC (shown in aggregate) and the maximum amount allocated to the *Ocean Peace*.

Table 4. AFA Catcher/Processor Companies and Their Pollock Directed Fishery Allocation and Pollock Conservation Cooperative Shares, 2000 and 2015

	2000		2015	
	Pollock DFA Share (%)	PCC Share (%)	Pollock DFA Share (%)	PCC Share (%)
PCC Catcher/Processors				
Alaska Ocean Seafood LP	2.988	7.47	-	-
Highland Light	1.754	4.39	-	-
C/P Northern Hawk, LLC	-	-	0.994	2.48
Starbound, LLC	1.576	3.94	1.576	3.94
Arctic Fjord, Inc.	1.784	4.46	1.784	4.46
Arctic Storm, Inc.	1.831	4.58	1.831	4.58
Glacier Fish Company LLC.	3.200	8.00	6.188	15.47
Trident Seafoods Corp.	6.785	16.96	6.785	16.96
American Seafoods LLC	16.48	41.20	17.243	43.11
PCC Company Total	**36.40**	**91.00**	**36.40**	**91.00**
Other Vessels in the Catcher/Processor Sector				
HSCC Vessels	3.40	8.5	3.40	8.50
Ocean Peace	0.20	0.50	0.20	0.50
Catcher/Processor Sector Total	**40.00**	**100.00**	**40.00**	**100.00**

Source: Developed by Northern Economics using data from Pollock Conservation Cooperative reports (National Marine Fisheries Service 2016e).

5.1.2 Participation in the Bering Sea Pollock Fishery

A total of 21 catcher/processors are qualified to participate in the BS pollock fishery under the AFA, including the *Ocean Peace*, the one catcher/processor that was not listed in the AFA but met the minimum historic harvest level to qualify under the AFA.[12] As noted above, the catcher/processor

[11] These data were originally compiled and published as Table 4-72 in National Marine Fisheries Service (2016d)

[12] The *Ocean Peace* is not a member of the PCC. It has made targeted landings in the BSAI pollock fishery every year since the beginning of the AFA. The AFA stipulates that harvests of catcher/processors that are not explicitly

Endurance left the BS pollock fishery before the 2000 fishing season. Of the remaining 19 catcher/processors, from 1 to 5 vessels did not participate in the BS pollock fishery in a given year during the 2000–2015 period, either because the vessels chose to lease their allocation and not fish or companies chose to fish with fewer vessels. The annual change in the number of active vessels within the PCC is shown in Table 5, with "active" defined as any commercial harvest of non-CDQ BS pollock in a given year. The PCC experienced its largest change in participation in 2009, when the number of active vessels dropped to 14 in response to the sharp decline in the BSAI pollock TAC in that year (Section 4). The fact that the number of active vessels dropped in response to the lower pollock resource abundance levels in 2009 and 2010 is an indication of the effectiveness of the cooperative management system.

According to PCC reports, two vessels—the *Northern Glacier* (owned by Glacier Fish Company) and the *Katie Ann* (owned by American Seafoods)—did not actively participate in the BS pollock fishery during most years. These two vessels, both of which have limited processing capacity in comparison to other AFA catcher/processors, participated in non-pollock sideboard fisheries.

Table 5 shows that the harvest of the catcher/processor sector's pollock allocation has been fairly evenly distributed among active vessels in most years. The distribution of pollock harvests across active vessels has been fairly equal in most years, and the Gini coefficient has been correspondingly low. The Gini coefficient increased during the years of low BSAI pollock TACs (2008–2010) before returning to lower levels in 2011. The table also includes rows showing the percentage of pollock harvests taken by each tertile of active vessels in the PCC. The harvest of the bottom tertile ranged from 17.6 percent in 2008 to 27.4 percent in 2015.

Table 5. Pollock Conservation Cooperative Catcher/Processor Activity in the Bering Sea Pollock Fishery, 2000–2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Vessels	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
Number of Active Vessels	14	15	16	16	17	16	16	16	18	14	14	15	14	14	15	14
Bottom Tertile (%)	25.2	21.3	21.4	21.7	21.3	21.4	24.3	21.8	17.6	23.9	20.1	20.7	27.0	25.2	20.9	27.4
Mid Tertile (%)	39.2	36.2	37.7	37.4	37.9	37.5	36.4	37.6	36.2	31.9	34.9	33.7	37.7	37.9	34.7	36.9
Top Tertile (%)	35.6	42.5	41.0	40.9	40.8	41.2	39.3	40.6	46.1	44.2	45.0	45.6	35.3	36.9	44.4	35.7
Gini Coefficient	0.13	0.16	0.15	0.15	0.20	0.15	0.12	0.15	0.21	0.20	0.25	0.19	0.12	0.15	0.18	0.12

Source: Developed by Northern Economics using data from Pollock Conservation Cooperative reports (National Marine Fisheries Service 2016e).

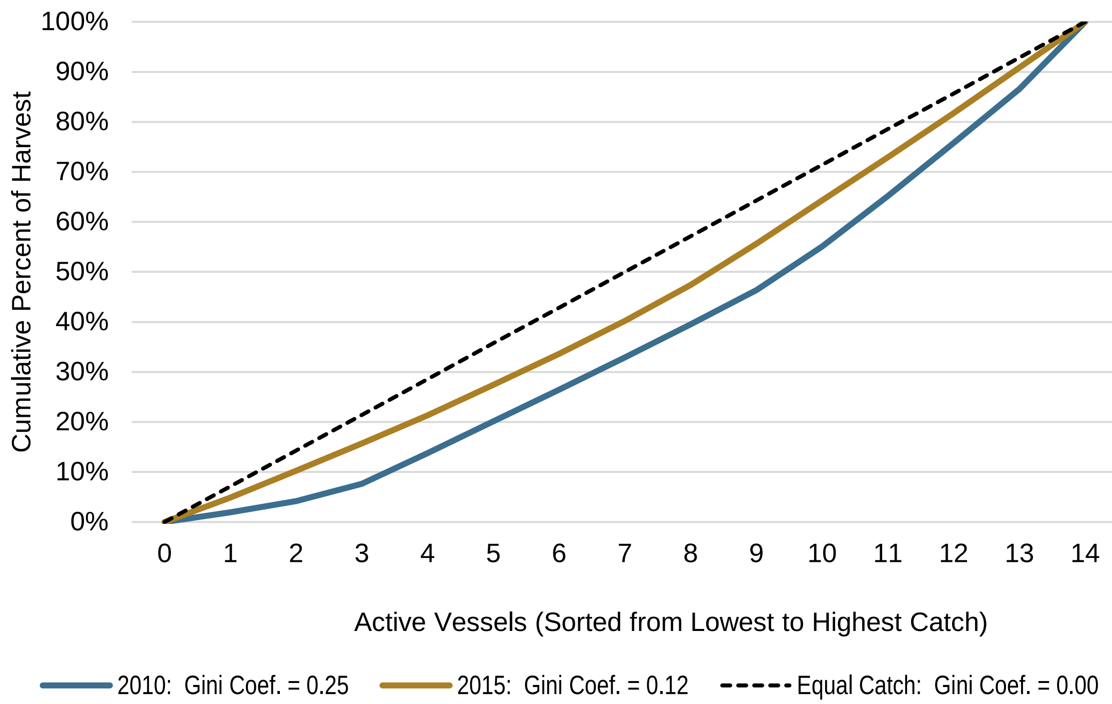
AFA catcher vessels eligible to deliver pollock to catcher/processors have typically been inactive in the BS pollock fishery, although the *Muir Milach* harvested 1,467 mt of BS pollock for the PCC in 2008. As discussed in Section 3.1, these catcher vessels typically find it more profitable to lease or sell their pollock quota to the PCC and its members. Five of the seven HSCC member have been active in other non-pollock fisheries.

Figure 7 demonstrates the distributional differences captured by the Gini coefficient. The figure shows three cumulative percentage distribution curves (also known as Lorenz curves) of harvest on a vessel-by-vessel basis for PCC vessels active in the BS pollock fishery. The blue line (with a Gini coefficient of 0.25) shows the distribution in 2010; the gold line (with a Gini coefficient of 0.12) shows the distribution

listed in the Act (i.e., the *Ocean Peace*) are limited to one-half of one percent of the catcher/processor sector allocation.

in 2015; and the black dashed line shows a hypothetical distribution with a Gini coefficient of zero, which indicates each vessel caught the same amount.

Figure 7. Cumulative Distribution of Bering Sea Pollock Harvest by AFA Catcher/Processors, 2010 and 2015



Source: Developed by Northern Economics using data from Pollock Conservation Cooperative reports (National Marine Fisheries Service 2016e).

5.2 Mothership Sector

5.2.1 Overview of Changes in Ownership

Currently, the three mothership vessels allowed by the AFA to operate in the mothership sector are owned by two entities. The *Golden Alaska* is owned by a partnership of independent fishermen, the Yukon Delta Fisheries Development Association, which is a CDQ group, and Maruha-Nichiro. Yukon Delta Fisheries Development Association acquired a share of the vessel in 2002 in return for assured deliveries from catcher vessels the CDQ group purchased (Strong and Criddle 2013). In 2015, the most recent year for which ownership data are available, Yukon Delta Fisheries Development Association was a 30.3 percent owner in the *Golden Alaska* (Yukon Delta Fisheries Development Association 2016).

At the time the AFA was enacted, Phoenix Processor Limited Partnership, which is managed through Premier Pacific Seafoods, owned the *Ocean Phoenix*, while the *Excellence* was owned by U.S. investors and Supreme Alaska Seafoods, a Maruha-Nichiro subsidiary. In 2010, the two motherships came under the ownership of one entity when Supreme Alaska Seafoods and Phoenix Processor Limited Partnership announced their merger. Supreme Alaska Seafoods' owners now own a 50 percent stake in the Phoenix Processor Limited Partnership. Marketing and management services for both vessels are provided by Premier Pacific Seafoods. The merger was possibly prompted by the reduced TAC for the BS pollock fishery from 2008 to 2010 (Section 4). The merger allowed the two companies to reduce management and operational costs and to process the combined pollock quota of the two vessels on the more efficient *Ocean Phoenix*. The *Excellence* did not participate in the pollock fishery during this period (North Pacific Fishery Management Council 2012; Strong and Criddle 2013).

To ensure a measure of certainty in their fish supplies, AFA motherships have sold themselves, in part, to catcher vessels (Strong and Criddle 2013). Approximately five catcher vessels have an operational/ownership linkage with the mothership *Excellence* to whom they deliver pollock (National Marine Fisheries Service 2002). Owners of three catcher vessels (*Aleutian Challenger*, *Amber Dawn,* and *Vanguard*) purchased an ownership interest in the *Golden Alaska*, and the *Golden Alaska* sold a significant percentage of itself to the Yukon Delta Fisheries Development Association in return for assured deliveries from two catcher vessels (*American Beauty* and *Ocean Leader*) that the CDQ group purchased.

5.2.2 Participation in the Bering Sea Pollock Fishery

Of the 20 catcher vessels originally qualified under the AFA to participate in the mothership sector, 14 to 15 have remained active in the BS pollock fishery.[13] Table 6 shows the participation trends of these catcher vessels based on information in the MFC reports. From 2001 to 2015, the majority of active vessels harvested more than 105 percent of their original allocations, indicating that shares of vessels that dropped out of the fishery were distributed among the remaining active vessels. The distribution of harvest across active vessels has been variable, with relatively high Gini coefficients in some years and low coefficients in others. In 2015, which had a Gini coefficient of 0.25, the top 5 vessels harvested nearly 50 percent of the total, and the bottom tertile harvested only 18.2.

Table 6. Mothership Fleet Cooperative Catcher Vessel Activity in the Bering Sea Pollock Fishery, 2001–2015

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Affiliated Vessels	20	20	20	20	19	19	19	19	19	19	19	19	19	19	19
Number of Active Vessels	19	17	17	18	17	17	17	17	17	14	14	15	14	15	15
Number of Vessels that Harvested > 105% of Allocation	11	10	10	9	12	12	12	11	10	12	11	12	10	11	9
Bottom Tertile (%)	14.1	24.1	22.4	20.3	26.5	18.5	20.6	14.5	17.8	23.2	25.4	22.8	23.6	18.3	18.2
Mid Tertile (%)	38.4	36.0	37.0	32.8	35.5	35.3	38.2	39.6	36.5	35.3	36.2	32.4	37.6	34.0	32.3
Top Tertile (%)	47.4	39.8	40.6	46.9	38.0	46.2	41.2	45.9	45.8	41.6	38.4	44.8	38.8	47.7	49.5
Gini Coefficient	0.27	0.16	0.19	0.20	0.14	0.25	0.21	0.28	0.25	0.20	0.16	0.17	0.17	0.23	0.25

Source: Developed by Northern Economic using data from Mothership Fleet Cooperative reports (National Marine Fisheries Service 2016e).

Notes:

Many of the catcher vessels qualified to participate in the mothership sector also participate in the inshore sector. Some "inactive" catcher vessels in the mothership sector may have been active in the inshore sector, while others may have stopped participating in the BS pollock fishery entirely.

Many catcher vessels are "dual qualified" with respect to AFA sectors—of the 20 catcher vessels eligible to participate in the mothership sector, 14 are also qualified to participate in the inshore sector. Of the six vessels that qualified to participate only in the mothership sector, three appear to have been active during the entire 2002–2015 period—one appears to have dropped out of the BS pollock fishery after 2005, one appears to have dropped out after 2012, and one does not appear to have been active in any year during that period. Of the dual-qualified vessels, nearly all made landings in both sectors during the years in which they were active.

[13] The *Amber Dawn*, which was lost at sea in 2001, was considered by the MFC as an affiliated vessel through 2004, but beginning in 2005 was removed from the list of affiliated vessels.

5.3 Inshore Sector

5.3.1 Overview of Changes in Ownership

Currently, the six shorebased and two floating processors in the inshore sector are owned by four companies and, as noted in Section 3.1, organized as seven cooperatives. Trident Seafoods owns shorebased processors in Akutan and Sand Point, but the Sand Point processor is not associated with a cooperative.[14] Trident Seafoods also owns the floating processor *Arctic Enterprise,* and is partnered with Arctic Enterprise Association. However, as discussed in Section 4.3, the *Arctic Enterprise* has been inactive since 2009. As shown in Table 3, which presents the percent distribution of the inshore sector allocation across inshore cooperatives, Trident Seafoods controlled 29.6 percent of the inshore sector allocation through the Akutan Catcher Vessel Cooperative in 2015 (net of the 10 percent of the cooperative's allocation that can be delivered to any inshore processor).

Three shorebased processors, one in King Cove and two in Dutch Harbor/Unalaska, are owned by Maruha-Nichiro, a partnership formed in October 2007 through the merger of the Maruha Group and Nichiro Corporation. In 2015, Maruha-Nichiro controlled around 30.0 percent of the inshore sector allocation through three cooperatives: the Peter Pan Fleet Cooperative, Westward Fleet Cooperative, and Unalaska Cooperative. A third shorebased processor in Dutch Harbor/Unalaska is owned by Nippon Suisan Kaisha. In 2015, the plant controlled 22.5 percent of the inshore sector allocation through the UniSea Fleet Cooperative. The *Northern Victor* is a floating processor owned by Icicle Seafoods, which was acquired by Paine & Partners in 2007 and then sold to Cooke Seafood in 2016. Through the Northern Victor Fleet Cooperative, Icicle Seafoods controlled 9.8 percent of the inshore sector allocation in 2015.

The vessel ownership information available to this AFA Program review was insufficient to determine changes in ownership patterns in the inshore catcher vessel fleet. However, publically available information indicates that over the years, CDQ groups have acquired significant ownership interests in companies possessing inshore catcher vessels (Table 7).

[14] Although Trident Seafoods' plant in Sand Point qualified as an AFA shoreside processor, it is not associated with a cooperative. Before passage of the AFA, the plant served as a "relief valve" for Trident Seafoods' plant in Akutan during the race-for-fish. When enactment of the AFA alleviated the race-for-fish, the BSAI pollock fishing season was lengthened, and the rate of harvesting and processing was reduced. This decreased the need to divert pollock for processing at the Sand Point plant. As a result, the plant does not qualify to receive a cooperative processing endorsement on its AFA inshore processing permit, as every catcher vessel that delivered pollock to the plant delivered over 90 percent of its catch to the Akutan plant. Only pollock deliveries that account for less than 10 percent of another cooperative's allocation and pollock harvested in the inshore open access fishery may be delivered to the Sand Point plant (National Marine Fisheries Service 2001b; National Marine Fisheries Service 2002).

Table 7. Community Development Quota Group Ownership of Inshore Catcher Vessels, 2015

CDQ Group	Company (% Ownership)	Vessels
Aleutian-Pribilof Islands Community Development Association	Golden Dawn, LLC (25%)	*Golden Dawn*
Bristol Bay Economic Development Corporation	Dona Marita, LLC (50%)	*Defender, Gun-Mar, Bering Defender, Morning Star*
	Neahkahnie, LLC (40%)	*Neahhahnie*
Central Bering Sea Fishermen's Association	St. Paul Fishing Company, LLC (ownership % varies by vessel)	*Starlite* (75%), *Starward* (75%), *Early Dawn* (50%), *Fierce Allegiance* (30%)
	American Seafoods (9.9%)	*Aleutian Challenger, Forum Star*
Coastal Villages Region Fund	BSAI Partners, LLC (37.5%)	*Bering Rose, Alaska Rose, Destination, Great Pacific, Messiah, Ms. Amy, Sea Wolf*
Norton Sound Economic Development Corporation	BSAI Partners, LLC (37.5%)	*Bering Rose, Alaska Rose, Destination, Great Pacific, Messiah, Ms. Amy, Sea Wolf*
Yukon Delta Fisheries Development Association	Alakanuk Beauty, LLC (75%)	*American Beauty*
	Emmonak Leader, LLC (75%)	*Ocean Leader*

Source: Developed by Northern Economics using data from National Marine Fisheries Service (2016d), key informant interviews, and CDQ group reports and web pages.

5.3.2 Participation in the Bering Sea Pollock Fishery

This section draws on information from inshore cooperative reports to describe the participation trends of catcher vessels that are fishing in the inshore portion of the BS pollock fishery and are members of inshore cooperatives. The number of affiliated vessels, active vessels, and vessels harvesting greater than 105 percent of their annual allocation from 2000 to 2015 is presented for all inshore catcher vessels in Table 8 and for each cooperative in Table 9. Neither of the tables includes harvests made through intercooperative transfers under Amendment 69 (Section 2.3).

As shown in Table 8, the number of catcher vessels active in a inshore cooperative since 2002 ranged from a high of 87 in 2004 and 2005 to a low of 76 in 2012. In 2008–2010, the three years with significantly low BSAI pollock TACs (Section 4), the number of active vessels fell. In general, approximately one-third of the active vessels harvested more than 105 percent of their allocations, while the remaining two-thirds harvested less than their initial allocation. While pollock catch percentages in the bottom tertile trended downward from 2002 to 2010, they rebounded slightly in more recent years. Pollock harvests in the top tertile have averaged over 63 percent, while the average Gini coefficient has been over 0.45. These statistics indicate that the upper third of the active vessels are harvesting considerably more than other vessels. However, the relative stability of these numbers indicates that consolidation levels have stabilized.

Table 8. Inshore Cooperative Catcher Vessel Activity in the Bering Sea Pollock Fishery, 2000–2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Affiliated Vessels	N/A	N/A	94	95	96	97	96	98	97	97	95	97	97	95	92	91
Number of Active Vessels	N/A	N/A	81	82	84	83	79	85	82	83	82	83	76	80	80	81
Vessels That Harvested > 105% of Allocation	N/A	N/A	29	28	33	30	32	25	30	34	29	27	39	33	30	30
Bottom Tertile (%)	N/A	N/A	7.3	7.5	6.5	5.7	5.3	5.0	4.5	5.4	5.4	6.2	7.2	6.4	6.1	6.0
Mid Tertile (%)	N/A	N/A	30.9	30.7	29.6	29.8	31.0	29.7	30.9	31.0	31.0	31.4	32.6	31.1	30.2	29.8
Top Tertile (%)	N/A	N/A	61.9	61.8	63.9	64.5	63.7	65.3	64.6	63.6	63.6	62.5	60.2	62.5	63.7	64.2
Gini Coefficient	N/A	N/A	0.44	0.45	0.47	0.49	0.47	0.47	0.46	0.45	0.45	0.44	0.41	0.44	0.46	0.45

Source: Developed by Northern Economics using data from inshore cooperative reports (National Marine Fisheries Service 2016e).
Notes: “N/A“ indicates that data are unavailable.

With respect to the distribution of catch among active vessels with individual cooperatives, Table 9 documents the phasing out of the Arctic Enterprise Association from 2002 to 2008, with most vessels moving into the Akutan Catcher Vessel Association. The table also shows the decline in the number of vessels affiliated with the Westward Fleet Cooperative, and the increase in the size of the Northern Victor Fleet Cooperative.

The table also shows that in some cooperatives harvests are more concentrated than in others. In 2005, for example, the top tertile of the Akutan Catcher Vessel Association’s members caught 71 percent of the cooperative’s harvest, while the bottom tertile caught only 2 percent. The relatively high average Gini coefficient (0.45) of the Akutan Catcher Vessel Association is a further indication of the unevenness of the distribution of catch among Akutan Catcher Vessel Association members in that year.[15] In contrast, the distribution of pollock harvests in the UniSea Fleet Cooperative is fairly even across the tertiles, with the bottom tertile averaging 18 percent of the cooperative’s pollock harvests, and the upper tertile averaging 51 percent.

Table 9. Inshore Cooperative Catcher Vessel Activity in the Bering Sea Pollock Fishery, by Cooperative, 2000–2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akutan Catcher Vessel Association																
Number of Affiliated Vessels	N/A	33	33	33	33	34	36	36	36	38	36	37	37	37	34	34
Number of Active Vessels	N/A	31	30	29	29	30	31	33	32	34	32	33	33	32	33	33
Vessels That Harvested > 105% of Allocation	N/A	9	11	6	10	9	13	10	13	18	13	12	17	14	16	13
Bottom Tertile (%)	N/A	8.9	8.5	8.8	6.6	4.3	4.0	3.9	4.9	6.9	6.9	7.2	6.6	7.8	6.5	6.9
Mid Tertile (%)	N/A	27.5	24.1	29.3	29.7	24.8	33.5	31.2	33.5	30.0	32.5	28.1	27.3	32.1	25.6	28.6
Top Tertile (%)	N/A	63.7	67.4	61.9	63.7	70.9	62.5	64.9	61.7	63.1	60.6	64.8	66.1	60.1	67.9	64.5
Gini Coefficient	N/A	0.43	0.45	0.43	0.46	0.50	0.46	0.46	0.45	0.43	0.43	0.43	0.44	0.42	0.46	0.44

[15] The relative stability of the Gini coefficient for the Akutan Catcher Vessel Association is an indication that initially allocations were also skewed toward the top tertile.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Arctic Enterprise Association																
Number of Affiliated Vessels	N/A	4	3	3	3	3	1	1	1							
Number of Active Vessels	N/A	4	3	3	3	3	-	-	1							
Vessels That Harvested > 105% of Allocation	N/A	-	-	-	1	1	-	-	-							
Bottom Tertile (%)	N/A	24.5	32.7	32.8	29.4	24.6	-	-	-				Inactive			
Mid Tertile (%)	N/A	50.2	33.3	33.3	32.9	34.0	-	-	-							
Top Tertile (%)	N/A	25.4	34.0	34.0	37.6	41.3	-	-	-							
Gini Coefficient	N/A	0.01	0.01	0.01	0.05	0.11	-	-	-							
Peter Pan Fleet Cooperative																
Number of Affiliated Vessels	5	N/A	8	8	8	10	9	10	10	10	10	9	9	9	9	9
Number of Active Vessels	5	N/A	5	5	5	6	6	9	8	10	9	9	N/A	7	7	7
Vessels That Harvested > 105% of Allocation	1	N/A	2	5	5	4	2	-	-	-	-	-	N/A	-	-	-
Bottom Tertile (%)	12.1	N/A	18.8	21.1	21.3	7.3	13.5	9.9	11.4	5.0	10.7	6.5	N/A	6.9	7.1	6.6
Mid Tertile (%)	34.2	N/A	37.2	51.5	51.0	34.8	25.1	28.9	41.5	30.0	27.9	29.2	N/A	33.9	32.1	37.3
Top Tertile (%)	53.7	N/A	44.0	27.3	27.7	58.0	61.4	61.2	47.1	65.1	61.4	64.3	N/A	59.2	60.7	56.1
Gini Coefficient	0.43	N/A	0.34	0.22	0.22	0.39	0.37	0.38	0.37	0.46	0.38	0.43	N/A	0.39	0.40	0.37
Northern Victor Fleet Cooperative																
Number of Affiliated Vessels	10	12	13	13	13	13	13	14	14	13	14	14	15	15	16	16
Number of Active Vessels	10	10	12	12	12	12	11	11	11	9	12	11	13	12	13	13
Vessels That Harvested > 105% of Allocation	5	5	5	4	4	3	3	4	4	5	6	5	6	6	5	7
Bottom Tertile (%)	1.9	9.5	7.5	10.6	12.1	9.8	11.4	16.1	11.2	9.2	6.3	8.8	7.0	9.7	9.8	9.1
Mid Tertile (%)	37.8	38.1	27.2	29.4	26.7	30.1	37.5	36.6	42.7	40.6	30.8	39.6	36.1	34.2	38.7	39.2
Top Tertile (%)	60.3	52.3	65.3	60.1	61.2	60.1	51.1	47.3	46.1	50.2	62.8	51.7	56.9	56.1	51.4	51.7
Gini Coefficient	0.46	0.34	0.42	0.36	0.36	0.37	0.38	0.32	0.34	0.29	0.42	0.40	0.39	0.35	0.33	0.33
UniSea Fleet Cooperative																
Number of Affiliated Vessels	14	12	11	11	12	13	14	14	13	13	14	15	15	15	15	14
Number of Active Vessels	13	12	11	11	12	12	13	14	13	13	13	13	13	13	13	12
Vessels That Harvested > 105% of Allocation	10	-	-	-	1	3	5	3	1	2	1	1	4	3	1	2
Bottom Tertile (%)	18.2	20.0	21.6	21.2	15.2	16.7	14.1	14.3	13.1	14.0	17.6	19.8	19.8	19.8	19.9	21.7
Mid Tertile (%)	31.4	27.1	33.1	33.0	28.7	28.1	34.7	33.3	33.8	32.4	31.5	31.9	32.0	31.1	31.8	26.6
Top Tertile (%)	50.4	52.8	45.2	45.8	56.2	55.2	51.2	52.4	53.1	53.6	50.9	48.3	48.2	49.1	48.3	51.7
Gini Coefficient	0.25	0.24	0.24	0.25	0.30	0.29	0.29	0.34	0.31	0.31	0.25	0.22	0.22	0.22	0.22	0.22
Westward Fleet Cooperative																
Number of Affiliated Vessels	N/A	14	15	16	16	13	12	12	12	12	11	11	10	8	8	8
Number of Active Vessels	N/A	10	11	13	14	11	9	9	9	9	8	8	8	7	6	8
Vessels That Harvested > 105% of Allocation	N/A	3	8	9	9	5	6	5	6	4	4	3	6	5	4	4
Bottom Tertile (%)	N/A	8.8	16.9	4.1	3.5	7.3	5.8	9.7	8.6	8.8	16.2	17.9	19.0	11.6	20.4	11.5
Mid Tertile (%)	N/A	33.5	33.6	34.9	36.7	31.1	30.6	32.5	31.8	33.4	37.7	38.4	40.1	38.9	30.4	42.2
Top Tertile (%)	N/A	57.7	49.5	60.9	59.8	61.6	63.6	57.7	59.6	57.8	46.1	43.7	40.9	49.5	49.1	46.3
Gini Coefficient	N/A	0.40	0.32	0.44	0.48	0.48	0.42	0.37	0.39	0.36	0.33	0.31	0.25	0.31	0.22	0.37

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Unalaska Cooperative																
Number of Affiliated Vessels	11	11	11	11	11	11	11	11	11	11	10	11	11	11	10	10
Number of Active Vessels	9	9	9	9	9	9	9	9	8	8	8	9	9	9	8	8
Vessels That Harvested > 105% of Allocation	6	6	3	4	3	5	3	3	6	5	5	6	6	5	4	4
Bottom Tertile (%)	13.2	11.8	11.9	12.3	13.6	12.0	12.2	10.4	20.3	19.8	13.8	6.6	8.0	8.2	8.5	10.5
Mid Tertile (%)	38.1	38.6	38.6	38.2	36.4	39.5	39.0	38.4	44.8	45.7	45.8	37.4	38.5	36.4	46.7	48.3
Top Tertile (%)	48.7	49.5	49.5	49.5	50.0	48.5	48.8	51.1	34.8	34.5	40.4	56.0	53.4	55.4	44.8	41.2
Gini Coefficient	0.28	0.29	0.29	0.28	0.27	0.27	0.28	0.31	0.23	0.23	0.31	0.36	0.33	0.35	0.37	0.33

Source: Developed by Northern Economics using data from inshore cooperative reports (National Marine Fisheries Service 2016e).

Notes:

After 2006, the vessel-by-vessel data for the Peter Pan Fleet Cooperative are uncertain.

"N/A" indicates that data are unavailable.

"-" indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

Amendment 69 provided inshore catcher vessel owners greater flexibility to contract with non-member vessels to ensure that a cooperative was able to harvest its entire allocation. Overall, the transfer of BS pollock allocation between inshore cooperatives has not been significant, averaging around 2 percent annually since 2003 (Table 10). However, both the Arctic Enterprise Association and Peter Pan Fleet Cooperative leased out large portions of their allocation in certain years. The Arctic Enterprise Association is made up of one floating processor, the *Arctic Enterprise,* which is owned by Trident Seafoods. The vessel ceased to operate in 2008, and the remaining catcher vessels in the Arctic Enterprise Association moved to the Akutan Catcher Vessel Association. Less is known about why a few of the Peter Pan Fleet Cooperative's member vessels regularly transfer allocations to other members of the Peter Pan Fleet Cooperative or to members of another inshore cooperative. Among these vessels are the *AJ* and *Providian*. It is possible that the two vessels, which are owned by the same Maine-based company, mainly operate in U.S. east coast fisheries.[16]

[16] Under the AFA, four vessels, including the *AJ* and *Providian*, retain their eligibility to participate in any fishery under the authority of the New England Fishery Management Council or Mid-Atlantic Fishery Management Council.

Table 10. Percent of Inshore Cooperative Allocations Leased to another Cooperative, 2003–2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Akutan Catcher Vessel Association	0.9	2.3	5.2	0.3	0.1	0.4	2.0	1.0	0.1	0.1	2.2	2.0	1.4
Arctic Enterprise Association	-	3.5	3.0	99.9	93.0	92.7				Inactive			
Northern Victor Fleet Cooperative	-	-	-	-	-	-	-	-	-	-	0.2	0.6	0.2
Peter Pan Fleet Cooperative	-	7.4	-	10.3	23.3	28.2	44.6	23.6	13.3	N/A	39.6	41.0	36.0
Unalaska Cooperative	-	3.2	3.1	0.7	0.4	0.4	-	0.7	-	-	0.1	0.4	-
UniSea Fleet Cooperative	-	-	4.3	-	-	-	-	-	-	-	0.1	0.2	0.2
Westward Fleet Cooperative	-	-	-	0.8	1.7	0.4	6.9	8.8	4.6	5.9	3.4	3.3	6.3
Percent of Total Inshore Allocation Leased Among Cooperatives	0.2	1.3	3.0	1.8	2.2	2.1	3.3	2.7	1.2	1.1	2.3	2.4	2.6

Source: Developed by Northern Economics using data from inshore cooperative reports (National Marine Fisheries Service 2016e).
"-" indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

Table 11 shows the number of inshore catcher vessels that entered the open access fishery and the percent of the inshore sector allocation they brought with them. These vessels likely entered the fishery so that they could switch cooperatives. The number of vessels in the fishery has been consistently small. As discussed in Section 3.1, participating in the open access fishery exposes them to the hazards of the race-for-fish both for target catches of pollock and for small PSC allocations.

Table 11. Allocation and Number of Catcher Vessels in the Inshore Open Access Fishery

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Catcher Vessels	3	3	2	1	-	-	-	-	-	2	-	-	-	-	1
Percent of Inshore Sector Allocation	0.30	0.20	0.15	0.05	-	-	-	-	-	0.79	-	-	-	-	1.97

Source: Developed by Northern Economics using data from inshore cooperative reports (National Marine Fisheries Service 2016e).
"-" indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

6 Prohibited Species Catch

AFA management measures do not mandate any change in the fishing patterns of AFA vessels to reduce the catch of prohibited species. However, by slowing down the rate pollock is harvested and processed, the AFA allowed vessels to spend more time potentially avoiding undesired fish species, including prohibited species. In addition, as discussed in Section 2.6, the Council and NMFS have attempted to reduce salmon PSC in the BS pollock fishery by implementing management measures that incorporate elements of the AFA. This section reviews PSC in the BS pollock fishery by each AFA harvest sector. PSC by AFA sectors in fisheries other than pollock is described in Section 11. Prohibited species in the BSAI Management Area include Pacific salmon (Chinook and non-Chinook), Pacific halibut, Pacific herring, red king crab (in Zone 1), golden king crab, blue king crab, *Chionoecetes opilio* (in the *C. opilio* bycatch limitation zone or COBLZ), other *C. opilio*, *Chionoecetes bairdi* (in Zone 1 and 2) caught by a vessel issued a federal fisheries permit under 50 CFR § 679.4(b) while fishing for groundfish in the BSAI. Prohibited species must be returned to the sea as soon as possible after they caught unless retention is authorized by other applicable laws (e.g., Prohibited Species Donation Program (National Marine Fisheries Service 2016c)).

PSC limits in the BSAI groundfish fisheries are assigned to individual target fishery categories. Not all prohibited species have PSC limits, and some have limits that have only recently been imposed or have changed from non-binding limits to binding limits. During the 2000–2015 period, new PSC limits for Chinook and non-Chinook salmon were established according to measures described in Section 2.6. Before passage of Amendment 80 to the BSAI groundfish FMP in 2008, PSC limits for other prohibited species were apportioned first to the trawl and non-trawl sectors, and then to each target fishery category. Crab, halibut, or herring PSC caught by AFA catcher/processors or catcher vessels while fishing for BS pollock accrue against the PSC allowances annually specified for the target fishery category that includes BS pollock. After implementation of Amendment 80, the PSC apportionment to the trawl sector was further divided between the Amendment 80 sector (non-pollock trawl catcher/processors) and the BSAI trawl limited access sector (all non-Amendment 80 trawl fishery participants, including AFA catcher/processors, AFA catcher vessels, and non-AFA trawl catcher vessels) before being allocated to individual trawl fishery categories.[17] An exception is the herring PSC limit, which is not further divided.

Table 12 shows annual PSC limits in the BS pollock fishery from 2003–2015, and the percent of the limit taken by the AFA fleet in each year. Additional information on the estimated PSC of salmon and halibut, two species that have been the focus of management measures for over two decades because of their importance to commercial, sport, and subsistence fisheries in the BSAI, is provided in the subsections that follow. Additional charts on PSC in the BS pollock fishery are found in Appendix A.

[17] Non-AFA trawl catcher vessels fish for Pacific cod and yellowfin sole and are not authorized to participate in directed fishing for pollock.

Table 12. PSC of AFA Vessels as a Percentage of PSC Limits in the Bering Sea Pollock Fishery, 2003–2015

PSC Species		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Chinook Salmon (no.)										60,000 (PSC Limit)				
	AFA Fleet Limit	29,000 (Chinook Salmon Savings Area Closure Limit)								47,591 (Performance Standard)				
	% Caught	149	168	228	279	402	71	42	33	52	23	26	30	36
Non-Chinook Salmon (no.)														
	Trawl Sector Limit	42,000 (Non-Chinook Salmon Savings Area Closure Limit)												
	% Caught	330	1,037	1,666	711	205	35	108	30	447	53	297	517	554
Pacific Halibut (mt)	Trawl Sector Limit	232	232	232	232	232	N/A							
	Trawl Limited Access Sector Limit	No BS Trawl Limited Access Sector					125	175	250	250	250	250	250	250
	% Caught	32	35	43	47	113	219	226	82	114	138	81	58	42
Red king crab Zone 1 (no. 1,000s)	Trawl Sector Limit	200	406	406	406	406	N/A							
	Trawl Limited Access Sector Limit	No BS Trawl Limited Access Sector					400	400	400	400	197	197	197	197
	% Caught	16	4	-	7	2	11	11	17	6	38	8	29	0
C. opilio COBLZ (no. 1,000s)	Trawl Sector Limit	72.4	72.4	80.9	106.6	80.5	N/A							
	Trawl Limited Access Sector Limit	No BS Trawl Limited Access Sector					20.0	20.0	20.0	38.2	32.3	48.3	50.0	49.2
	% Caught	1	-	2	2	3	27	14	23	11	7	7	6	5
C. bairdi Zone 1 (no. 1,000s)	Trawl Sector Limit	17.2	17.2	17.2	17.2	17.2	N/A							
	Trawl Limited Access Sector Limit	No BS Trawl Limited Access Sector					5.0	5.0	4.2	4.2	5.0	5.0	5.0	5.0
C. bairdi Zone 2 (no. 1,000s)	Trawl Sector Limit	27.5	27.5	27.5	27.5	27.5	N/A							
	Trawl Limited Access Sector Limit	No BS Trawl Limited Access Sector					5.0	5.0	4.2	4.2	5.0	5.0	5.0	5.0
	% caught in Zone 1 & 2	2	2	1	2	2	14	15	19	65	11	20	17	12
Pacific Herring (mt)	Trawl Limit	1,330	1,635	1,754	1,542	1,558	1,505	1,480	1,722	1,984	1,827	2,365	1,940	2,449
	% Caught	73	59	33	28	22	7	4	20	18	123	41	7	61

Source: Developed by Northern Economics, Inc. using data from NMFS Groundfish Harvest Specification tables (National Marine Fisheries Service 2016b) and AKFIN data (Fey 2016)

Notes: “N/A” means not applicable.

“-“ indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

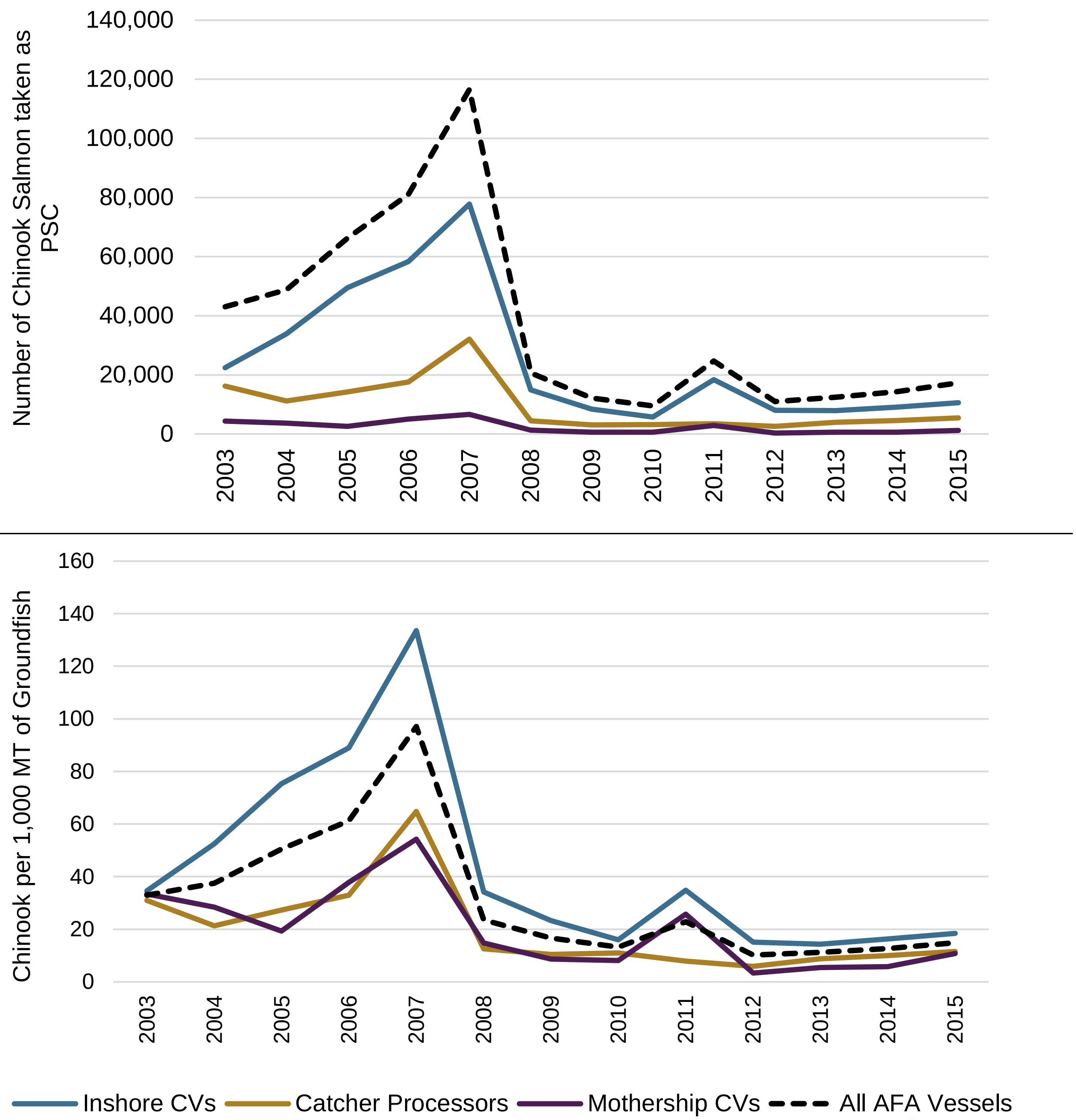
6.1 Salmon Prohibited Species Catch

6.1.1 Chinook Salmon Prohibited Species Catch

Chinook salmon are taken in the BS pollock fishery during both the A and B seasons. The upper chart in Figure 8 shows the actual Chinook salmon PSC, while the lower chart shows the catch rate per 1,000 mt of groundfish caught in pollock target fisheries. The upper chart shows that Chinook salmon PSC in the BS pollock fishery was relatively high from 2003 to 2007. The rate chart is useful for inter-sector comparisons—the inshore catcher vessels had noticeably higher rates of Chinook salmon PSC prior to 2008, while mothership catcher vessels and catcher/processors had roughly comparable rates. As shown in Table 12, the non-binding Chinook salmon PSC limits were exceeded each year from 2003 to 2007 resulting in exclusions of the BS pollock fishery from the Chinook Salmon Savings Areas.

After 2007, Chinook salmon PSC declined sharply, and it remained under the PSC limits through 2015. The decline is most likely due to a combination of factors, including changes in abundance and distribution of Chinook salmon and pollock, as well as changes in fleet behavior to avoid salmon bycatch (Stram and Ianelli 2014). As described in Section 2.6, in 2007, Amendment 84 provided AFA vessels with tools to reduce salmon PSC, and the first rolling hotspot system IA approved by NMFS was in effect starting in January 2008. Beginning in 2008, the Chinook salmon catch rates of the three sectors have been more closely aligned.

Figure 8. Chinook Salmon PSC Amount and Rate in the Bering Sea Pollock Fishery, by AFA Sector, 2003–2015

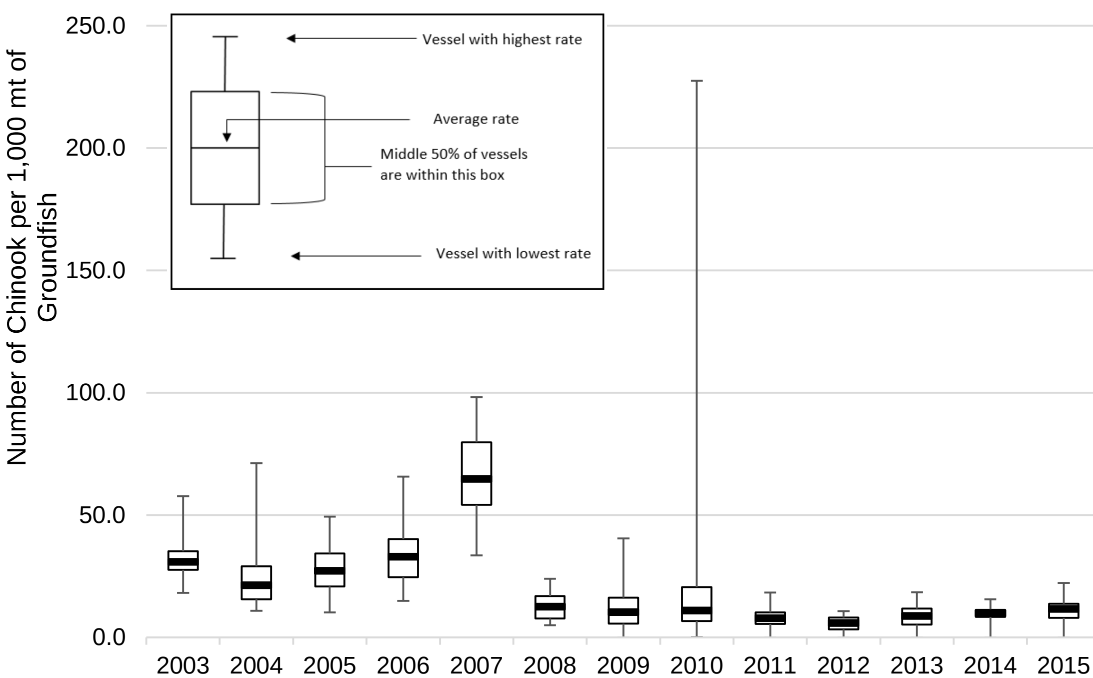


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)
Note: CV = Catcher Vessel

In addition, as detailed in Section 2.6, further measures to reduce Chinook salmon PSC were implemented in 2010 under Amendment 91, which set a binding limit for Chinook salmon at 60,000 fish, and utilizes the AFA cooperative structure to create sector level IPAs which encourage vessels to reduce Chinook salmon catches, including in years of low Chinook salmon abundance when sectors are unlikely to reach the overall limit. The "candlestick" format of Figure 9, Figure 10, and Figure 11 provides measures of the effectiveness of the IPAs for the three AFA sectors. In each figure, the distribution of Chinook salmon PSC rates (as measured by the number of Chinook salmon per 1,000 mt of groundfish in the pollock fishery) is shown for each year from 2003 to 2015. The candlestick "body" for each year represents the PSC rate of the middle 50 percent of vessels in the sector (i.e., from the twenty-fifth percentile to seventy-fifth percentile), while the average PSC rate of all vessels is shown by the horizontal bar within the body. The downward extending "wick" shows the PSC rate of the "best" performing vessel in the sector, while the upward extending wick shows the PSC rate of the "worst" performing vessel. A lower average, more compressed candlestick body, and shorter upward extending wick is indicative of an effective IPA.

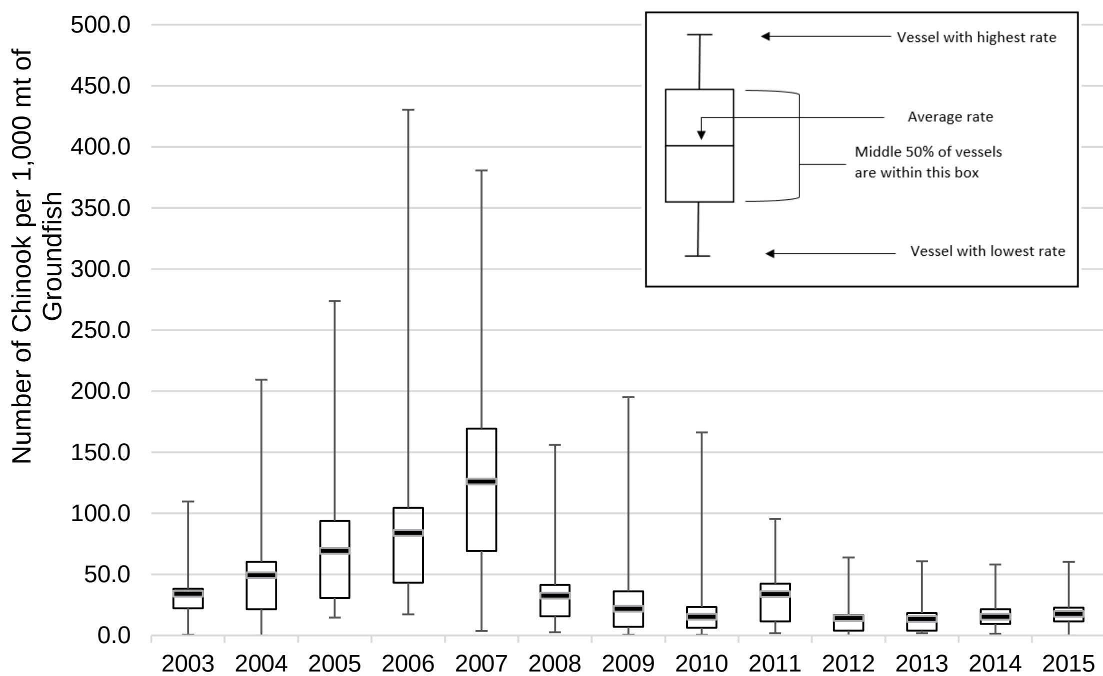
The trend shown in Figure 9 suggests that the IPA may working in the catcher/processor sector. From 2011 to 2015 the distribution of Chinook salmon PSC rates is much narrower than in previous years. The same is generally true for the two catcher vessel sectors, with the exception of the 2011 for the mothership sector (the first year of the program). In that year the distribution of Chinook salmon PSC spread covered by the middle 50 percent of vessels is the third largest of 13 years shown. The performance of the mothership sector improved substantially from 2012 to 2015.

Figure 9. Chinook Salmon PSC Rate Distribution in the AFA Catcher/Processor Sector, 2003–2015



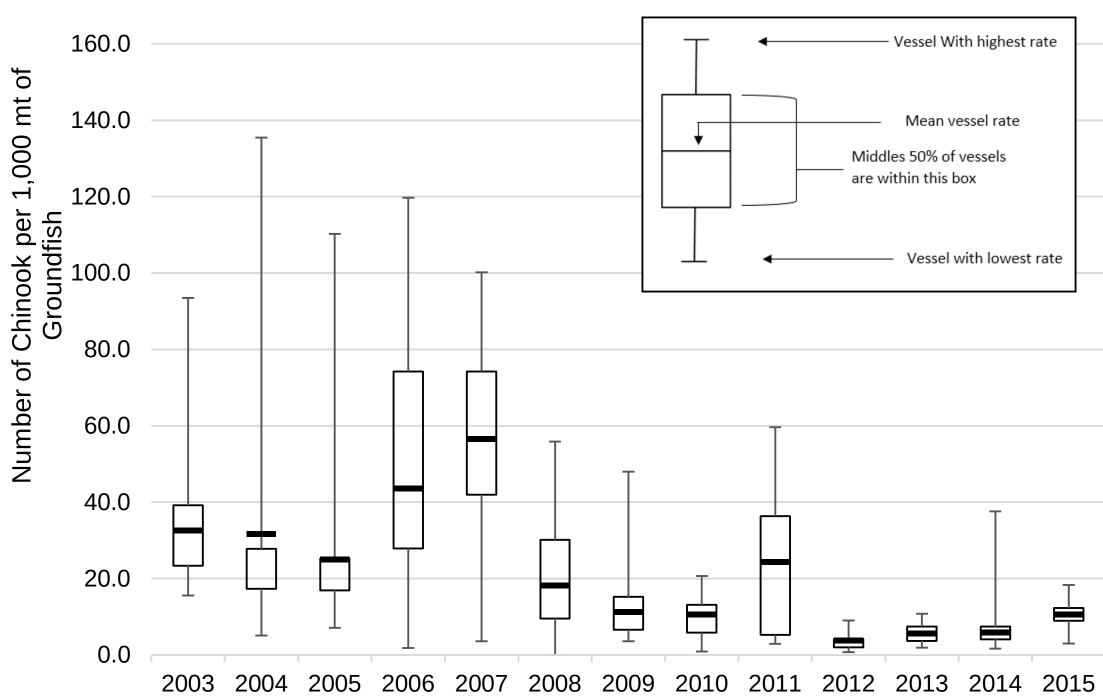
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)
Note: Includes the *Ocean Peace* and all other active PCC vessels.

Figure 10. Chinook Salmon PSC Rate Distribution in the AFA Inshore Sector, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 11. Chinook Salmon PSC Rate Distribution in the AFA Mothership Sector, 2003–2015

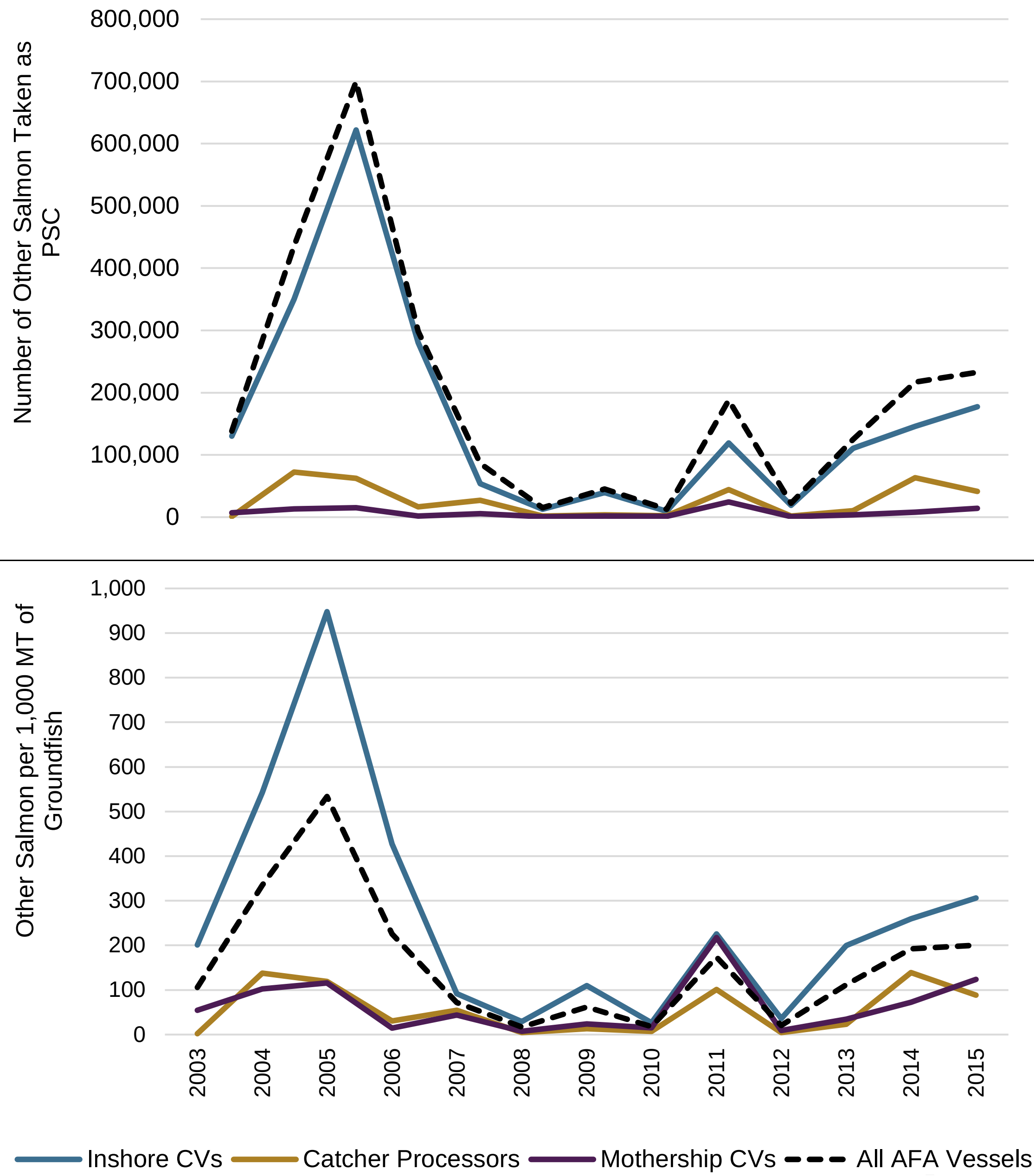


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

6.1.2 Non-Chinook Salmon Prohibited Species Catch

Non-Chinook salmon are primarily taken in the BS pollock fishery during the B season. Catches of non-Chinook salmon increased after 2003 and reached a historic high in 2005 (Figure 12). These catch levels resulted in additional closure periods beyond the automatic August 1–31 period. After a sharp decline from 2006 to 2008, catch levels have been variable. As with Chinook salmon, catch rates of non-Chinook Salmon were higher for inshore catcher vessels than for the other sectors.

Figure 12. Non-Chinook Salmon PSC Amount and Rate in the Bering Sea Pollock Fishery, by AFA Sector, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

6.2 Halibut Prohibited Species Catch

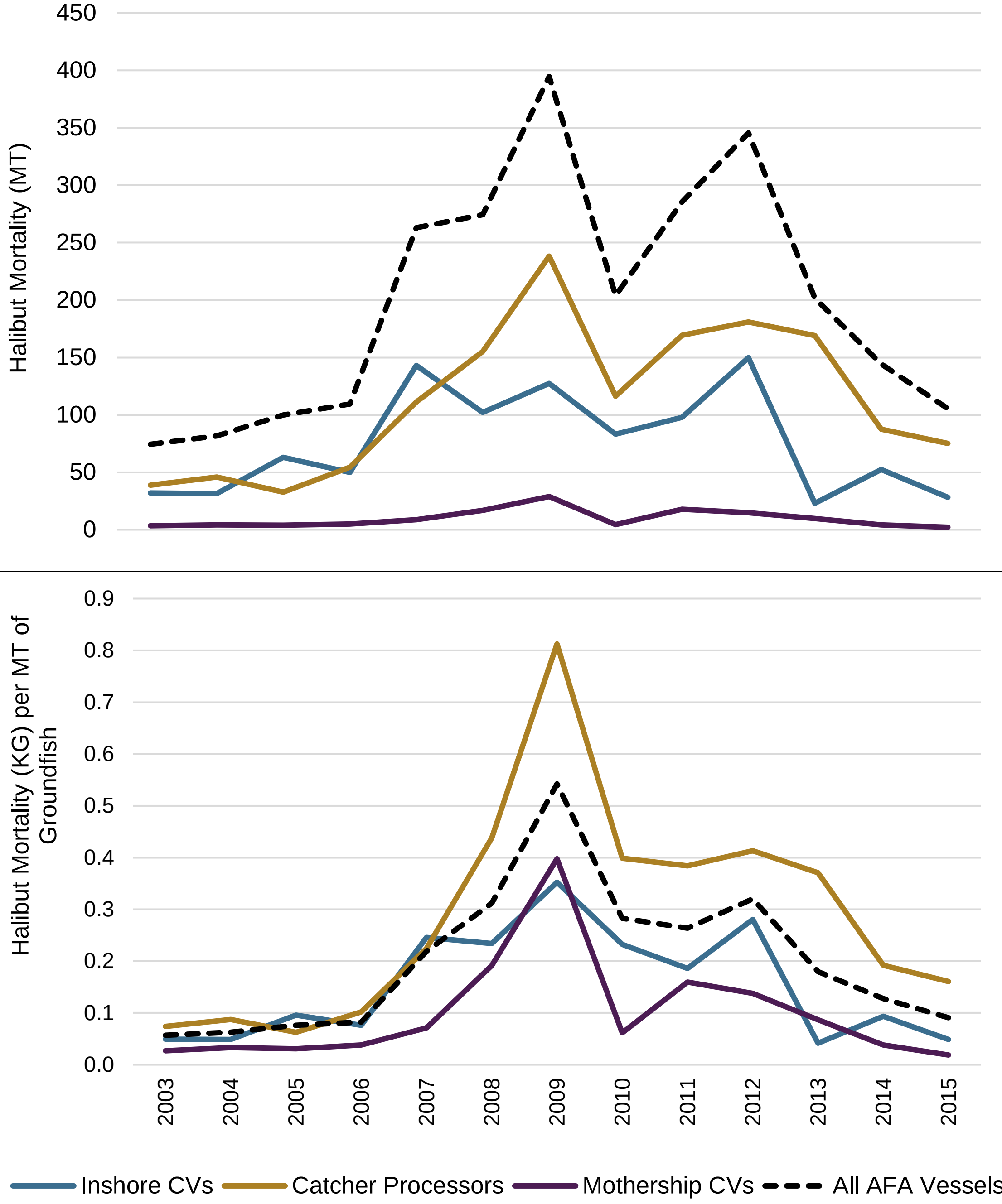
For the BS pollock fishery, the halibut PSC limit is a non-binding constraint. Amendment 21 to the BSAI groundfish FMP, which came into effect in 1993, established target fishery categories to which Halibut PSC would be assigned, monitored, and in most cases, limited. Under this amendment the "pollock, Atka mackerel, other species" target fishery category was created, along with others including a categories for flatfish, rockfish and for the "mid-water pollock" target fishery. The "pollock, Atka mackerel, other species" target fishery category was specifically established for these targets when using bottom trawl gear—if the halibut PSC limit was reached, pollock could no longer be taken using bottom trawl gear. Halibut PSC taken by vessels targeting pollock using midwater trawl gear was also assigned to the "pollock, Atka mackerel, other species" target fishery category and would contribute to the closure for bottom pollock, but would not close the midwater pollock fishery—it would, however, close the Atka mackerel target fishery as well as the target fishery for "other" species. In other words, the midwater trawl fishery for pollock is not constrained by halibut PSC. Amendment 57, which became effective in 1999, prohibited the use of bottom trawl gear when fishing for pollock, but maintained the "pollock, Atka mackerel, other species" target fishery category for halibut PSC—all halibut PSC taken in pollock fisheries is attributed to this target fishery category. The result of Amendment 57 in combination with Amendment 21 is that there are no regulatory constraints on the pollock fishery if halibut PSC exceeds the "pollock, Atka mackerel, other species" limit for halibut PSC.

As shown in Table 12, halibut PSC limits in the BS pollock fishery were exceeded in the 2007–2012 period except for 2010. Halibut PSC is also shown in Figure 13 by sector, and reveals that halibut PSC in the BS pollock fishery by AFA vessels increased steadily to a peak in 2009. The increase in halibut PSC may have been due, at least in part, by a possible decision of the AFA fleet to focus more on avoiding Chinook salmon rather than on limiting halibut PSC. As discussed above, Chinook salmon PSC limits were exceeded from 2003 to 2007. In response to heightened concerns over all sources of Chinook salmon mortality, the AFA feet was under increased pressure to lower salmon PSC. However, after 2012, the AFA fleet made voluntary changes to various aspects of their fishing behavior to reduce halibut PSC, and halibut PSC limits have not been exceeded since then.

By 2012, trawl vessels, including the AFA fleet, were coming under additional pressure to reduce halibut PSC, as annual catch limits for the IFQ halibut fishery were being reduced because of lower estimates of halibut biomass.[18] In June of 2015, the NPFMC approved Amendment 110, which reduced overall halibut PSC limits for all trawl fisheries. Under Amendment 110, the "pollock, Atka mackerel, other species" target fishery category remains, and halibut limits are set which effectively close the Atka mackerel fishery, and fisheries for "other species", but which do not specifically limit the BS pollock fishery. During the Council meetings in which Amendment 110 was discussed and approved, representatives of the AFA fleet indicated that, in spite of the fact that the halibut PSC limit would continue as a non-binding constraint, they would strive to limit halibut PSC taken in the pollock fishery through their respective cooperative agreements.

[18] Further, in June 2014, the AFA fleet and other members of the fishing industry were asked by the Council to voluntarily reduce halibut PSC over the 2014 and 2015 fishing seasons (National Marine Fisheries Service 2016d).

Figure 13. Halibut PSC Amount and Rate in the Bering Sea Pollock Fishery, by AFA Sector, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

7 Excessive Harvesting and Processing Limits[19]

Section 210(e) of the AFA, sets out excessive harvesting and processing limits for participants to prevent the excessive consolidation of participants and privileges in the AFA Program. This section also established that any entity in which 10 percent or more of the interest is owned or controlled by another individual or entity shall be considered to be the same entity as the other individual or entity. This is referred to as the "AFA 10 percent rule."

To implement the "AFA 10 percent rule", in § 679.2, NMFS defines an ''AFA entity'' as a group of affiliated individuals, corporations, or other business concerns that harvest or process pollock in the Bering Sea directed pollock fishery. The proposed rule for the AFA Program states that the concept of ''affiliation'' is central to the definition of ''AFA entity'' (66 FR 65049; December 17, 2001). Simply stated, ''affiliation'' means a relationship between two or more individuals, corporations, or other business concerns in which one concern directly or indirectly owns a 10 percent or greater interest in the other, exerts 10 percent or greater control over the other, or has the power to exert 10 percent or greater control over the other; or a third individual, corporation, or other business concern directly or indirectly owns a 10 percent or greater interest in both, exerts 10 percent or greater control over both, or has the power to exert 10 percent or greater control over both. The proposed rule for the AFA Program also states that ownership and control are overlapping concepts that may arise through a wide variety of relationships between two or more individuals, corporations, or other business concerns. Affiliation may arise through various relationships, such as: ownership, stock ownership, management control, or control over operations and manning (personnel).

The harvesting activity and processing activity of AFA participants is determined by adding up an entity's direct harvest or processing along with the harvest or processing of any other affiliated entities as determined by the 10 percent threshold. CDQ groups are not held to the "AFA 10 percent rule" and are instead held to the individual and collective rule which attributes ownership proportionally[20] as directed by the Magnuson-Stevens Act (Section 305(i)(1)(F)(i)). Section 210(e)(3) of the AFA directs the Maritime Administration (MARAD) (under the Department of Transportation) to review claims submitted by NMFS or the Council about individuals or entities believed to be in violation of the excessive harvesting or excessive processing caps established for the Bering Sea pollock fishery. For the purposes of determining ownership for the Bering Sea pollock fisheries, MARAD also extends the individual and collective rule to subsidiaries of CDQ groups.

7.1 Excessive harvesting limits

Section 210(e)(1) of the AFA restricts an individual, corporation, or other entity from harvesting more than 17.5 percent of the pollock available to be harvested in the Bering Sea directed pollock fishery. This limit is codified at § 679.20(5)(i)(A)(6). Every year, NMFS publishes the limit in the annual harvest specifications. For 2016, the limit was 205,216 metric tons of Bering Sea pollock (81 FR 52367; August 8, 2016). The limit is subject to revision on an in-season basis if NMFS reallocates unharvested amounts of the Bering Sea incidental catch allowance or Aleutian Islands pollock to the directed fishing allowance (e.g., 81 FR 16097; March 25, 2016).

[19] This section was authored by Keeley Kent, Fishery Management Specialist, NMFS Alaska Regional Office.

[20] The individual and collective rule stipulates that, for example, if entity "A" owns or controls 15 percent of entity "B", then entity "A" is attributed 15 percent of the harvesting or processing activity of entity "B".

7.2 Excessive processing limits

Section 210(e)(2) of the AFA directed the Council to create management measures to prevent any particular individual or entity from processing an excessive share of pollock available in the directed Bering Sea fishery. The Council and NMFS established the limit at 30 percent of the sum of the Bering Sea pollock directed fishing allowances. This processing limit is codified at § 679.20(5)(i)(A)(7). Every year, NMFS publishes this limit in the annual harvest specifications. For 2016, the limit was 351,798 metric tons (81 FR 52367; August 8, 2016). The limit is subject to revision on an in-season basis if NMFS reallocates unharvested amounts of the Bering Sea incidental catch allowance or Aleutian Islands pollock to the directed fishing allowance (e.g., 81 FR 16097; March 25, 2016).

7.3 Management of limits

NMFS and MARAD receive limited ownership information for AFA entities for the purposes of managing and enforcing the excessive harvesting and processing limits. Many AFA entities have complex ownership structures including trusts, annuities, and other financial instruments. Assessing these complicated ownership structures requires expertise in financial management and regulation; and detailed ownership information. Based on our available expertise, a review of publically available and other confidential information submitted to NMFS indicates that some entities are close to the limits, but do not appear to be exceeding the limits. The current ownership relationships under the AFA Program are thought to be generally stable, however, with future replacement vessels in the fleet, there may be a greater need to examine ownership.

8 Community Development Quota Program and Fishing Communities

A wide range of coastal communities are engaged in and dependent upon the fishery managed under the AFA program. These include communities that participate in the BS pollock fishery primarily through the auspices of the CDQ program as well as communities that participate in the fishery but are not a part of the CDQ program. These two sets of fishing communities were affected in different ways by the implementation of the AFA program and are discussed separately in this section.

8.1 Community Development Quota Program

8.1.1 Background

The CDQ program is an economic development program associated with federally managed fisheries in the BSAI Management Area. Regulations implementing the program designate a portion of the fishery quotas for exclusive use by eligible western Alaska villages. The purpose of the CDQ program is to provide western Alaska communities the opportunity to participate and invest in BSAI fisheries, to support economic development in western Alaska, to alleviate poverty and provide economic and social benefits for residents of western Alaska, and to achieve sustainable and diversified local economies in western Alaska (National Marine Fisheries Service Undated).

A total of 65 western Alaska villages participate in the CDQ program through 6 nonprofit corporations (commonly referred to as "CDQ groups") that each represent different coastal areas encompassing between 1 and 20 villages. These groups include the following:

Aleutian Pribilof Island Community Development Association. This CDQ group represents six Bering Sea coastal communities within the Aleutians East Borough (three communities) and Aleutians West Census Area (three communities).[21] In 2015, the population of the communities was 1,180 persons.

Bristol Bay Economic Development Corporation. This CDQ group represents 17 coastal communities in the Bristol Bay region. In 2015 the population of these communities was 5,508 persons.

Central Bering Sea Fishermen's Association. This CDQ group represents the community of St. Paul, the only community on the island of St. Paul. In 2015, the population of the community was 427 persons.

Coastal Villages Region Fund. This CDQ group represents 17 coastal communities in the Bethel Census area plus 3 communities in the Southwest portion of Kusilvak Census Area. In 2015, the population of these communities was 9,442 persons.

Norton Sound Economic Development Corporation. This CDQ group represents 15 communities along the Bering Sea Coast of the Nome Census area. In 2015, the population of these communities was 8,863 persons.

Yukon Delta Fisheries Development Association. This CDQ group represents six communities at the mouth of the Yukon River plus the community of Grayling. In 2015, the population of these communities was 3,448 persons.

In broad terms, the original eligibility criteria to participate in the CDQ program required a community to (1) be located within 50 nautical miles of the Bering Sea, (2) not be located on the Gulf of Alaska coast of the North Pacific Ocean, (3) be certified as a Native village under ANCSA, (4) consist of residents

[21] Although not officially considered a CDQ Community, APICDA considers Unalaska to be an affiliated community.

who conduct more than one-half of their current commercial or subsistence fishing effort in the waters of the Bering Sea or waters surrounding the Aleutian Islands; and (5) not have previously developed harvesting or processing capability sufficient to support substantial participation in the groundfish fisheries in the Bering Sea.[22]

The CDQ program was implemented by the NPFMC and NMFS in 1992 with an allocation of 7.5 percent of the BS pollock fishery TAC during the inshore/offshore allocative split (Section 2.1). Allocations of halibut and sablefish were added to the CDQ program in 1995. In 1996, authorization of the CDQ program was added to the MSFCMA and, in 1998, the NPFMC expanded the CDQ program by adding allocations of the remaining BSAI groundfish species, prohibited species, and crab (National Marine Fisheries Service Undated). The AFA-related impacts to the CDQ program result from both the allocative change that occurred under the Act and from the opportunities for CDQ groups created by the Act.

8.1.2 Impacts of the AFA on the CDQ Program Documented in the Council's 2002 Report

As reflected in the language of Section 213(d) of the AFA, Congress anticipated that implementation of the Act could affect the CDQ program. The Council's 2002 report on the impacts of the AFA included a section on CDQ impacts prepared by the State of Alaska that incorporated information gathered from responses to a survey sent to CDQ groups (North Pacific Fishery Management Council 2002). The report concluded that there were a broad range of AFA-related impacts to CDQ groups that fell into several different categories. In overview, these were:

Direct Impacts. A primary benefit to the CDQ program from the AFA was the increase in CDQ pollock quota from 7.5 percent to 10 percent of the BSAI pollock fishery TAC. This 33 percent increase in CDQ pollock quota resulted in a corresponding increase in royalty payments to CDQ groups. Increases in royalty payments were also linked to AFA-related changes to fishing conditions, including the shift away from a race-for-fish, resulting in higher pollock product values. The increase in CDQ pollock quota was also seen as increasing the bargaining power of CDQ groups with respect to royalty agreements (including royalty agreements for non-AFA fisheries) and employment/training programs with industry partners.

U.S. Ownership Requirements and Increased Cost of Pollock Fishery Investments. The AFA requirement that vessel-owning entities be at least 75 percent owned and controlled by U.S. citizens resulted in foreign-owned companies divesting majority ownership interests in vessels engaged in BSAI fisheries, which, in turn, provided CDQ groups greater opportunities to acquire equity interests in those entities than would have otherwise been the case. CDQ groups became sought-after business partners for their political capital as well as their CDQ quota, resulting in financing arrangements being extended to CDQ groups that were not previously available to them. At the same time, CDQ groups noted that the AFA, by creating fishing rights and reducing the number of vessels participating in the fishery, effectively made it more expensive for CDQ groups and other investors to purchase equity in pollock companies.

Employment and Training Benefits and Educational Opportunities. According to the Council's 2002 report, the AFA had both adverse and beneficial effects on CDQ employment and training: the reduction in the number of active vessels in the BSAI pollock fishery (and corresponding increase in the availability of trained seafood processors to fill the remaining jobs) decreased the employment opportunities for some CDQ groups; however, the increased level of ownership in seafood companies provided other CDQ groups with a stronger negotiating position, which, in turn, led to greater access to employment

[22] Under the 2006 reauthorization of the MSFCMA, eligibility requirements for communities were removed and instead all 65 communities and six CDQ groups currently eligible were listed by name.

and training opportunities for those groups. Overall, CDQ-related jobs and wages likely increased substantially after passage of the AFA, and AFA-related increases in the predictability of work schedules were seen as contributing to increased worker retention rates and improved opportunities for consistent employment. A more consistent employment schedule, in turn, was seen as more compatible with traditional subsistence activities than employment in the BSAI pollock fishery during pre-AFA race-for-fish conditions. A number of CDQ group employment and training programs were in place before implementation of the AFA, which makes quantification of the job benefits of the AFA difficult. Clearly, however, the AFA played a positive role in increasing educational and training opportunities for CDQ community residents by making more money available to support various scholarship and endowment funds.

Community Based Fisheries Development. All CDQ groups surveyed in 2002 indicated that the increase in CDQ pollock quota under the AFA made more funds available for in-region fisheries development. By the time of the survey, CDQ groups had built or were in the process of building docks, harbors, shoreside seafood processing facilities, sportfishing lodges, halibut buying stations, etc. Many of these projects were underway before passage of the AFA. Nevertheless, the additional funding that the AFA provided to CDQ groups for these types of projects was beneficial. However, one CDQ group (the Aleutian Pribilof Island Community Development Association) expressed concern that the AFA could preclude new or existing CDQ inshore processing facilities from entering the pollock fishery. The group stated that the AFA might make it more difficult for the existing Bering Pacific Seafoods facility in False Pass or a proposed processing facility in St. George to process pollock, as these facilities could find themselves competing on unequal footing with a "closed class" of AFA processors in the region.

Fishery Conservation. According to the Council's 2002 report, the reduction in bycatch and discard rates that accompanied the transition to cooperatives and a slower fishing pace was seen as providing long-term benefits to the CDQ fisheries and the coastal communities reliant on them.

In summary, at the time of the Council's 2002 report, it was clear that the CDQ program had been a beneficiary of the changes brought about by the Act, but it was difficult to quantify those benefits.

8.1.3 Continuing Impacts of the AFA on the CDQ Program

In the years since the Council's 2002 report, quantifying the effect of the AFA on the CDQ Program has become more problematic due to ongoing changes to the program that were intended to give CDQ groups and their communities greater autonomy, while promoting the goals of the CDQ program (National Marine Fisheries Service Undated). Specifically, the Coast Guard and Marine Transportation act of 2006 revised the MSFCMA so that CDQ groups were no longer required to submit community development plans and budget reports to NMFS for review and approval. The result was that the federal government oversight of how CDQ groups used program allocations to provide benefits to the eligible communities was suspended.

While these changes made analysis of the continuing impacts of the AFA to CDQ groups challenging, it seems clear that the groups have continued to perform well under the Act's management regime. In terms of CDQ royalties, from 2001 through 2005, the last year annual CDQ group reporting was required, total royalties ranged between \$42.6 and \$60.5 million per year, with increases seen in each successive year. Pollock accounted for 79 to 86 percent of total all-species royalties in any given year during this period. Estimates of total royalties from 2007 to 2013 ranged between \$59.9 and \$79.5 million per year, with a general upward trend. Estimates of pollock royalties as a percentage of all-species royalties ranged between 57 and 79 percent during the 2006–2010 period, the most recent years for which estimates are available. In 2013, the aggregate revenue for all CDQ groups was \$248.7

million, of which approximately 23 percent was derived directly from CDQ royalties (National Marine Fisheries Service Undated).

As documented in Section 5, CDQ groups have obtained direct ownership interest in AFA vessels. As of 2015, all six CDQ groups had ownership interests in inshore catcher vessels; all but one CDQ group (the Yukon Delta Fisheries Development Association) had ownership interests in catcher/processors; and one CDQ group (Yukon Delta Fisheries Development Association) had an ownership interest in a mothership.

8.2 Fishing Communities

The non-CDQ fishing communities engaged in the fishery managed under the AFA program are numerous and far-flung. They include Alaska communities from the BSAI and GOA regions as well as communities in the Pacific Northwest and beyond.

8.2.1 Background

The fishing community discussion in the Council's 2002 report provides regional overviews and selected community level accounts of the pre-AFA historic development of the BS pollock fishery. It specifically included detailed community profiles that provided a key fishing community context for the pre-AFA trends of engagement in and dependency on the BS pollock fishery in Unalaska/Dutch Harbor, Akutan, Sand Point, King Cove, and Kodiak, Alaska, as well as Seattle, Washington (North Pacific Fishery Management Council 2002). That information is not recapitulated here, but each of these communities played a key role in the fishery from the time of the transition of the fishery from a largely foreign undertaking, through the joint venture era and the "Americanization" of the fishery, to the inshore/offshore regulatory context that immediately preceded the implementation of the AFA.

8.2.2 Impacts of the AFA on Fishing Communities Documented in the Council's 2002 Report

As reflected in the language of Section 213(d) of the AFA, Congress anticipated that implementation of the Act could affect, among other things, fishing communities and required a reporting of those effects. Also required was reporting of the effects of the AFA on business and employment practices of participants in any fishery cooperatives; these types of effects have the potential, in turn, to result in impacts to fishing communities through several mechanisms, including changes in direct employment and income opportunities in the fishery sector as well as more indirectly through changes in demand for local support sector services, among others.

In the Council's 2002 report, social impacts were considered at both the regional and community level. At total of six regions were characterized and analyzed for effects in that report: four in Alaska (the Alaska Peninsula/Aleutian Islands, Kodiak Island, Southcentral Alaska, and Southeast Alaska regions) and two in the Pacific Northwest (the Washington inland waters and Oregon coast regions). In overview:

- AFA effects were characterized as generally positive on an industry or sector basis as had been expected. There was some variability between sectors in this regard, with the gains seen in the mothership sector perhaps not as large as those seen in other sectors.
- The AFA was characterized as having resulted in ownership changes within different sectors, and this led to some shifts in ownership between communities and regions.
- A common observation among fishery participants was that the AFA had the beneficial impact of helping to mitigate negative impacts associated with post-AFA implementation of Steller sea lion related protection measures, but this was noted as difficult to quantify.

- The AFA was characterized as potentially related to a downturn in fishing support sectors in some communities, but this downturn was noted as also part of: (1) other fishery dynamics; (2) "rationalization" of the larger economies of the relevant communities; (3) less sharp "peaks and valleys" in fishing seasons.
- A general level caveat in the 2002 analysis, however, was that few post-AFA data were then available. At the time, there had been only one full year under the inshore cooperative system, and only two years under the offshore cooperative system. This was noted as making interpretations of changes apparently related to the AFA problematic, due to normally occurring year-to-year changes in the fishery as well as the fact that fishery participants were still working out strategies, adaptations, and responses to AFA-influenced fishery conditions.

In terms of regional differences and varying outcomes between communities, relatively little change from the AFA was seen in the Southcentral and Southeast Alaska regions and their constituent communities. Oregon coast region changes were reported as accruing almost exclusively to regionally owned catcher vessels that were, in turn, largely concentrated in Newport, and these changes had been generally positive. Changes seen in the Alaska Peninsula/Aleutian Islands region tended to be focused in Unalaska/Dutch Harbor, Akutan, Sand Point, and King Cove. For the Kodiak Island region, impacts were characterized as having been concentrated in the community of Kodiak; Washington inland waters region impacts tended to be concentrated in the greater Seattle area. Of these communities, Unalaska/Dutch Harbor, Sand Point, Kodiak, and Seattle were selected for closer characterization of impacts, based on several community fishery engagement and/or dependency attributes. The following paragraphs summarize the rationale for the selection of these communities for more detailed analysis in the Council's 2002 report and a summary of community impacts noted in that report.

Unalaska/Dutch Harbor was selected as the major support port for the Bering Sea groundfish fisheries, and as the home to the major concentration of Bering Sea-related inshore processing. The industry is large relative to the overall local economy, the number of workers associated with the industry make up a significant portion of the population base, and the industry in its various sectors contributes a significant portion of the local tax revenue base for the community. The larger pattern of AFA impacts would appear to have been direct benefits to the participating groundfish sector entities present in the community, benefits to the municipality in terms of increased revenues, and a decline in demand for services or mixed results among entities within the various subsectors in the local support sector. Not all difficulties faced by support service sector businesses were, however, attributable to AFA. These support sector challenges and many of the other changes seen in the community, such as a decline in housing demand and a softening of the real estate market, were linked to a larger "rationalization" or increase in efficiency of the community economy and a move away from an economy geared for a pulse demand cycle and inefficiencies within the commercial fisheries. The AFA played a marked role in this general level change, but trends along these lines were apparent in the community before the implementation of the AFA.

Sand Point was chosen as a study community for the assessment of the social impacts of AFA due to its status as a community that was engaged in the Bering Sea pollock fishery. Although Trident Seafoods' plant in Sand Point qualified as an AFA shoreside processor, it is not associated with an inshore cooperative (Footnote 14). Thus, Sand Point experienced a very different set of outcomes than Unalaska/Dutch Harbor under the AFA, and the AFA caused a shift in the commercial fisheries base of the community as less pollock was delivered to the community. At the time of the 2002 report, Sand Point was experiencing a range of adverse fishery-related impacts, including GOA quota shifts away from the western Gulf, increased Area M salmon restrictions, and Steller sea lion-related fishery restrictions, among others. While not the cause of many of the adverse commercial fishery changes, AFA was characterized as one of several elements that contributed to a downward trend of key fishery-related socioeconomic indicators for the community.

Kodiak was chosen as a community for analysis of the impacts of AFA as it represented non-Bering Sea communities in Alaska that did not have a substantial historical level of involvement with Bering Sea pollock, but that could potentially experience AFA-related impacts in several ways. No Kodiak processing plants qualified as AFA plants, but were put in a position of being GOA open access processors competing with BSAI cooperative processors. The AFA was also seen as spurring a "race for history" among both processors and catcher vessels in anticipation of a possible GOA equivalent of the AFA. In terms of general community level impacts, housing, tax revenues, and other community indices had changed over the post-AFA implementation period, but there was no indication that Kodiak experienced community level impacts attributable to the AFA.

Seattle was selected for analysis as the fishing community that is arguably at once the most engaged and the least dependent on the AFA-influenced fisheries. In absolute terms, Seattle is in one way or another "home" to a very large proportion of the AFA fishery. In relative terms, this fishery is a negligible component of the overall economy of the Seattle area. In general, discussion of a distinct "fishing community" within the greater Seattle area is problematic, although there are areas of concentration of AFA fishery-related activity in Ballard, the Port of Seattle, and the Ballard/Interbay/Northend Manufacturing Center planning area. Given the concentration of ownership across sectors in Seattle, many of earlier described sector impacts have proportionately accrued to Seattle. For example, the loss of employment in the catcher/processor sector largely occurred among vessels owned and/or operated out of Seattle, with displaced crew members coming from a wide geography. When the sectors that have links to Seattle are taken in aggregate, locating a "footprint" of the fishery for the purposes of a social impact assessment still proved problematic. For example, when the Port of Seattle was examined, moorage fees associated with the catcher-processor fleet were down as the size of the fleet has been reduced and the remaining vessels spent more time at sea. Port representatives stated, however, that while this involved short-term fiscal impacts, over the longer term there was a strengthening of the Port revenue base as the remaining operations were more stable and could remain in place for coming years. As for the Ballard and the Ballard/Interbay/Northend Manufacturing Center area, there were no updated data available that would indicate there were localized AFA impacts occurring in this area, nor were there qualitative indications that such changes are taking place. There were some changes seen for fishery support services in this area, but those were generally more attributable to land valuation changes than any changes seen in the fishery. In sum, while changes were experienced by the individual sectors located in Seattle, and there were changes in some of the areas of Seattle that host these sectors, the Council's 2002 report concluded that there were no significant AFA-related community level social impacts apparent for Seattle.

The Council's 2002 report notes, however, that even with the AFA being relatively newly implemented, one of the most difficult analytic challenges in examining the community impacts of the Act resulted from the many other dynamics affecting the fishery and the fishing communities simultaneously. That is, "not all other things were being equal," so that attributing changes to a single cause or action (or estimating the weight of a single factor in combination with one or more other factors) was difficult if not impossible in a strict sense. In general, however, the Council's 2002 report found in summary:

- Social or community level impacts of AFA differed widely by community.
- The impacts of AFA had been generally positive.
- The slowing of the race for fish, and the increased economic efficiency of the fishery have had impacts on fishery support service sector businesses.

- The slowing of the race for fish and better utilization of the resource had long-term benefits for the fishery and, thus, the communities engaged in or dependent upon the fishery.
- It was difficult to isolate the impacts of AFA in a dynamic environment. Other changes occurring at the same time complicated the picture, with the most notable of these being those associated with Steller sea lion conservation-related management measures.
- While difficult to quantify, the cooperation within and between sectors that AFA had fostered replaced a much higher level divisiveness seen in earlier quota allocation approaches. This had positive if subtle social impacts in the communities.
- Change was still occurring as all sectors and communities were still in the process of adapting to the post-AFA environment at the time of the 2002 report.

Additionally, the Council's 2002 report noted that the sideboards incorporated into the AFA appear to have functioned as intended in avoiding adverse AFA-related impacts to other fisheries. It was assumed, therefore, that adverse AFA-related impacts to the fishing communities reliant on those fisheries were also avoided.

8.2.3 Continuing Impacts of the AFA on Fishing Communities

As noted in the previous section, change was still occurring as all sectors and communities were still in the process of adapting to the post-AFA environment at the time of the Council's 2002 report. In more recent years, several types of changes have continued to occur, including an ongoing consolidation of the AFA catcher vessel fleet which, in turn, has fostered at least two types of impacts. First, consolidation of active AFA catcher vessels within a region is assumed to impact crew employment and income opportunities as the number of vessels declines. Second, a declining number of vessels participating in the fishery is assumed to equate to a decline in the number of unique vessels making port calls in communities where inshore processing takes place, which likely would extend the types of impacts to support service businesses in those communities described in the Council's 2002 report. Consolidation of the AFA catcher vessel fleet, however, has not been evenly distributed across regions, and similar consolidation has not occurred in the inshore processing sector or in the catcher/processor sector, with the result that social or community impact outcomes have continued to vary across regions and communities.

The following is an overview of 2000–2015 trends of change in the AFA catcher vessel sector, both in terms of specific fishery participation and the geographic distribution of the fleet. This section also focuses on the regional/community distribution of continuing impacts of the AFA in four regions: 1) Alaska Peninsula/Aleutian Islands, 2) Kodiak Island, 3) Washington inland waters, and 4) coastal Oregon.[23]

We note that there are two changes in geographic definitions of these regions for the purposes of this analysis compared to the definitions used in the Council's 2002 report. First, the Kodiak Island region, formerly defined as the Kodiak Island Borough and other parts of the Kodiak archipelago, has been reduced in geographic scope to the City of Kodiak in recognition of the findings of the 2002 report that impacts of the AFA in the region were limited to that single community. Second, the Oregon coast region, formerly defined as Lincoln, Tillamook, and Clatsop counties, has been reduced in geographic scope to Lincoln county alone, due to data availability and disclosure considerations and in recognition

[23] Given the relative lack of impacts documented in the Southcentral and Southeast Alaska regions in the Council's 2002 report and the lack of more recent direct participation in the fishery, these two regions have been dropped.

that the Council's 2002 report finding that coastal Oregon impacts were largely focused on Newport.[24] We also note that a residual "Other Areas" category has been added to this section to capture selected data from Washington communities outside of the Washington inland waters region, Oregon communities outside of Lincoln county, and any communities outside of Alaska, Washington, and Oregon.[25,26]

The regional discussions vary based on the presence of affected sectors in those regions and the nature of regional/community engagement and dependency on the relevant fisheries. These discussions will be expanded at a later date to include more information on community impacts related to changes in business and employment practices of participants in the fishery cooperatives once the data to support that additional analysis have been developed.

8.2.3.1 Overview of Ongoing AFA Catcher Vessel Trends of Change, 2000–2015

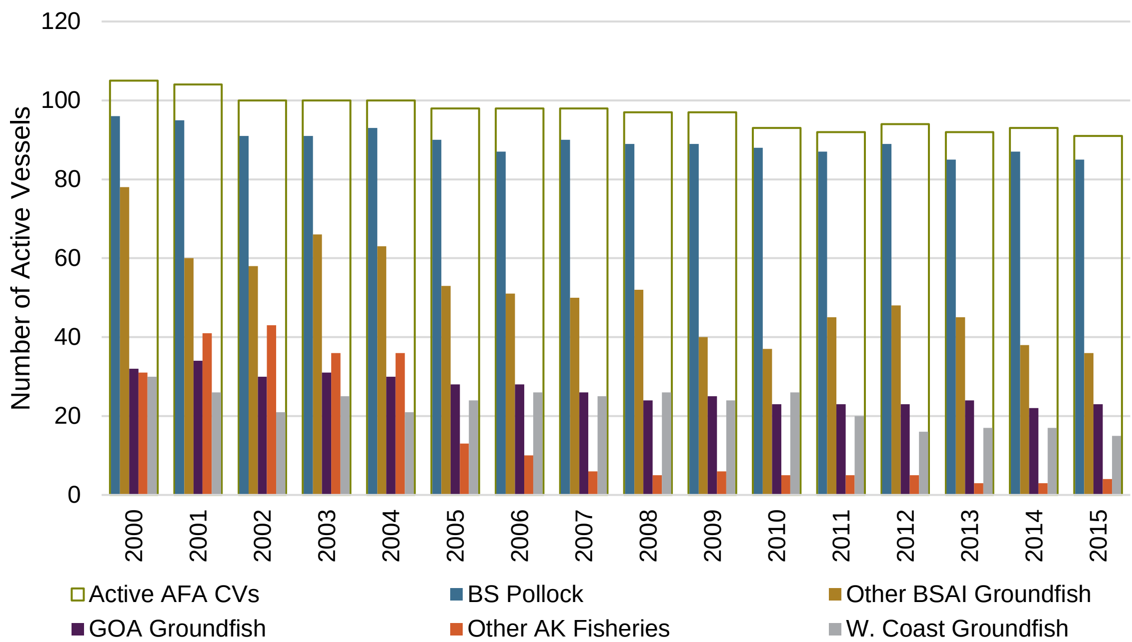
Figure 14 illustrates the number of active AFA catcher vessels, by major fishery, by year from 2000 to 2015. While the number of active AFA catcher vessels has relatively slowly trended downward over this period, declining by approximately 13 percent between 2000 and 2015, there has been have been steeper declines in participation in individual fisheries. This is more apparent in Figure 15, which shows, in terms of percentage of all active AFA catcher vessel participation, relatively steady participation in the BS pollock fishery but generally ongoing declines in participation in the other BSAI groundfish, GOA groundfish, and other Alaska fisheries among the remaining vessels over time.

[24] Lincoln County includes multiple Oregon coastal communities that have historically been engaged in a range of Alaska fisheries, including Newport and South Beach, which is contiguous with Newport, and the communities of Depoe Bay, Siletz, and Toledo, which are all located within a dozen miles of Newport, among others. It does not include several other coastal Oregon communities that have also historically been involved in Alaska groundfish fisheries, if to a lesser extent, such as Warrenton, Cloverdale, Florence, Charleston, Port Orford, and Brookings, but participation of these communities, where involved, is captured in this analysis in the "Other Areas" category.

[25] The definition of the Washington inland waters region remains unchanged (all counties bordering Puget Sound and the Strait of Juan de Fuca, including Clallam, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston, and Whatcom counties), as does the definition of the Alaska Peninsula/Aleutian Islands region (the combination of the Aleutians East Borough and the Aleutians West Census Area).

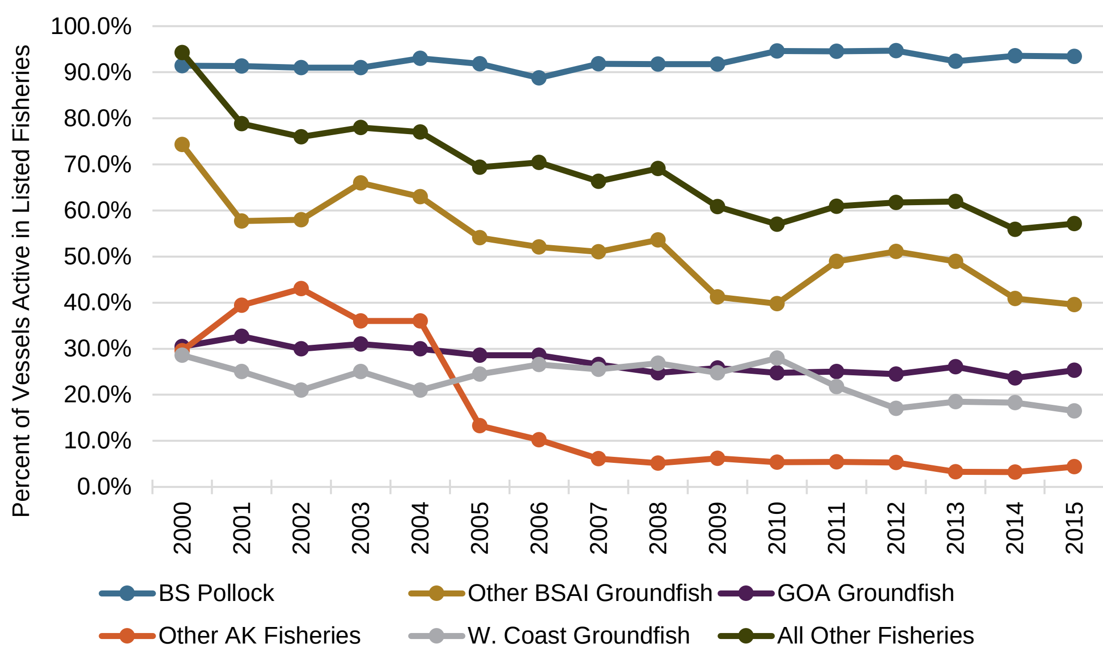
[26] Communities in California and New Hampshire appear in the AFA catcher vessel data at least some years 2000-2015; no Alaska communities outside of Kodiak appear in the AFA catcher vessel data for any of these years.

Figure 14. Number of Active AFA Catcher Vessels, by Activity in Various Fisheries, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

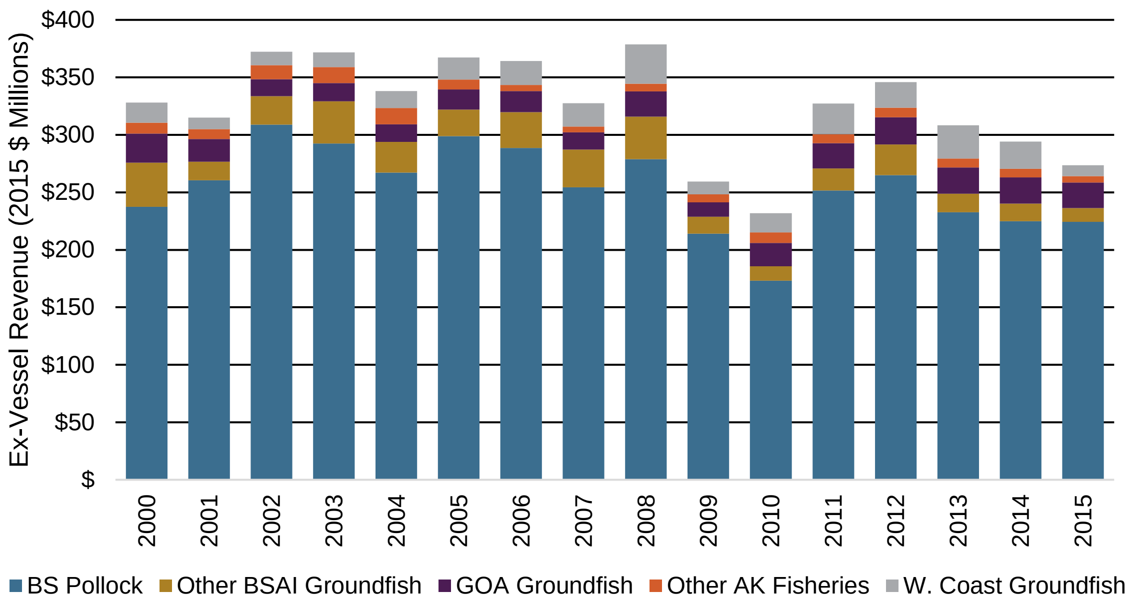
Figure 15. Total Active AFA Catcher Vessels, by Activity in Various Fisheries, 2000–2015 (Percent)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

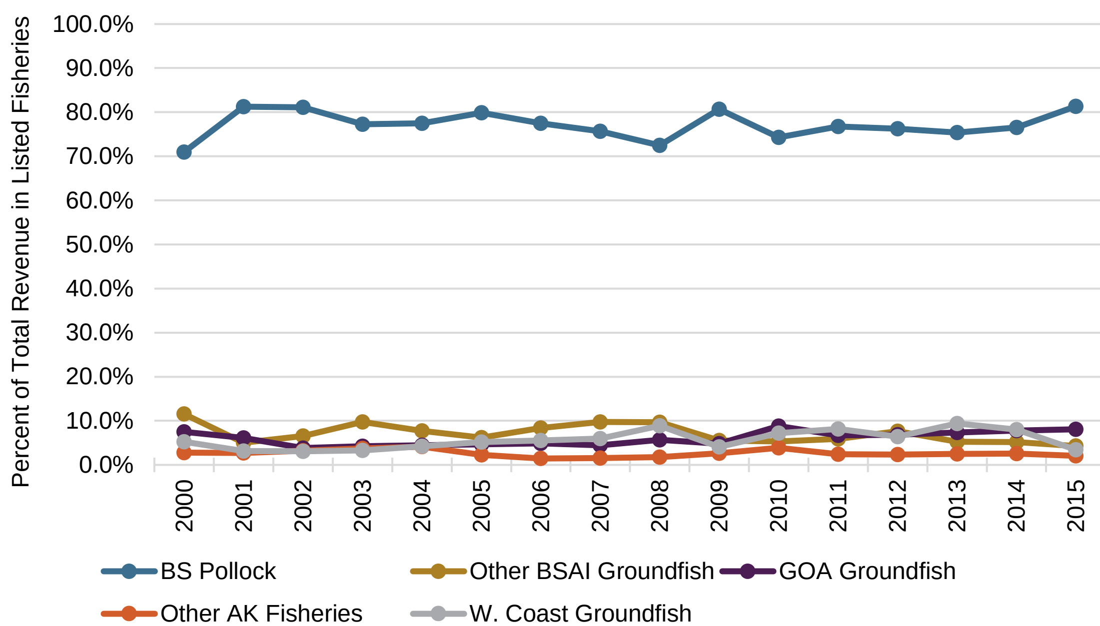
Figure 16 illustrates the ex-vessel revenues of active AFA catcher vessels, by major fishery, by year from 2000 to 2015. Overall, revenues have fluctuated over the years, as have relative contributions of the different fisheries within the diversified fishing portfolios of these vessels, but with BS pollock remaining the major foundation of total ex-vessel revenues in every year. This is particularly apparent in Figure 17, which clearly shows, in terms of percentage of all active AFA catcher vessel ex-vessel revenues, relatively steady dominance of BS pollock ex-vessel revenues, which have generally accounted for roughly three-quarters of all ex-vessel revenues among the active vessels annually.

Figure 16. AFA Catcher Vessel Ex-vessel Revenue, by Fishery, 2000–2015 (2015$)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

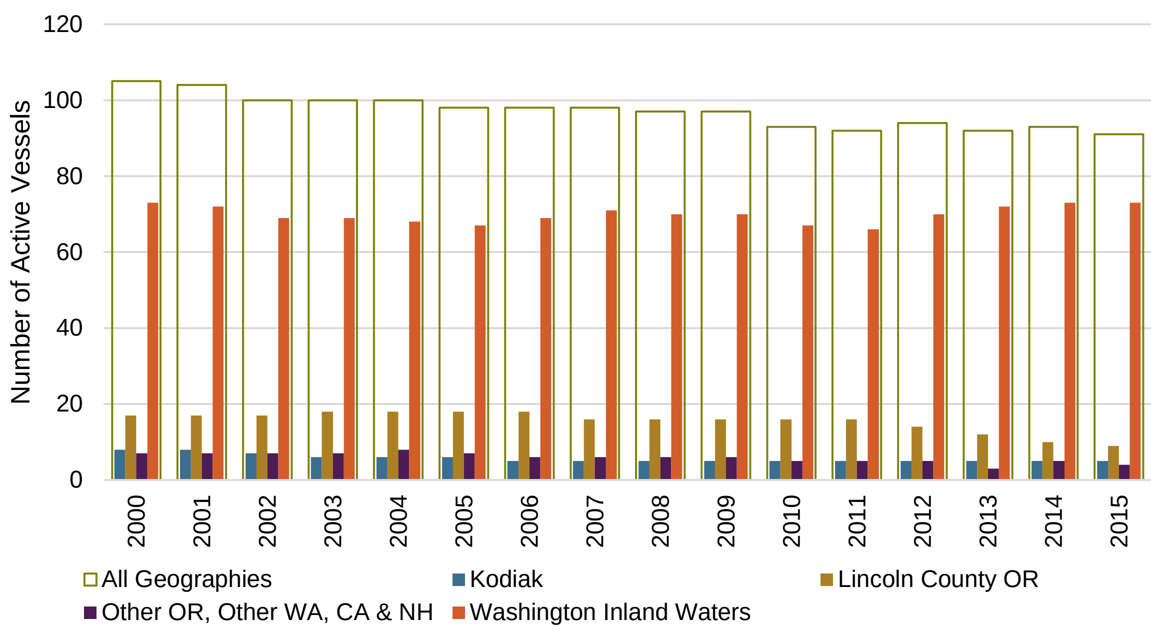
Figure 17. AFA Catcher Vessel Ex-vessel Revenue, by Fishery, 2000–2015 (Percent)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

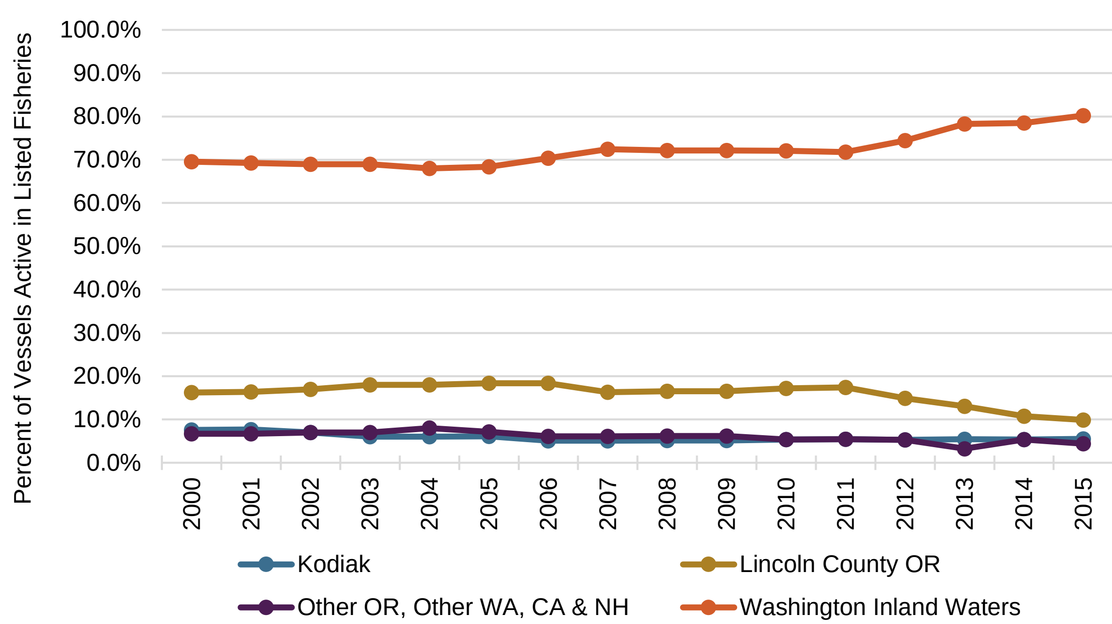
Figure 18 and Figure 19 show the number of active AFA catcher vessels, by region, by year from 2000 to 2015. As can be seen, trends by region are variable, with some regions increasing and others declining. These differences will be discussed in in detail in the sections for each individual regional below. However, it is clear in these two figures that the vast majority of AFA catcher vessels are based in the Washington inland waters region.

Figure 18. Number of Active AFA Catcher Vessels, by Major Geography, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

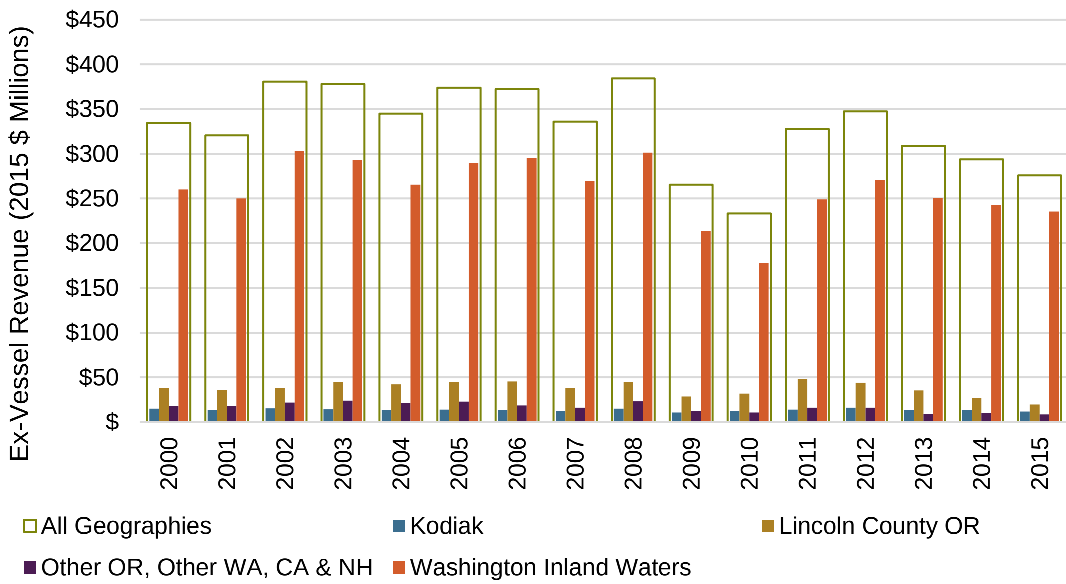
Figure 19. Percent of Active AFA Catcher Vessels, by Major Geography, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

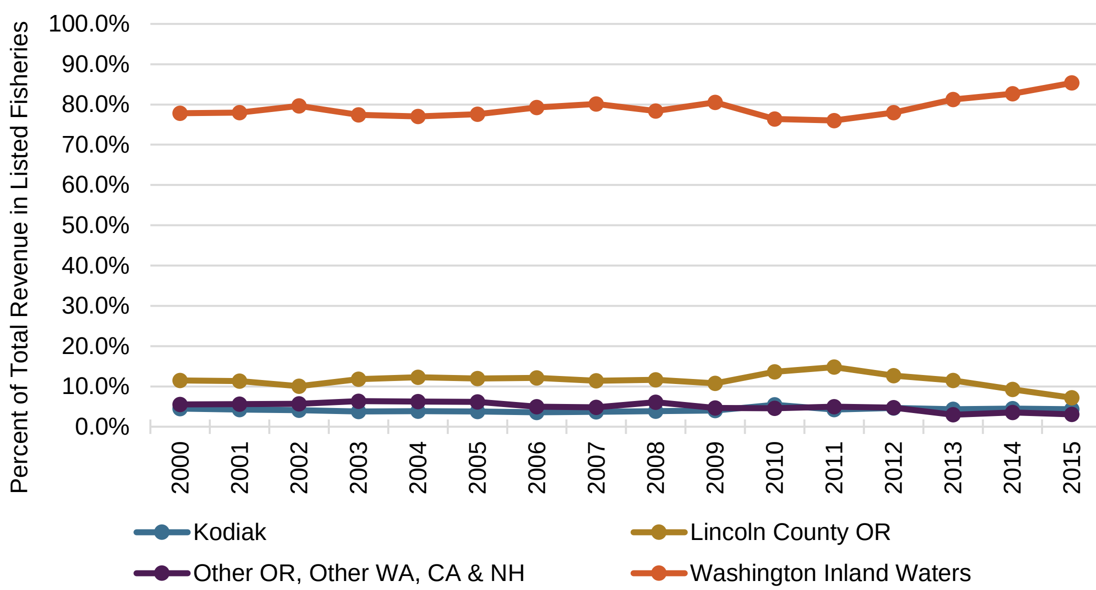
Figure 20 illustrates the ex-vessel revenues of active AFA catcher vessels, by region, by year from 2000 to 2015. While ex-vessel revenues have fluctuated substantially on a year-to-year basis for the fleet as a whole, and ex-vessel revenues by region seem to track with overall fluctuations, the overall importance of the contribution of the Washington inland waters region is apparent. This is even more clearly illustrated in Figure 21, which shows, in terms of percentage of ex-vessel revenues of all active AFA catcher vessel participation by year, the dominance of the Washington inland waters fleet, which has accounted for roughly 80 percent of all AFA catcher vessel revenues over this period.

Figure 20. Total AFA Catcher Vessel Ex-vessel Revenue, by Major Geography, 2000–2015 (2015$)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 21. Total AFA Catcher Vessel Ex-vessel Revenue, by Major Geography, 2000–2015 (Percent)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

8.2.3.2 Distribution of Social Impacts by Region/Fishing Community

Alaska Peninsula/Aleutian Islands

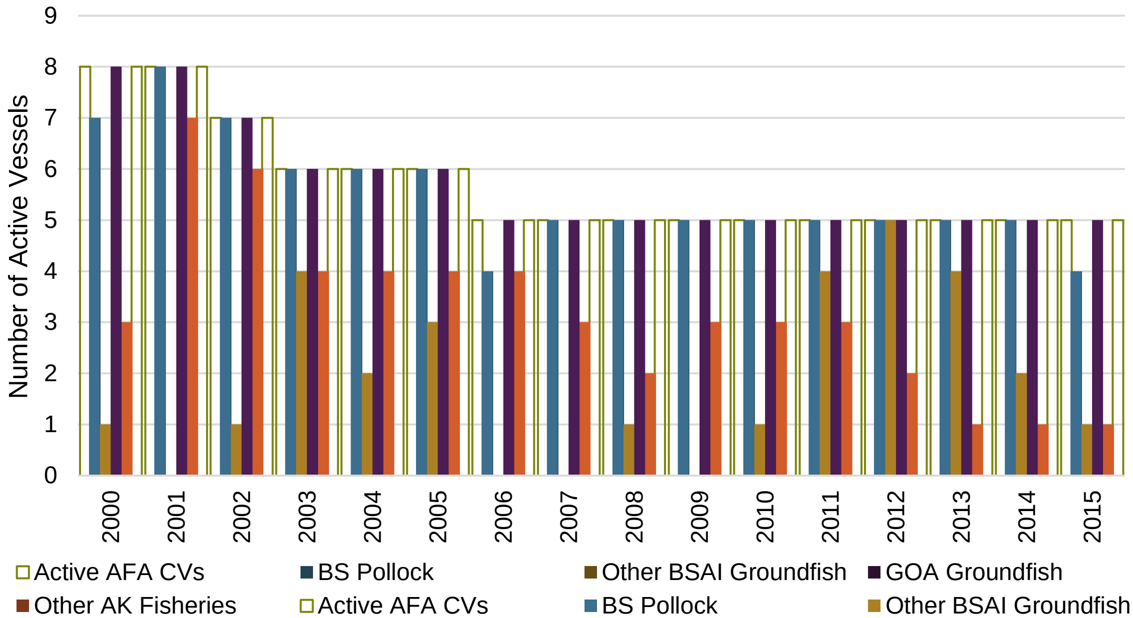
In the Alaska Peninsula/Aleutian Islands region, direct participation in the AFA fishery was limited to local operation of inshore processing plants, as well as inshore floating processors. No major consolidation among AFA inshore processors was seen during 2000 to 2015; Unalaska/Dutch Harbor had three active AFA inshore processors operation annually over this period, while Akutan, King Cove, and Sand Point each had one (with the Sand Point processor, unlike the other AFA inshore processors, not being a part of a cooperative, as noted above). Two floating processors (*Northern Victor* and *Arctic Enterprise*) operated in the region annually from 2000 through 2006, while only one (*Northern Victor*) operated from 2007 to 2015.

No AFA catcher vessels were owned by the residents of the region in any of the years between 2000 and 2015, but consolidation of the AFA catcher vessel fleet that calls on these communities has continued since the Council's 2002 report. This ongoing consolidation may be continuing to impact support businesses in Unalaska/Dutch Harbor and, to a lesser degree, in King Cove, Sand Point, and Akutan in the ways noted in the 2002 report. It is important to note, however, that these types of impacts are difficult to attribute to a single regulatory action and, even where causality may appear to be more easily inferred, are difficult to quantify. It is also important to note, as did the Council's 2002 report, that the trend away from a race-for-fish, with accompanying catcher vessel fleet consolidation and lessening demand for locally provided support services, did not start with the AFA. Further, additional fishery management changes since the enactment of the AFA, such as the implementation of the BSAI crab rationalization program in 2005, have added their own incremental impacts to these same support sectors (Northern Economics 2016). It is clear, however, that the AFA remains a part of the cumulative impact context with respect to support service businesses in several communities in this region where, under pre-rationalization conditions, the inefficiency of the fisheries tended to create greater/peak demand for locally provided support services. These services were inefficient in the larger economic picture, but they contributed to small-scale, local economies that typically capture few of the benefits of commercial fishery revenues.

Kodiak Island

In Kodiak, the number of active AFA catcher vessels decreased between 2001 and 2002, between 2002 and 2003, and between 2005 and 2006 before plateauing from 2006 to 2015, as shown in Figure 22. The overall consolidation was unidirectional from eight to five active catcher vessels over the 2000–2015 period, or a decline of roughly one-third, with no consolidation occurring in the most recent 10 years for which data are available. While this is a modest decline with respect to the size of the overall Kodiak commercial fishing fleet, this change is seen as part of an adverse cumulative impact of declining skipper and crew employment opportunities resulting from the implementation of rationalization programs such as the BSAI crab rationalization program (Northern Economics 2016). All Kodiak AFA vessels that were active participated in the GOA groundfish fishery every year from 2000 to 2012, while none participated in the west coast groundfish fishery in any year over this period; in every year, all active Kodiak AFA vessels participated in the BS pollock fishery, except for 2000, 2006, and 2015 when all but one did so.

Figure 22. Number of Active Kodiak AFA Catcher Vessels, by Activity in Various Fisheries, 2000–2015

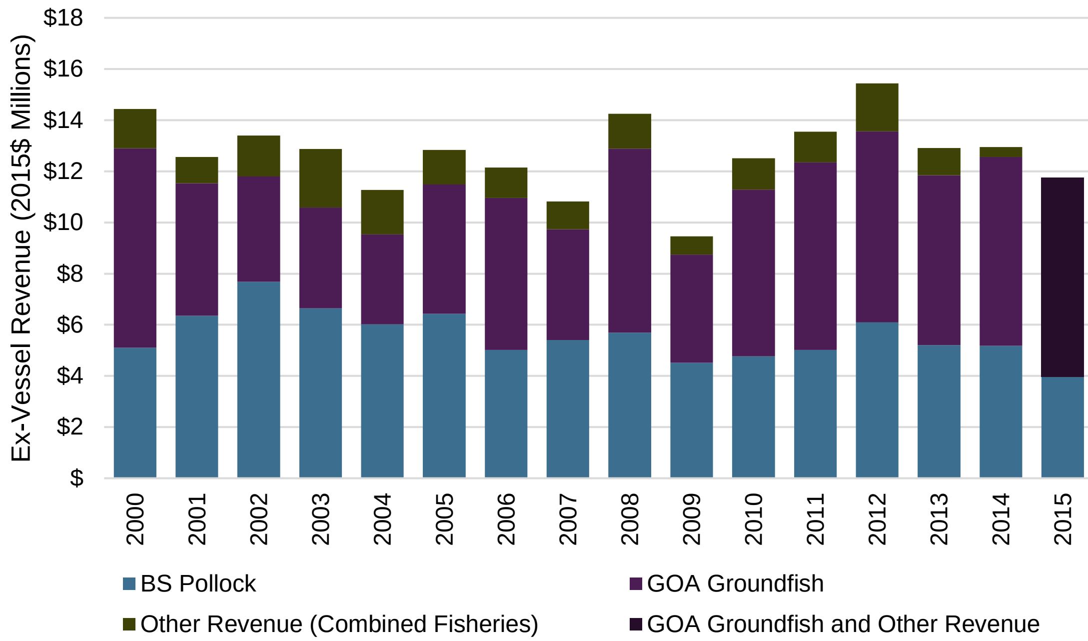


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 23 illustrates the relative reliance of active Kodiak AFA catcher vessels on BS pollock, GOA groundfish, and all other fisheries combined, as measured by ex-vessel revenues, by year for 2000 to 2015.[27] Figure 24 portrays these same data, but in terms of percentage of ex-vessel revenues, making apparent the fundamental reliance of these vessels on both BS pollock and GOA/non-AFA fisheries.

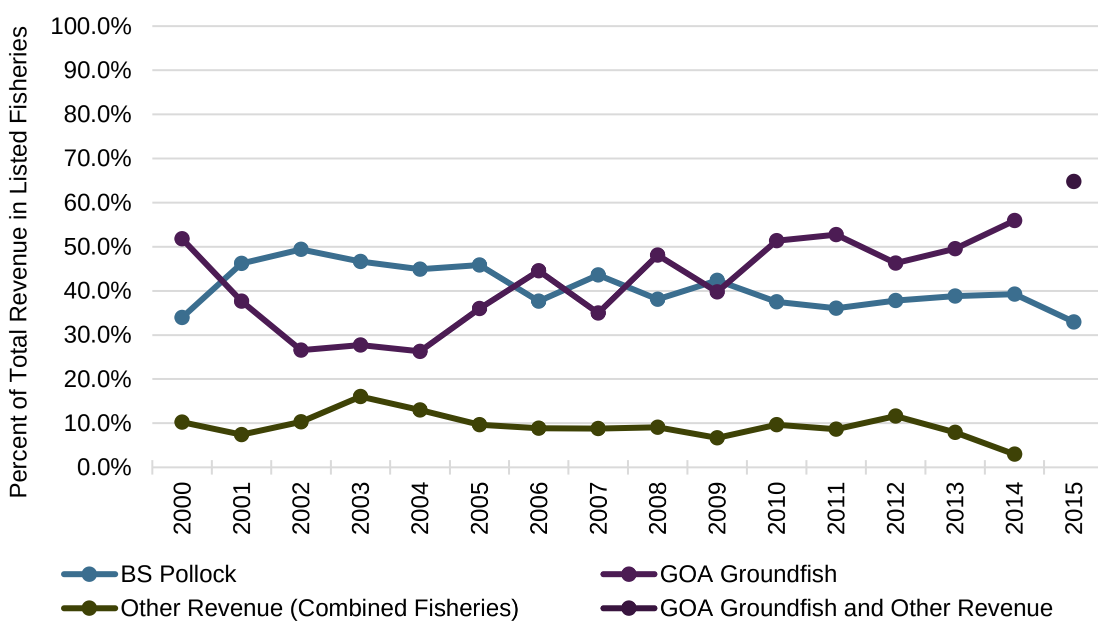
[27] In case of 2015, ex-vessel revenues for GOA groundfish and all other fisheries combined were necessarily aggregated due to data confidentiality constraints.

Figure 23. Total Active Kodiak AFA Catcher Vessel Ex-vessel Revenue, by Fishery, 2000–2015 (2015$)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 24. Total Active Kodiak AFA Catcher Vessel Ex-vessel Revenue, by Fishery, 2000–2015 (Percent)

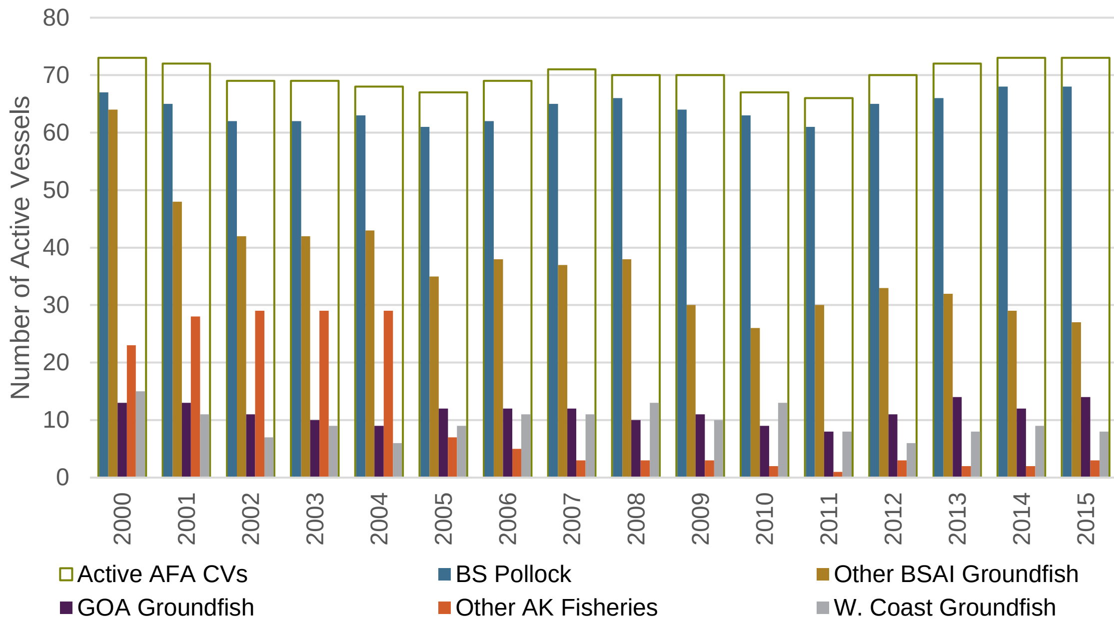


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Washington Inland Waters

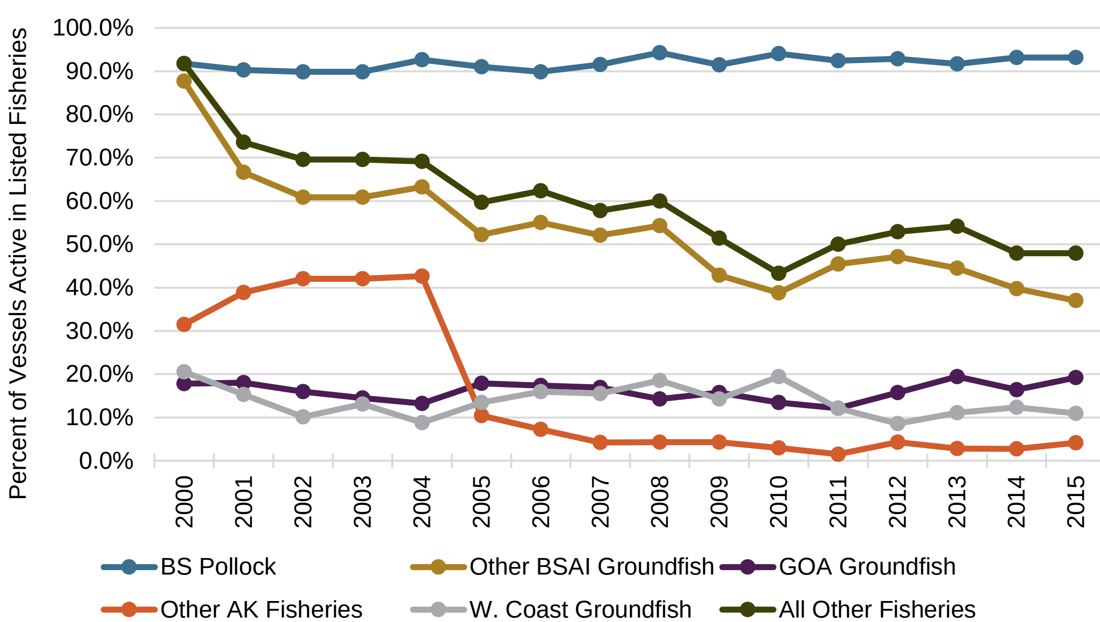
In the Washington inland waters region, no long-term consolidation of active AFA catcher vessels has occurred in the years covered by the data (2000–2015). The number of active AFA catcher vessels was the same 2015 as it had been in 2000, although there was some downward fluctuation in the years in between, as shown in Figure 25. As shown in Figure 26, approximately 90 percent of Washington inland waters AFA vessels participated in the BS pollock fishery every year from 2000 to 2012, while the participation in other Alaska fisheries has declined over time.

Figure 25. Number of Total Active Inland Washington AFA Catcher Vessels, by Activity in Various Fisheries



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

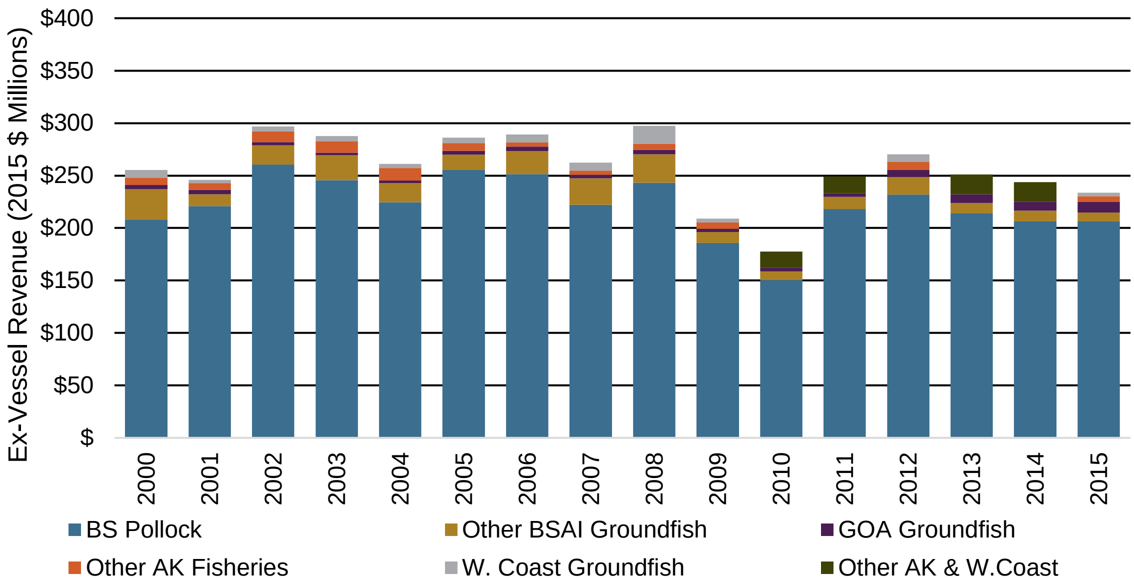
Figure 26. Percent of Active Inland Washington AFA Catcher Vessels in Various Fisheries, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

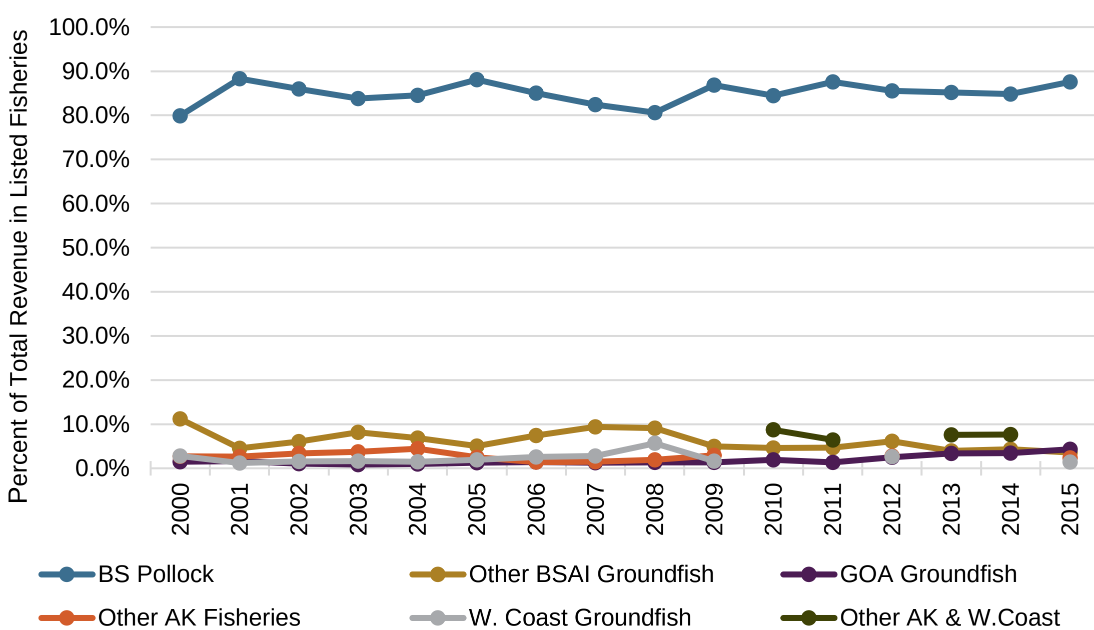
Figure 27 illustrates the relative reliance of active Washington inland waters AFA catcher vessels on BS pollock, other BSAI groundfish, GOA groundfish, other Alaska fisheries, and west coast groundfish to the extent possible within data confidentiality constraints, which necessitated the combining of the latter two categories in 2010–2011 and 2013–2014. Figure 28 portrays these same data, but in terms of percentage of ex-vessel revenues, making apparent the fundamental reliance of these vessels on the BS pollock fishery.

Figure 27. Total Active Inland Washington AFA Catcher Vessel Ex-vessel Revenue, by Fishery in 2015$



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

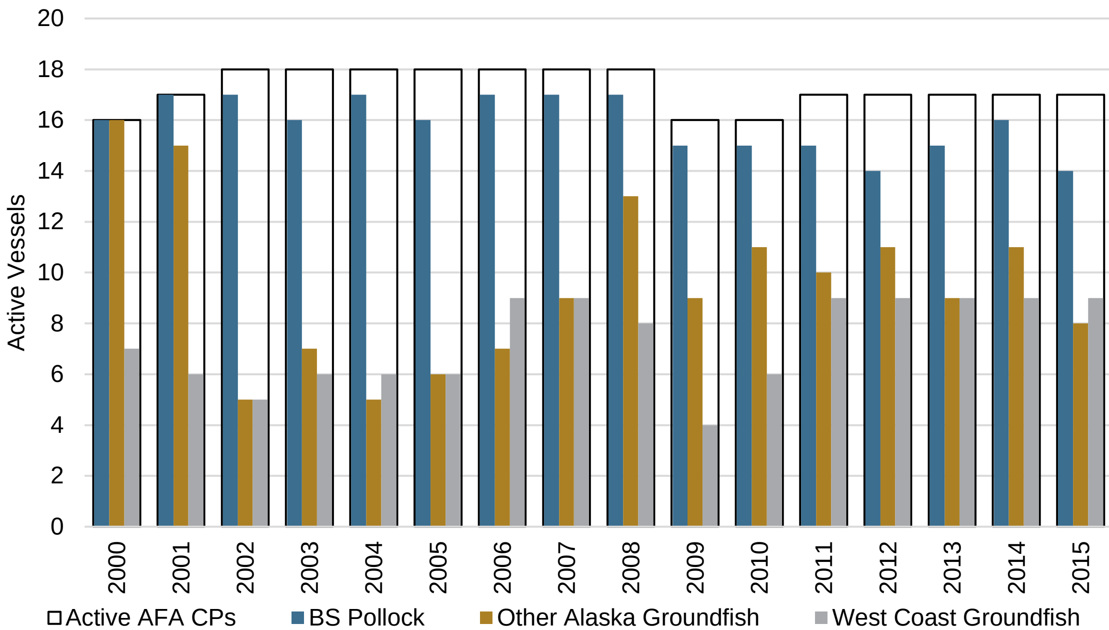
Figure 28. Percent of Ex-vessel Revenue by Fishery of Active Inland Washington AFA Catcher Vessels



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 29 illustrates the number of active AFA catcher/processors, by major fishery, by year from 2000 to 2015.[28] The number of active AFA catcher/processors varied little over this period, with no general trend of overall fleet consolidation mirroring that of active AFA catcher vessels being seen. There are, however, fluctuations in levels of participation in individual fisheries. This is more apparent in Figure 30, which clearly shows, in terms of percentage of all active AFA catcher/processor participation, that while BS pollock participation remains high and there is year-to-year variability, it has on average shown a gradual decline over the years covered by the data, with participation rates in the other Alaska groundfish and west coast groundfish fisheries being more volatile.

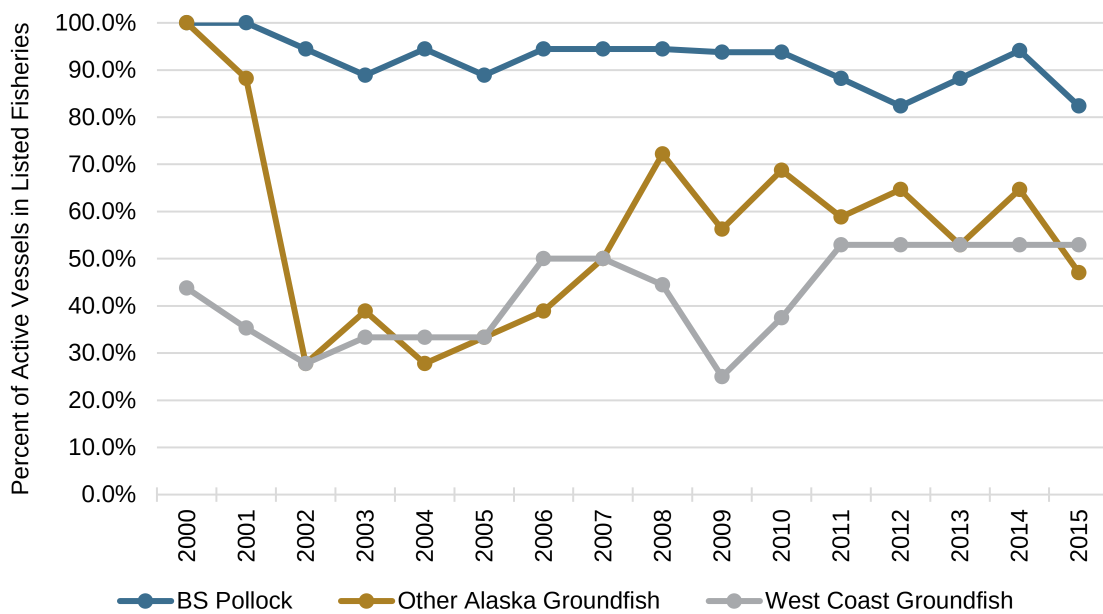
Figure 29. Number of Active AFA Catcher/Processors, by Activity in Various Fisheries, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

[28] The text and figures in this section include the *Ocean Peace*, as well as all of its non-pollock activity and revenue.

Figure 30. Percent of Active AFA Catcher/Processors, by Activity in Various Fisheries, 2000–2015

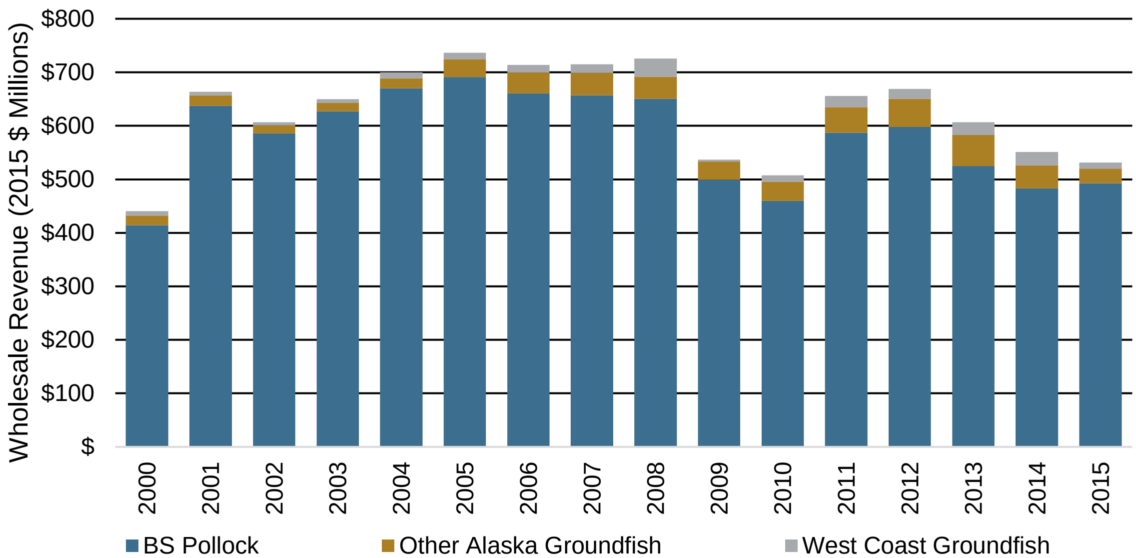


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 31 illustrates the wholesale revenues of active AFA catcher/processors, by major fishery, from 2000 to 2015. Overall revenues have fluctuated over the years, as have the relative contributions of the different fisheries within the diversified fishing portfolios of these vessels, but with BS pollock remaining the major foundation of total wholesale revenues in every year.[29] This is particularly apparent in Figure 32, which clearly shows, in terms of percentage of all active AFA catcher/processor wholesale revenues, relatively steady dominance of BS pollock ex-vessel revenues, which have on average accounted for over 90 percent of all wholesale revenues among the active catcher/processors annually during the 2000–2015 period.

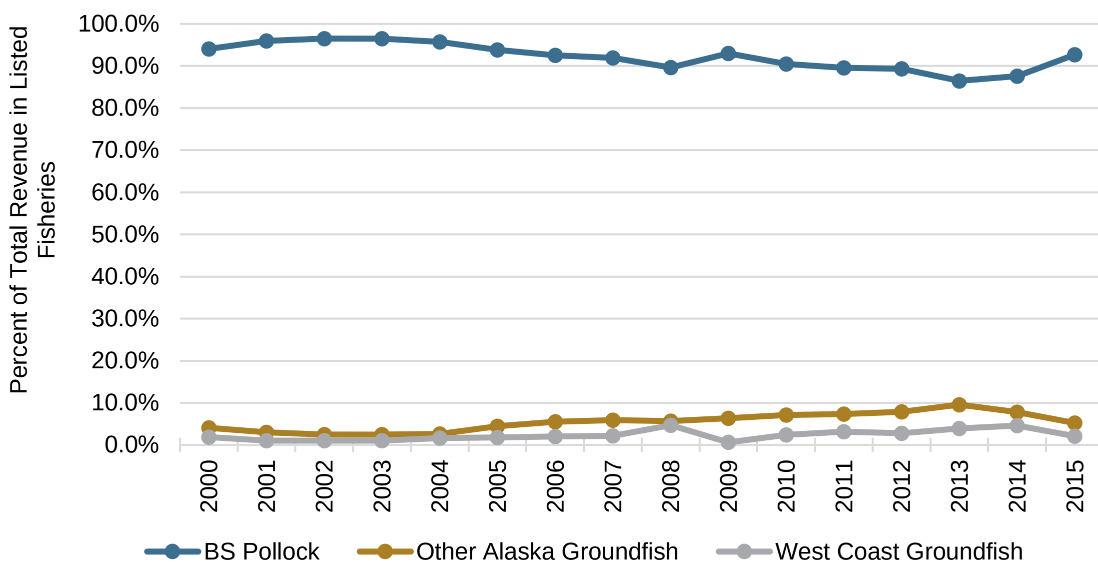
[29] The significant decline in revenues in 2009 and 2010 was the result of a reduced pollock DFA (Section 4).

Figure 31. Total Active AFA Catcher/Processor Wholesale Revenues, by Fishery, 2000–2015 (2015$)



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 32. Percent of Wholesale Revenue by Fishery of Active AFA Catcher/Processors, 2000–2015



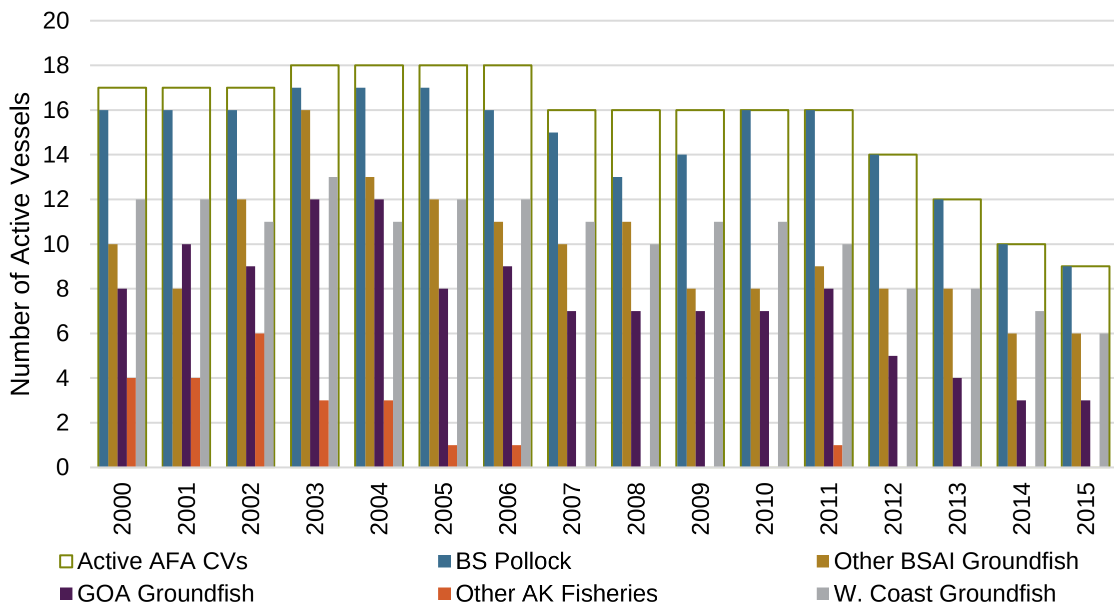
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Lincoln County Oregon

In Lincoln county, by 2015, the most recent year for which data are available, the number of active AFA catcher vessels was half of the 2003–2006 annual total, which represented the peak years of the 2000–2015 period, as shown in Figure 33. While there was a one-vessel increase in active AFA catcher vessels between 2002 and 2003, thereafter there was an overall trend of consolidation, with declines seen between 2006 and 2007, and then annually from 2011 to 2015. The reduction from 17 active

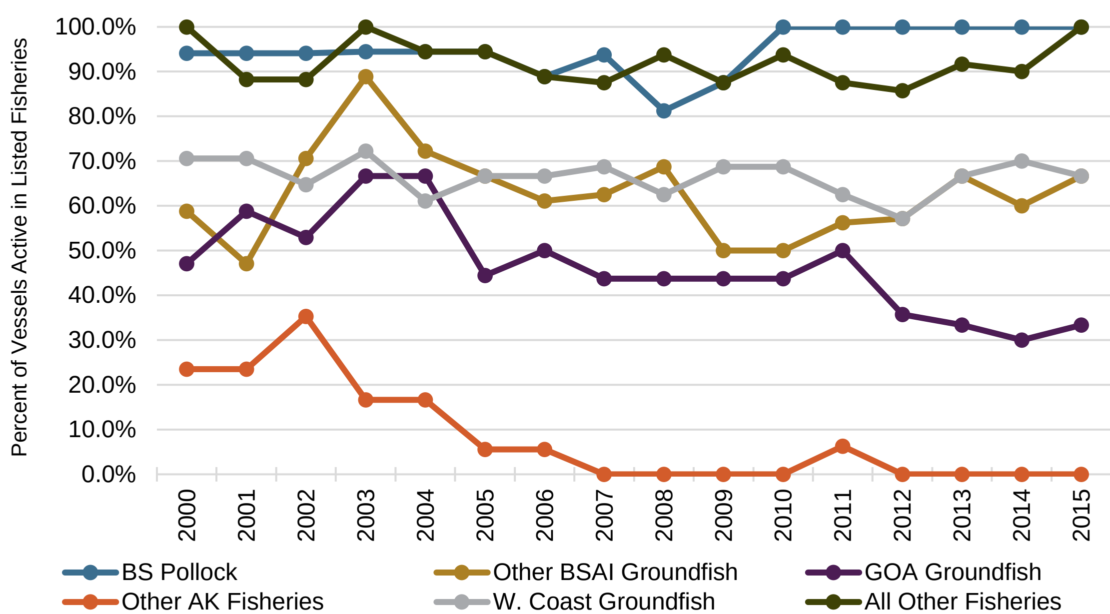
AFA vessels in 2000 to 9 in 2015 was the largest consolidation in both absolute and relative terms of any of the regions (i.e., a loss of eight vessels or 47 percent of the active 2000 fleet). As shown in Figure 34, while nearly all Lincoln county AFA vessels participated in the BS pollock fishery annually from 2000 to 2015, and all did so in the six most recent years for which data are available, a large portion of these vessels also participated in several other fisheries on a regular basis. A notable decline in participation in the GOA groundfish fishery over the later years covered by the data is also apparent, following an increase in participation in that fishery in the earlier years included in the dataset.

Figure 33. Number of Active Lincoln County, Oregon AFA Catcher Vessels, by Activity in Various Fisheries



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

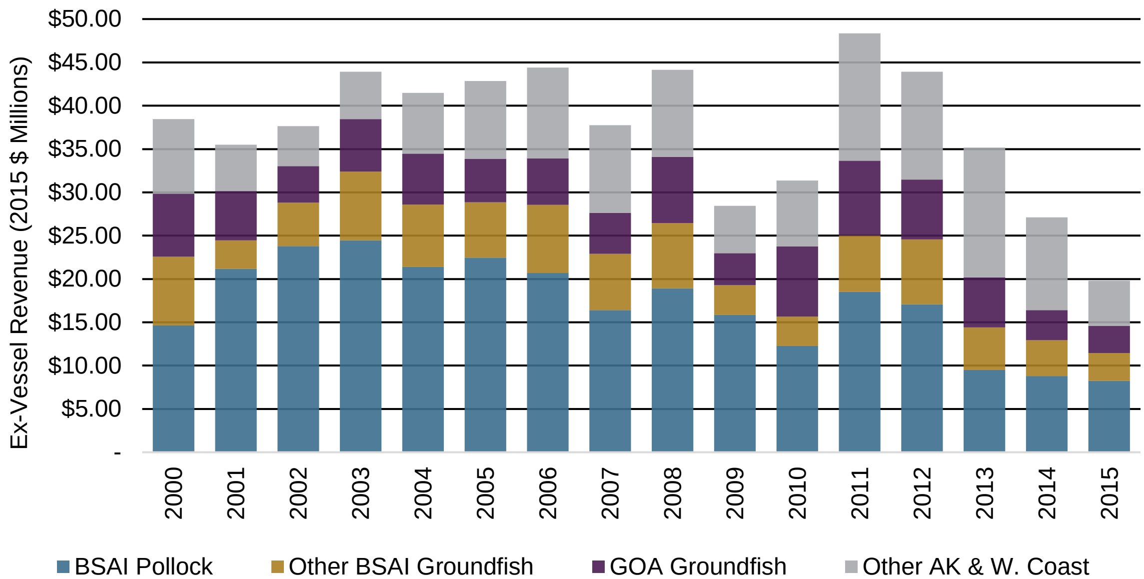
Figure 34. Percent of Active Lincoln County, Oregon AFA Catcher Vessels, in Various Fisheries, 2000-2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

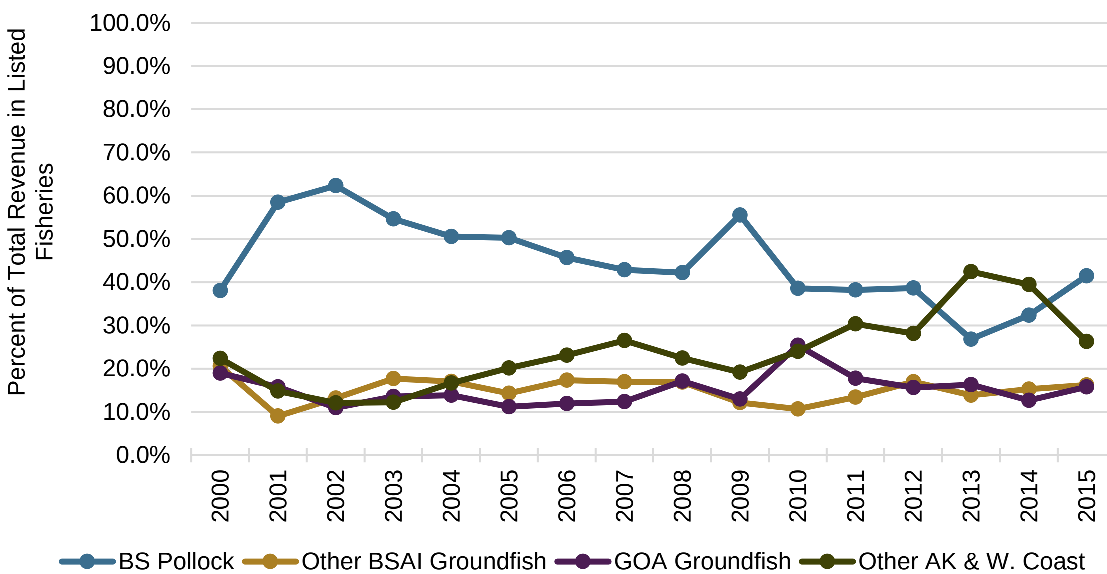
Figure 35 illustrates the relative reliance of active Lincoln county AFA catcher vessels on BS pollock, other BSAI groundfish, GOA groundfish, and other Alaska and west coast fisheries, as measured by ex-vessel revenues, by year for 2000 to 2015. Figure 36 portrays these same data, but in terms of percentage of ex-vessel revenues, showing an increase in the relative importance of BS pollock revenues in the early years covered by the data, followed by a return to roughly the same proportional reliance in more recent years as was seen in 2000.

Figure 35. Ex-vessel Revenue, by Fishery (in 2015$) by Lincoln County, Oregon AFA Catcher Vessels



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 36. Percent of Ex-vessel Revenue by Fishery of Lincoln County AFA Catcher Vessels, 2000–2015

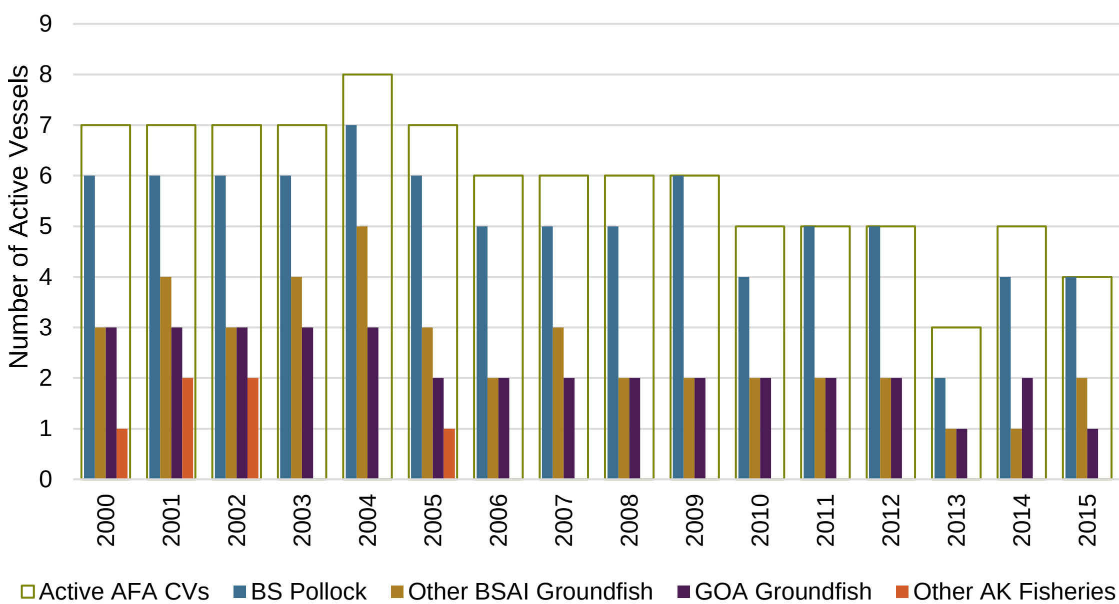


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Other Areas

In other areas combined, by 2015, the most recent year data are available, the number of active AFA catcher vessels was half of the 2004 annual total, which represented the peak year of the 2000–2015 period (Figure 37). While there was a one-vessel increase in active AFA catcher vessels between 2003 and 2004, thereafter there was an overall trend of consolidation, with a year-to-year increase seen only in 2013–2014. The majority of "other area" AFA vessels participated in the BS pollock fishery annually from 2000 to 2015, and all did so in four of the seven most recent years for which data are available. A large portion of these vessels also participated in several other fisheries on a regular basis.

Figure 37. Number of Active Other OR, Other WA, CA, and NH AFA Catcher Vessels, by Activity in Various Fisheries, 2000–2015

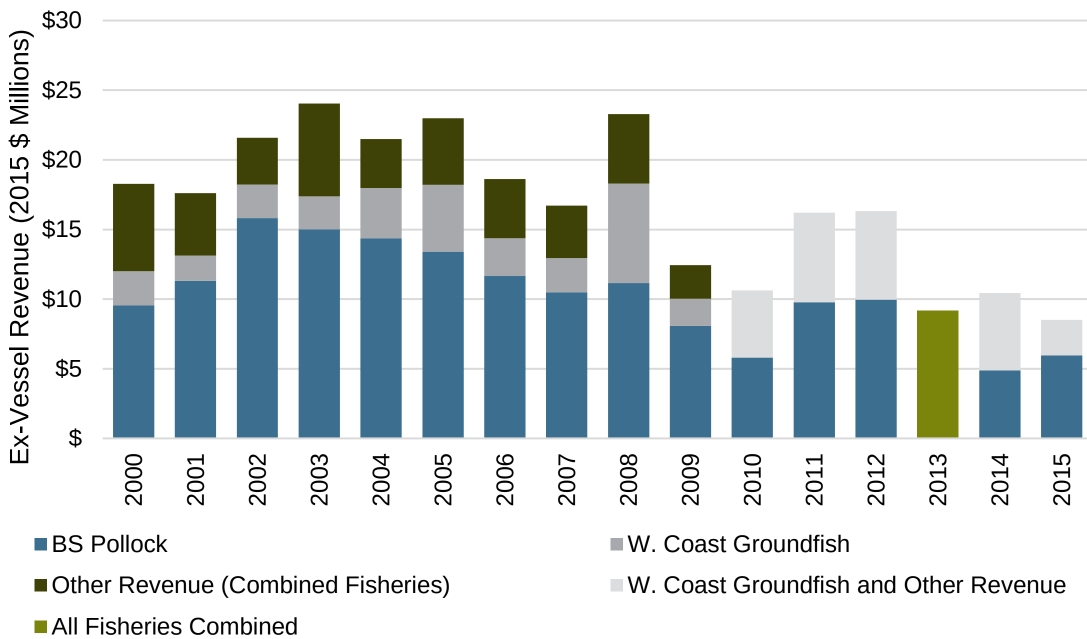


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 38 illustrates the relative reliance of active "other area" AFA catcher vessels on BS pollock, west coast groundfish, and all other fisheries combined, to the extent possible within data confidentiality constraints, as measured by ex-vessel revenues, by year for 2000 to 2015.[30] Figure 39 portrays these same data, but in terms of percentage of ex-vessel revenues of all active "other area" AFA catcher vessels. Although data confidentiality constraints limit the display of disaggregated data, especially in the most recent years, the continuing importance of BS pollock is clear.

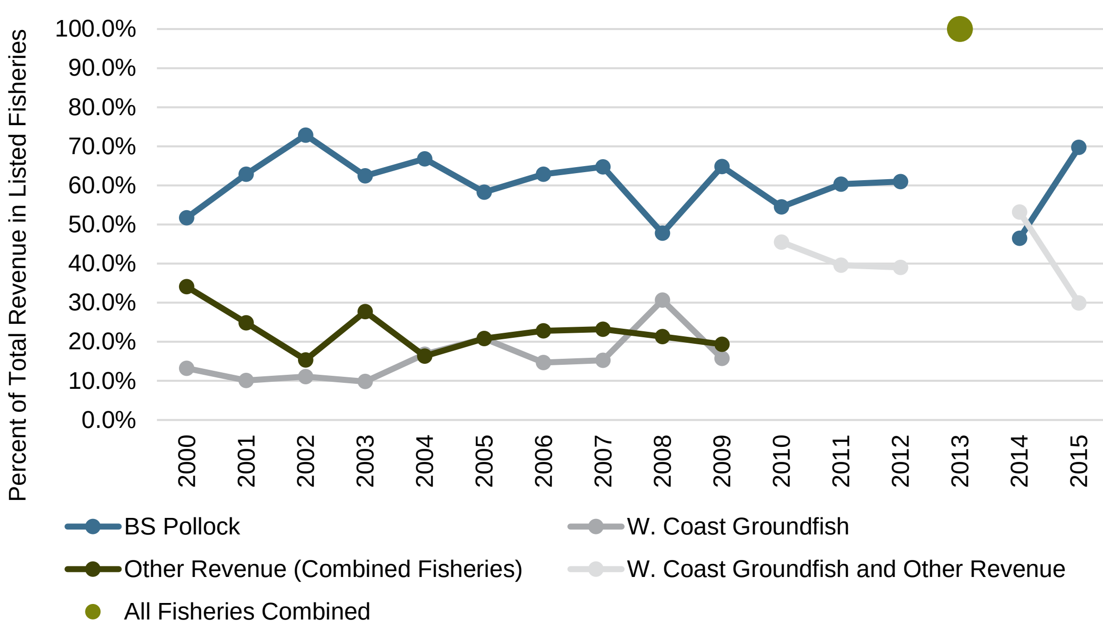
[30] In the case of 2013, ex-vessel revenues for BSAI pollock and all other fisheries combined were necessarily aggregated due to data confidentiality constraints.

Figure 38. Ex-vessel Revenue, by Fishery of AFA Catcher Vessels from Other OR, Other WA, CA, and NH in 2015$, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 39. Percent of Ex-vessel Revenue, by Fishery, of AFA Catcher Vessels from Other OR, Other WA, CA, and NH, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

8.3 Summary

While assigning causality to the AFA for changes seen in the coastal communities that participate in the CDQ program is problematic given the numerous intervening variables since passage of the Act, it is clear that the beneficial impacts first documented in the Council's 2002 report remain relevant. While there are differences in performance across the CDQ groups because of the diverse decisions the groups have made, the opportunities that accrued to CDQ groups as a result of the changes to the BSAI pollock fishery brought about by the AFA have continued to further the economic and social goals of the CDQ program.

With respect to other coastal communities, the types of direct impacts to these communities resulting from the implementation of the AFA were largely realized in the first few years of the program and were documented in the Council's 2002 report. These impacts were largely beneficial, but also included adverse impacts, including loss of employment and income opportunities resulting from consolidation of the AFA catcher vessel and catcher/processor fleets, as well as associated impacts to support service businesses in a limited number of communities. Other changes were seen with the transition away from race-for-fish conditions and toward a slower, longer fishery with less distinct peaks and valleys of activity which, in turn, had secondary impacts to other parts of local economies and patterns of engagement of AFA fishery participants in other fisheries. While the AFA did not initiate or complete these trends of change in the affected communities, and an attribution of specific changes to the AFA (and a quantification of those changes) is problematic in general, it is clear that the AFA has (1) contributed to cumulative community impacts resulting from a larger move toward catch share type of management in general and (2) generated at least some ongoing level of impact with the continuing consolidation of the AFA catcher vessel fleet. Overall, no new types of impacts to fishing communities resulting from the AFA have been identified, and the available data suggest that the conclusion reached in the Council's 2002 report that the impacts of the AFA on fishing communities participating in the fisheries managed under the AFA have been largely beneficial remains accurate. Additionally, as noted in Section 11, the sideboards incorporated into the AFA appear to have continued to work well in avoiding adverse AFA-related impacts to other fisheries and, by extension, the communities reliant on those fisheries.

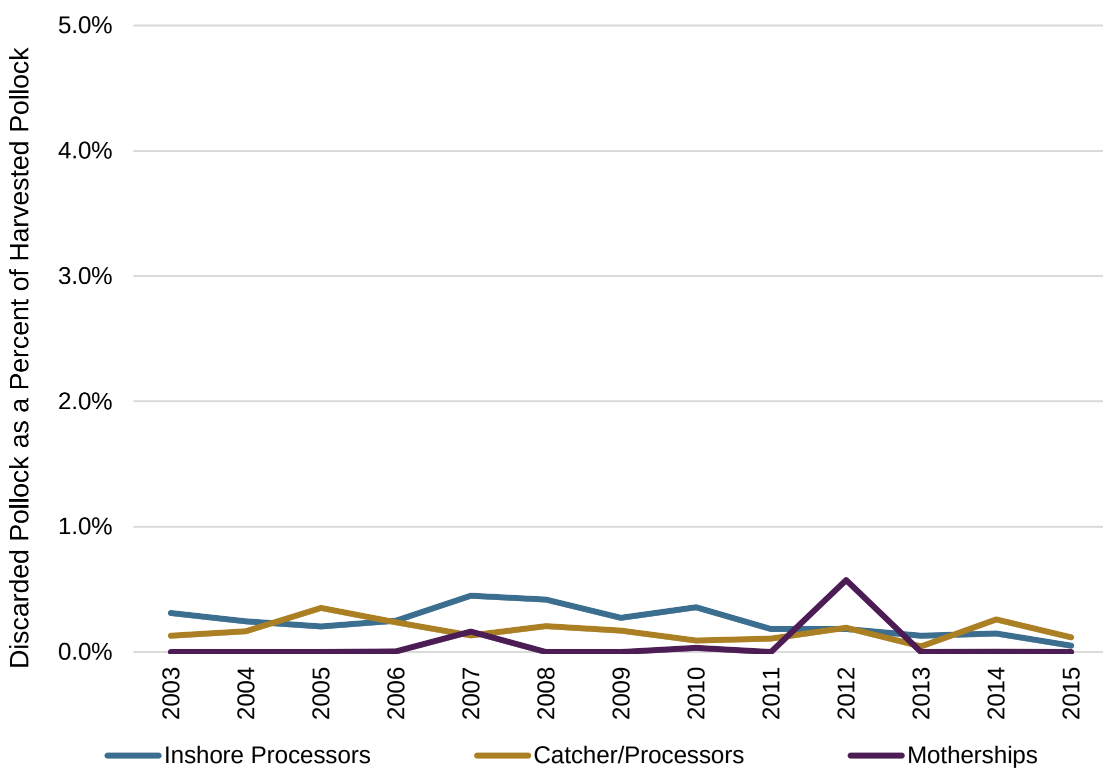
9 Retention and Utilization

This section examines the retention and utilization of fishery resources after AFA implementation. Discard rate refers to the percentage of the groundfish catch that is not retained because the fish are unwanted for economic reasons (undesirable size, sex, quality, etc.), or because the fish are required by regulation to be discarded. Utilization rate refers to the percentage of retained groundfish processed into some type of product. Discards of prohibited species are not included in this discussion.

9.1 Discard Rate

Discard rates in the BS pollock fishery are very low are a result of Amendment 49 to the BSAI groundfish FMP, which required all vessels fishing for groundfish in the BSAI management area to retain all pollock and Pacific cod beginning January 3, 1998. The adoption of Amendment 49 coincided with passage of the AFA. Slowing down the rate pollock is harvested and processed was one of the results of the AFA, especially during the non-roe seasons. In turn, slower fishing resulted in fishing practices that further helped reduce discard rates. For example, vessels could spend more time searching for pollock of the preferred size and avoiding undesired fish species, including prohibited species. As shown in Figure 40, the discard rates of groundfish across all sectors have held at less than one percent since 2003.

Figure 40. Discard Rate in the Bering Sea Pollock Fishery, by AFA Sector, 2003–2015

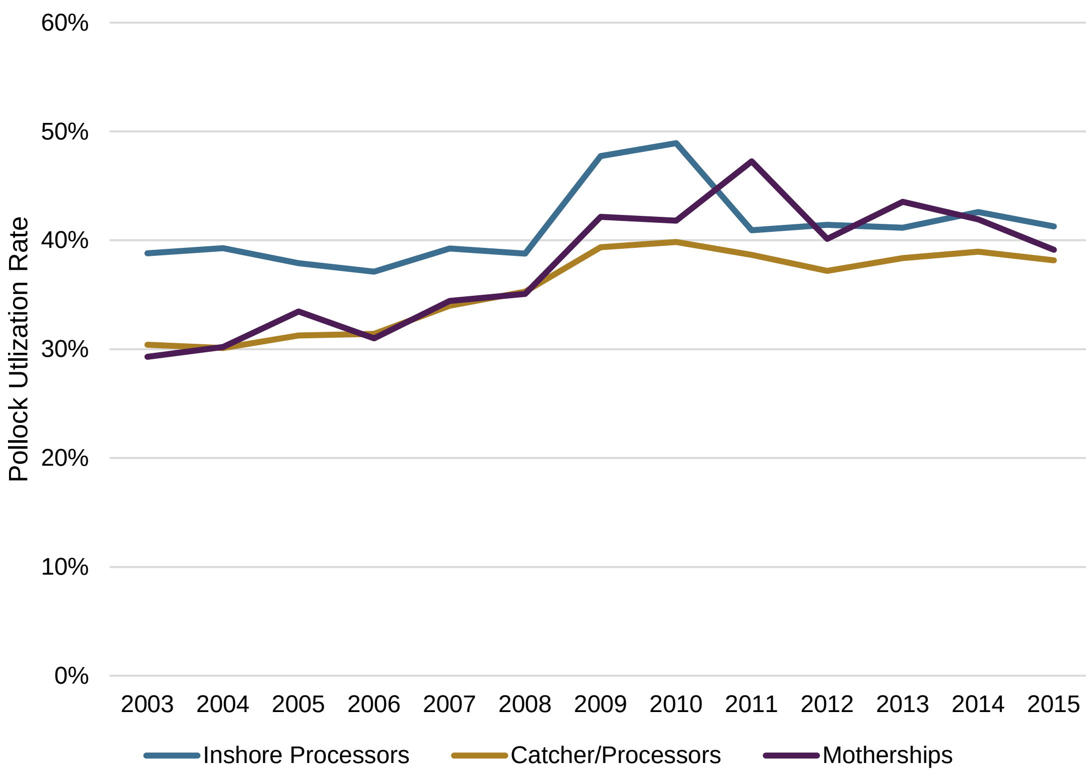


Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

9.2 Utilization Rate

Amendment 49 also established a 15 percent minimum utilization rate with no restriction on product type beginning January 3, 1998 for pollock. However, a much higher utilization rate has been attained under the AFA. As noted above, slowing down the rate at which pollock is harvested was one of the results of the Act. Slowing down harvesting allowed vessels to be more size selective, with larger-sized fish providing higher yields. In addition, slowing the rate of throughput from harvesting activities permitted slower processing rates and more processing precision. The overall result is that processors are able to extract more useable products from the fish, thereby increasing the utilization rate. In 1999, the utilization rate was 36 percent in the inshore sector; 26 percent in the catcher/processor sector, and 21 percent in the mothership sector (North Pacific Fishery Management Council 2002). Figure 41 shows that the utilization rate followed an increasing trend for several years after AFA implementation. Yields increased significantly from 2008 through 2010 as the TAC for the BS pollock fishery was cut back and processors attempted to maximize recovery rates from a smaller harvest (National Marine Fisheries Service 2016a). Utilization rates declined after 2010 or 2011 as the TAC rebounded but are substantially higher than levels seen before 2009.

Figure 41. Utilization Rate in the Bering Sea Pollock Fishery, by AFA Sector, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

10 Product Types and Markets

This section examines the effects of the AFA on pollock products, including product types, product branding, and product markets. The Council's 2002 report on AFA impacts provided limited information on pollock products and prices. Consequently, the current review discusses the pre- as well as post-AFA periods.

The cooperatives created by the AFA are harvest-only agreements among fishermen. Cooperative members are prohibited by federal antitrust laws from coordinating processing, marketing, or sales activities (Sullivan 2000). However, by giving cooperative members more certainty about a share of the BS pollock quota, the cooperative agreements largely stopped the competition for fish. Rather than attempting to maximize catch and throughput, fishing companies could focus on maximizing revenues through optimizing the product mix, capitalizing on the marketing value of being a well-managed fishery, increasing global markets, and increasing utilization of fish (Strong and Criddle 2013). The sections in this chapter describe the first three of these AFA benefits; increased utilization is discussed in Section 9. The information presented draws on several studies of the changes in efficiency and productivity growth in the BS pollock fishery arising from the AFA, including Strong and Criddle (2014), Wilen and Richardson (2008), Morrison Paul et al. (2009), Fell (2008), and Felthoven (2002).

The discussion of the product and market effects of the AFA is prefaced by a brief description of each of main types of products derived from pollock.

10.1 Overview of Pollock Products

Pollock is one of the world's most valuable fisheries due to its large volume, production versatility, and white, mild-flavored flesh (National Marine Fisheries Service 2016a). Because it is a fragile fish that deteriorates rather quickly after harvest, the amount sold fresh is negligible (National Marine Fisheries Service 2001a). Instead, pollock is processed into a variety of product forms, the most significant of which are fillets, surimi, and roe. Once these primary products are taken, the remainder of the pollock can be used for secondary products such as mince, fish meal, and fish oil. Northern Economics (2008) and National Marine Fisheries Service (2016a) provide a detailed account of these pollock products and their key markets. A summary description of the three primary pollock products is provided below.

Fillets. Pollock fillets are typically sold as frozen fillets and fillet blocks (compressed slabs of fillets used as raw material for value-added products such as breaded items, including nuggets, fish sticks, and fish burgers), either as pin bone-out fillets (also referred to as regular fillets) or deep-skin fillets. Deep-skin fillets are generally leaner and whiter than regular fillets and command a higher wholesale price. The two major sources of pollock fillets are the United States and Russia.

Pollock fillets are also produced in secondary processing facilities using frozen headed and gutted (H&G) pollock harvested and initially processed in the United States or Russia. Typically, the majority of H&G pollock is sent to China for secondary processing.[31] The frozen H&G fish are thawed, processed into fillets, and then re-frozen, thereby creating what is known as twice-frozen fillets. In contrast, most pollock caught in the BSAI fishery is processed immediately into fillets or fillet blocks, producing what

[31] Transport costs to China can be offset by significant presentational and yield improvements achieved by use of a highly skilled labor force (EU Fish Processors' Association 2006; Stringer et al. 2011). This is in contrast to the need for mainly mechanical filleting and preparation by Alaska processors, with consequent yield loss. It is estimated that Alaska offshore processors require 69 percent more fish to produce the same quantity of pollock fillets as compared to Chinese processors (Ng 2007). To avoid paying high import duties and going through formal customs procedures, some Chinese processors process and store raw material delivered from overseas in a free-trade or "bonded" zone (Retherford 2007; Stringer et al. 2011).

is referred to as once-frozen fillets. Once-frozen and twice-frozen pollock fillets compete in most of the same markets, but once-frozen product sells at a premium due to its higher quality. Nearly all twice-frozen pollock fillets are re-exported to Europe, the United States, and elsewhere (Northern Economics 2008; National Marine Fisheries Service 2016a).

Surimi. Surimi is the generic name for a processed white paste made from pollock and other whitefish. In the case of pollock surimi, the fish are first filleted and then minced. Fat, blood, pigments and odorous substances are removed through repeated washing and dewatering. Cryoprotectants, such as sugar and/or sorbitol, are then added to maintain important gel strength during frozen storage. The resulting surimi is an odorless, high protein, white paste that is an intermediate product used in the preparation of a variety of seafood products (Northern Economics 2008). Pollock is one of the most valuable species for surimi production because of its good gelation properties, desirable odor, white color, and good cooking tolerance. Most pollock surimi is produced for Asian markets, with Japan being the single largest buyer. The United States is by far the leading country providing pollock surimi to the Japanese market (National Marine Fisheries Service 2001a).

Roe. Pollock roe is extracted from the fish after heading, separated from the other viscera, washed, sorted, and frozen. After the roe is stripped from the pollock, the fish can be further processed into surimi or fillets (National Marine Fisheries Service 2001a). The best time for harvesting pollock for roe production is in winter, just before the pollock spawn, which is when the eggs are largest. Most U.S. pollock roe production is from the A season, when yields are significantly higher. Pollock roe is an export product, with nearly all the product being consumed in Japan in various forms. Roe typically has the highest profit margin per unit of production of any pollock product, although prices have fallen with declining demand for pollock roe as a gourmet gift (Northern Economics 2008; National Marine Fisheries Service 2016a). The United States and Russia are the two primary sources of pollock roe.

10.2 Product Mix

This section describes the effects of the AFA on the ability of AFA members to adjust product mixes in response to market conditions. Changes in the production of both primary and secondary pollock products are discussed. In addition, the limits to the ability of processors to make short-term changes in product mix in the post-AFA era are described.

10.2.1 Primary Products

At the time the AFA was implemented, each processing sector (catcher/processors, motherships, and inshore) in the BS pollock fishery focused on producing a different array of pollock products. Motherships produced no fillets, just surimi, roe, fish meal, mince, and fish oil (National Marine Fisheries Service 2002). Like catcher/processors, motherships enjoy the advantage of being able to move with the fish, so catcher vessels that deliver to motherships deliver fresher fish than catcher vessels that deliver to shoreside processors in the inshore sector. Access to fresh fish helps motherships produce high quality roe and surimi that command premium prices (Strong and Criddle 2013). Shoreside processors in the inshore sector historically produced relatively few fillets, focusing instead on surimi, together with roe, fish meal, and mince. Inshore floating processors produced fillets, roe, fish meal, and mince, but limited amounts of surimi (National Marine Fisheries Service 2002).

The catcher/processor fleet had two fairly distinct components: the surimi catcher/processors, which produced a combination of surimi and fillets, and the fillet catcher/processors, which concentrated on fillet product. Both components also produced roe, while the ability to process secondary products such as fishmeal varied from vessel to vessel (National Marine Fisheries Service 2002; Strong and Criddle 2013).

The surimi catcher/processors were equipped with full processing facilities below the main deck, containing multiple lines of both surimi and fillet producing machinery (Sullivan 2000). While the fillet lines allowed these vessels to produce higher-valued fillet product from larger fish (National Marine Fisheries Service 2002), most vessels focused on surimi production, which is quicker and less labor intensive than fillet production. Moreover, it was easier and cheaper to find large schools of small fish suitable for surimi production (Strong and Criddle 2013).[32]

Fillet catcher/processors were typically smaller than their surimi counterparts. They produce fillets exclusively (except for roe and mince products), and therefore targeted larger pollock. The primary product of this fleet is deep-skin, boneless fillets which are sold to various markets, including U.S. fast food and grocery markets (National Marine Fisheries Service 2002). The ability of surimi catcher/processors to adapt to different size fish and market conditions gave them a significant advantage over fillet catcher/processors under pre-AFA race-for-fish conditions. As a result, fillet catcher/processor production peaked at 424,000 mt of groundfish in 1991 and steadily declined to 82,500 mt by 1999. Due to their operational disadvantages, eight of the nine vessels scrapped by the American Seafoods in concert with AFA implementation were fillet catcher/processors (Strong and Criddle 2013).

During debate on the AFA, concerns were voiced that the supply of fillets might be inadequate because fillet catcher/processors were being removed from the offshore sector, and the shoreside processors, which, as noted above, produced mainly surimi, was receiving a higher portion of the allowable catch. Section 213(e) of the AFA required the U.S. General Accounting Office to report by June 1, 2000, on whether the Act had negatively affected the market for pollock fillets, including any reduction in their supply.

The final report issued by the U.S. General Accounting Office concluded that the AFA had a positive effect on the production of pollock fillets by catcher/processors (U.S. General Accounting Office 2000). This positive effect is depicted in Figure 42, which shows that production of BS pollock fillets by the offshore sector steadily increased before leveling off in 2003. According to the U.S. General Accounting Office report, increased fillet production resulted in part from the AFA's structure for creating cooperatives. With the ability to coordinate a slower fishing pace, catcher/processors could take additional time to fish selectively for schools of larger fish (Sullivan 2000). In addition, many catcher/processors decided they could invest in additional fillet-producing equipment and increase fillet production to take advantage of the high fillet prices during the early 2000s caused by a sharp drop in Russian production of pollock (U.S. General Accounting Office 2000).[33]

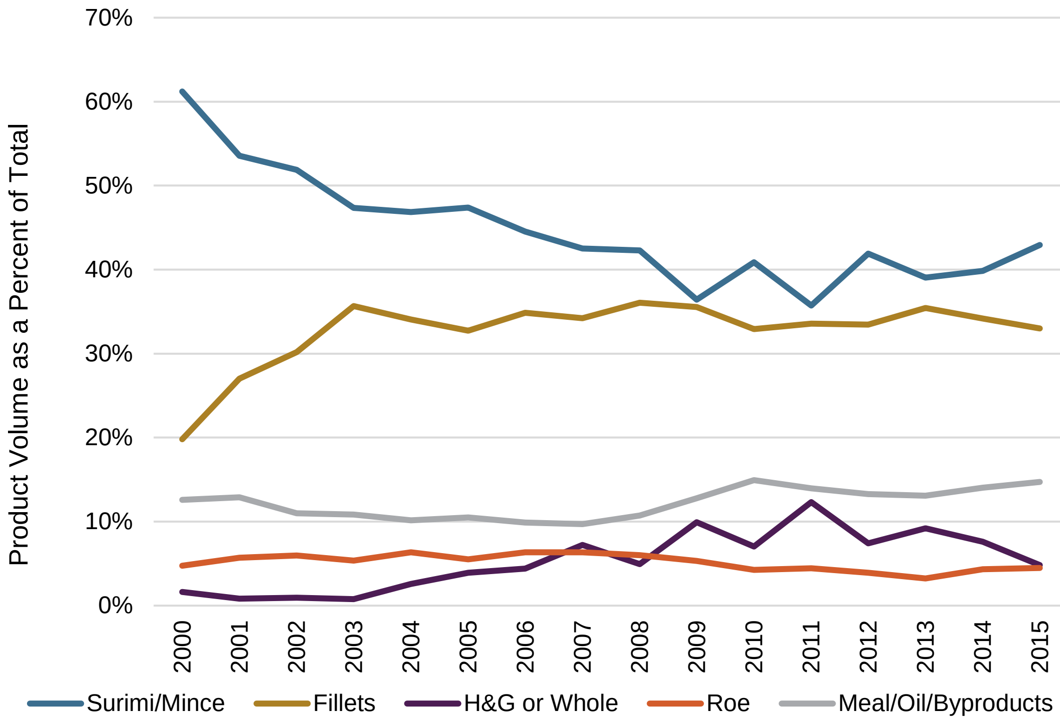
Figure 42 shows that surimi represented a declining percentage of total offshore product volume as the demand for fillets increased. However, with the exception of those years (2008–2010) when the BS pollock TAC was significantly cut (Section 4), surimi production in absolute terms has remained fairly steady due to a significant increase in yields in surimi processing that occurred from 1999 onward. Under the AFA, processors have the time to produce as much "recovery-grade" surimi as possible

[32] Age-3 and age-4 pollock, which average 345 to 548 g, are considered ideal for producing surimi. Pollock larger than 750 g tend to yield lower-grade surimi because their flesh strength declines. Larger fish are best for producing fillets (Strong and Criddle 2014).

[33] The Russian pollock catch in the Sea of Okhotsk increased to 1.6-1.7 million tons per year in the 1980s-1990s, and a historical high catch of 2 million tons was registered in 1996. Thereafter, the catch began to decrease rapidly as a result of overfishing, and by 2002, it had fallen to approximately 500,000 tons (Pollock Catchers Association 2012).

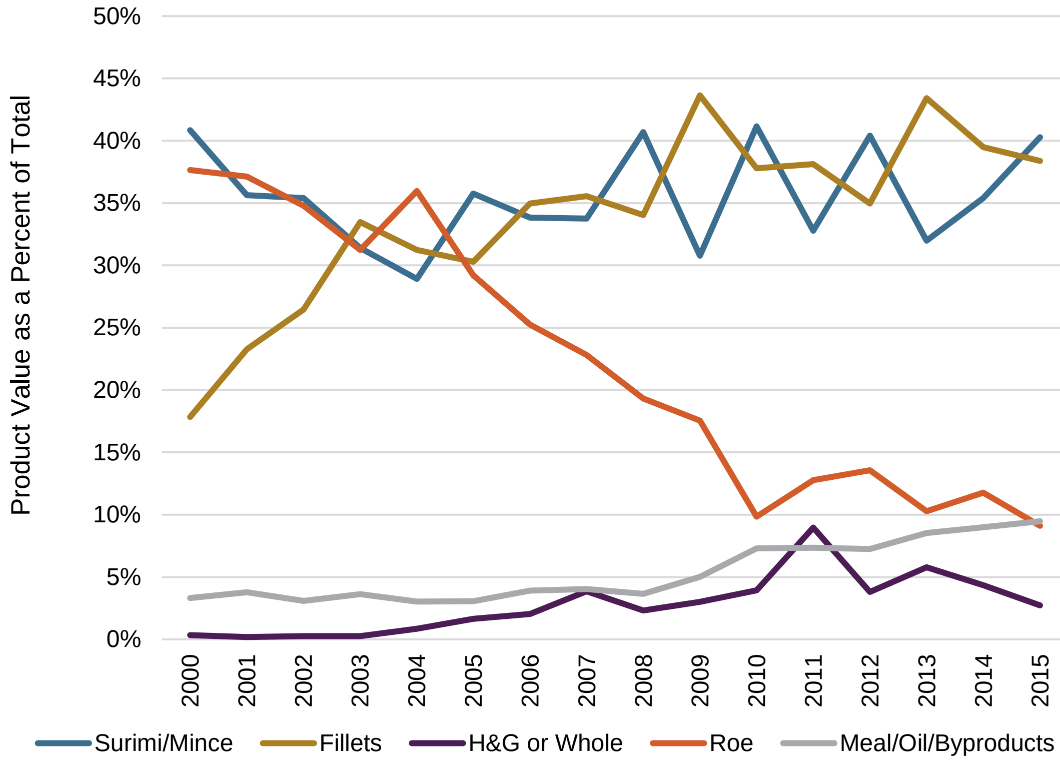
through better cutting of the fish and the recovery of meat from the frames and washwater (Strong and Criddle 2014). As shown in Figure 43, the percentage of total offshore product value represented by surimi has fluctuated, as the price of Alaska-produced pollock surimi can vary widely from year to year depending on global surimi market conditions (National Marine Fisheries Service 2016a).

Figure 42. Product Mix of the AFA Offshore Sector in Terms of Wholesale Product Volume, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 43. Product Mix of the AFA Offshore Sector in Terms of Wholesale Value, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

The post-AFA era also saw an increase in the production of H&G pollock by the offshore sector (Figure 42). One catcher/processor that produced H&G product was not listed in the AFA, but met the minimum historic harvest level to qualify under the AFA. In addition, after passage of the AFA, two AFA motherships invested in equipment that allowed them to produce frozen H&G product. Generally, most of this product is sold into China where it is further processed and marketed as twice-frozen fillets. While there may be a number of reasons for the increase in H&G product, perhaps the most important is that the price premium that once-frozen fillets have over twice-frozen fillets has declined; in 2007, it was 35 percent; by 2015, it was only 18 percent (Kearns 2015; National Marine Fisheries Service 2016a). The spike in the production of H&G product in 2011 may have been a result of the cut in the BS pollock fishery TAC that occurred a couple of years prior. The decline in supply led to a sharp increase in the price of once-frozen fillets from Alaska, which prompted buyers to switch to cheaper twice-frozen fillets. The strong demand for twice-frozen fillets caused some AFA offshore processors to increase production of H&G product until the TAC increased and the market for once-frozen fillets recovered (Seaman 2013; Knapp 2016).

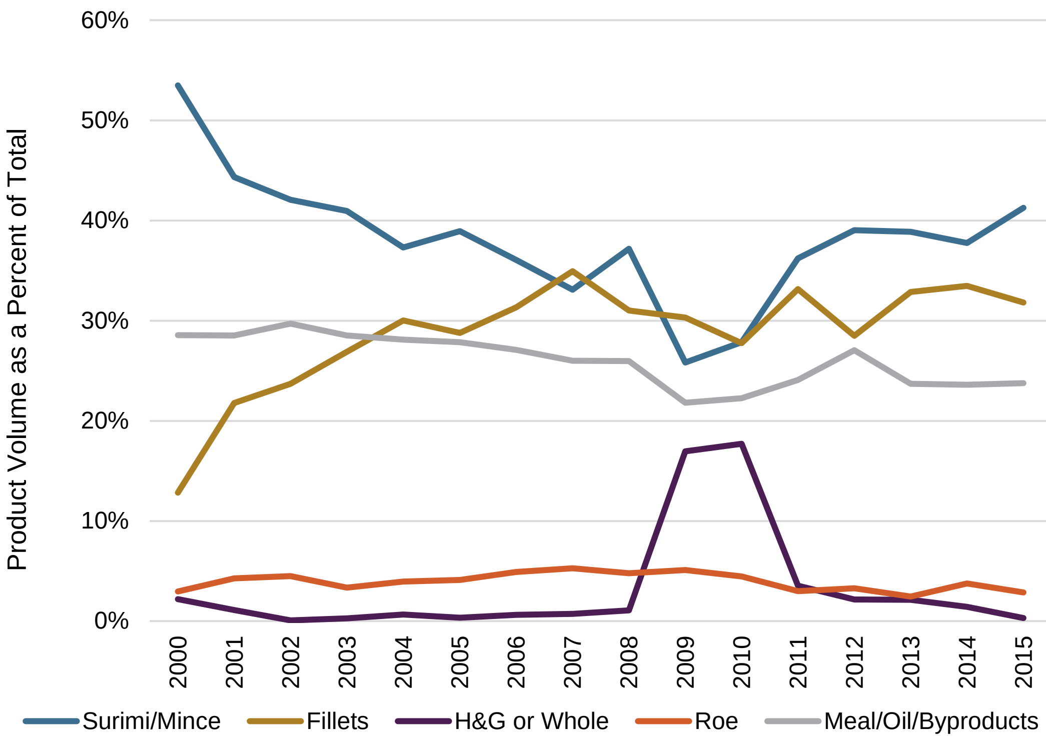
With respect to the mix of primary products in the inshore sector, the 2000 report by the U.S. General Accounting Office found that the sector started producing large quantities of pollock fillets for the first time in 2000.[34] As the percentage of total product volume represented by fillets increased (Figure 44),

[34] Because three of the four major shoreside processors are subsidiaries of Japanese seafood conglomerates that control a sizeable percentage of the Japanese surimi market, there were questions as to how responsive their product mix would be to market prices. However, modeling results suggest that shoreside processors became more price-responsive in the production of fillets as well as surimi after AFA (Fell 2008).

fillet production by the inshore sector rose from 23,400 mt in 2000 to nearly 79,000 mt by 2007. As with the catcher/processors, the inshore sector stated that the end of the competition for fish was one factor encouraging them to add fillet-producing equipment and increase their production of fillets (U.S. General Accounting Office 2000). By slowing down fishing, catcher vessels could spend more time searching for fish of the desired size, and the focus of shoreside and floating processors on fillet production made it worthwhile for catcher vessels to deliver partial loads of large fish (Strong and Criddle 2013).

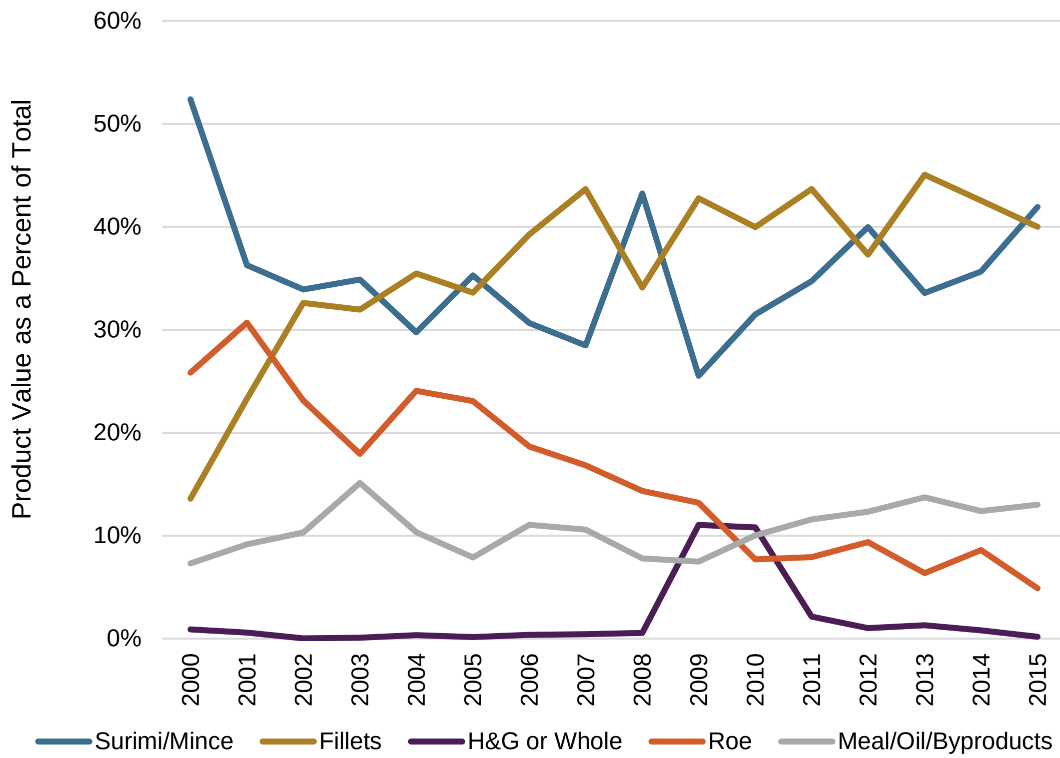
Similar to the offshore sector, surimi represented a declining percentage of total inshore product volume as fillet production increased (Figure 44), and the percentage of total inshore product value represented by surimi has fluctuated with changing prices in the world market (Figure 45). As with the offshore sector, the sharp increase in the production of H&G product by inshore processors in 2009 and 2010 may have been a result of the low demand for relatively expensive once-frozen fillets when the BS pollock fishery TAC was cut.

Figure 44. Product Mix of the AFA Inshore Sector in Terms of Wholesale Volume, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 45. Product Mix of the AFA Inshore Sector in Terms of Wholesale Value, 2000–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Aside from fillets and surimi, AFA also affected the production of pollock roe. Pollock roe production is primarily a function of overall harvest volume; however, it can also fluctuate significantly based on roe yields, which are dictated by harvest timing and fish size (National Marine Fisheries Service 2016a). After passage of the AFA, vessels were able to achieve higher roe recovery rates through an increased ability to time their fishing activity to coincide with periods of peak roe recovery and through an increased ability to selectively target schools of large mature pollock (68 FR 40812, July 9, 2003). In addition, under the AFA, fishing effort was spread out over time as vessels made fewer tows per day and limited the amount of pollock harvested per tow (Sullivan 2000). Smaller tows allow vessels to more closely match harvesting rates to optimal processing rates and reduce damage to the fish, thereby contributing to improved roe quality (Strong and Criddle 2013). In both the offshore and inshore sectors, pollock roe production between 1999 and 2007 was significantly higher than in pre-AFA years, reflecting both an increase in pollock harvests as well as an increase in pollock roe yields (Northern Economics 2008).

In terms of the percentage of total product volume represented by roe, the trend has been fairly flat in both the offshore and inshore sectors (Figure 42 and Figure 44). However, the percentage of total product value represented by roe shows a declining trend because of falling prices (Figure 43 and Figure 45). Demand for pollock roe in Japan appears to be falling and more is being sold at grocery stores than at specialty shops. Although similar quantities of pollock roe continue to be consumed, the market clearing price has dropped precipitously (Strong and Criddle 2014). Additionally, the supply of pollock roe from Russia has increased, which has placed additional downward pressure on prices (Fissel 2016). In 2000, the wholesale price of a pound of roe from Alaska-harvested pollock was around $16.70; by 2015, the price had dropped to about $2.20.

10.2.2 Secondary Products

In addition to affecting the production of primary pollock products, AFA was an important factor in the production of secondary products made from processed fish (mince and fish meal from fillet trimmings and carcasses, and fish oil). Recovery processes require specialized machines that remove head meat from filleted carcasses and process-water decanters that scavenge protein fibers from wash-water streams. In addition to requiring a significant investment, these machines require space and are time- and labor-intensive. Under the race-for-fish, there was little opportunity to operate secondary recovery processes efficiently, and most companies found it difficult to justify spending the money.

Passage of the AFA coincided with the imposition of improved retention and utilization requirements under Amendment 49 (Section 9). By prohibiting catcher/processors from dumping pollock carcasses overboard after extracting flesh portions used in fillets and surimi, these requirements compelled vessels to make production of secondary products an integral part of processing (Felthoven 2002).[35] Once AFA enabled catcher/processors to coordinate a slower fishing pace, it became more cost-effective for them to meet the new mandate. Minced pollock and fish meal production increased from a better matching of offal flows to meal-plant capacities (Wilen and Richardson 2008). In addition, one of the operational benefits under the AFA is that B season catches can be delayed to late summer or early fall when fish oil content as well as fillet yields are higher. Fish oil can be utilized as fuel in hybrid diesel electric engines, allowing significant fuel savings by catcher/processors (Strong and Criddle 2013). Although secondary products have low unit values, the high volumes of pollock harvested have made improvements in the recovery of these products of significant economic importance (Wilen and Richardson 2008).

The production of fish meal and fish oil from BS pollock significantly increased after implementation of improved retention and utilization requirements and passage of the AFA. Using oil production per ton as a basic index (tons of oil per ton retained catch), Table 13 shows the increases in fish oil production by offshore processors. The 2005–2007 average was 0.3 percent, and starting in 2008, it increased and leveled off around 2010 with a little over 1.5 percent of the catch being converted to fish oil (Table 12). This represents about a 5-fold increase in recorded oil production during this period. Oil production from inshore processors was somewhat higher than the offshore processors before 2008 but has been relatively stable according to available records. Oil production estimates from inshore processors may be biased low because some production occurs at secondary processors (fishmeal plants) in Alaska. The increased production of oil beginning in 2008 can be attributed to the steady trend to add more value per ton of fish landed (Fissel 2016).

Table 13. Bering Sea Pollock Fish Oil Production Index (Tons of Oil per Ton Retained Catch), 2005–2015

	2005–2007 average	2008–2010 average	2011	2012	2013	2014	2015
All AFA Processors	1.26	2.04	1.79	1.61	1.90	2.20	1.85
Inshore Processors	2.07	2.58	2.00	1.89	2.11	2.42	1.94
Offshore Processors	0.31	1.42	1.54	1.30	1.67	1.95	1.73

Source: Fissel (2016)

[35] In 1991, the practice of stripping roe from female pollock and discarding the carcasses without further processing was prohibited by Amendment 14 to the BSAI groundfish FMP.

10.2.3 Processing Plant Upgrades

All active AFA catcher/processors are now equipped to produce either surimi or fillets and can switch-out processing lines in response to which product price is higher (Morrison Paul et al. 2009). In addition, most active catcher/processors currently have the ability to produce fish meal. Upgrading and retro-fitting existing shore-based facilities and vessel platforms has allowed processors to diversify their product mix and thereby take advantage of the enhanced flexibility to respond to prevailing market conditions. This ability to adjust product mixes and production improves the bottom line (Northwest Farm Credit Services 2016).

As discussed in Section 2.5, the Coast Guard Authorization Act of 2010 expanded the opportunities for an owner of an AFA catcher/processor, catcher vessel, or mothership to rebuild or replace a vessel to take advantage of new vessel designs and improved technology that would increase the operational efficiency and production capacity of the vessel. The original AFA included provisions that limited the length, size, and horsepower of rebuilt or replacement vessels. The Coast Guard Authorization Act amended the AFA so that rebuilt or replacement vessels were not subject to these limitations while participating in the BS pollock fishery.

Specific examples of AFA processors adding new equipment intended to broaden product ranges and provide greater flexibility to adjust production levels to meet changes in the marketplace are listed below. Some of these capital investments were facilitated by the Coast Guard Authorization Act of 2010, while others occurred prior to, or otherwise independently of, the vessel upgrade opportunities afforded by the Act.

- The owners of the mothership *Golden Alaska* invested in an $8 million upgrade in 2008 to transform the vessel into a flexible operation able to process H&G product, fillets, mince, surimi, fishmeal, and fish oil. With this upgrade, the vessel can profitably operate with only 60 percent of the raw fish previously required to maintain daily operations (Strong and Criddle 2013). In addition, the vessel has recently started producing a new product—individually wrapped portions of pollock, which will be sold to restaurants and to Zaycon Fresh, a company bringing food direct from producers to U.S. consumers (Wietecha and Seaman 2015).
- In 2004, the owners of the mothership *Ocean Phoenix* spent $10 million on new equipment to switch to H&G product (Strong and Criddle 2014).
- In 2015, partially in response to a weak market for fillets, the owners of the catcher/processor *Starbound* added a 60-foot midsection to the vessel. In addition to accommodating a new fish meal and fish oil plant, the extension expanded the vessel's ability to produce higher grade surimi. Previously, the vessel produced only recovery grade surimi (Wietecha 2015).
- In 2016, the owners of the mothership *Excellence* expressed interest in renovating the vessel within the next two years to allow it to produce fillets (Wietecha and Seaman 2015).
- Recently, the catcher/processor *Alaska Ocean* upgraded its fishmeal production capabilities to a state-of-the-art plant, capable of fully utilizing all processing waste and producing an additional 40 metric tons of fishmeal and 8,000 gallons of fish oil per day (Glacier Fish Company 2015).

10.2.4 Limitations to Product Mix

Although AFA significantly enhanced the flexibility of AFA processors to respond to changing market, there continue to be limits to the ability of processors to make short-term changes in product mix. One limitation applies to switching between fillets and surimi production. Trimmings, along with small fish, can be used to produce surimi but cannot be shifted into fillets. Consequently, no matter what the price differential is, a portion of the total recovery will invariably go into surimi (Strong and Criddle 2014) or minced products. Product flexibility is also limited by long-term contracts, which can constrain processors from responding to short-term changes in demand. In addition, a majority of their Alaska pollock fillet output is presold and thus unresponsive to short-term price fluctuations (Strong and Criddle 2014). AFA may have fostered these contracts by essentially guarantying vessel owners a share of the pollock catch each year, which decreased supply uncertainty to their customers and allowed them to develop longer-term contracts for specific product forms (Morrison Paul et al. 2009).

In addition, technical constraints may place limits on the interchangeability of processing lines. Processors typically maintain dedicated processing lines devoted to surimi or fillets, as well as processing lines that can be switched between surimi and fillet production. Some minimum amount of pollock must be processed through the surimi lines to avoid shutdown or reductions in surimi quality. Further, time spent in refrigerated fish holds aboard catcher vessels affects flesh recovery and product quality; thus, increased travel distances from fishing grounds, especially in the B season, negatively impact flesh recovery in shoreside processors and lead to an increase in surimi production relative to fillet production (Strong and Criddle 2014).

It is also important to note that because the BS pollock fishery faces a cap on the catch of Chinook salmon (Section 2.6), together with fixed and dynamic spatial closures intended to reduce the catch of other species, the fishery may be constrained from fishing in areas with preferred sizes of pollock (Strong and Criddle 2014).

10.3 Product Branding

The cooperative management structure implemented by the AFA has also benefited the BS pollock fishery by fostering a new spirit of collaboration among fishery participants. Under the race-for-fish, companies were in constant competition with each other, but since implementation of the AFA, pollock operations have been more willing to work together for the benefit of the fishery as a whole. An important example of this collaboration was seeking sustainable seafood certification for the BS pollock fishery under the standards of the Marine Stewardship Council (MSC) (Strong and Criddle 2013).[36]

This section discusses the fishing industry's involvement in certification of the BS pollock fishery by both the MSC and Alaska Responsible Fisheries Management (RFM) Certification Program, together with the perceived product marketing benefits of the two programs. In addition, collaborative efforts by industry to further differentiate their products in markets are described.

10.3.1 Marine Stewardship Council Certification

The MSC certification program is the world's leading seafood sustainability certification program. It uses a third party to review the current condition and management of a fishery. Fisheries that meet the certification criteria are authorized to mark their products with the MSC logo.

[36] The following passage from Foley and Hébert (2013) underscores the importance of social and economic relations in the MSC certification process: "It is critical to recognize that the 'voluntary' enrollment of fisheries and commodities into the MSC certification and labeling regime is not only a technical and scientific process, but also a social process that entails new economic and organizational relationships. At the outset, someone has to define what fishery or group of commercial fishery participants is to be assessed as part of a unit of certification, determine eligibility for certification, and organize fishery participants into an applicant group."

In 2000, the Unilever Corporation, a co-founder of the MSC, approached the At-sea Processors Association about applying to have the BS pollock fishery assessed against the MSC sustainability standard. At the time, Unilever was one of the largest whitefish buyers in the world, owning such popular brands as Gorton's, Iglo, and Birds Eye. Unilever was committed to sourcing seafood from proven sustainable fisheries, and Alaska's pollock fishery was one of the world's largest fisheries and at that time an important component of Unilever's fish supply (Gilmore 2008). With the support of other AFA members, the At-sea Processors Association began the arduous and costly MSC certification process in 2001 (Strong and Criddle 2013).[37] The AFA's beneficial economic and biological impacts to the BS pollock fishery figured prominently in the third-party assessment of the fishery. The three-person team of outside experts that participated in the assessment expressed concern that the AFA did not undergo an environmental review before its enactment, but it concluded that "there is no doubt that the Bering Sea fisheries can be managed with extraordinary precision, a remarkable achievement given the scale and intensity of the fishery…The team recognizes that the risk of future such exceedances [of catch limits] may have been pushed to de minimis levels by the provisions of the AFA that, in effect, ended the 'race-for-fish'" (Scientific Certification Systems 2005).

The BS pollock fishery was certified as a "well managed and sustainable fishery" by the MSC in 2005 (and re-certified in 2010 and 2016). Each AFA catcher/processor, catcher vessel, and mothership, or the company that owns and operates such vessels, participates in the MSC's product traceability program in which independent chain-of-custody auditors review production processes and records to confirm that a supplier can track products back to a certified fishery (MRAG Americas 2015). By 2007, there were 167 different Alaska-origin pollock products bearing the MSC ecolabel being marketed in 12 countries, predominantly in Europe (Gilmore 2008).

The marketing advantages of MSC certification were acknowledged by Jim Gilmore, public affairs director of the At-Sea Processors Association, as follows:

> We entered this programme because we believed we met the MSC standard, but what the MSC does, through its third-party validation, is provide an added assurance—and recognition in the seafood community—that it is a well-managed fishery. It gives us enhanced visibility…I know that our member companies have kept customers as a result of MSC certification, and have broadened their customer base in Europe and the UK because of it. There is no doubt about it—there are benefits (Marine Stewardship Council 2009).

In addition to providing Alaska-origin pollock products preferential access to European and North American markets, MSC certification allowed Alaska producers of pollock to exact a price premium over noncertified, but otherwise comparable product (Strong and Criddle 2013).

10.3.2 Alaska Responsible Fisheries Management Certification

Consumers were provided additional assurance that pollock caught in state and federal waters off the coast of Alaska are harvested in a sustainable manner in 2011, when the BSAI and GOA pollock fisheries were awarded a designation of "certified responsible fisheries management" by the Alaska RFM Certification Program. The Alaska Seafood Marketing Institute, a public–private agency created under state law as a public corporation to serve as Alaska's seafood marketing arm, developed the Alaska RFM

[37] According to Gilmore (2008), one reason that the MSC assessment process for the BSAI pollock fishery was particularly lengthy and expensive was because environmental advocacy organizations sought extensions of deadlines at virtually every stage of the process and appealed against the final certification determination of the assessment team.

Certification Program in 2010 to provide cost-effective third-party certification of the management of the major Alaska commercial fisheries (Alaska Seafood Marketing Institute 2016).[38] The program was the first seafood certification program to achieve recognition by the Global Sustainable Seafood Initiative's Global Benchmark Tool, which is based on the United Nations Food and Agriculture Organization's Code of Conduct for Responsible Fisheries and Guidelines for Ecolabelling of Fish and Fishery Products from Marine/Inland Capture Fisheries (Global Sustainable Seafood Initiative 2012).[39]

The applicant for initial certification was the Alaska Seafood Marketing Institute, which contracted Global Trust Certification, an accredited certification body based in Ireland, to conduct the assessment for Alaska's pollock fisheries. The applicant for the fourth annual audit completed in 2016 was the Alaska Fishery Client Group, which consists of the Pacific Seafood Processors Association, At-sea Processors Association, and Alaska Groundfish Data Bank. As was the case during MSC certification, the team formed to undertake the original assessment of Alaska's pollock fisheries under the Alaska RFM Certification Program highlighted the conservation and economic benefits of the AFA in its report (Global Trust Certification 2011).

Stephanie Madsen, executive director of the At-Sea Processors Association, cited the association's desire "to allow for customer choice" as the primary reason it supported both the Alaska RFM Certification Program and MSC certification program (IntraFish Media 2014).

10.3.3 Association of Genuine Alaska Pollock Producers

In 2013, the Russian Sea of Okhotsk pollock fishery also achieved MSC certification.[40] There remain differences between the products that Russian and U.S. pollock fisheries bring to market, with most Alaska-caught pollock being once-frozen and most Russian product being twice-frozen. Twice-frozen pollock fillets, most of which are processed in China, have traditionally been considered the lowest grade of fillets and have sold at a discount. However, as discussed in Section 10.2.1, the price premium that once-frozen fillets had over twice-frozen fillets has declined.

The fact that nearly 40 percent of pollock marketed to U.S. customers is Russian pollock is an indication of the domestic market competition faced by Alaska producers of pollock (Kearns 2015). The only alternative for AFA members has been to try and differentiate their product even further in the consumer's mind. These efforts have been led by the Association of Genuine Alaska Pollock Producers (GAPP), an industry trade association formed in 2003 that represents major Alaska producers of pollock,

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[38] The costs associated with maintaining MSC certification and the associated ecolabel licensing fees were the main reason behind the Alaska Seafood Marketing Institute's decision to provide an alternative certification program. There is no consumer-facing logo (and no logo licensing fees) associated with the Alaska RFM Certification Program. Moreover, Alaska Seafood Marketing Institute representatives noted that MSC certification was important in certain markets, such as retail markets in Europe, but not in other markets, and that its certification program allowed it to maintain Alaska stakeholder control of messaging and to communicate what it perceived to be a well-established historic reputation of sustainability of Alaska's fisheries (Foley and Hébert 2013; Foley and Havice 2016).

[39] In 2016, the MSC certification program also applied for benchmarking under the Global Sustainable Seafood Initiative standard, and it is expected to be accepted in 2017 (Sackton 2016a).

[40] MSC certification of Russia-harvested pollock was encouraged by buyers committed to supplying European markets with MSC-labeled products. These buyers were concerned about a shortage of fish due to cutbacks in the U.S. TAC for BSAI pollock during the late 2000s (Sackton 2008a). The Russian Pollock Fisheries Improvement Partnership, which included large seafood producers such as BAMR-ROLIZ, BirdsEye-Iglo Group, FRoSTA, Royal Greenland, FoodVest, Pickenpack, Delmar, High Liner and the Fishin' Company, brought together resources and expertise to support the Russian Pollock Catchers Association in their efforts to meet the requirements of the MSC (Sackton 2008b).

including both offshore and inshore operations, and is dedicated to the marketing of once-frozen pollock products harvested and processed in Alaska (Association of Genuine Alaska Pollock Producers 2016). One challenge the GAPP focused on was that pollock from both Russia and Alaska were sold in the United States under the name "Alaska pollock," making it impossible for consumers to determine product origin and to make a choice between the two sources. The lobbying campaign by the GAPP to promote legislation requiring stricter labeling of pollock products was successful—in 2016, the U.S. Food and Drug Administration (USDA) amended its Seafood List to reflect a provision in the Consolidated Appropriations Act of 2016 that only pollock caught in Alaska state waters or the U.S. EEZ adjacent to Alaska can be labeled "Alaska pollock."[41]

The marketing advantages of the labeling statute were described by Pat Shanahan, program director for the GAPP, as follows: "With this new law, we will be able to associate the better quality and world class sustainability of Alaska pollock with a name that is truthful and easily recognizable for consumers. Hopefully, that will result in better seafood for consumers and better market conditions for our producers" (Kearns 2015).

Converging prices for once-frozen and twice-frozen fillets in European markets have prompted the GAPP to emphasize quality as a strategic point of competition. For instance, the association recently began a broad information campaign to improve German consumers' perceptions of Alaska-caught pollock and promote its Genuine Alaska Pollock® trademark (Sackton 2016b).

10.4 Product Markets

This section describes the reported shift in product destination, focusing particularly on fillets and surimi. Historically, the primary market for Alaska-origin pollock fillets was the U.S. foodservice industry (National Marine Fisheries Service 2001a). Since the passage of the AFA, the U.S. pollock companies have been able to turn their attention to new product markets as well as new product mixes. In particular, AFA members have focused on developing the European market for pollock products (Strong and Criddle 2013). Their efforts have been bolstered by the product branding strategies described above.

The following sections discusses the evolving markets for two primary products, fillets and surimi. The end markets for roe have not changed significantly since enactment of the AFA, with nearly all of the product still being exported to Japan and South Korea.

10.4.1 Fillets

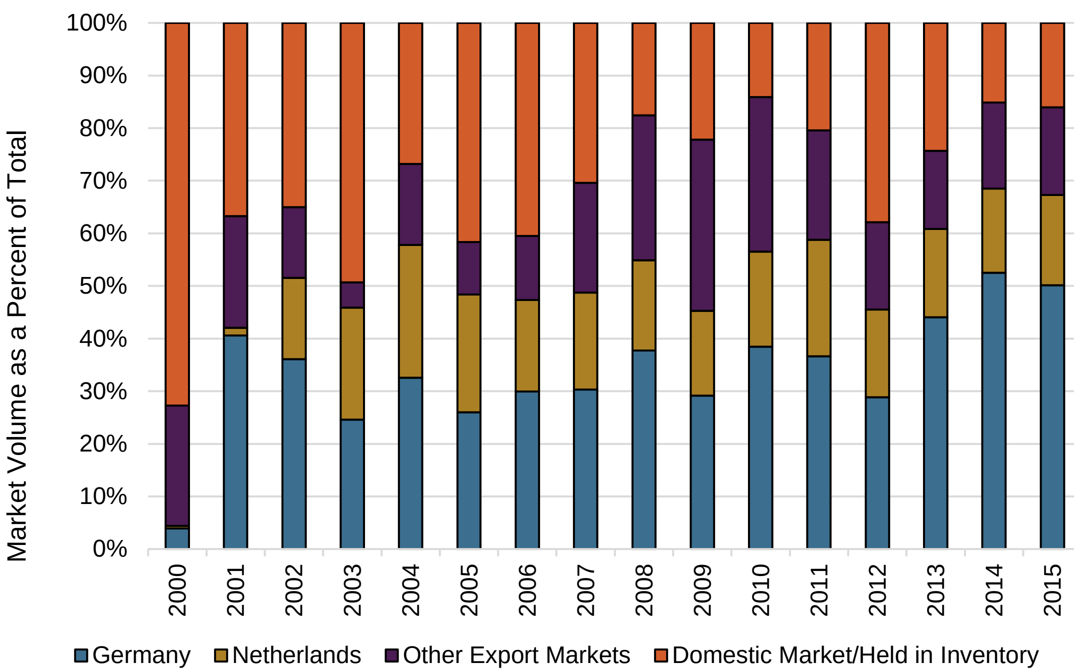
In the first years after passage of the AFA, the decline in Russian pollock harvests, together with declining catch quotas available for whitefish species in European Union waters and a weak U.S. dollar, provided AFA processors with a competitive advantage in implementing their strategy to increase their presence in European markets (American Seafoods Group LLC 2002). As discussed in Section 10.2.1, there was a dramatic increase in fillet production by AFA processors, and most of this product was exported to Europe.

[41] To give Alaskan producers of once-frozen fillets an additional marketing edge over twice-frozen fillets produced in China, the National Fisheries Institute plans to push for USDA enforcement of moisture content in labeling (Seaman 2016). Producers of twice-frozen fillets often use additives, such as sodium tripolyphosphate, to retain moisture in pollock fillets, but these additives can be misused, leading to sensory defects, texture deterioration, and the potential for charges of economic fraud due to dramatic increases in the ratio of water to protein (Aitken 1975; Lampila and Godber 2002).

European demand for Alaska-origin pollock fillets has increased over the ensuing years. As shown in Figure 46, the sales volume of pollock fillets exported to Europe exceeded the volume of pollock fillets retained in the United States for the first time in 2001 and has generally done so in every year since. The single most important export market for pollock fillets has been Germany. Another important European destination for Alaska-caught pollock is the Netherlands because it has two of Europe's leading ports (Rotterdam and Amsterdam) and is in close proximity to other countries in Western Europe; most product imported by the Netherlands is further processed and re-exported to other European Union countries (Chetrick 2007).

Europe is expected to remain a growing market for Alaska-origin pollock fillets because of consumer preferences shifting toward healthy, low-fat foods. In addition, AFA processors have been able to increase their market share in the European marketplace by capitalizing on the MSC certification of Alaska's pollock fisheries. Many retailers in Europe, especially the United Kingdom and Germany, will not carry seafood that does not have an ecolabel (Sackton 2007; Gruver 2009).

Figure 46. Fillet Markets of AFA Sectors, 2000–2015



Source: Developed by Northern Economics, Inc. using data from AKFIN (Fey 2016) and National Marine Fisheries Service (2016g)

10.4.2 Surimi

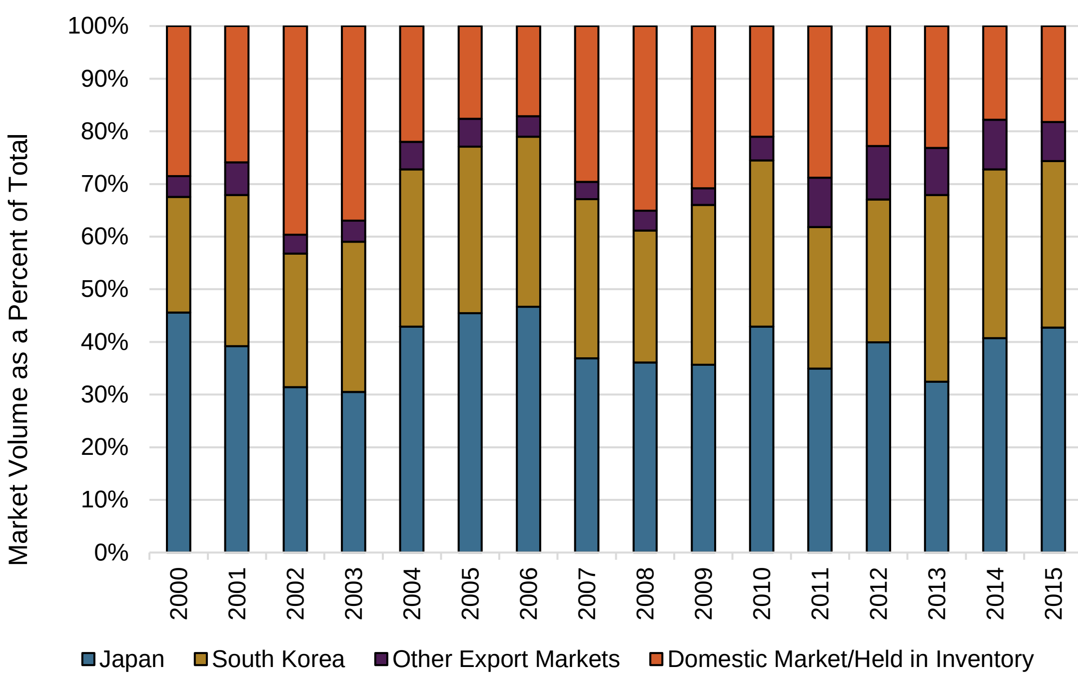
As noted earlier, pollock is the most valuable species for surimi production. Thus, it was mainly used for the higher-quality surimi before implementation of the AFA. However, as discussed in Section 10.2.1, AFA processors reduced the share of harvests going to surimi production as the demand for other product forms made from Alaska pollock increased. This reduction has been offset by the significant increase in recovery-grade surimi from fillet trimmings and washwater. Under the AFA, processors have the time to recover as much of these lower grades of surimi as possible.

Most high-grade pollock surimi continues to be sold to the Japanese market, leaving lower-grade surimi for sale to less-discerning markets. World demand for lower-quality surimi has allowed processors to market recovery grade or to blend it with primary grades to produce medium grade surimi (Guenneugues and Morrissey 2005). The surimi sold in domestic and European markets, as shown in Figure 47, consists mainly of recovery grades of pollock surimi.

It is important to note that Europe is a larger market than the export data in Figure 47 suggest, as it imports significant volumes of surimi from South Korea (containing Alaska-origin pollock as well as surimi made from other species) (National Marine Fisheries Service 2016a). Several factors played a role in the growing exports of pollock surimi to Europe, including seafood's popularity due to interest in healthy eating and the large variety of surimi-based convenience foods sold in the retail sector (Chetrick 2005). MSC program certification of the BS pollock fishery also increased sales of surimi products made from Alaska-harvested pollock. In 2007, Coraya, Europe's leading surimi brand, launched a range of MSC-labeled surimi products made from Alaska-harvested pollock (Marine Stewardship Council 2007). The growth in popularity of surimi products within Europe has freed pollock producers from being wholly dependent on the vagaries of the Japanese surimi market. The combination of less variability in pricing and demand allows for increased stability and for long-term planning that was unthinkable under the pre-AFA race-for-fish (Strong and Criddle 2013).

The pollock surimi purchased by the U.S. market is also of intermediate and recovery grades (Strong and Criddle 2014). As in Europe, changing food habits fueled the development of surimi consumption in the United States. The domestic surimi market received a boost in 2006, when the USDA began allowing surimi to be labeled as "crab-flavored seafood" or whatever seafood it is made to resemble, rather than as "imitation" (Ramseyer 2007). More recently, U.S. consumption of surimi has stagnated, and AFA processors, along with other members of the U.S. surimi industry, are taking steps to reverse this trend, focusing on product development and particularly on improving quality (Stewart and Seaman 2014).

Figure 47. Surimi Markets of AFA Sectors, 2000–2015



Source: Developed by Northern Economics, Inc. using data from AKFIN (Fey 2016) and National Marine Fisheries Service (2016g)

10.5 Summary

Under the AFA, pollock value has been distributed across a diverse set of product forms enabling processors to make marginal changes in production mix based on market prices and demand. The production of more valuable product forms, together with increased utilization rates, has contributed to the economic performance of the BS pollock fishery. Moreover, the flexibility in product choices provides a buffer against adverse shocks in any one product type.

The ability to diversify products and markets helps explain why the wholesale value of the BS pollock fishery has become less vulnerable to year-to-year changes in the TAC for the fishery—as the TAC changes, AFA processors respond by reallocating production to take advantage of differences in the elasticity of demand across product forms and markets (Strong and Criddle 2014). This ability to adapt was evident when the TAC was cut substantially from 2008 to 2010 as a precautionary measure to protect the fishery (Section 4). During those years there was approximately a 40 percent drop in the average annual harvest in comparison to what it had been over the previous seven years, while the average annual total product value fell by only 17 percent.

Currently, the BS pollock fishery is again facing significant economic headwinds. The continuing drop in pollock roe prices is a major reason for lower wholesale values in the fishery. In addition, wholesale prices for pollock fillets have declined in recent years due to a stronger U.S. dollar and increased fillet production by both Alaska and Russia (National Marine Fisheries Service 2016a). The overall stability made possible by the product diversification, market expansion, and increased utilization that followed implementation is expected to help AFA processors weather these poor economic conditions (Strong and Criddle 2014).

11 Sideboard Limits

By providing AFA vessel owners with fixed allocations and the ability to effectively consolidate or otherwise improve the efficiency of their Bering Sea pollock operations, the AFA could potentially have provided an opportunity for these vessel owners to expand into other fisheries that would not otherwise have been available. To limit these expansions, the AFA created harvesting limits, known as sideboards, on AFA vessels in non-pollock groundfish, crab, and scallop fisheries in the BSAI and GOA. Sideboard limits were also developed for prohibited species as were sideboard processing limits for BSAI crab species for all AFA processors. The sideboard limit amounts were calculated as percentages of the TAC based on the history of AFA vessels and processors in these other fisheries. The sideboards set forth in the AFA were further refined by the Council's recommendations for AFA catcher vessels and catcher/processors under Amendments 61/61/13/8 (Section 2.2). Because some catcher vessels that qualified under the AFA were much more focused on fisheries other than pollock, the Council added some exemptions to the sideboard harvesting limits—these exemptions will also be discussed in this section.

This section also serves to briefly discuss implications pertaining to AFA sideboard limits as a result of recent regulatory changes, including the passage of Amendments 80 and 85 (reallocation of Pacific cod) to the BSAI groundfish FMP, as well as Amendments 68 and 88 (Rockfish Pilot Program and Rockfish Program) to the GOA groundfish FMP.

It is important to emphasize that all sideboard fisheries are managed by NMFS through directed fishing closures. In general, NFMS will open a fishery for directed fishing if it determines that the annual harvest limit for any individual species is large enough to support directed fishing. In many instances however, directed fishing closures are made at the start of the season, and certain species are never available for directed fishing. If NMFS closes a species to directed fishing, i.e. the species is placed on a "Bycatch Only" status, then vessels may not retain that species at levels in excess of "maximum retainable amounts" (MRA), which have been set in regulation for each species.

NMFS takes a similar approach with respect to managing AFA sideboard limits for groundfish species. The agency makes an initial determination at the beginning of the fishing year, regarding the fisheries in which AFA vessels are likely to participate, based on historical participation, TACs, PSC limits, and other apportionments and regulations. For those species, NFMS actively manages sideboard limits; for the other sideboard species, NFMS closes the sideboard species to directed fishing by AFA vessels, typically at the beginning of the fishing year.

For sideboard fisheries for which they allow directed fishing, NMFS combines the AFA harvest of each sideboard species into the sideboard total regardless of whether the catch occurred in a directed fishery for that species, or if the catch was considered as incidental catch in another fishery. If AFA catch of a sideboard species that is open for directed fishing approaches the sideboard limit, NMFS will set aside an amount they estimate will be needed for incidental catch in other fisheries by AFA vessels for the remainder of the year, and then place that sideboard species on bycatch-only status, with retention allowed up to MRAs.[42] Sideboard fisheries that are closed to directed fishing by AFA vessels at the beginning of the year, or are closed to directed fishing for reasons other than the sideboard limit, are placed by NMFS on "bycatch-only" status. For these species, if incidental catch amounts in AFA sideboard fisheries combined with catch in other non AFA fisheries approaches the total allowable

[42] If NMFS underestimates the additional incidental catch of a sideboard species needed by AFA vessels in other target fisheries, NMFS could, by regulation, take the additional step of placing the species on PSC status, precluding any further retention of that species by AFA vessels. NMFS has never placed an AFA sideboard on PSC status.

catch, then NMFS could place these sideboard species on "PSC" status; otherwise AFA catch in these "bycatch-only" sideboards can accrue without limit.

11.1 Catcher Vessels

At the beginning of each year, NMFS sets separate sideboard harvest limits for catcher vessels and catcher/processors for non-pollock target species of groundfish and for all of the currently listed prohibited species. In selected fisheries, the sideboards are applied on a seasonal basis as well. The AFA catcher vessel cooperatives (including the inshore cooperatives, as well as the MFC and HSCC) divide the harvest limits among themselves, and each cooperative apportions its allocations among member vessels. Because the sideboard harvest limits apply to all AFA catcher vessels across the three AFA sectors, the Catcher Vessel IA was created to divide the limits among cooperatives, set penalties for exceeding the limits, and to monitor sideboard species transfers between cooperatives. Thus, the cooperative structure provides a mechanism by which AFA catcher vessels can manage the harvest of non-pollock species as well as their harvests of pollock.

It is important to note that for catcher vessels, the sideboard limits for both groundfish and prohibited species apply only to AFA vessels that are not exempt from the specific sideboard limits in question. Amendments 61/61/13/8 established two classes of exempted AFA catcher vessels: 1) those exempt from sideboard limits in the BSAI Pacific cod fishery, and 2) those exempt from sideboard limits in the GOA groundfish fisheries. In the sections that follow we will first discuss the sideboard limits, and then describe the exemptions to the limits.

11.1.1 Catcher Vessel BSAI Groundfish Harvesting Sideboards

Catcher vessel sideboards are established for all BSAI groundfish species (except pollock) using a formula based on the retained catch of all non-exempt AFA catcher vessels for each sideboard species from 1995 through 1997 (only 1997 for BSAI Pacific cod), divided by the available TAC during the same time period. For the BSAI, NMFS issues sideboard limits on 16 different groundfish species or species groups. Of these, AFA catcher vessels have historically only targeted two species—Pacific cod and yellowfin sole—fisheries for the remaining sideboard species have generally been closed to directed fishing by AFA catcher vessels at the beginning of the year. A summary of all AFA catcher vessel sideboard limit percentages and amounts in BSAI groundfish fisheries is provided in Appendix B.

Table 13 summarizes AFA catcher vessel participation in the BSAI Pacific cod and yellowfin sole sideboard fisheries from 2001 through 2015 using data provided by both catcher vessel intercooperative reports and inshore cooperative reports.[43] Aggregate catch includes both directed harvest and incidental harvest—both of which accrue against the sideboard limit. The BSAI Pacific cod fishery is the primary sideboard fishery in which AFA catcher vessels have historically participated. The sideboard limit for AFA catcher vessels is 86.09 percent of the trawl catcher vessel apportionment of the BSAI Pacific cod initial TAC.[44] The number of non-exempt AFA catcher vessels participating in the BSAI Pacific cod fishery reached a high of 50 in 2004, and has since shown a decreasing trend. Between 2001 and 2015,

[43] Sideboard limits and aggregate catch amounts (incidental and directed) are reported by catcher vessel intercooperative reports. The number of vessels involved in directed fishing, and their directed harvest on a vessel-by-vessel basis are reported by inshore cooperative reports.

[44] The ITAC for Pacific cod is the TAC, less the CDQ apportionment. From 1998–2007 the CDQ apportionment of Pacific cod was 7.5 percent of the TAC, but since 2008, the CDQ apportionment for Pacific cod has been 10.7 percent of the TAC. From 1997–2007 (under Amendment 46) Trawl catcher vessels were allocated 23.5 percent of the Pacific cod ITAC. Since 2008 (with implementation of Amendment 85), trawl catcher vessels have been apportioned 22.1 percent of the total initial TAC for Pacific cod.

an average of 68 percent of the initial sideboard limit was annually harvested in aggregate. During these years, directed fishing harvests by non-exempt vessels accounted for an average of 76 percent of the aggregate catch—or 52 percent of the sideboard limit, while the remainder of the harvests are considered incidental catch in pollock and other non-pollock target fisheries.

Historically, AFA catcher vessels have much less participation in the BSAI yellowfin sole fishery than in the Pacific cod fishery. The yellowfin sole sideboard limit for AFA catcher vessels is 6.47 percent of the initial TAC for the fishery. Amendment 80 to the BSAI groundfish FMP, which was implemented in 2008, suspends AFA sideboard limits for BSAI yellowfin sole when the initial TAC is equal to or greater than 125,000 mt in order to allow AFA sectors the potential to expand their harvest in the yellowfin sole fishery in periods of diminished availability of pollock (North Pacific Fishery Management Council 2007). AFA catcher vessels have not been sideboarded for participation in the yellowfin sole directed fishery since the implementation of Amendment 80 because the initial TAC has been set higher than the threshold. As shown in Table 14, aggregate catch of yellowfin sole is only reported in the catcher vessel intercooperative reports for two years after Amendment 80 (2008 and 2013)—the lack of reporting is a result of the negated yellowfin sole sideboard limit. However, individual inshore cooperative reports continued to report any directed fishing efforts if directed fishing occurred (as in 2015).

Table 14. AFA Catcher Vessel Harvest and Participation in BSAI Pacific Cod and Yellowfin Sole Fisheries, 2001–2015

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pacific Cod	Sideboard Limit (1,000 mt)	31.5	37.4	38.8	46.9	38.6	36.3	32.0	29.0	30.0	28.7	28.7	44.4	44.2	43.2	42.4
	Aggregate Catch (1,000 mt)	13.5	35.7	28.4	28.4	33.5	23.4	22.5	21.6	22.7	22.3	21.4	27.7	25.9	27.0	21.8
	% of Sideboard Limit Harvested	42.7	95.2	73.0	60.6	86.8	64.6	70.4	74.5	75.6	77.7	74.8	62.4	58.6	62.6	51.4
	Non-Exempt Directed Fishing Catcher Vessels	49	51	54	55	42	40	41	43	32	27	45	29	32	33	33
	Directed Fishing Catch (1,000 mt)	11.4	25.3	23.5	23.5	20.7	20.7	19.7	18.2	14.0	13.0	15.9	18.5	21.3	24.8	16.9
Yellowfin Sole	Sideboard Limit (1,000 mt)	6.8	4.7	4.6	4.7	4.9	5.3	7.5				No Limit				
	Aggregate Catch (1,000 mt)	0.2	0.2	0.1	0.2	0.1	0.4	0.2	0.1	-	-	-	-	-	0.3	-
	% of Sideboard Limit Harvested	3.3	3.3	2.9	3.5	2.6	8.0	2.2				No Limit				
	Directed Fishing Catcher Vessels	-	-	-	-	-	3	1	-	-	-	-	-	-	-	1
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	0.4	0.2	-	-	-	-	-	-	-	0.7

Source: Developed by Northern Economics, Inc. using data from NMFS Groundfish Harvest Specification tables (National Marine Fisheries Service 2016b) and data from inshore cooperative reports and catcher vessel intercooperative reports (National Marine Fisheries Service 2016e).

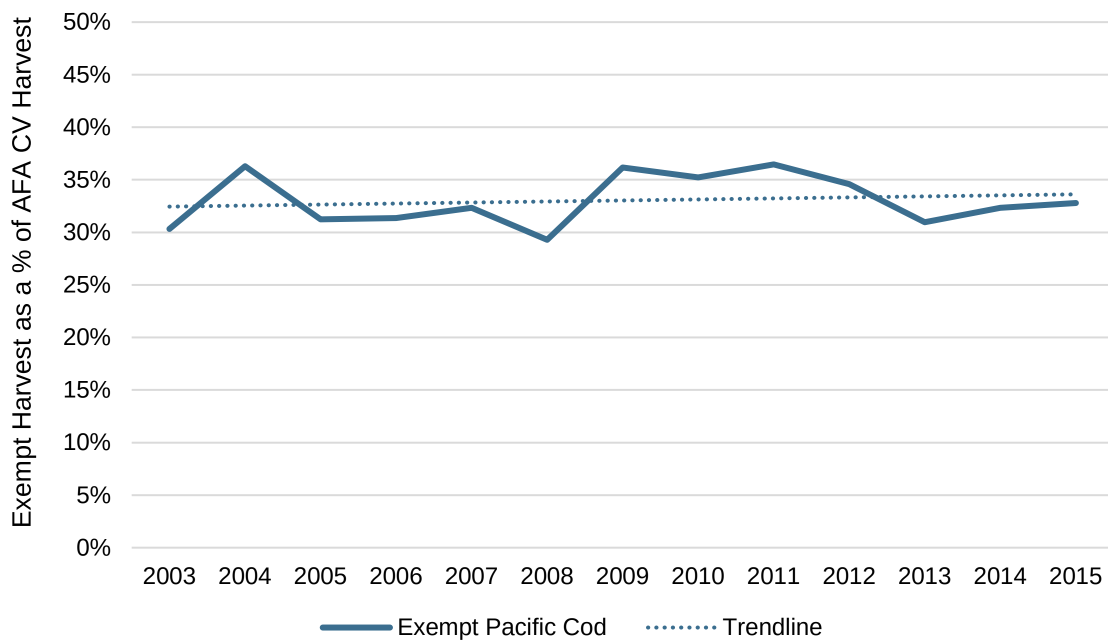
Notes:

All sideboard limits and catch are aggregated across seasons and areas where applicable.

“-“ indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

Pacific Cod Exempt Vessels. Under Amendments 61/61/13/8, the Council recommended that certain AFA catcher vessels that have relatively low pollock fishing history and show a significant economic dependence on BSAI Pacific cod be exempt from BSAI Pacific cod sideboards. For AFA catcher vessels to receive an exemption from BSAI Pacific cod sideboards, they had to have made 30 or more legal landings of BSAI Pacific cod in the BSAI directed fishery for Pacific cod from 1995 to 1997, averaged annual BS pollock landings less than 1,700 mt from 1995 to 1997, and be less than 125 ft in length. In addition, the Council recommended that all AFA catcher vessels with mothership endorsements be exempt from Pacific cod sideboard measures after March 1 of each year. Of the 112 permitted AFA catcher vessels, 10 are exempt from the sideboards under the landings and vessel size criteria, as are the 19 vessels that are members of the MFC, after March 1 of each fishing year. The remaining 83 AFA catcher vessels are subject to BSAI Pacific cod sideboard limits. As shown in Figure 48, the Pacific cod harvest caught by exempt AFA catcher vessels as a percentage of the Pacific cod harvest of all AFA catcher vessels has ranged from a low of 30 percent in 2003 to a high of 36 percent in 2011, and overall shows a slight increasing trend.

Figure 48. Percent of AFA Catcher Vessel BSAI Pacific Cod Harvest Caught by Exempt Vessels, 2003-2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

11.1.1.1 Bering Sea/Aleutian Islands AFA Catcher Vessel Sideboard Prohibited Species Catch

The AFA also required PSC limits for BSAI and GOA sideboard fisheries. For a variety of reasons, including a desire not to "reward" vessels for higher levels of PSC, the Council and NMFS chose to calculate PSC sideboard amounts based on the percentage of historical groundfish catch in each BSAI groundfish fisher, rather than on the actual PSC in the historical fishery. Annually, NMFS publishes PSC sideboards limits for four species—halibut, red king crab, *C. opilio* (COBLZ), and *C. bairdi* (zone 1 and 2). NMFS also publishes PSC limits for herring, by target category, that apply to all trawl sectors in the BSAI (both the BSAI trawl limited access and Amendment 80 sectors). PSC sideboard limits in the BSAI only apply to non-exempt AFA catcher vessels, with the exception of the halibut PSC limit, which also applies to Pacific cod-exempt AFA catcher vessels.

Before Amendment 80, AFA catcher vessel sideboard PSC limits were apportioned for all trawl sectors by target category (e.g. the "rock sole/flathead sole/other flatfish" target fishery category). After the implementation of Amendment 80, with the exception of the halibut PSC limit, AFA catcher vessel sideboard PSC limits changed from being apportioned by target category to an aggregate apportionment for all non-pollock targets.[45] Implementation of Amendment 80 created new PSC limits by fishery category for the BSAI trawl limited access sector as a whole, of which AFA catcher vessels are a part. This meant that AFA catcher vessels would need to abide by BSAI trawl limited access PSC limits for

[45] AFA catcher vessel halibut PSC sideboard limits continue to be apportioned by fishery category.

each target category. In most cases, the PSC limit for any individual target category in the BSAI trawl limited access sector is much smaller than the AFA PSC sideboard limit for non-pollock targets, rendering the sideboard limit non-constraining for any single fishery category. However, for crab species with abundance-based PSC limits, if the aggregate total of PSC limits across all fishery categories in the BSAI trawl limited access sector is greater than the non-pollock AFA sideboard PSC limit, the sideboard limit could still be constraining for AFA catcher vessels in sideboard fisheries. A list of all AFA catcher vessel PSC sideboard limits, herring PSC limits, and BSAI trawl limited access sector PSC limits is provided in Appendix C.[46]

Table 15 summarizes PSC sideboard limits, PSC limits for the BSAI trawl limited access sector, and catch by non-exempt AFA catcher vessels participating in the BSAI Pacific cod fishery. Non-exempt AFA catcher vessels participating in the Pacific cod fishery remained below all constraining PSC limits between 2003 and 2015.[47] For halibut, both exempt and non-exempt catcher vessels' PSC of halibut accrues toward the AFA PSC sideboard limit before 2008. Since 2008, the AFA catcher vessel halibut PSC sideboard is non-constraining as the halibut PSC limit for the BSAI trawl limited access sector is smaller. On average, AFA catcher vessels caught only 52.2 percent of their constraining halibut PSC limit. Figure 49 illustrates the steady decline in halibut PSC amount and rate (shown as kilogram (kg) of halibut mortality per mt of all groundfish caught while targeting Pacific cod) for both non-exempt and exempt AFA catcher vessels. Because there are many more non-exempt vessels than exempt vessels, the non-exempt vessels have taken more halibut than exempt catcher vessels in every year. However the halibut PSC rate (shown in the lower figure) of exempt catcher vessels was higher through 2011, but largely tracks the non-exempt PSC rate thereafter.

[46] PSC limits for the BSAI trawl limited access sector are not apportioned separately by participant. In other words, the PSC limits apply to AFA catcher vessels, AFA catcher/processors, and non-AFA participants in each target category.

[47] The constraining PSC limit is the smaller of the PSC limits between AFA sideboards and PSC limits for the BSAI trawl limited access sector.

Table 15. Non-Exempt AFA Catcher Vessel PSC Sideboard Limits and PSC in the BSAI Pacific Cod Fishery, 2003–2015

Species		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Limited PSC Species														
Halibut (applies to both exempt and non-exempt)	Sideboard Limit (mt)	887	887	887	887	825	887	887	887	887	887	887	887	887
	Trawl Limited Access Sector PSC Limit (mt)	No BS Trawl Limited Access Sector					585	508	453	453	453	453	453	453
	PSC (mt)	655	399	551	540	374	257	151	227	181	308	244	224	162
	% Constraining Limit	74	45	62	61	45	44	30	50	40	68	54	49	36
Red king crab Zone 1	Sideboard Limit (no. 1,000s)	8.1	16.4	16.4	16.4	16.4	52.6	52.6	52.6	52.6	25.9	25.9	25.9	25.9
	Trawl Limited Access Sector PSC Limit (no. 1,000s)	No BS Trawl Limited Access Sector					6.0	6.0	6.0	6.0	3.0	3.0	3.0	3.0
	PSC (no. 1,000s)	-	0.2	2.7	0.0	0.0	0.9	0.1	0.1	0.8	0.1	-	0.4	0.0
	% Limit	-	1	17	0	0	15	2	2	14	2	-	15	0
C. opilio COBLZ	Sideboard Limit (no. 1,000s)	77.1	77.1	86.1	114.0	74.6	652.6	652.6	652.6	1246.8	1,054.6	1575.5	1678.2	1652.1
	Trawl Limited Access Sector PSC Limit (no. 1,000s)	No BS Trawl Limited Access Sector					50.0	50.0	50.0	95.5	80.8	120.7	129.0	127.0
	PSC (no. 1,000s)	1.4	0.1	0.1	0.0	0.0	-	0.3	0.0	-	-	-	0.2	0.1
	% Limit	2	0	0	0	0	-	1	0	-	-	-	0	0
C. bairdi Zone 1 & 2	Sideboard Limit (no. 1,000s)	313.7	313.7	313.7	313.7	313.7	782.1	782.1	663.2	663.2	782.1	782.1	782.1	782.1
	Trawl Limited Access Sector PSC Limit (no. 1,000s)	No BS Trawl Limited Access Sector					110.0	110.0	93.2	93.2	110.0	110.0	110.0	110.0
	Catch (no. 1,000s)	32.1	30.3	33.7	38.3	17.5	20.3	3.1	11.7	5.8	3.5	2.9	1.5	7.6
	% Limit	10	10	11	12	6	18	3	12	6	3	3	1	7
Herring	All Trawl Gear Limit (mt)	20.0	25.0	27.0	27.0	27.0	26.0	25.0	29.0	33.0	31.0	40.0	33.0	42.0
	Catch (mt)	0.8	0.2	0.0	0.3	0.2	-	-	-	-	0.8	0.1	-	0.0
	% Limit	4	1	0	1	1	-	-	-	-	3	0	-	0
Non-Limited PSC Species														
Chinook	Catch (no.)	N/A	1,376	1,336	966	2,345	837	516	762	346	479	554	518	604
Non-Chinook	Catch (no.)	457	483	365	1,315	342	47	27	10	20	3	-	546	102
Other Opilio	Catch (no. 1,000s)	N/A	3.1	4.5	11.3	5.2	9.7	3.9	2.5	3.0	2.9	2.1	1.0	0.6
Blue King Crab	Catch (no.)	-	168	-	36	-	-	-	-	-	-	-	-	-
Golden King Crab	Catch (no.)	-	-	0	2	2	0	45	5	38	3	-	-	-

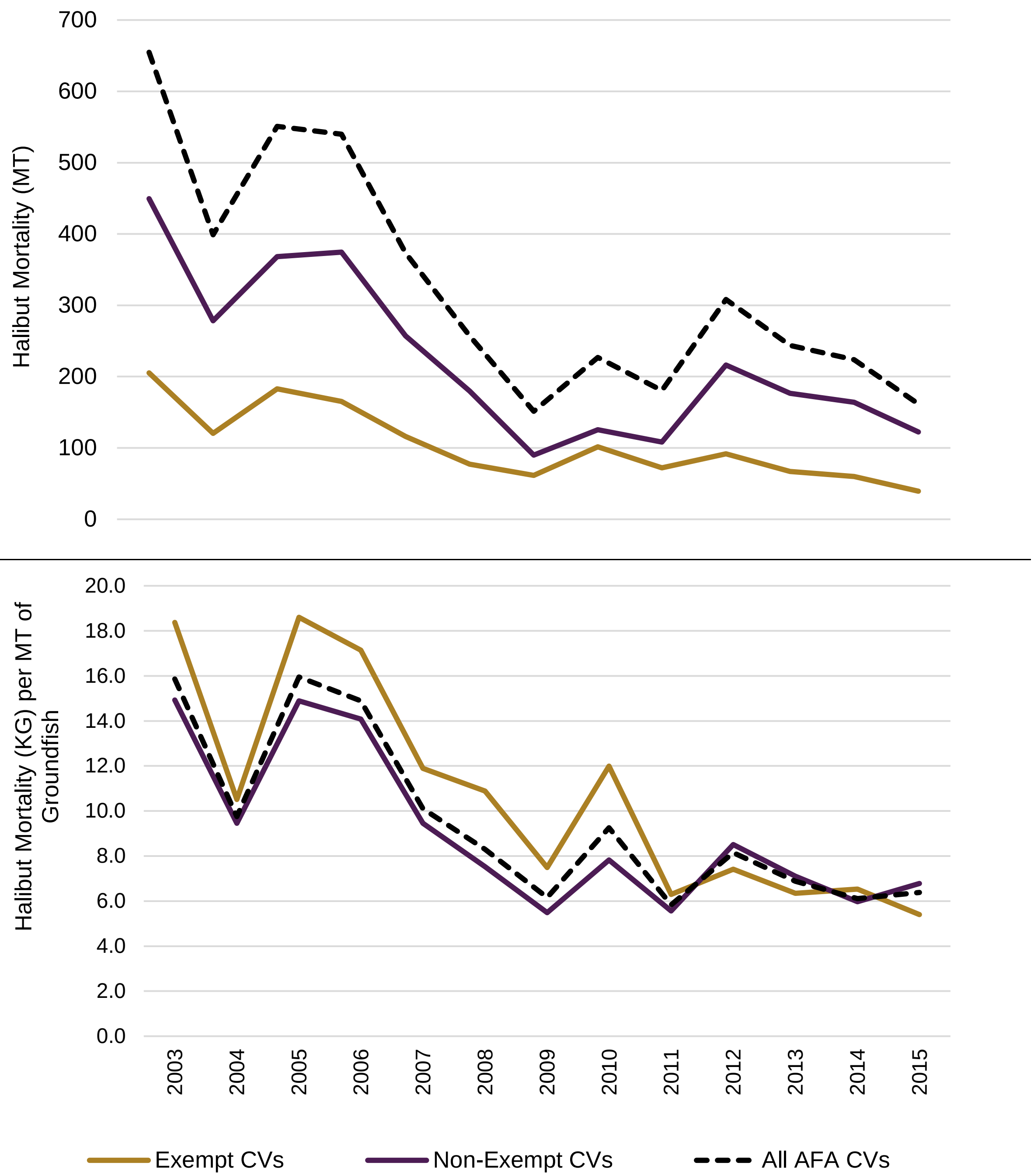
Source: Developed by Northern Economics, Inc. using data from NMFS Groundfish Harvest Specification tables (National Marine Fisheries Service 2016b) and AKFIN data (Fey 2016)

Notes:

The table indicates initial PSC limits and does not reflect any in-season adjustments. Shaded cells indicate that the AFA PSC sideboard limit is non-constraining.

"-" indicates that data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

Figure 49. Halibut PSC Amount and Rate by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Table 16 summarizes non-limited PSC of all prohibited species by exempt AFA catcher vessels in the Pacific cod target fishery. Due to confidentiality restrictions, PSC of AFA catcher vessel in the yellowfin sole fishery cannot be reported. Appendix C provides figures summarizing the catch of all prohibited species in the Pacific cod target fishery, by AFA vessel type.

Table 16. Exempt AFA Catcher Vessel PSC in BSAI Pacific Cod Fishery, 2003–2015

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Halibut (mt)	204	120	183	165	116	77	61	102	72	92	67	60	39
Red king crab Zone 1 (no.)	-	9	212	4	7	196	33	71	480	249	-	14	35
C. opilio COBLZ (no.)	-	-	-	-	-	-	-	-	-	-	-	-	-
C. bairdi Zone 1 & 2 (no.)	11,786	10,062	19,808	14,365	8,569	11,434	2,977	8,043	3,843	2,128	1,180	222	1,610
Herring (mt)	0	0	-	0	1	-	-	-	0	5	0	-	0
Chinook (no.)	N/A	681	365	355	746	331	169	179	49	228	187	534	185
Non-Chinook (no.)	129	98	12	73	79	7	25	6	6	1	0	-	21
Other Opilio (no.)	N/A	1,120	1,409	5,396	2,226	5,576	2,474	973	1,474	1,441	162	353	201
Blue King Crab (no.)	-	13	-	-	-	-	-	-	0	-	-	-	-
Golden King Crab (no.)	-	-	0	1	1	-	0	5	2	-	-	-	-

Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)
"-" indicates that data value is zero. Data values reported as 0 are greater than zero, but less than rounding level.

11.1.2 Catcher Vessel GOA Groundfish Harvesting Sideboards

Non-exempt AFA catcher vessel sideboard limits in GOA groundfish fisheries are established and managed in the same manner as those in BSAI groundfish fisheries. The 20 GOA groundfish species sideboard limits rely on formula based on the retained catch of all non-exempt AFA catcher vessels for each sideboard species from 1995 through 1997, divided by the available TAC during the same time period. Like the Pacific cod fishery in the BSAI, the Council recommended that certain AFA catcher vessels that had relatively low BS pollock fishing history and could demonstrate a significant economic dependence on GOA fisheries be exempt from GOA sideboards. Exempt AFA catcher vessels are discussed at the end of this section.

Table 17 summarizes non-exempt AFA catcher vessel participation in GOA groundfish fisheries, from 2001 through 2015, as reported in the catcher vessel intercooperative reports and inshore cooperative reports.[48] These reports are used as data sources rather than AKFIN because there are relatively few non-exempt vessels participating in these sideboard fisheries, which causes disclosure issues if AKFIN data are used. Although Table 16 reports directed fishing for the seven GOA groundfish species in which at least one year of directed fishing is reported by individual inshore cooperative reports, pollock is the primary sideboard fishery in which non-exempt AFA catcher vessels participate in the GOA. On average, eight vessels participated in the directed fishery for pollock from 2001 to 2015. Aggregate pollock harvest peaked in 2015 with over 15,000 mt, accounting for 37 percent of the total sideboard limit for GOA pollock. However, nearly all harvest in 2015 (13,700 mt) was reported as directed fishing harvest. On average, directed fishing harvest has accounted for 89 percent of aggregate sideboard harvest of pollock between 2001 and 2015.

Cooperative reports show aggregate catch for some species in years when the fishery was closed for directed fishing. Further, in some years, sideboard limits appear to be exceeded greatly—sometimes with no directed fishing effort. For example, the northern rockfish sideboard in 2007 was exceeded by nearly 200 percent—(i.e. double the sideboard limit). These apparent overages occur as a result of

[48] Sideboard limits and aggregate catch amounts (incidental and directed) are reported by catcher vessel intercooperative reports between 2001 and 2012. Beginning in 2013, aggregate catch amounts are estimated using AKFIN data. The number of vessels involved in directed fishing and their directed harvest on a vessel-by-vessel basis are reported in inshore cooperative reports.

incidental catch in other target fisheries. NMFS believes that the Council did not intend that the incidental catch of sideboard species be a cause for shutting down other target fisheries in which AFA vessels are participating (Furuness 2017), and, therefore, it allows some sideboards for species that are not targeted by AFA vessels to be exceeded. A summary of all AFA catcher vessel sideboard limit percentages and amounts in GOA groundfish fisheries is provided in Appendix B.

Table 17. AFA Catcher Vessel Harvest and Participation in GOA Groundfish Fisheries, 2001–2015

	Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014*	2015*
Pollock	Sideboard Limit (1,000 mt)	32.5	19.2	18.2	24.0	30.9	29.3	24.5	20.2	16.4	27.0	28.9	33.9	29.7	41.1	41.2
	Aggregate Catch (1,000 mt)	10.4	6.8	5.2	6.7	7.9	6.9	6.3	3.2	1.9	5.6	4.4	6.6	12.6	13.1	15.1
	% Sideboard Limit	32.2	35.2	28.4	28.2	25.4	23.7	25.7	15.9	11.3	20.8	15.2	19.5	42.4	31.8	36.6
	No. of Directed Fishing Catcher Vessels	11	5	9	9	8	9	7	6	9	9	7	6	9	6	6
	Directed Fishing Catch (1,000 mt)	9.8	3.2	4.4	5.9	6.8	6.6	4.7	2.5	1.8	6.7	4.1	6.4	11.5	12.0	13.7
Pacific Cod	Sideboard Limit (1,000 mt)	4.0	4.1	3.8	4.3	4.0	4.9	4.9	4.8	3.8	5.3	5.8	5.8	5.4	5.8	6.8
	Aggregate Catch (1,000 mt)	0.4	0.7	0.7	0.4	0.5	0.2	0.6	0.3	0.3	0.9	1.0	0.3	0.4	0.9	0.7
	% Sideboard Limit	9.7	16.8	18.7	8.2	12.2	3.2	11.6	6.6	7.6	17.0	17.7	4.6	7.2	16.1	10.0
	No. of Directed Fishing Catcher Vessels	3	3	3	3	2	1	1	2	2	3	6	3	4	3	4
	Directed Fishing Catch (1,000 mt)	0.3	0.2	0.3	0.3	0.2	0.1	0.1	0.2	0.2	0.5	0.3	0.2	0.1	0.2	0.4
Arrowtooth Flounder	Sideboard Limit (1,000 mt)	0.6	0.8	0.8	0.8	0.8	0.8	1.0	1.0	0.9	0.9	0.9	2.1	2.1	2.1	2.1
	Aggregate Catch (1,000 mt)	0.3	0.1	0.0	0.0	0.1	0.2	1.0	0.8	0.7	0.4	0.7	0.1	0.5	0.8	0.5
	% Sideboard Limit	49.7	14.3	2.7	2.0	14.0	26.4	101.9	79.1	82.6	48.6	80.0	6.2	24.9	38.7	25.5
	No. of Directed Fishing Catcher Vessels	-	-	-	-	2	1	1	-	1	1	1	-	1	1	1
	Directed Fishing Catch (1,000 mt)	-	-	-	-	0.1	0.2	0.4	-	0.1	0.4	0.6	-	0.2	0.5	0.4
Pacific Ocean Perch	Sideboard Limit (1,000 mt)	0.7	1.0	1.0	1.0	1.0	1.0	1.1	1.1	0.8	1.0	0.9	1.0	1.0	1.2	1.3
	Aggregate Catch (1,000 mt)	0.3	0.4	0.4	0.4	0.3	0.2	0.6	0.4	0.3	0.0	0.4	0.0	0.5	0.8	0.6
	% Sideboard Limit	41.3	40.3	34.6	37.5	30.4	23.5	59.4	36.1	33.2	2.1	47.5	0.8	53.6	65.0	47.6
	No. of Directed Fishing Catcher Vessels	2	2	3	3	1	2	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	0.3	0.4	0.5	0.5	0.3	0.2	-	-	-	-	-	-	-	-	-
Shallow-water Flatfish	Sideboard Limit (1,000 mt)	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	1.3	1.1	1.0	1.1
	Aggregate Catch (1,000 mt)	0.1	0.0	0.0	0.0	-	0.0	0.4	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.2
	% Sideboard Limit	17.0	0.9	2.2	0.1	-	0.5	40.0	12.1	9.7	9.7	7.4	12.0	17.3	39.3	20.7
	No. of Directed Fishing Catcher Vessels	1	1	1	-	1	-	-	1	1	1	-	1	2	1	1
	Directed Fishing Catch (1,000 mt)	0.0	0.0	0.0	-	0.0	-	-	0.0	0.1	0.1	-	0.1	0.1	0.3	0.2
Northern Rockfish	Sideboard Limit (1,000 mt)	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Aggregate Catch (1,000 mt)	0.1	0.1	0.0	0.0	0.1	-	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	% Sideboard Limit	76.3	56.0	7.0	20.0	56.9	-	199.2	189.0	93.8	1.5	81.3	1.1	2.6	16.0	5.8
	No. of Directed Fishing Catcher Vessels	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Rex Sole	Sideboard Limit (1,000 mt)	0.1	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.3	0.0
	% Sideboard Limit	16.7	2.6	0.1	0.3	0.3	0.8	7.8	9.2	17.7	37.3	34.6	2.8	53.7	138.2	N/A
	No. of Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	1	1	-	-	1	1	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	0.1	0.1	-	-	0.0	0.1	-

Source: Developed by Northern Economics, Inc. using data from inshore cooperative reports, catcher vessel intercooperative reports (National Marine Fisheries Service 2016e), and AKFIN data (Fey 2016).

Notes:

Beginning in 2013, only data for sideboard fisheries in which directed fishing occurred are reported in catcher vessel intercooperative reports.

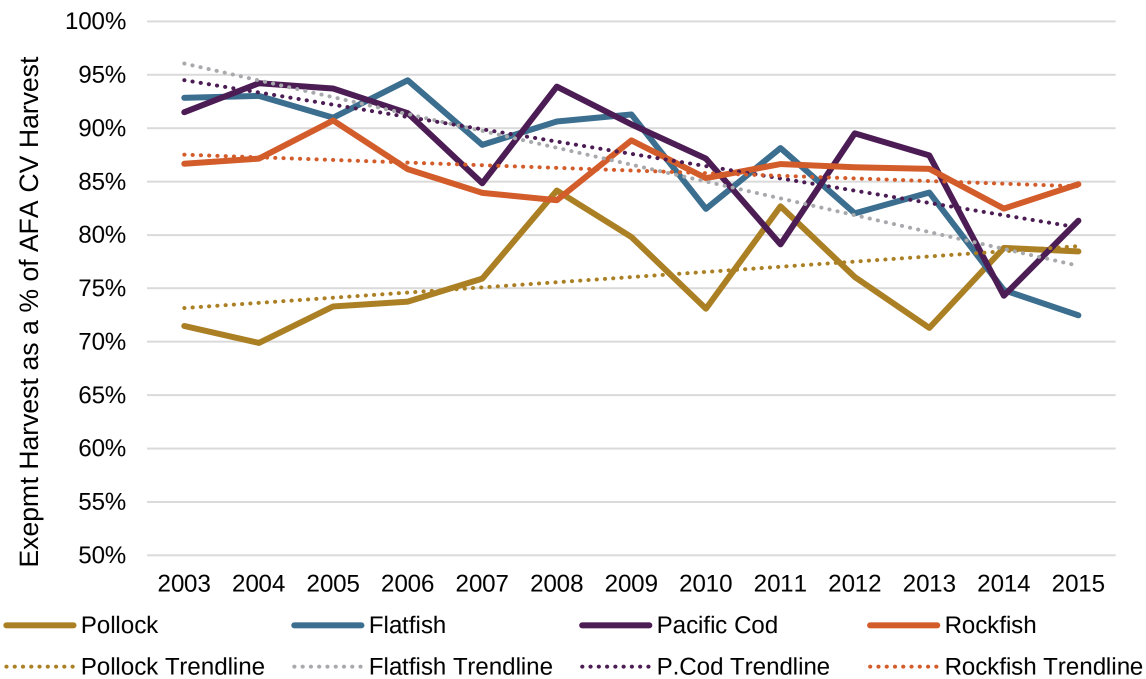
All sideboard limits and catch are aggregated across seasons and areas where applicable.

"-" indicates data value is zero. Data values reported as 0.0 are greater than zero, but less than rounding level.

*Aggregate catch for years 2013–2015 estimated using AKFIN data (no longer available in intercooperative reports).

GOA Groundfish Exempt Vessels. The Council recommended that certain AFA catcher vessels that have relatively low pollock fishing history and show a significant economic dependence on GOA groundfish fisheries be exempt from GOA sideboards. The criteria to receive an exemption from GOA sideboards differs slightly from the criteria established for BSAI Pacific cod. For an AFA catcher vessel to receive a GOA exemption, it had to meet the same length and landing requirements as BSAI Pacific cod, but make 40 or more legal landings of GOA groundfish from 1995 to 1997. Of the 112 permitted AFA catcher vessels, 17 are exempt from the GOA sideboards under the landings and vessel size criteria. The remaining 95 vessels are subject to GOA sideboard limits. As shown in Figure 50, between 2003 and 2015, GOA exempt AFA catcher vessels have increased harvest relative to non-exempt AFA catcher vessels in the pollock fishery, while exempt vessel harvests of flatfish, Pacific cod, and rockfish have declined in comparison. We note here that the rockfish fishery in the Central GOA (CGOA) was "rationalized" in 2007, and the effects of this change to AFA vessels operating in the fishery are discussed in the following section.

Figure 50. Percent of AFA Catcher Vessel GOA Groundfish Harvest Caught by Exempt Vessels, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Central Gulf of Alaska Rockfish Fishery. Amendments 68 and 88 to the GOA groundfish FMP implemented the CGOA Rockfish Pilot Program and CGOA Rockfish Program in 2006 and 2011, respectively. The CGOA Rockfish Pilot Program moved the management of the CGOA rockfish fishery from a license limitation program to a limited access privilege program in which quota share was allocated based on historic participation among fishing vessels and processors in Pacific ocean perch, northern rockfish, and pelagic shelf rockfish in the CGOA. In addition, allocations are also made for secondary species (non-rockfish species and non-target rockfish species) harvested while fishing for Pacific ocean perch, northern rockfish, and pelagic shelf rockfish. These species include Pacific cod, rougheye rockfish, shortraker rockfish, sablefish, and thornyhead rockfish.

The impact of CGOA rockfish fishery rationalization on AFA vessels are subtle. Non-exempt AFA catcher vessels that qualified, and participate(d) in the CGOA rockfish programs are now exempt from the additional sideboards placed upon participants in the programs.[49] Therefore, GOA non-exempt AFA catcher vessels that receive both primary rockfish species quota and secondary species quota are permitted to harvest both the Pacific cod allocation made to them as a secondary species under the CGOA rockfish programs, and also continue to fish for Pacific cod as an AFA sideboard fishery.[50] Implementation of the CGOA Rockfish Program closed all directed fishing on rockfish species for non-rockfish program participants in the CGOA, as well as directed fishing by non-exempt AFA catcher vessels in the Western GOA. Therefore, non-GOA exempt AFA vessels that did not qualify or chose not to participate in the CGOA rockfish programs, lost the ability to directed fish for Pacific ocean perch, northern rockfish, and dusky rockfish. However, participation among non-exempt AFA catcher vessels in rockfish sideboard fisheries was minimal before 2007.

GOA-exempt AFA catcher vessels comprise of the majority of AFA catcher vessels participating in the CGOA Rockfish Program. Table 18 summarizes AFA catcher vessels permitted to participate in CGOA Rockfish Pilot Program (2007–2011) and Rockfish Program (2012–2015). Under implementation of the CGOA Rockfish Program in 2012, new qualifying years were established causing five non-exempt AFA catcher vessels and one exempt AFA catcher vessel (*Morning Star*) to no longer qualify.

[49] GOA exempt AFA catcher vessels are restricted by additional CGOA Rockfish Program sideboard limits.

[50] 3.81 percent of the GOA Pacific cod (season B) TAC is made available to the CGOA Rockfish Program for allocation as a secondary species to participants of the program.

Table 18. AFA Catcher Vessels Receiving Central Gulf of Alaska Rockfish Pilot Program and Rockfish Program Permits, 2007–2015

Catcher Vessel	2007	2008	2009	2010	2011	2012	2013	2014	2015
GOA Non-Exempt AFA Catcher Vessels									
Muir Milach				X	X				
Progress	X	X	X	X	X	X	X	X	X
Vanguard	X	X	X	X	X	X	X	X	X
Pacific Challenger	X	X	X	X	X				
Sovereignty	X	X	X	X	X				
Nordic Explorer	X	X	X	X	X				
Traveler	X	X	X	X	X	X	X	X	X
Forum Star	X	X	X	X	X				
Intrepid Explorer	X	X	X						
Non-Exempt Total	8	8	8	8	8	3	3	3	3
GOA Exempt AFA Catcher Vessels									
Topaz	X	X	X	X	X	X	X	X	X
Excalibur Ii	X	X	X	X	X	X	X	X	X
Arctic Ram							X	X	X
Hazel Lorraine	X	X	X	X	X	X			
Elizabeth F	X	X	X	X	X	X	X	X	X
Walter N	X	X	X	X	X	X	X	X	X
Peggy Jo	X	X	X	X	X	X	X	X	X
Hickory Wind	X	X	X	X	X	X	X	X	X
Leslie Lee	X	X	X	X	X	X	X	X	X
Cape Kiwanda	X	X	X	X	X	X	X	X	X
Ocean Hope 3	X	X	X	X	X	X	X	X	X
Gold Rush	X	X	X	X	X	X	X	X	X
Marcy J	X	X	X	X	X	X	X	X	X
Collier Brothers	X	X	X	X	X	X	X	X	X
Pacific Ram	X	X	X	X	X	X	X	X	X
Morning Star	X	X	X	X	X				
Exempt Total	15	15	15	15	15	14	14	14	14
Non-Exempt and Exempt Total	23	23	23	23	23	17	17	17	17

Source: Developed by Northern Economics, Inc. using data from National Marine Fisheries Service (2016f)

11.1.2.1 Gulf of Alaska AFA Catcher Vessel Sideboard Prohibited Species Catch

In the GOA, halibut PSC sideboard limits for non-exempt AFA catcher vessels are that portion of the GOA trawl PSC limit equal to the ratio of aggregate retained groundfish catch by non-exempt AFA catcher vessels in each PSC target category from 1995 through 1997 relative to the retained catch of all vessels in that fishery over the same period. GOA exempt AFA catcher vessels are also exempt from AFA halibut PSC sideboards in the GOA—their halibut PSC accrues to the general GOA trawl PSC limits.

In the GOA there are two fishery categories: the shallow-water species fishery, and the deep-water species fishery.[51] Trawl halibut PSC limits (and halibut PSC sideboard limits) for each category in the GOA are further apportioned by NMFS into five seasons. The fifth season is for combined species fishery

[51] The Shallow-water species fishery category includes: pollock, Pacific cod, shallow-water flatfish, flathead sole, Atka mackerel, and “other” species. The Deep-water species fishery category is defined as all other groundfish that are not in the shallow-water category, including: arrowtooth flounder, deep-water flatfish, rex sole, rockfish, and sablefish.

categories. Table 18 summarizes halibut PSC sideboard limits, by season and fishery category, for non-exempt AFA catcher vessels in the GOA.

It is important to note that unused seasonal apportionments of trawl halibut PSC limits will be added to the respective seasonal apportionment for the next season during a current fishing year—including the fifth season combined fishery category.[52] In addition, if a seasonal apportionment of trawl halibut PSC is exceeded, the amount by which the seasonal apportionment is exceeded will be deducted from the respective apportionment for the next season during a current fishing year.

Table 19. Non-Exempt AFA Catcher Vessel Halibut PSC Sideboard Limits in GOA Deep- and Shallow-Water Species Fisheries, 2003–2015

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Shallow water Targets	306	306	306	306	306	306	306	306	306	306	302	302	270
Trawl, 1st Season	153	153	153	153	153	153	153	153	153	153	151	151	135
Trawl, 2st Season	34	34	34	34	34	34	34	34	34	34	34	34	30
Trawl, 3rd Season	68	68	68	68	68	68	68	68	68	68	67	67	60
Trawl, 4th Season	51	51	51	51	51	51	51	51	51	51	50	50	45
Deep water Targets	56	56	56	56	56	56	56	56	56	56	56	56	49
Trawl, 1st Season	7	7	7	7	7	7	7	7	7	7	7	7	6
Trawl, 2st Season	21	21	21	21	21	21	21	21	21	21	21	21	18
Trawl, 3rd Season	28	28	28	28	28	28	28	28	28	28	28	28	25
Trawl, 4th Season	0	0	0	0	0	0	0	0	0	0	0	0	0
All Targets (5th Season)	62	62	61	61	61	61	61	62	62	62	61	61	54
Total	424	424	423	423	423	423	423	424	424	424	419	419	373

Source: Developed by Northern Economics, Inc. using data from National Marine Fisheries Service (2016b).

The halibut PSC in AFA sideboard fisheries in the GOA by season is largely confidential due to the low numbers of vessels participating in the various seasons. Because of these disclosure issues, a tables and figures showing AFA catcher vessels PSC by season and target category are not provided. However, it was determined that in no year between 2003 and 2015 were annual AFA halibut PSC sideboard limits in the GOA exceeded.[53]

Annual totals of halibut PSC by non-exempt AFA catcher vessels can be reported for shallow-water species fisheries. However, for deep-water species fisheries, fewer than three non-exempt AFA catcher vessels participate in GOA groundfish fisheries after 2007, and catch data cannot be disclosed due to data confidentiality restrictions. On average, non-exempt AFA catcher vessels caught 9.4 and 41.2 percent of their annual halibut PSC limits for shallow- and deep-water targets, respectively.[54]

The halibut PSC amount and rate by exempt and non-exempt AFA catcher vessels participating in shallow-water species fisheries are illustrated in Figure 51. Historically, exempt AFA catcher vessels have taken the majority of halibut PSC by AFA vessels in the shallow-water target fisheries and have had consistently higher rates of halibut PSC per mt of groundfish. Halibut PSC of AFA catcher vessels reached 402 mt in 2004—peaking again in 2008. Since then, exempt AFA catcher vessels' PSC has consistently

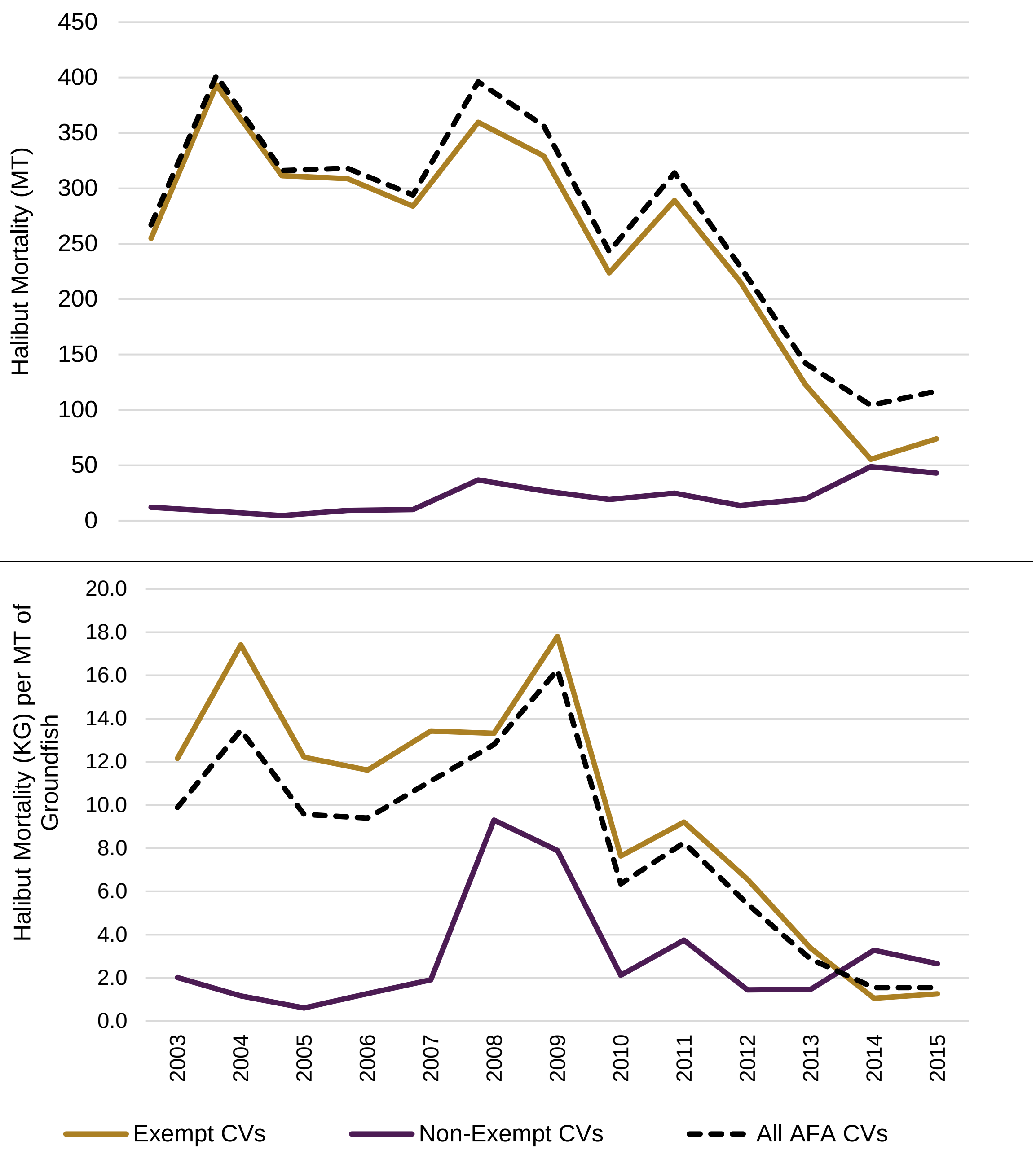
[52] Combined management of trawl halibut PSC also occurs between May 15 and June 30 to allow halibut PSC to be used in either fishery, but this does not include the AFA halibut PSC sideboard limits.

[53] Seasonal limits were exceeded an estimated five times, but the overages were covered by unused apportionments in prior seasons.

[54] Averages do not include halibut PSC taken in the combined species fisheries fifth season.

declined (despite an uptick in 2011). It should be noted that during this same period, the commercial catch limits for the directed halibut fishery in International Pacific Halibut Commission areas 3A and 3B have declined approximately 68 and 82 percent respectively, indicating a decrease in overall halibut abundance. In addition to lower halibut abundance, in 2014, NMFS also began reducing the total halibut PSC available in the GOA as authorized by Amendment 95 to the GOA FMP. The reduction includes a 7 percent reduction in 2014, a 12 percent reduction in 2015, and a 15 percent reduction in 2016.

Figure 51. Halibut PSC Amount and Rate by AFA Catcher Vessels in GOA Shallow-Water Species Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

The halibut PSC amount and rate by AFA catcher vessels participating in deep-water species fisheries are illustrated in Figure 52. For non-exempt AFA catcher vessels, the data are confidential after 2007. On average, non-exempt AFA catcher vessels caught 41.2 percent of their annual halibut PSC limits for deep-water species fisheries between 2003 and 2015. Unlike halibut PSC in the shallow water species fisheries category, PSC of AFA exempt catcher vessels in the deep-water species fishery category has not declined with the declines in halibut abundance.

Figure 52. Halibut PSC Amount and Rate by AFA Catcher Vessels in GOA Deep-Water Species Fishery, 2003–2015

Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)
Notes: Non-exempt AFA catcher vessel halibut PSC taken after 2007 cannot be shown due to data confidentiality restrictions.

In addition to halibut, catch of other GOA PSC species in both shallow- and deep-water species fisheries are included in Appendix C, including Chinook, non-Chinook, *C. bairdi*, and herring.

11.1.3 AFA Catcher Vessel Crab Harvesting Sideboards

The AFA specifically addressed limiting participation among AFA catcher vessels in BSAI crab fisheries. To accomplish this, the Council recommended regulating participation through the issuance of crab sideboard endorsements and sideboard harvest limits. AFA catcher vessels were issued crab sideboard endorsements based on the vessel's history of participation in the crab fisheries.

In addition to permit restrictions, participation of AFA catcher vessels in BSAI crab sideboards was also managed under sideboard harvest limits for the Bristol Bay red king crab and *C. bairdi* fisheries to keep BSAI crab-endorsed AFA catcher vessels from harvesting more than their historical harvest.[55] For Bristol Bay red king crab, the sideboard harvest limit was calculated as the percentage of Bristol Bay red king crab harvested by AFA catcher vessels from 1991 through 1997 (excluding 1994 and 1995 when the fishery was closed). Under these provisions, the AFA vessels could harvest no more than approximately 13 percent of the available quota in the Bristol Bay red king crab fishery. For *C. bairdi*, the harvest limit was calculated using their historic catch percentage from 1995 and 1996. Under these limits, AFA vessels could harvest no more than approximately 7 percent of the *C. bairdi* fishery.

The Council also made recommendations exempting some AFA catcher vessels from all crab harvesting sideboards if the catcher vessel made a legal landing of crab in every Bristol Bay red king crab, *C. opilio*, and *C. bairdi* fishery opening from 1991 to 1997.

A program to rationalize BSAI crab fisheries was implemented through Amendments 18 and 19 to the BSAI King and Tanner Crabs FMP in 2005. Under rationalization, AFA vessels with historic participation in BSAI crab fisheries received crab quota share, thereby making AFA sideboard restrictions redundant. Regulations contained within the final rule to implement the crab rationalization program removed all requirements for AFA crab sideboard endorsements.

11.2 Catcher/Processors

The AFA mandated that sideboards be established for AFA catcher/processors participating in other BSAI groundfish fisheries, and completely prohibited these vessels from fishing in the GOA. These sideboards only apply to catcher/processors listed in the AFA, i.e. the sideboard limits do not apply to the F/V Ocean Peace which was not listed, but which qualified to harvest limited amounts of BS pollock in targeted fisheries.

11.2.1 Catcher/Processor BSAI Groundfish Harvesting Sideboards

The BSAI non-pollock fisheries in which at least one AFA catcher/processor engaged in directed fishing are the yellowfin sole, Pacific cod, and Atka mackerel fisheries. Table 20 summarizes vessel participation in the three fisheries. AFA catcher/processors have consistently harvested more BSAI yellowfin sole than AFA catcher vessels. Between 2001 and 2015, the number of AFA catcher/processors participating in the BSAI yellowfin sole fishery ranged from a low of 3 vessels to a high of 12 vessels. Harvest amounts ranged from a low of 2,028 mt in 2002 to a high of 23,899 mt in 2011. AFA catcher/processors have

[55] Catch limits did not apply to AFA vessels in the Bering Sea snow crab, Pribilof king crab, and St. Matthew king crab fisheries because seasons were short and few AFA vessels participated in these fisheries (National Marine Fisheries Service and North Pacific Fishery Management Council 2004).

not been sideboarded for participation in the yellowfin sole directed fishery since 2008 because the initial TAC has been greater than 125,000 mt.

Under Amendment 85 to the BSAI groundfish FMP, which was implemented in 2008, AFA catcher/processors are allocated 2.3 percent of the BSAI Pacific cod TAC. If an AFA sector receives a direct allocation of BSAI Pacific cod, the Pacific cod sideboards for that sector are replaced by the direct allocation. The catcher/processor F/V *Katie Ann*[56] used this allocation for targeted fishing of BSAI Pacific cod. However, incidental catches of Pacific cod in the BS AFA pollock fishery are also deducted from this allocation. Increasing incidental catches of Pacific cod in the BS pollock fishery have reduced the share of the allocation available for the F/V *Katie Ann*'s directed fishing. AFA catcher/processor participation in the BSAI Atka mackerel fishery has been consistently low.

Table 20. AFA Catcher/Processor Harvest and Participation in BSAI Sideboard Fisheries, 2001–2015

Species		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Yellowfin Sole	Sideboard Limit (1,000 mt)	24.4	22.4	17.0	13.5	16.8	17.7	18.7	26.6				No Limit				
	Aggregate Catch (1,000 mt)	7.4	2.0	2.0	4.5	4.2	7.6	12.5	20.6	17.1	11.3	19.5	23.9	22.5	23.7	23.2	9.3
	% Sideboard Limit	30.5	9.1	11.9	33.0	24.7	43.1	66.6	77.6				No Limit				
	No. of Directed Fishing Catcher/Processors	4	3	3	3	3	5	6	8	12	8	9	9	10	8	10	7
Pacific Cod	Sideboard Limit (1,000 mt)	11.0	10.7	10.7	10.9	12.1	11.6	10.6	9.6				Allocation				
	Aggregate Catch (1,000 mt)	2.4	2.2	0.8	1.8	1.2	2.6	2.9	1.9	1.3	0.8	0.4	-	-	-	0.7	0.1
	% Sideboard Limit	21.7	20.9	7.5	16.2	9.8	22.8	27.3	19.5				No Limit				
	No. of Directed Fishing Catcher/Processors	3	2	1	1	1	1	1	1	1	1	1	-	-	-	1	1
Atka Mackerel	Sideboard Limit (1,000 mt)	4.1	8.7	2.5	6.8	10.4	7.5	9.3	4.9	5.5	6.4	6.7	1.4	1.4	1.0	0.6	3.6
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.4	0.2	0.8
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	34.6	37.2	33.8	20.7
	No. of Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1

Source: Developed by Northern Economics, Inc. using data from NMFS Groundfish Harvest Specification tables (National Marine Fisheries Service 2016b) and data from annual Pollock Conservation Cooperative reports (National Marine Fisheries Service 2016e).

Notes:

All sideboard limits and catch are aggregated across seasons and areas where applicable.

"-" indicates that data value is zero.

11.2.1.1 Bering Sea/Aleutian Islands AFA Catcher/Processor Sideboard Prohibited Species Catch

AFA catcher/processor PSC sideboard limits are equivalent to the total prohibited species harvested in 1995, 1996, and 1997 relative to the total amount of prohibited species available to be harvested by the offshore component in the fishery in 1995, 1996, and 1997. Like non-exempt AFA catcher vessels, NMFS publishes separate PSC sideboards limits for four species—halibut, red king crab, *C. opilio* (COBLZ), and *C. bairdi* (Zone 1 and 2)—for AFA catcher/processors. AFA catcher/processors are also

[56] Because the vessel by vessel catch histories are reported in the annual PCC cooperative reports, the catch and participation information in those reports are not considered confidential.

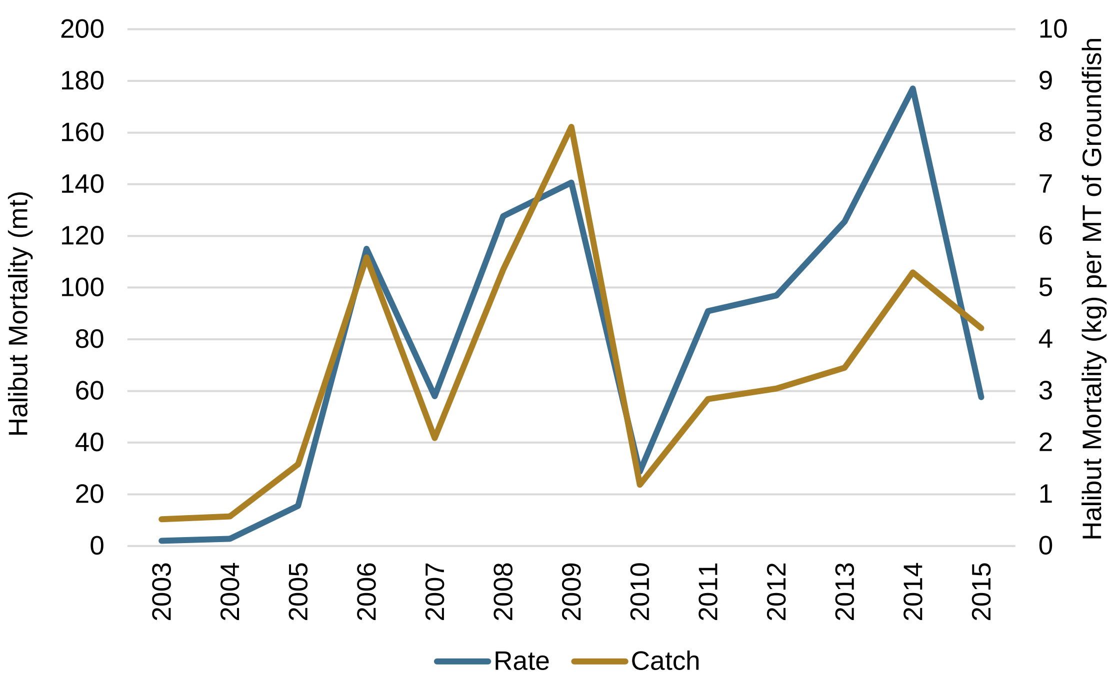
subject to the general PSC limits for herring that apply to both the BSAI trawl limited access and Amendment 80 sectors. AFA catcher/processor PSC sideboard limits extend to all listed catcher/processors and do not include unlisted AFA catcher/processors that qualify to fish for pollock under paragraph 208(e)(21) of the AFA (F/V *Ocean Peace*).

As with AFA catcher vessel PSC sideboard limits (except halibut), all AFA catcher/processor PSC sideboard limits are apportioned as a whole to all non-pollock targets in all years (pre- and post-Amendment 80). Because the AFA catcher/processor halibut PSC sideboard is not apportioned by fishery category (as is done for AFA catcher vessels), the catcher/processor halibut PSC sideboard limit applies to all non-pollock targets.

Under Amendment 80, PSC limits for the BSAI trawl limited-access sector are apportioned to fishery category, and therefore, the historic sideboard limits may not be constraining for any individual target species. For AFA catcher/processors, the general PSC limit for yellowfin sole for the BSAI trawl limited access sector is more constraining than the single AFA catcher/processor sideboard PSC limit for non-pollock targets. Therefore, it is possible that AFA catcher/processors could reach the halibut PSC limit in the yellowfin sole fishery before reaching their AFA sideboard limit.

Figure 53 summarizes halibut PSC of AFA catcher/processors in the BSAI yellowfin sole sideboard fishery from 2003 to 2015 with total catch using the left axis and the rate (in kg of halibut per mt of Groundfish) using the right axis. Both have shown considerable variability with big declines in 2007, 2010, and 2015. Appendix C contains figures illustrating AFA catcher/processor catch of all BSAI PSC species (i.e. salmon, crab and herring) in the yellowfin sole target fishery.

Figure 53. Total Halibut PSC Amount and Rate by AFA Catcher/Processors in BSAI Yellowfin Sole Sideboard Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Table 21, on the following page, summarizes AFA catcher/processor PSC sideboard limits, BSAI trawl limited access sector PSC limits, and PSC in the yellowfin sole sideboard fishery by AFA catcher/processors between 2003 and 2015.[57] On average, AFA catcher/processors caught 37.3 percent of their constraining halibut PSC limit, and exceeded their constraining halibut PSC limit in 2014 by 6 percent.

Table 21. All Non-Exempt AFA Catcher/Processor PSC Sideboard Limits and Catch in the BSAI Yellowfin Sole Fishery, 2003–2015

Species		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Limited PSC Species														
Halibut	Sideboard Limit (mt)	286	286	286	286	286	286	286	286	286	286	286	286	286
	Trawl Limited Access Sector PSC Limit (mt)	No BS Trawl Limited Access					162	187	167	167	167	167	167	167
	Catch (mt)	2	3	15	115	58	128	141	29	91	97	125	177	58
	% Limit	1	1	5	40	20	79	75	17	54	58	75	106	34
Red king crab (Zone 1)	Sideboard Limit (no. 1,000s)	0.6	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.2	0.6	0.6	0.6	0.6
	Trawl Limited Access Sector PSC Limit (no. 1,000s)	No BS Trawl Limited Access					47.4	47.4	47.4	47.4	23.3	23.3	23.3	23.3
	Catch (no. 1,000s)	-	-	0.1	0.3	0.0	3.4	5.4	0.0	1.1	1.5	1.4	0.3	0.4
	% Limit	-	-	10	25	1	278	440	1	88	242	229	55	61
C. opilio (COBLZ)	Sideboard Limit (no. 1,000s)	615.6	615.6	687.7	815.4	615.6	594.3	594.3	594.3	1,135	960	1,435	1,528	1,505
	Trawl Limited Access Sector PSC Limit (no. 1,000s)	No BS Trawl Limited Access					1,176	1,176	1,176	2,248	1,901	2,840	3,026	2,979
	Catch (no. 1,000s)	19.9	8.6	111.1	116.8	552.1	57.4	22.8	1,379	214.9	234.1	188.6	71.6	35.7
	% Limit	3	1	16	14	90	10	4	232	19	24	13	5	2
C. bairdi (Zone 1 & 2)	Sideboard Limit (no. 1,000s)	264.3	264.3	264.3	264.3	264.3	255.1	255.1	216.3	216.3	255.1	255.1	255.1	255.1
	Trawl Limited Access Sector PSC Limit (no. 1,000s)	No BS Trawl Limited Access					1,532	1,532	1,299	1,299	1,532	1,532	1,532	1,532
	Catch (no. 1,000s)	0.7	0.9	56.8	86.4	63.7	74.0	63.9	65.9	60.5	36.2	59.6	85.2	27.3
	% Limit	0	0	22	33	24	29	25	30	28	14	23	33	11
Herring	All Trawl Gear Limit (mt)	139	171	183	152	153	148	146	169	195	179	180	148	187
	Catch (mt)	0.0	0.6	0.5	0.1	2.1	0.0	0.0	0.0	3.1	0.2	3.1	0.5	2.7
	% Limit	0	0	0	0	1	0	0	0	2	0	2	0	1
Non-Limited PSC Species														
Chinook	Catch (no.)	-	-	36	9	21	-	-	8	-	4	87	-	109
Non-Chinook	Catch (no.)	-	-	-	-	-	-	-	-	-	-	-	54	-
Other Opilio	Catch (no. 1,000s)	-	-	-	-	-	1.4	5.5	-	0.0	0.0	0.0	-	-
Blue King Crab	Catch (no.)	-	3	-	15	129	21	-	-	-	-	29	-	-
Golden King Crab	Catch (no.)	-	-	-	-	3	-	-	-	-	-	-	-	-

Source: Developed by Northern Economics, Inc. using data from NMFS Groundfish Harvest Specification tables (National Marine Fisheries Service 2016b) and AKFIN data (Fey 2016)
"-" indicates that data value is zero. Data values reported as 0 are greater than zero, but less than rounding level.

[57] PSC taken in the BSAI Pacific cod fishery and the Atka mackerel target fishery are not reported due to data confidentiality restrictions.

11.3 Processing Sideboards

The AFA also established limits on crab processing for AFA inshore processors and AFA motherships that receive pollock harvested by a fishery cooperative. Specifically, AFA inshore processors and AFA motherships that receive pollock harvest by a fishery cooperative are "prohibited from processing, in the aggregate for each calendar year, more than the percentage of the total catch of each species of crab in directed fisheries under the (Council's) jurisdiction...than facilities operated by such owners processed of each such species in the aggregate, on average, in 1995, 1996 (and) 1997." While these processing limits were implemented by NMFS in 2000 as an interim rule, the Council later recommended that the 1995 to 1997 years used to calculate crab processing sideboard amounts be revised to include 1998 and give that year double weight.

In 2005, amendments 18 and 19 to the BSAI King and Tanner Crabs FMP rationalized BSAI crab fisheries. Under rationalization, AFA processors with historic participation in BSAI crab fisheries received crab processing quota share, thereby making AFA crab processing sideboard restrictions redundant. Regulations contained within the final rule to implement the crab rationalization program removed all requirements for AFA crab processing sideboard limits.

11.4 Non-Constraining Sideboards and Sideboards for Species Closed to Directed Fishing

Since implementation of the AFA, other regulations and amendments have altered the mechanism by which harvest and PSC sideboards limits are calculated for the AFA fleet. For AFA catcher/processors, both the yellowfin sole and Pacific cod sideboard fisheries have experienced changes resulting from Amendments 80 and 85, respectively. For yellowfin sole, Amendment 80 relieved the AFA sideboard limits for yellowfin sole when the initial TAC is equal to or greater than 125,000 mt. However, when the initial TAC is below 125,000 mt, the sideboards are still in effect. Amendment 80 also allocates a proportion of the yellowfin sole initial TAC between the Amendment 80 and BSAI trawl limited access sectors.[58] AFA sideboards for the yellowfin sole fishery are then determined by the 1995–1997 historic AFA ratio of catch to TAC multiplied by the (smaller) allocation made to the BSAI trawl limited access sector. For example, the historic sideboard ratio for AFA catcher/processors and catcher vessels is 0.23 and 0.0647, respectively. For an initial TAC of 100,000 mt, the allocation to the Amendment 80 sector would be 92,036 mt, and the allocation to the BSAI trawl limited access sector would be 7,964 mt. Since the initial TAC for yellowfin sole is below 125,000 mt, the sideboard limit is in effect—the catcher/processor sideboard limit would be 23,000 mt (0.23 X 100,000 mt) and the catcher vessel sideboard limit would be 6,470 mt (0.0647 X 100,000 mt). In this scenario, the sideboard limit for catcher/processors is non-constraining—i.e. the sideboard limit is higher than the total allocation to the BSAI trawl limited access sector, while the AFA catcher vessel sideboard limit is 81 percent of the total.

Establishment of a Pacific cod allocation to AFA catcher/processors under Amendment 85 negated Pacific cod sideboard limits for these catcher/processors. For this reason, Pacific cod was added to the list of exceptions to the groundfish species or species groups for which sideboard harvest limits are calculated for the listed AFA trawl catcher/processors. However, halibut and crab PSC sideboard limits are maintained as currently specified in regulations. Before the implementation of Amendment 80, halibut and crab PSC limits were made to all BSAI trawl fisheries by target fishery categories and PSC sideboards were calculated using a historic ratio. After the implementation of Amendment 80, PSC limits for BSAI trawl fisheries are further apportioned between the Amendment 80 fleet and AFA fleet.

[58] The proportion of yellowfin sole allocated to each fishery fluctuates with the yellowfin sole TAC. See 50 CFR part 679 Table 34.

In much the same way the yellowfin sole sideboard limit has become non-constraining (described above), PSC sideboard limits for AFA vessels are also non-constraining. For example, the halibut PSC sideboard limit for AFA catcher vessels participating in the BSAI Pacific cod fishery is 887 mt (825 mt in 2007). Beginning in 2008, the BSAI trawl limited access PSC limit for Pacific cod was 585 mt—302 mt smaller than the AFA catcher vessel sideboard limit. Because the BSAI trawl limited access halibut PSC limit for the Pacific cod target category is smaller than the AFA catcher vessel sideboard PSC limit, the sideboard limit is no longer constraining. A list of all AFA vessel PSC sideboard limits, herring PSC limits, and BSAI trawl limited access sector PSC limits is provided in Appendix C.

In addition to sideboard limits that are no longer constraining due to regulatory changes, many other sideboard limits are effectively non-constraining because NMFS prohibits directed fishing for these species—this is particularly true for species that were never intended as a target fishery, but were merely the result of incidental catch in other target fisheries. For the majority of non-target sideboard species, historic catch amounts are too small to support a directed fishery and are generally closed by NMFS at the beginning of each year. However, the incidental catches for these species often exceed the sideboard limits unless an overfishing limits is approached, as the Council did not intend to have incidental catch of sideboard species be a cause for moving to prohibited species status or closing other target fisheries. This management approach effectively renders the sideboard limits for species closed at the beginning of the year non-constraining. A summary of all AFA vessel sideboard limits and catch amounts in BSAI and GOA groundfish fisheries is provided in Appendix B.

Recommendations for Non-Constraining Sideboards and Sideboards for Species Closed to Directed Fishing

The AFA Program Review provides NMFS with the opportunity to review current AFA Program regulations to evaluate whether they could be streamlined and/or clarified. In this section, NMFS has identified some potential areas for improved management of sideboard limits in the AFA regulations and some recommendations of how these areas may be addressed. These recommendations are divided into the following sections: catcher vessel GOA groundfish harvesting sideboards, catcher vessel BSAI groundfish harvesting sideboards, and catcher/processor BSAI groundfish harvesting sideboards.

Catcher vessel GOA groundfish harvesting sideboards

As Table 17 in Section 11.1.2 shows, several of the GOA groundfish harvesting sideboards for AFA catcher vessels are not opened for directed fishing where the sideboard limits are not large enough to support a directed fishery. NMFS annually publishes a list of these sideboards closed to directed fishing (Table 30; 81 FR 14768; March 18, 2016). **To streamline the management of the GOA groundfish harvesting sideboards, NMFS recommends prohibiting directed fishing by regulation for those species (and any future break-out or combination of these species) for non-exempt AFA catcher vessels where the sideboard limits are not large enough to support a directed fishery and thus removing the sideboard for that species.** If circumstances were to change in the future, NMFS would address any readjustments to sideboards through additional rulemaking. These species would include:

- Pacific cod in the Eastern regulatory area/district
- Shallow-water flatfish in the Eastern regulatory area/district
- Deep-water flatfish in the Western regulatory area/district
- Rex sole in the Eastern and Western regulatory area/district
- Arrowtooth flounder in the Eastern and Western regulatory area/district
- Flathead sole in the Eastern and Western regulatory area/district
- Pacific ocean perch in the Western regulatory area/district

- Northern rockfish Western regulatory area/district
- Dusky rockfish in the entire GOA
- Demersal shelf rockfish in the SEO district
- Sculpins in the entire GOA
- Squids in the entire GOA

Catcher vessel BSAI groundfish harvesting sideboards

As Table 25 (in Appendix B) shows, several of the BSAI groundfish harvesting sideboards for AFA catcher vessels are not opened for directed fishing where the sideboard limits are not large enough to support a directed fishery. NMFS annually publishes a list of these sideboards closed to directed fishing (Table 26; 81 FR 14794; March 18, 2016). **To streamline the management of the BSAI groundfish harvesting sideboards, NMFS recommends prohibiting directed fishing by regulation for those species (and any future break-out or combination of these species) for non-exempt AFA catcher vessels where the sideboard limits are not large enough to support a directed fishery and thus removing the sideboard for that species.** If circumstances were to change in the future, NMFS would address any readjustments to sideboards through additional rulemaking. These species would include:

- Sablefish in the BS and AI
- Atka mackerel in the Eastern AI/BS, Central AI (CAI), and Western AI (WAI)
- Greenland turbot in the BS and AI
- Arrowtooth flounder in the BSAI
- Kamchatka flounder in the BSAI
- Alaska plaice in the BSAI
- Other flatfish[2] in the BSAI
- Flathead sole in the BSAI
- Rock sole in the BSAI
- Pacific ocean perch in the BS, EAI, CAI, and WAI
- Northern rockfish in the BSAI
- Shortraker rockfish in the BSAI
- Rougheye rockfish in the BS/EAI and CAI/WAI
- Other rockfish[3] in the BS and AI
- Skates in the BSAI
- Sculpins in the BSAI
- Sharks in the BSAI
- Squids in the BSAI
- Octopuses in the BSAI

Catcher/processor BSAI groundfish harvesting sideboards

As Table 26 (in Appendix B) shows, several of the BSAI groundfish harvesting sideboards for AFA catcher/processors are not opened for directed fishing where the sideboard limits are not large enough to support a directed fishery. NMFS annually publishes a list of these sideboards closed to directed fishing (Table 25; 81 FR 14793; March 18, 2016). **To streamline the management of the BSAI groundfish harvesting sideboards, NMFS recommends prohibiting directed fishing by regulation for those species (and any future break-out or combination of these species) for non-exempt AFA catcher/processors where the sideboard limits are not large enough to support a directed fishery and thus removing the sideboard for that species.** If circumstances were to change in the future, NMFS would address any readjustments to sideboards through additional rulemaking. These species would include:

- Sablefish trawl in the BS and AI
- Rock sole in the BSAI
- Greenland turbot in the BS and AI
- Arrowtooth flounder in the BSAI
- Kamchatka flounder in the BSAI
- Alaska Plaice in the BSAI
- Other flatfish[59] in the BSAI
- Flathead sole in the BSAI
- Pacific ocean perch in the BS, EAI, CAI, and WAI
- Northern Rockfish in the BSAI
- Shortraker Rockfish in the BSAI
- Rougheye Rockfish in the EBS/EAI and CAI/WAI
- Other rockfish[60] in the BS and AI
- Skates in the BSAI
- Sculpins in the BSAI
- Sharks in the BSAI
- Squids in the BSAI
- Octopuses in the BSAI

[59] ''Other flatfish'' includes all flatfish species, except for halibut, Alaska plaice, flathead sole, Greenland turbot, rock sole, yellowfin sole, Kamchatka flounder, and arrowtooth flounder.

[60] ''Other rockfish'' includes all Sebastes and Sebastolobus species except for Pacific ocean perch, northern rockfish, shortraker rockfish, and rougheye rockfish.

12 Fishing Vessel Safety[61]

With the establishment of cooperatives under the AFA and subsequent lessening of the race-for-fish, AFA vessel vessels can better choose when to fish during the longer fishing season, thereby maximizing safe weather and sea conditions. The extended fishing season has also led to more stable employment, which results in crews that are better trained and more experienced. Further, to the extent that the AFA has helped improve the profitability of fishing operations, vessel owners can perform additional preventive and corrective vessel maintenance that will enhance safety at sea (Hughes and Woodley 2007; Lincoln et al. 2007).

Lincoln et al. (2007) attempted to quantify the safety improvements in the BS pollock fishery following passage of the AFA using data from the U.S. Coast Guard. The analysis was restricted to reported non-fatal injuries that occurred between 1995 and 2005. When pre- and post-AFA implementation periods were compared, the rate of nonfatal injuries had decreased by 76 percent. However, upon studying annual rates, Lincoln et al. discovered that the decline started to occur before AFA implementation. The authors suggested that the decline of non-fatal injuries pre-1999 could have been because the fishing companies that owned vessels operating in the BS pollock fishery had started developing occupational safety programs at that time which focused on preventing these types of injuries.

Case et al. (2016) analyzed the number of fatalities that have occurred in the BS pollock fishery since implementation of the AFA. They found that the five fatalities reported for the fishery during 2002 to 2014 is low compared to other Alaska fisheries. The authors note that the relatively few fatalities highlights the success of the BS pollock fleet in maintaining a high level of vessel safety, and conclude that the fleet is among the safest in Alaska. Nevertheless, Case et al. caution that the continuing fatalities are reminders that serious hazards still exist in the fleet. Similarly, Lincoln et al. (2007) note that while the AFA generally slowed the pace of the BS pollock fishery, there are still economic pressures present, such as delivery deadlines and harvesting the most fish during their prime stage of life, that influence fishermen's risk-taking behavior.

Since implementation of the AFA, there have been three major safety incidents involving AFA vessels:

- In 2001, the catcher vessel, Amber Dawn, sank north of Atka while fishing for Pacific cod. Two of the five crew members were lost at sea (Anonymous 2001). This incident is not reported in the report at Appendix D because the vessel was not fishing for BS pollock at the time of the incident.
- In 2008, the catcher/processor, Pacific Glacier, caught fire 136 miles northeast of Dutch Harbor. There were no fatalities, and the vessel made it to port. The vessel was refurbished, and it resumed operating in the BS pollock fishery in 2009 (Fredrickson 2008; Fey 2016).
- In 2009, the catcher vessel, Mar-Gun, was grounded on St. George Island. There were no fatalities. The vessel was refloated in May of the same year, but it has not returned to the BS pollock fishery (Anonymous 2009; Fey 2016).

[61] This section is based, in part, on information in a report prepared for this AFA Program review by Samantha Case, Devin Lucas, and Krystal Mason, National Institute of Occupational Safety and Health, Western States Division, Alaska Office. The complete report is attached as Appendix D.

13 Management Costs and Cost Recovery[62]

The shift to a cooperative management structure under the AFA placed more of the monitoring and enforcement burden on the participants of the fishery. By aligning the interests of participants of the BS pollock fishery, while simultaneously providing participants the autonomy to operate in a manner they deem most fit, this style of management has allowed many aspects of the fishery to be managed more precisely, including levels of participation and sideboard and PSC limits (Section 3).

Nevertheless, there are also public sector costs related to implementation of the AFA Program. As discussed in Section 1, NMFS manages the AFA Program as a limited access privilege program. Section 304(d) of the MSFCMA authorizes and requires the collection of cost recovery fees for limited access privilege programs and the CDQ program. Cost recovery fees recover the actual costs directly related to the management, data collection, and enforcement of the programs (direct program costs). Section 304(d) mandates that cost recovery fees not exceed three percent of the annual ex-vessel value of fish harvested by a program subject to a cost recovery fee, and that the fee be collected either at the time of landing, filing of a landing report, or sale of such fish during a fishing season or in the last quarter of the calendar year in which the fish is harvested.

In early 2016, NMFS published a final rule to implement cost recovery for the AFA Program (81 FR 150, January 5, 2016). Cost recovery requirements for the AFA sectors are at 50 CFR § 679.66. The cooperatives established under the AFA are responsible for paying the fee for BS pollock landed under the AFA, due on December 31 of the year in which the landings were made. The total dollar amount of the fee is determined by multiplying the calculated fee percentage by the ex-vessel value of all landings under the program made during the fishing year. NMFS calculates the fee percentage each year according to the factors and methods described at 50 CFR § 679.66(c)(2). NMFS calculates the fee percentage that applies to landings made during the year by dividing the direct program costs by the fishery value. NMFS published notice of the 2016 fee percentages for the AFA Program in the *Federal Register* (81 FR 85522, November 28, 2016).

Direct program costs are calculated by determining the incremental management costs of the AFA Program—that is, costs that would not have been incurred but for the AFA Program. These costs cover the direct program costs to NMFS (including Restricted Access Management [RAM], Information Services Division [ISD], Sustainable Fisheries Division [SFD], Operations and Management Division [OMD], and Alaska Fisheries Science Center [AFSC], Alaska Department of Fish and Game [ADF&G], and the Pacific States Marine Fisheries Commission [PSMFC]). For 2016, the direct program costs were tracked from February 4, 2016 (the effective date of the cost recovery rule), to September 30, 2016 (the end of the fiscal year). In subsequent years, direct program costs will be calculated based on a full fiscal year.

To arrive at the NMFS costs every year, each management unit calculates its AFA Program-associated costs through an established accounting system that allows staff to track labor, travel, contracts, rent, and procurement. The management units are: RAM, ISD, SFD, OMD, AFSC, and the ADF&G. These costs are broken out by cost categories including personnel/overhead, travel, transportation, printing, contracts/training, supplies, equipment, and rent/utilities. Table 21, Table 22, and Table 23 display the direct program costs for fiscal year 2016 for the catcher/processor sector, mothership sector, and inshore sector, respectively. For all three sectors, the highest costs were attributed to the AFSC, which includes the Fisheries Monitoring and Analysis Program (FRAM) and the Economic and Social Sciences Research Program (ESSRP), and grant funding for PSMFC.

[62] This section was authored by Keeley Kent, Fishery Management Specialist, NMFS Alaska Regional Office.

Table 22. Direct Program Costs for the AFA Catcher/Processor Sector, February 4, 2016 through September 30, 2016

	Operations & Management Division	Sustainable Fisheries Division	Information Systems Division	Alaska Fisheries Science Center	Alaska Department of Fish & Game	Total
Personnel/Overhead	$ 900	$ 5,333	$ 4,367	$ 50,573	$ 6,075	$ 67,248
Personnel Benefits	$ 300	$ 1,933	$ 1,800	-	-	$ 4,033
Travel	-	$ 333	-	-	$ 15	$ 348
Transportation	-	-	-	-	-	-
Printing	-	$ 100	-	-	-	$ 100
Contracts/Training	-	-	$ 21,498	-	$ 571	$ 22,068
Supplies	-	-	-	-	-	-
Equipment	-	-	-	-	-	-
Rent/Utilities	-	-	-	-	-	-
Other	-	-	-	$ 46,441	-	$ 46,441
Total	$ 1,200	$ 7,700	$ 27,664	$ 97,014	$ 6,662	$ 140,239

Notes: AFSC direct program costs include grants to PSMFC.

Table 23. Direct Program Costs for the AFA Mothership Sector, February 4, 2016 through September 30, 2016

	Operations & Management Division	Sustainable Fisheries Division	Information Systems Division	Alaska Fisheries Science Center	Alaska Department of Fish & Game	Total
Personnel/Overhead	$ 900	$ 3,833	$ 4,367	$ 13,880	$ 6,075	$ 29,055
Personnel Benefits	$ 300	$ 1,433	$ 1,800	-	-	$ 3,533
Travel	-	$ 333	-	-	$ 15	$ 348
Transportation	-	-	-	-	-	-
Printing	-	-	-	-	-	-
Contracts/Training	-	-	$ 21,498	-	$ 571	$ 22,068
Supplies	-	-	-	-	-	-
Equipment	-	-	-	-	-	-
Rent/Utilities	-	-	-	-	-	-
Other	-	-	-	$ 5,289	-	$ 5,289
Total	$ 1,200	$ 5,600	$ 27,664	$ 19,169	$ 6,662	$ 60,295

Notes: AFSC direct program costs include grants to PSMFC

Table 24. Direct Program Costs for the AFA Inshore Sector, February 4, 2016 through September 30, 2016

	Operations & Management Division	Restricted Access Management	Sustainable Fisheries Division	Information Systems Division	Alaska Fisheries Science Center	Alaska Department of Fish & Game	Total
Personnel/Overhead	$ 900	$ 2,000	$ 4,333	$ 4,367	$ 40,317	$ 6,075	$ 57,992
Personnel Benefits	$ 300	$ 800	$ 1,533	$ 1,800	-	-	$ 4,433
Travel	-	-	$ 500	-	-	$ 15	$ 515
Transportation	-	-	-	-	-	-	-
Printing	-	-	-	-	-	-	-
Contracts/Training	-	-	-	$ 21,498	-	$ 571	$ 22,068
Supplies	-	-	-	-	-	-	-
Equipment	-	-	-	-	-	-	-
Rent/Utilities	-	-	-	-	-	-	-
Other	-	-	-	-	$ 81,144	-	$ 81,144
Total	$ 1,200	$2,800	$ 6,367	$ 27,664	$ 121,462	$ 6,662	$ 166,154

Notes: AFSC direct program costs include grants to PSMFC

Cost recovery fees do not increase agency budgets or expenditures. They simply offset funds that would otherwise have been appropriated, except the ADF&G and PSMFC expenditures for which there is no direct appropriation. No budgetary advantage is gained by inflating direct program costs. NMFS has established an annual process to monitor and review direct program costs to ensure that direct program costs are consistent with NMFS guidelines for cost recovery programs and the requirements of the MSFCMA.

The types of tasks that fall under AFA direct program costs include, but are not limited to:

- rulemaking (SFD),
- calculation of BS pollock allocations and sideboards in other fisheries (SFD),
- management of sideboards (SFD),
- review of weekly inshore catch reports (SFD),
- review of annual cooperative reports (SFD),
- incentive plan agreement review and approval (SFD),
- maintenance of the catch accounting system (ISD, ADF&G),
- programming and web design for online applications (ISD),
- processing cooperative applications (RAM),
- processing vessel replacement applications (RAM),
- at-sea scale inspections (SFD),
- observer sampling station inspections (SFD),
- video equipment inspections (SFD),
- fee determination and collection process (OMD),
- deployment of second observer (FRAM), and
- Amendment 91 Chinook Salmon Bycatch Economic Data Reports (ESSRP).

Using the fee percentage formula described above, the estimated percentage of direct program costs to fishery value for the 2016 calendar year was 0.10 percent for the catcher/processor sector, 0.17 percent for the mothership sector, and 0.10 percent for the inshore sector.

For purposes of calculating the fishery value for the AFA, NMFS calculates a standard ex-vessel price (standard price) for BS pollock. NMFS calculates the standard price using the most recent annual value information reported to the ADF&G for the Commercial Operator's Annual Report and compiled in the Alaska Commercial Fisheries Entry Commission Gross Earnings data for BS pollock. Due to the time required to compile the data, there is a one-year delay between the gross earnings data year and the fishing year to which it is applied. For example, NMFS used 2015 gross earnings data to calculate the standard price for 2016 BS pollock landings. Each landing made under the AFA is multiplied by the appropriate standard price to arrive at an ex-vessel value for each landing. These values are summed together to arrive at the ex-vessel value for the AFA (fishery value).

Appendices

Appendix A

Appendix A provides additional PSC and PSC rate figures, by AFA sector, in the BS directed pollock fishery. PSC species include: Pacific herring, red king crab (in Zone 1), *Chionoecetes opilio* (in the COBLZ), other *C. opilio*, *Chionoecetes bairdi* (in Zone 1 and 2).

Figure 54 - Total Groundfish Caught in the BS pollock Fishery by AFA Sector, 2003–2015

Figure 55 - Red King Crab PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015

Figure 56 - *C. Opilio* PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015

Figure 57 - *C. Bairdi* PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015

Figure 58 - Herring PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015

Appendix B

Appendix B contains tables summarizing sideboard limits, harvest, and participation by AFA fleet in BSAI and GOA sideboard fisheries as reported by catcher vessel intercooperative reports and inshore cooperative reports.[63]

Table 25 - AFA Catcher Vessel Harvest and Participation in BSAI Sideboard Fisheries, 2001–2015

Table 26 - AFA Catcher/Processor Harvest and Participation in BSAI Sideboard Fisheries, 2001–2015

Table 27 - AFA Catcher Vessel Harvest and Participation in GOA Sideboard Fisheries, 2001–2015

For all tables:

- All sideboard limits and catch are aggregated across seasons and areas where applicable.
- "N/A" indicates that data are unavailable.
- "-" indicates the data value is zero. Data reported as 0.0 are greater than zero, but less than rounding level.
- Aggregate catch for years 2013 – 2015 are estimated using AKFIN data.

Appendix C

Appendix C contains tables summarizing AFA catcher vessel and catcher/processor PSC sideboard limits and BSAI trawl limited access PSC limits (after the implementation of Amendment 80).[64] Additional PSC amount and rate figures are included for AFA catcher vessels and AFA catcher/processors participating in the BSAI Pacific cod and yellowfin sole fisheries, respectively, including total groundfish taken. Additional PSC figures are also included for AFA catcher/vessels participating in the deep- and shallow-water target fisheries in the GOA.

Table 28 - Non-Exempt AFA Catcher Vessel PSC Sideboard Limits in BSAI Pacific Cod Fishery, 2003–2015

Table 29 - AFA Catcher/Processor PSC Sideboard Limits in BSAI Fisheries, 2003–2015

[63] Beginning in 2013, only data for GOA sideboard fisheries in which directed fishing occurred are reported in the intercooperative catcher vessel reports. NMFS groundfish harvest specification tables are used to report sideboard limits in the GOA starting in 2013.

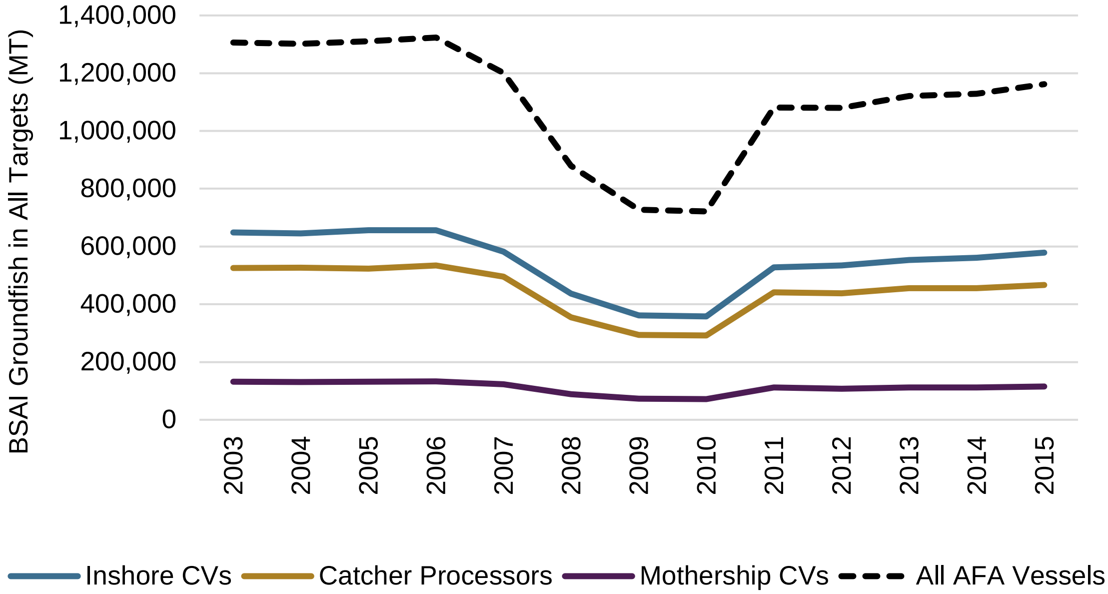
[64] All PSC limits reflect initial apportionments, and do not reflect limits after in-season adjustments.

Appendix D

Appendix D is a report prepared for the AFA Program review by Samantha Case, Devin Lucas, and Krystal Mason, National Institute of Occupational Safety and Health, Western States Division, Alaska Office.

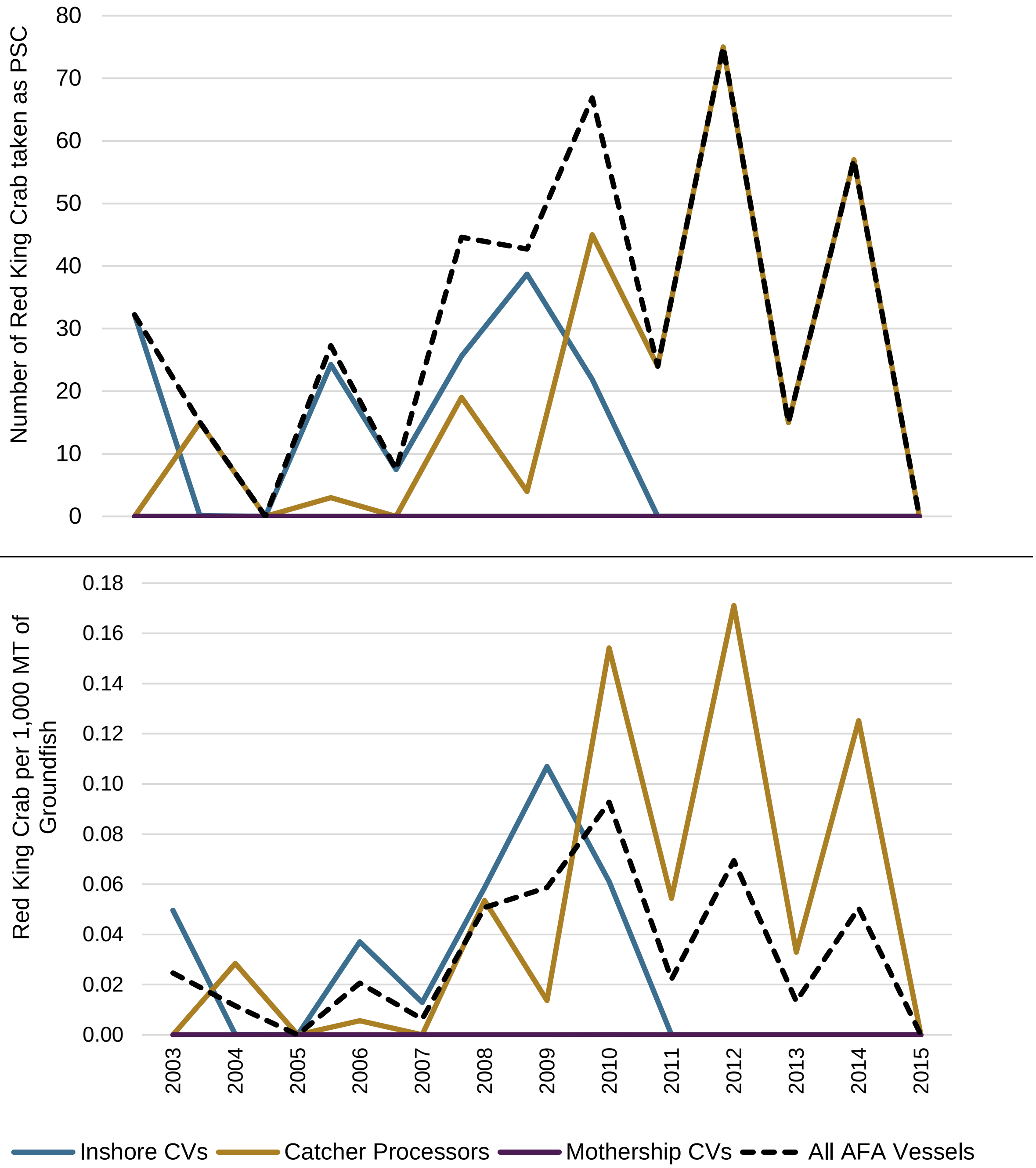
Appendix A: AFA Sideboard PSC Taken in BS pollock Fishery

Figure 54. Total Groundfish Caught in the BS pollock Fishery by AFA Sector, 2003–2015



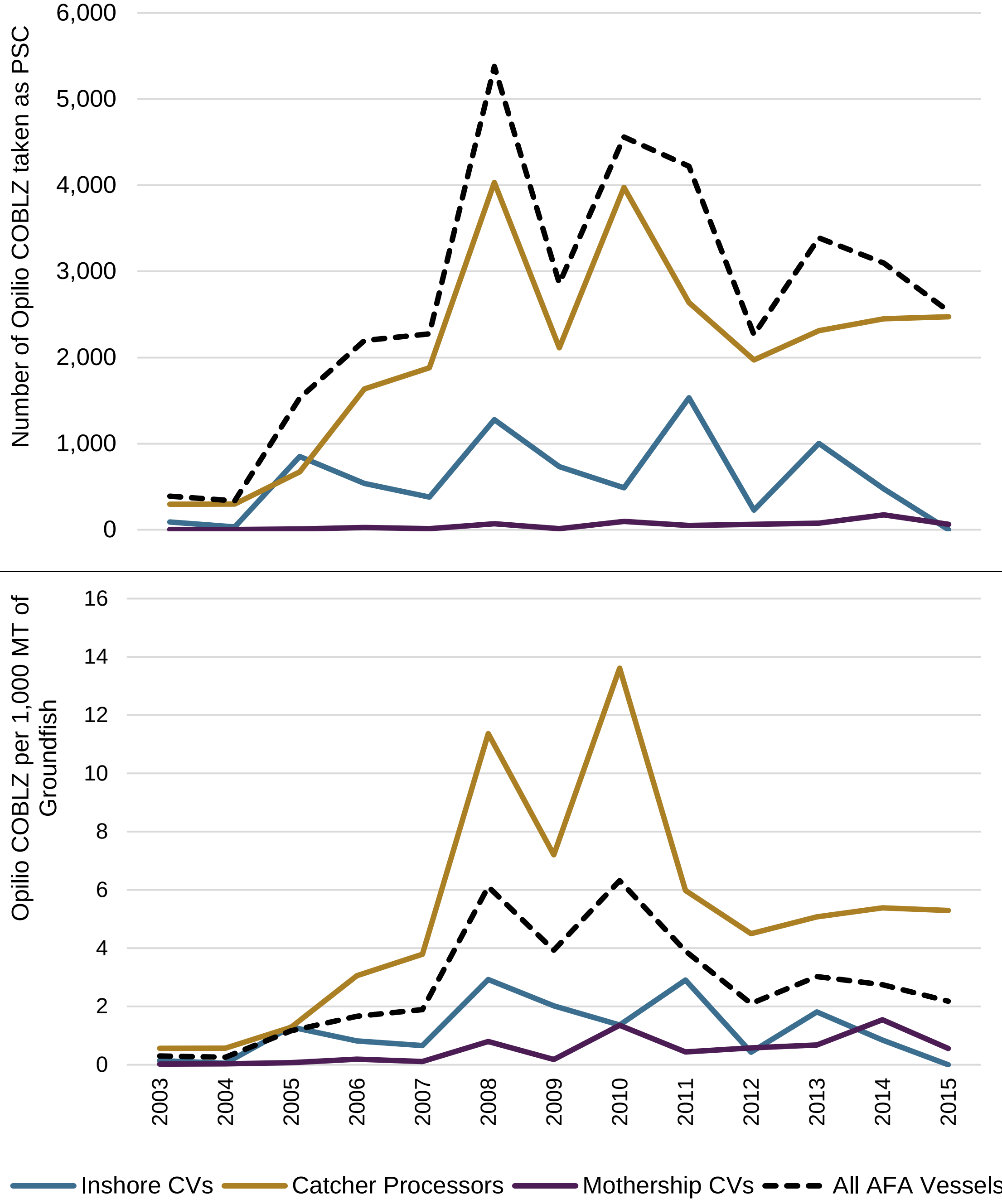
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 55. Red King Crab PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015



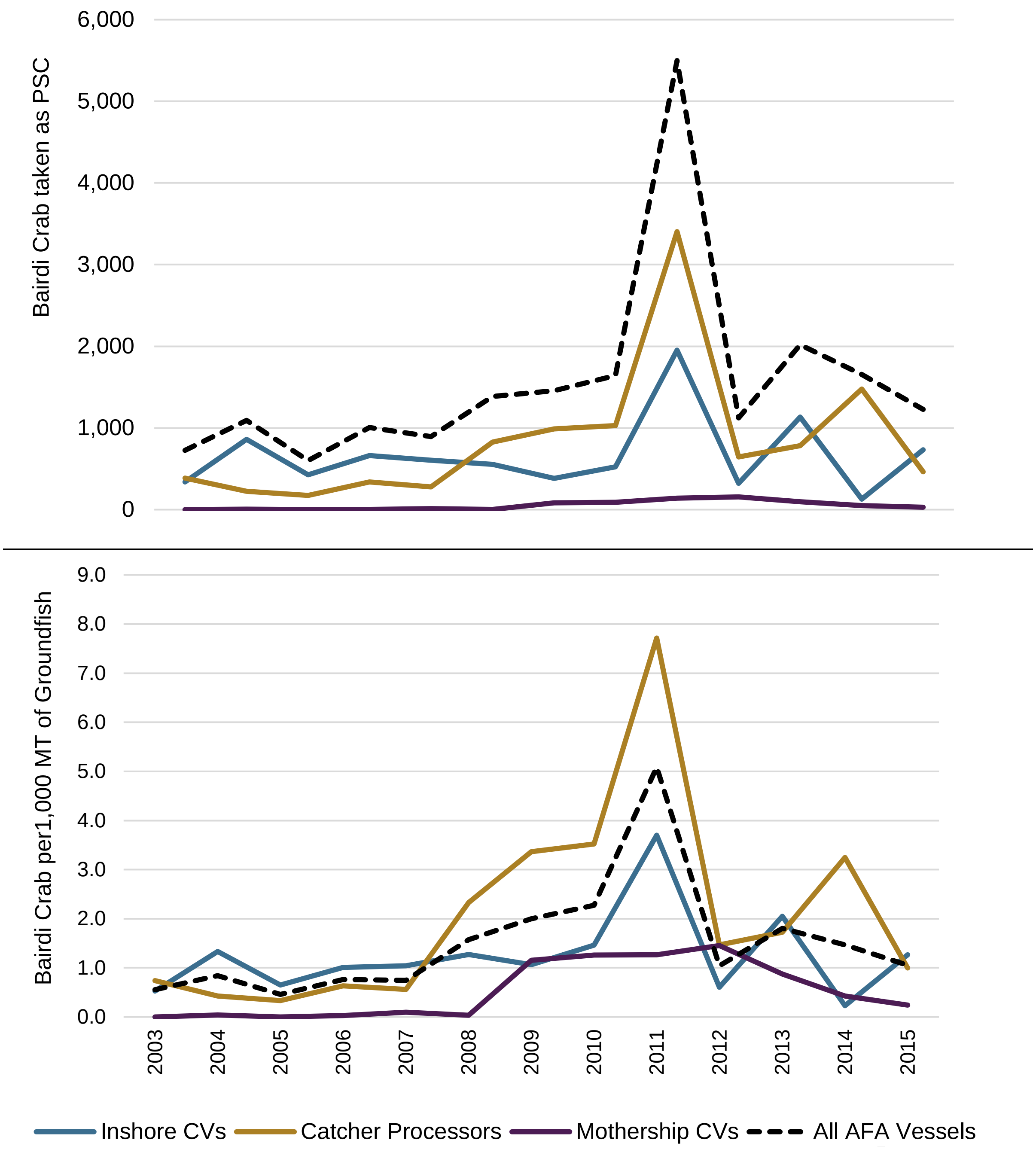
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 56. *C. Opilio* PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015



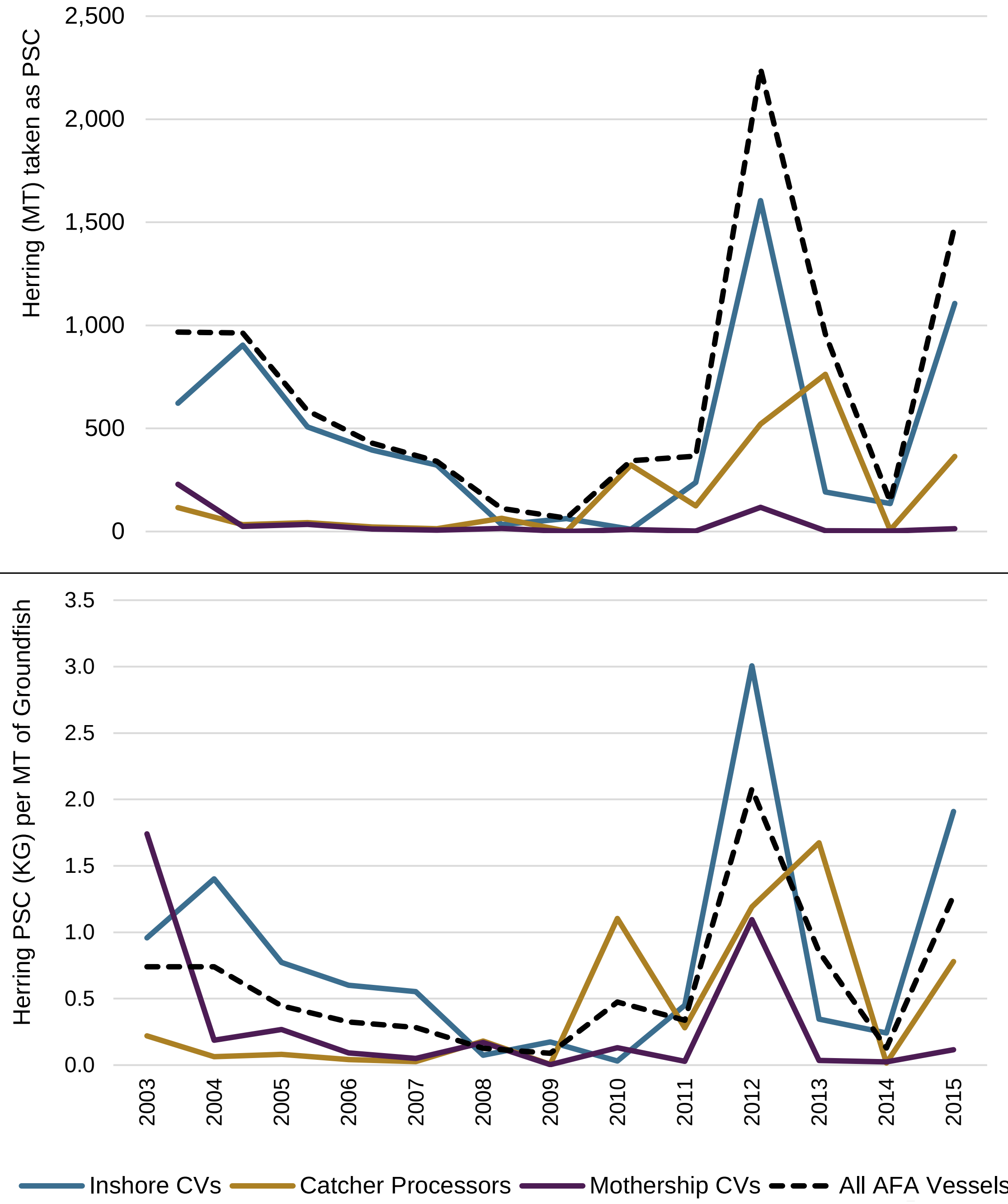
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 57. *C. Bairdi* PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 58. Herring PSC Amount and Rate in the BS pollock Fishery by AFA Sector, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Appendix B: BSAI and GOA Groundfish Sideboard Fishery Harvest and Participation by AFA Vessels

Table 25. AFA Catcher Vessel Harvest and Participation in BSAI Sideboard Fisheries, 2001–2015

Species		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pacific Cod	Sideboard Limit (1,000 mt)	31.5	37.4	38.8	46.9	38.6	36.3	32.0	29.0	30.0	28.7	28.7	44.4	44.2	43.2	42.4
	Aggregate Catch (1,000 mt)	13.5	35.7	28.4	28.4	33.5	23.4	22.5	21.6	22.7	22.3	21.4	27.7	25.9	27.0	21.8
	% Limit Harvested	43	95	73	61	87	65	70	74	76	78	75	62	59	63	51
	No. of Directed Fishing CVs	45	47	50	52	39	37	38	40	29	24	42	26	29	30	30
	Directed Fishing Catch (1,000 mt)	9.4	20.6	19.5	19.8	16.3	17.5	16.4	16.0	11.3	10.7	11.7	15.3	17.1	20.8	13.8
Yellowfin Sole	Sideboard Limit (1,000 mt)	6.8	4.7	4.6	4.7	4.9	5.3	7.5				No Limit				
	Aggregate Catch (1,000 mt)	0.2	0.2	0.1	0.2	0.1	0.4	0.2	0.1	-	-	-	-	-	0.3	-
	% Limit Harvested	3.3	3.3	2.9	3.5	2.6	8.0	2.2	-	-	-	-	-	-	-	-
	No. of Directed Fishing CVs	-	-	-	-	-	3	1	-	-	-	-	-	-	-	1
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	0.4	0.2	-	-	-	-	-	-	-	0.7
Rock Sole	Sideboard Limit (1,000 mt)	1.6	1.6	1.3	1.2	1.2	1.2	1.6	2.3	2.7	2.7	2.6	2.6	2.8	2.6	2.1
	Aggregate Catch (1,000 mt)	1.2	1.9	1.9	2.1	1.4	1.2	2.0	1.6	5.7	1.1	2.4	2.5	1.0	1.2	0.7
	% Limit Harvested	76	119	149	173	115	96	125	71	206	41	93	95	36	47	31
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arrowtooth/ Kamchatka Flounder	Sideboard Limit (1,000 mt)	1.1	0.9	0.7	0.7	0.7	0.8	1.2	4.4	4.4	4.4	2.6	2.5	2.1	1.9	1.7
	Aggregate Catch (1,000 mt)	0.5	0.7	1.3	1.1	0.8	0.9	1.9	1.2	1.7	0.8	0.8	0.5	0.4	0.4	0.2
	% Limit Harvested	47	75	180	157	120	116	164	27	38	17	31	21	20	19	12
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Species	Sideboard Limit (1,000 mt)	0.6	1.4	1.6	1.3	1.3	1.3	1.7	2.3	2.3	2.3	1.0	1.7	1.6	1.5	1.4
	Aggregate Catch (1,000 mt)	0.8	0.7	1.0	1.5	0.8	0.9	1.3	2.5	3.0	1.1	1.1	1.2	0.8	0.7	0.6
	% Limit Harvested	120	50	65	121	59	70	76	111	132	48	111	72	50	46	42
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flathead Sole	Sideboard Limit (1,000 mt)	1.7	1.1	0.9	0.8	0.8	0.8	1.3	2.3	2.7	2.7	1.9	1.5	1.0	1.1	1.1
	Aggregate Catch (1,000 mt)	0.7	0.8	0.9	1.1	1.9	1.5	2.6	2.4	2.9	1.3	1.7	1.4	0.9	1.0	0.6
	% Limit Harvested	44	74	105	138	230	183	205	106	108	47	91	89	85	92	59
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alaska Plaice	Sideboard Limit (1,000 mt)	N/A	0.5	0.4	0.4	0.3	0.3	0.9	1.9	1.9	1.9	0.6	0.9	0.8	0.9	0.7
	Aggregate Catch (1,000 mt)	-	0.0	-	0.0	-	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
	% Limit Harvested	N/A	6	-	2	-	163	1	1	3	0	1	1	1	2	16
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Squid	Sideboard Limit (1,000 mt)	0.7	0.6	0.6	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.1	0.1	0.2	0.1	0.1
	Aggregate Catch (1,000 mt)	1.3	0.9	0.5	0.7	0.8	0.9	0.5	1.2	0.1	0.2	0.1	0.5	0.1	0.9	2.0
	% Limit Harvested	194	144	79	159	187	226	79	192	22	36	80	346	39	916	1,524
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Species		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pacific Ocean Perch	Sideboard Limit (1,000 mt)	0.2	0.3	0.2	0.1	0.1	0.1	0.2	0.4	0.4	0.4	0.5	0.5	0.9	0.7	0.8
	Aggregate Catch (1,000 mt)	0.2	0.2	0.2	0.3	0.4	0.6	0.5	0.2	0.1	0.1	0.2	0.4	0.3	0.4	1.0
	% Limit Harvested	90	80	139	202	270	439	216	46	26	29	31	70	32	54	138
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Flatfish	Sideboard Limit (1,000 mt)	1.3	0.1	0.1	0.1	0.1	0.1	0.4	0.8	0.7	0.6	0.1	0.1	0.1	0.1	0.1
	Aggregate Catch (1,000 mt)	0.1	0.2	0.3	0.4	0.5	0.0	0.9	0.4	0.3	0.2	0.3	0.3	0.1	0.2	0.1
	% Limit Harvested	5	158	257	330	353	4	233	51	43	35	286	290	66	168	99
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenland Turbot	Sideboard Limit (1,000 mt)	0.2	0.4	0.2	0.2	0.2	0.1	0.1	0.1	0.3	0.3	0.2	0.4	0.1	0.1	0.1
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Limit Harvested	9	4	8	2	3	14	13	35	2	1	1	4	4	3	5
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sablefish	Sideboard Limit (1,000 mt)	0.0	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	-	-	-	-	-
	% Limit Harvested	72	34	10	10	8	4	-	1	1	-	-	-	-	-	-
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Atka Mackerel	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
	Aggregate Catch (1,000 mt)	0.1	-	0.7	1.3	0.7	1.0	0.3	0.0	0.0	0.1	0.9	0.2	0.1	-	0.0
	% Limit Harvested	285	-	1,950	3,395	3,088	3,815	468	30	55	74	1,586	219	144	-	46
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sharpchin/ Northern Rockfish	Sideboard Limit (1,000 mt)	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0
	% Limit Harvested	133	39	84	121	95	266	72	92	108	31	32	74	128	347	174
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Rockfish	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Limit Harvested	7	153	244	225	300	286	471	214	217	83	133	14	133	200	129
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shortraker/ Rougheye	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	-
	% Limit Harvested	-	-	54	67	-	33	50	50	12	28	-	67	-	67	-
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 26. AFA Catcher/Processor Harvest and Participation in BSAI Sideboard Fisheries, 2001–2015

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Yellowfin Sole	Sideboard Limit (1,000 mt)	24.4	22.4	17.0	13.5	16.8	17.7	18.7	26.6							No Limit	
	Aggregate Catch (1,000 mt)	7.4	2.0	2.0	4.5	4.2	7.6	12.5	20.6	17.1	11.3	19.5	23.9	22.5	23.7	23.2	9.3
	% Sideboard Limit	30	9	12	33	25	43	67	78	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	4	3	3	3	3	5	6	8	12	8	9	9	10	8	10	7
Pacific Cod	Sideboard Limit (1,000 mt)	11.0	10.7	10.7	10.9	12.1	11.6	10.6	9.6							Allocation	
	Aggregate Catch (1,000 mt)	2.4	2.2	0.8	1.8	1.2	2.6	2.9	1.9	1.3	0.8	0.4	-	-	-	0.7	0.1
	% Sideboard Limit	22	21	7	16	10	23	27	19	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	3	2	1	1	1	1	1	1	1	1	1	-	-	-	1	1
Atka Mackerel	Sideboard Limit (1,000 mt)	4.1	8.7	2.5	6.8	10.4	7.5	9.3	4.9	5.5	6.4	6.7	1.4	1.4	1.0	0.6	3.6
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.4	0.2	0.8
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	35	37	34	21
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1
Rock sole	Sideboard Limit (1,000 mt)	8.4	4.7	3.4	1.2	1.3	1.3	1.3	1.7	2.5	3.0	3.0	2.8	2.9	3.1	2.8	2.3
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Flatfish	Sideboard Limit (1,000 mt)	9.3	3.1	1.3	0.1	0.2	0.1	0.2	0.5	1.1	0.9	0.9	0.1	0.2	0.2	0.1	0.2
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flathead Sole	Sideboard Limit (1,000 mt)	1.5	1.2	1.2	0.4	0.6	0.6	0.6	0.9	1.6	1.9	1.9	1.3	1.1	0.7	0.8	0.8
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alaska Plaice	Sideboard Limit (1,000 mt)	-	-	0.3	0.3	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arrowtooth Flounder	Sideboard Limit (1,000 mt)	2.3	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Pacific Ocean Perch	Sideboard Limit (1,000 mt)	0.3	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sharpchin/Northern Rockfish	Sideboard Limit (1,000 mt)	0.4	0.5	0.5	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenland Turbot	Sideboard Limit (1,000 mt)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Rockfish	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Squid	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shortraker/ Rougheye	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sablefish	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Red Rockfish	Sideboard Limit (1,000 mt)	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	% Sideboard Limit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	No. Directed Fishing Catcher/Processors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 27. AFA Catcher Vessel Harvest and Participation in GOA Sideboard Fisheries, 2001–2015

Species		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014*	2015*
Pollock	Sideboard Limit (1,000 mt)	32.5	19.2	18.2	24.0	30.9	29.3	24.5	20.2	16.4	27.0	28.9	33.9	29.7	41.1	41.2
	Aggregate Catch (1,000 mt)	10.4	6.8	5.2	6.7	7.9	6.9	6.3	3.2	1.9	5.6	4.4	6.6	12.6	13.1	15.1
	% Limit Harvested	32	35	28	28	25	24	26	16	11	21	15	19	42	31	36
	Non-Exempt Directed Fishing Catcher Vessels	8	4	8	8	6	7	6	6	7	8	7	6	9	6	6
	Directed Fishing Catch (1,000 mt)	7.8	3.0	4.3	4.4	4.8	4.1	4.4	2.5	1.4	5.8	4.1	6.4	11.5	12.0	13.7
Pacific Cod	Sideboard Limit (1,000 mt)	4.0	4.1	3.8	4.3	4.0	4.9	4.9	4.8	3.8	5.3	5.8	5.8	5.4	5.8	6.8
	Aggregate Catch (1,000 mt)	0.4	0.7	0.7	0.4	0.5	0.2	0.6	0.3	0.3	0.9	1.0	0.3	0.4	0.9	0.7
	% Limit Harvested	10	17	19	8	12	3	12	7	8	17	18	5	7.2	16	10
	Non-Exempt Directed Fishing Catcher Vessels	1	2	2	3	1	1	1	2	2	3	6	3	4	3	4
	Directed Fishing Catch (1,000 mt)	0.0	0.1	0.3	0.3	0.1	0.1	0.1	0.2	0.2	0.5	0.3	0.2	0.1	0.2	0.4
Arrowtooth/ Flounder	Sideboard Limit (1,000 mt)	0.6	0.8	0.8	0.8	0.8	0.8	1.0	1.0	0.9	0.9	0.9	2.1	2.1	2.1	2.1
	Aggregate Catch (1,000 mt)	0.3	0.1	0.0	0.0	0.1	0.2	1.0	0.8	0.7	0.4	0.7	0.1	0.5	0.8	0.5
	% Limit Harvested	50	14	3	2	14	26	102	79	83	49	80	6	24.9	38	25
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	2	1	1	-	1	1	1	-	1	1	1
	Directed Fishing Catch (1,000 mt)	-	-	-	-	0.1	0.2	0.4	-	0.1	0.4	0.6	-	0.2	0.5	0.4
Pacific Ocean Perch	Sideboard Limit (1,000 mt)	0.7	1.0	1.0	1.0	1.0	1.0	1.1	1.1	0.8	1.0	0.9	1.0	1.0	1.2	1.3
	Aggregate Catch (1,000 mt)	0.3	0.4	0.4	0.4	0.3	0.2	0.6	0.4	0.3	0.0	0.4	0.0	0.5	0.8	0.6
	% Limit Harvested	41	40	35	38	30	23	59	36	33	2	47	1	53	65	47
	Non-Exempt Directed Fishing Catcher Vessels	1	2	3	3	1	2	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	0.2	0.4	0.5	0.5	0.3	0.2	-	-	-	-	-	-	-	-	-
Shallow-water Flatfish	Sideboard Limit (1,000 mt)	0.7	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	1.3	1.1	1.0	1.1
	Aggregate Catch (1,000 mt)	0.1	0.0	0.0	0.0	-	0.0	0.4	0.1	0.1	0.1	0.1	0.2	N/A	N/A	N/A
	% Limit Harvested	17	1	2	0	-	0	40	12	10	10	7	12	8	30	17
	Non-Exempt Directed Fishing Catcher Vessels	1	1	1	-	1	-	-	1	1	1	-	1	2	1	1
	Directed Fishing Catch (1,000 mt)	0.0	0.0	0.0	-	0.0	-	-	0.0	0.1	0.1	-	0.1	0.1	0.3	0.2
Northern Rockfish	Sideboard Limit (1,000 mt)	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Aggregate Catch (1,000 mt)	0.1	0.1	0.0	0.0	0.1	-	0.3	0.2	0.1	0.0	0.1	0.0	0.0	0.0	0.0
	% Limit Harvested	76	56	7	20	57	-	199	189	94	1	81	1	3	16	6
	Non-Exempt Directed Fishing Catcher Vessels	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-
	Directed Fishing Catch (1,000 mt)	0.1	0.1	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pelagic Shelf Rockfish	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Aggregate Catch (1,000 mt)	0.0	-	-	-	-	-	-	0.3	0.2	0.1	0.0	0.0			
	% Limit Harvested	33	-	-	-	-	-	-	6,140	3,850	1,750	13	933		N/A	
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-			
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			

Species		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014*	2015*
Rex Sole	Sideboard Limit (1,000 mt)	0.1	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.2
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.3	0.0
	% Limit Harvested	17	3	0	0	0	1	8	9	18	37	35	3	54	138	20
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	1	1	-	-	1	1	-
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	0.1	0.1	-	-	0.0	0.1	-
Flathead Sole	Sideboard Limit (1,000 mt)	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.4			
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0			
	% Limit Harvested	57	21	7	1	12	2	37	53	17	78	64	12			
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
Other Species	Sideboard Limit (1,000 mt)	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1			
	Aggregate Catch (1,000 mt)	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0			
	% Limit Harvested	16	8	107	9	1	1	373	51	54	221	16	34			
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
Sablefish	Sideboard Limit (1,000 mt)	0.0	0.1	0.1	0.1	0.1	2.1	0.1	0.1	0.1	0.1	0.1	0.1			
	Aggregate Catch (1,000 mt)	0.0	0.0	0.0	-	-	-	0.1	0.0	0.0	0.0	0.0	-			
	% Limit Harvested	90	26	21	-	-	-	49	42	43	12	58	-			
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
Deep-water Flatfish	Sideboard Limit (1,000 mt)	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.2	0.2	0.2	0.1		
	Aggregate Catch (1,000 mt)	0.0	0.1	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	N/A		
	% Limit Harvested	12	32	3	2	-	-	4	1	1	9	5	-	-		
	Non-Exempt Directed Fishing Catcher Vessels	1	2	1	-	-	-	-	-	-	-	-	-	-	N/A	
	Directed Fishing Catch (1,000 mt)	0.0	0.1	0.0	-	-	-	-	-	-	-	-	-	-		
Big Skates	Sideboard Limit (1,000 mt)	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0			
	% Limit Harvested	N/A	N/A	N/A	N/A	-	-	90	55	57	90	148	174			
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
Shortraker / Rougheye	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Aggregate Catch (1,000 mt)	0.0	0.0	-	0.0	-	-	0.1	0.0	0.0	0.0	0.0	0.0			
	% Limit Harvested	5	4	-	5	-	-	210	46	8	36	21	8			
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
Atka Mackerel	Sideboard Limit (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1			
	Aggregate Catch (1,000 mt)	-	-	-	0.0	0.0	0.0	0.1	-	0.0	-	-	-			
	% Limit Harvested	-	-	-	95	5	17	115	-	16	-	-	-		N/A	
	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-			

Species		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013*	2014*	2015*
	Sideboard Limit (1,000 mt)	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
	Aggregate Catch (1,000 mt)	0.1	-	-	-	-	-	-	0.0	-	-	-	-			
	% Limit Harvested	220	-	-	-	-	-	-	3	-	-	-	-			
Other Rockfish	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
	Sideboard Limit (1,000 mt)	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0			
	% Limit Harvested	N/A	N/A	N/A	N/A	-	-	153	63	15	8	31	8			
Other Skates	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
	Sideboard Limit (1,000 mt)	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0			
	Aggregate Catch (1,000 mt)	-	-	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0			
	% Limit Harvested	-	-	6	-	2	-	7	7	15	10	16	2			
Thornyhead Rockfish	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
	Sideboard Limit (1,000 mt)	N/A	N/A	N/A	N/A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0			
Longnose Skates	% of Sideboard Limit Harvested	N/A	N/A	N/A	N/A	-	-	30	35	22	11	37	19		N/A	
	No. of Directed Fishing CVs	-	-	-	-	-	-	-	-	-	-	-	-			
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			
	Sideboard Limit (1,000 mt)	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
	Aggregate Catch (1,000 mt)	-	-	-	-	-	-	-	0.0	-	-	-	-			
	% Limit Harvested	-	-	-	-	-	-	-	200	-	-	-	-			
Demersal Shelf Rockfish	Non-Exempt Directed Fishing Catcher Vessels	-	-	-	-	-	-	-	-	-	-	-	-		N/A	
	Directed Fishing Catch (1,000 mt)	-	-	-	-	-	-	-	-	-	-	-	-			

Appendix C: AFA Sideboard PSC Limits and Catch in BSAI and GOA

Table 28. Non-Exempt AFA Catcher Vessel PSC Sideboard Limits and TLA PSC Limits in BSAI Fisheries, 2003–2015

PSC Species	Limit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Halibut (mt)	AFA CV Sideboard	1,218	1,218	1,218	1,218	1,176	1,225	1,225	1,225	1,225	1,225	1,225	1,225	1,225
	Pacific cod (trawl)	887	887	887	887	825	887	887	887	887	887	887	887	887
	Pacific cod (HAL or pot)	2	2	2	2	2	2	2	2	2	2	2	2	2
	Yellowfin sole	101	101	101	101	107	101	101	101	101	101	101	101	101
	R Sole/F.Sole/O.Flatfish	221	221	221	221	235	228	228	228	228	228	228	228	228
	Turbot/Sablefish/Arrowtooth	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rockfish	2	2	2	2	2	2	2	2	2	2	2	2	2
	Pollock/Atka Mack./Other	5	5	5	5	5	5	5	5	5	5	5	5	5
	TLA* Sector PSC Limit						875	875	875	875	875	875	875	875
	Pacific Cod	No BS Trawl Limited Access Sector					585	508	453	453	453	453	453	453
	Yellowfin Sole						162	187	167	167	167	167	167	167
	R Sole/F.Sole/O.Flatfish						-	-	-	-	-	-	-	-
	Turbot/Sablefish/Arrowtooth						-	-	-	-	-	-	-	-
	Rockfish						3	5	5	5	5	5	5	5
	Pollock/Atka Mack./Other						125	175	250	250	250	250	250	250
Red king crab Zone 1 (no. 1,000s)	AFA CV Sideboard	27.0	54.8	54.8	54.8	54.8	52.6	52.6	52.6	52.6	25.9	25.9	25.9	25.9
	Pacific cod trawl	8.1	16.4	16.4	16.4	16.4	-	-	-	-	-	-	-	-
	Yellowfin sole	1.9	3.9	3.9	3.9	3.9	-	-	-	-	-	-	-	-
	R Sole/F.Sole/O.Flatfish	17.0	34.5	34.5	34.5	34.5	-	-	-	-	-	-	-	-
	Pollock/Atka Mack./Other	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
	All Targets	-	-	-	-	-	52.6	52.6	52.6	52.6	25.9	25.9	25.9	25.9
	TLA Sector PSC Limit						53.8	53.8	53.8	53.8	26.5	26.5	26.5	26.5
	Pacific Cod	No BS Trawl Limited Access Sector					6.0	6.0	6.0	6.0	3.0	3.0	3.0	3.0
	Yellowfin Sole						47.4	47.4	47.4	47.4	23.3	23.3	23.3	23.3
	Rock Sole/Flathead Sole/Other Flatfish						-	-	-	-	-	-	-	-
	Pollock/Atka Mack./Other						0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2
C. opilio COBLZ (no. 1,000s)	AFA CV Sideboard	682.1	652.6	652.6	652.6	1,247	1,055	1,575	1,678	1,652	1,055	1,575	1,678	1,652
	Pacific cod trawl	77.1	77.1	86.1	114.0	74.6	-	-	-	-	-	-	-	-
	Yellowfin sole	317.7	317.7	354.9	469.5	354.4	-	-	-	-	-	-	-	-
	R Sole/F.Sole/O.Flatfish	275.3	275.3	307.5	230.1	182.9	-	-	-	-	-	-	-	-
	Turbot/Sablefish/Arrowtooth	9.4	9.4	10.5	14.5	9.4	-	-	-	-	-	-	-	-
	Rockfish	1.0	1.0	1.1	1.5	1.0	-	-	-	-	-	-	-	-
	Pollock/Atka Mack./Other	1.6	1.6	1.8	2.4	2.7	-	-	-	-	-	-	-	-
	All Targets	-	-	-	-	-	652.6	652.6	652.6	1,247	1,055	1,575	1,678	1,652
	TLA Sector PSC Limit						1,248	1,248	1,248	2,385	2,018	3,014	3,210	3,161
	Pacific Cod	No BS Trawl Limited Access Sector					50.0	50.0	50.0	95.5	80.8	120.7	129.0	127.0
	Yellowfin Sole						1,176	1,176	1,176	2,248	1,901	2,840	3,026	2,979
	R Sole/F.Sole/O.Flatfish						-	-	-	-	-	-	-	-
	Rockfish						2.0	2.0	2.0	3.8	3.2	4.8	5.0	4.9
	Pollock/Atka Mack./Other						20.0	20.0	20.0	38.2	32.3	48.3	50.0	49.2

PSC Species	Limit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
C. bairdi Zone 1 (no. 1,000s)	AFA CV Sideboard	256.4	256.4	256.4	256.4	256.4	288.8	288.8	244.6	244.6	288.8	288.8	288.8	288.8
	Pacific cod trawl	113.2	113.2	113.2	113.2	113.2	-	-	-	-	-	-	-	-
	Yellowfin sole	39.0	39.0	39.0	39.0	39.0	-	-	-	-	-	-	-	-
	R Sole/F.Sole/O.Flatfish	103.8	103.8	103.8	103.8	103.8	-	-	-	-	-	-	-	-
	Pollock/Atka Mack./Other	0.4	0.4	0.4	0.4	0.4	-	-	-	-	-	-	-	-
	All Targets	-	-	-	-	-	288.8	288.8	244.6	244.6	288.8	288.8	288.8	288.8
	TLA Sector PSC Limit						471.2	471.2	348.3	348.3	411.2	411.2	411.2	411.2
	Pacific Cod						60.0	60.0	50.8	50.8	60.0	60.0	60.0	60.0
	Yellowfin Sole						346.2	346.2	293.2	293.2	346.2	346.2	346.2	346.2
	R Sole/F.Sole/O.Flatfish	No BS Trawl Limited Access Sector					-	-	-	-	-	-	-	-
	Rockfish						60.0	60.0	-	-	-	-	-	-
	Pollock/Atka Mack./Other						5.0	5.0	4.2	4.2	5.0	5.0	5.0	5.0
C. bairdi Zone 2 (no. 1,000s)	AFA CV Sideboard	575.3	575.3	575.3	575.3	575.3	493.3	493.3	418.6	418.6	493.3	493.3	493.3	493.3
	Pacific cod trawl	200.4	200.4	200.4	200.4	200.4	-	-	-	-	-	-	-	-
	Yellowfin sole	204.6	204.6	204.6	204.6	204.6	-	-	-	-	-	-	-	-
	Rock sole/flathead sole/other flatfish	169.4	169.4	169.4	169.4	169.4	-	-	-	-	-	-	-	-
	Rockfish	0.3	0.3	0.3	0.3	0.3	-	-	-	-	-	-	-	-
	Pollock/A.mack./other	0.6	0.6	0.6	0.6	0.6	-	-	-	-	-	-	-	-
	All Targets	-	-	-	-	-	493.3	493.3	418.6	418.6	493.3	493.3	493.3	493.3
	TLA Sector PSC Limit						1,242	1,242	1,053	1,053	1,242	1,242	1,242	1,242
	Pacific Cod						50.0	50.0	42.4	42.4	50.0	50.0	50.0	50.0
	Yellowfin Sole						1,186	1,186	1,006	1,006	1,186	1,186	1,186	1,186
	R Sole/F.Sole/O.Flatfish	No BS Trawl Limited Access Sector					-	-	-	-	-	-	-	-
	Rockfish						1.0	1.0	0.8	0.8	1.0	1.0	1.0	1.0
	Pollock/Atka Mack./Other						5.0	5.0	4.2	4.2	5.0	5.0	5.0	5.0
Herring (mt)	Herring Savings Subarea (All Trawl Sectors)	1,525	1,867	2,013	1,770	1,787	1,726	1,697	1,973	2,273	2,094	2,648	2,172	2,742
	Pacific Cod	20	25	27	27	27	26	25	29	33	31	40	33	42
	Yellowfin Sole	139	171	183	152	153	148	146	169	195	179	180	148	187
	R Sole/F.Sole/O.Flatfish	20	25	27	27	27	26	25	29	33	31	30	24	30
	Turbot/Sablefish/Arrowtooth	9	11	12	12	12	12	12	14	16	15	20	16	20
	Rockfish	7	-	10	10	10	9	9	10	12	11	13	11	14
	Midwater Trawl Pollock	1,184	1,456	1,562	1,350	1,364	1,318	1,296	1,508	1,737	1,600	2,165	1,776	2,242
	Pollock/Atka Mack./Other	-	-	-	-	-	-	-	-	-	-	-	-	-

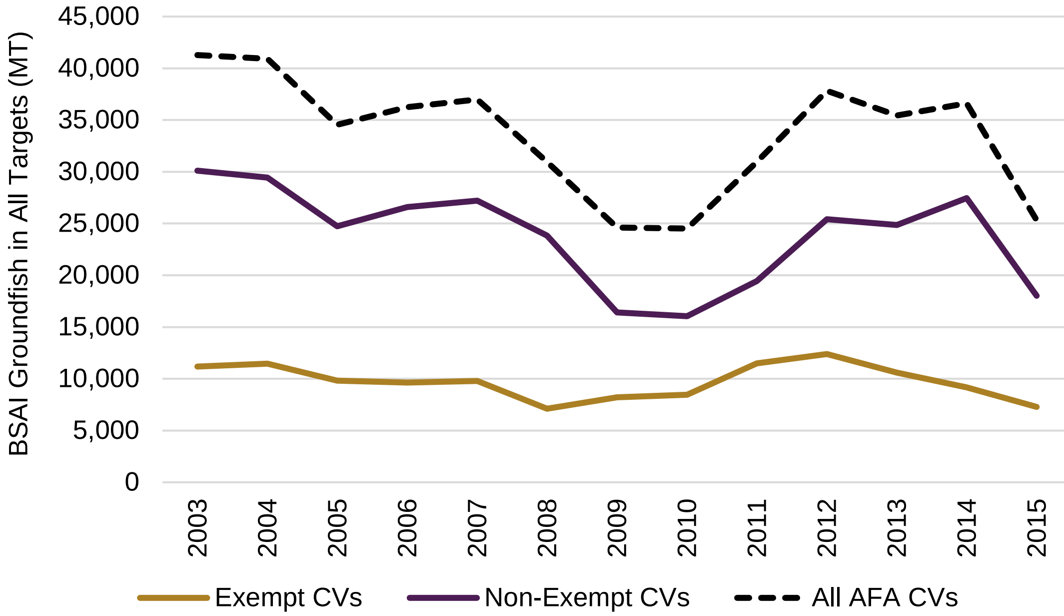
Note:
*TLA = trawl limited access

Table 29. AFA Catcher/Processor PSC Sideboard Limits and TLA PSC Limits in BSAI Fisheries, 2003–2015

PSC Species	Limit	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Halibut (mt)	AFA CP Sideboard	286	286	286	286	286	286	286	286	286	286	286	286	286
	TLA Sector PSC Limit						875	875	875	875	875	875	875	875
	Pacific Cod						585	508	453	453	453	453	453	453
	Yellowfin Sole						162	187	167	167	167	167	167	167
	R Sole/F.Sole/O.Flatfish	No BS Trawl Limited Access Sector					-	-	-	-	-	-	-	-
	Turbot/arrowtooth/sablefish						-	-	-	-	-	-	-	-
	Rockfish						3	5	5	5	5	5	5	5
	Pollock/Atka Mack./Other						125	175	250	250	250	250	250	250
Red king crab Zone 1 (no. 1,000s)	AFA CP Sideboard	0.6	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.2	0.6	0.6	0.6	0.6
	TLA Sector PSC Limit						53.8	53.8	53.8	53.8	26.5	26.5	26.5	26.5
	Pacific Cod						6.0	6.0	6.0	6.0	3.0	3.0	3.0	3.0
	Yellowfin Sole	No BS Trawl Limited Access Sector					47.4	47.4	47.4	47.4	23.3	23.3	23.3	23.3
	R Sole/F.Sole/O.Flatfish						-	-	-	-	-	-	-	-
	Pollock/Atka Mack./Other						0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2
C. opilio COBLZ (no. 1,000s)	AFA CP Sideboard	615.6	615.6	687.7	815.4	615.6	594.3	594.3	594.3	1,135	960	1,435	1,528	1,505
	TLA Sector PSC Limit						1,248	1,248	1,248	2,385	2,018	3,014	3,210	3,161
	Pacific Cod						50.0	50.0	50.0	95.5	80.8	120.7	129.0	127.0
	Yellowfin Sole						1,176	1,176	1,176	2,248	1,901	2,840	3,026	2,979
	R Sole/F.Sole/O.Flatfish	No BS Trawl Limited Access Sector					-	-	-	-	-	-	-	-
	Rockfish						2.0	2.0	2.0	3.8	3.2	4.8	5.0	4.9
	Pollock/Atka Mack./Other						20.0	20.0	20.0	38.2	32.3	48.3	50.0	49.2
C. bairdi Zone 1 (no. 1,000s)	AFA CP Sideboard	126.9	126.9	126.9	126.9	126.9	122.5	122.5	103.8	103.8	122.5	122.5	122.5	122.5
	TLA Sector PSC Limit						471.2	471.2	348.3	348.3	411.2	411.2	411.2	411.2
	Pacific Cod						60.0	60.0	50.8	50.8	60.0	60.0	60.0	60.0
	Yellowfin Sole						346.2	346.2	293.2	293.2	346.2	346.2	346.2	346.2
	R Sole/F.Sole/O.Flatfish	No BS Trawl Limited Access Sector					-	-	-	-	-	-	-	-
	Rockfish						60.0	60.0	-	-	-	-	-	-
	Pollock/Atka Mack./Other						5.0	5.0	4.2	4.2	5.0	5.0	5.0	5.0
C. bairdi Zone 2 (no. 1,000s)	AFA CP Sideboard	137.4	137.4	137.4	137.4	137.4	132.6	132.6	112.5	112.5	132.6	132.6	132.6	132.6
	TLA Sector PSC Limit						1,242	1,242	1,053	1,053	1,242	1,242	1,242	1,242
	Pacific Cod						50.0	50.0	42.4	42.4	50.0	50.0	50.0	50.0
	Yellowfin Sole						1,186	1,186	1,006	1,006	1,186	1,186	1,186	1,186
	R Sole/F.Sole/O.Flatfish	No BS Trawl Limited Access Sector					-	-	-	-	-	-	-	-
	Rockfish						1.0	1.0	0.8	0.8	1.0	1.0	1.0	1.0
	Pollock/Atka Mack./Other						5.0	5.0	4.2	4.2	5.0	5.0	5.0	5.0
Herring (mt)	Herring Savings Subarea (All Trawl Sectors)	1,525	1,867	2,013	1,770	1,787	1,726	1,697	1,973	2,273	2,094	2,648	2,172	2,742
	Pacific Cod	20	25	27	27	27	26	25	29	33	31	40	33	42
	Yellowfin Sole	139	171	183	152	153	148	146	169	195	179	180	148	187
	R Sole/F.Sole/O.Flatfish	20	25	27	27	27	26	25	29	33	31	30	24	30
	Turbot/Sablefish/Arrowtooth	9	11	12	12	12	12	12	14	16	15	20	16	20
	Rockfish	7	-	10	10	10	9	9	10	12	11	13	11	14
	Midwater Trawl Pollock	1,184	1,456	1,562	1,350	1,364	1,318	1,296	1,508	1,737	1,600	2,165	1,776	2,242
	Pollock/Atka Mack./Other	-	-	-	-	-	-	-	-	-	-	-	-	-

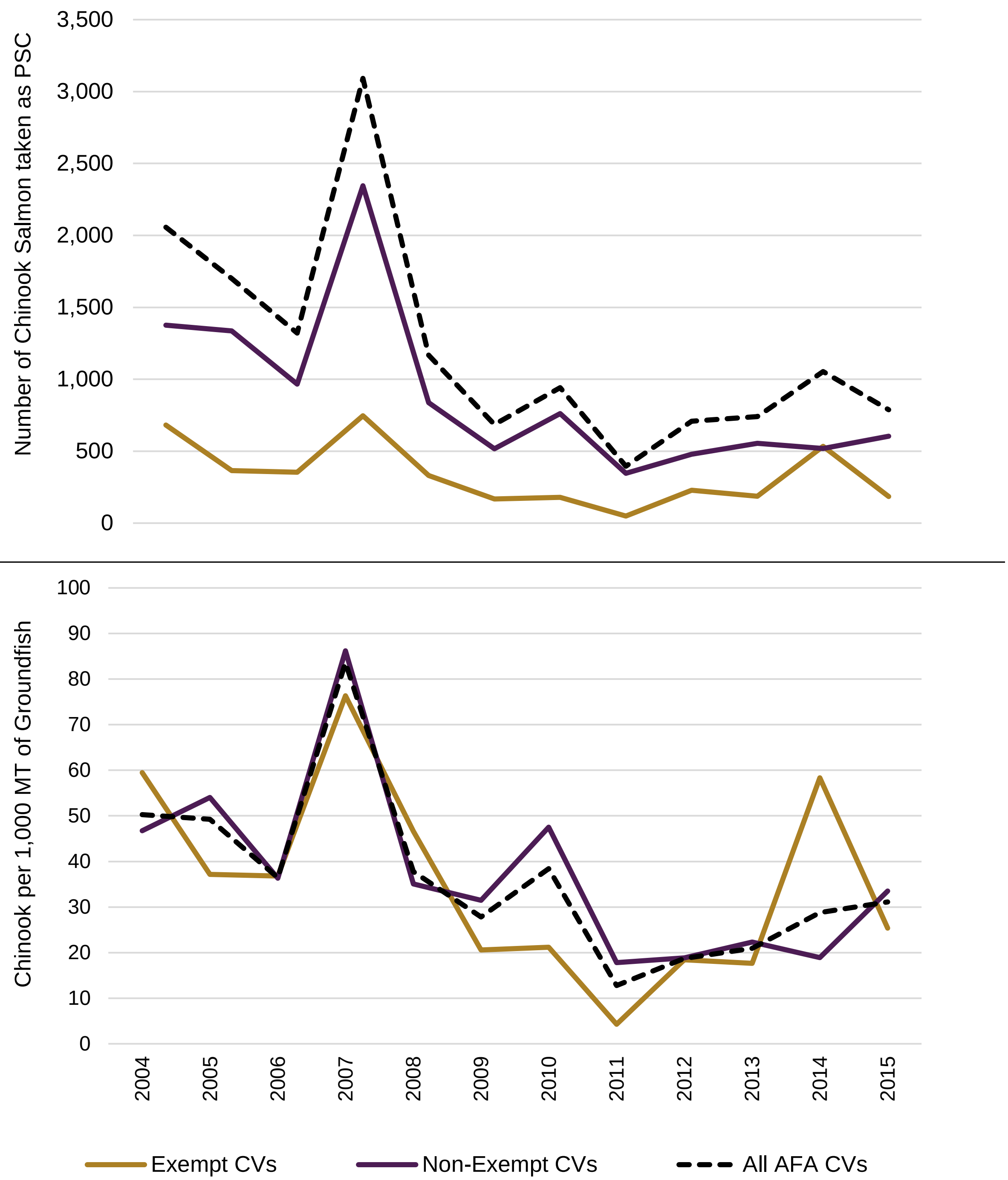
Additional PSC Amounts and Rates by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015

Figure 59. Total Groundfish Caught in the BSAI Pacific Cod Fishery by AFA Catcher Vessels, 2003–2015



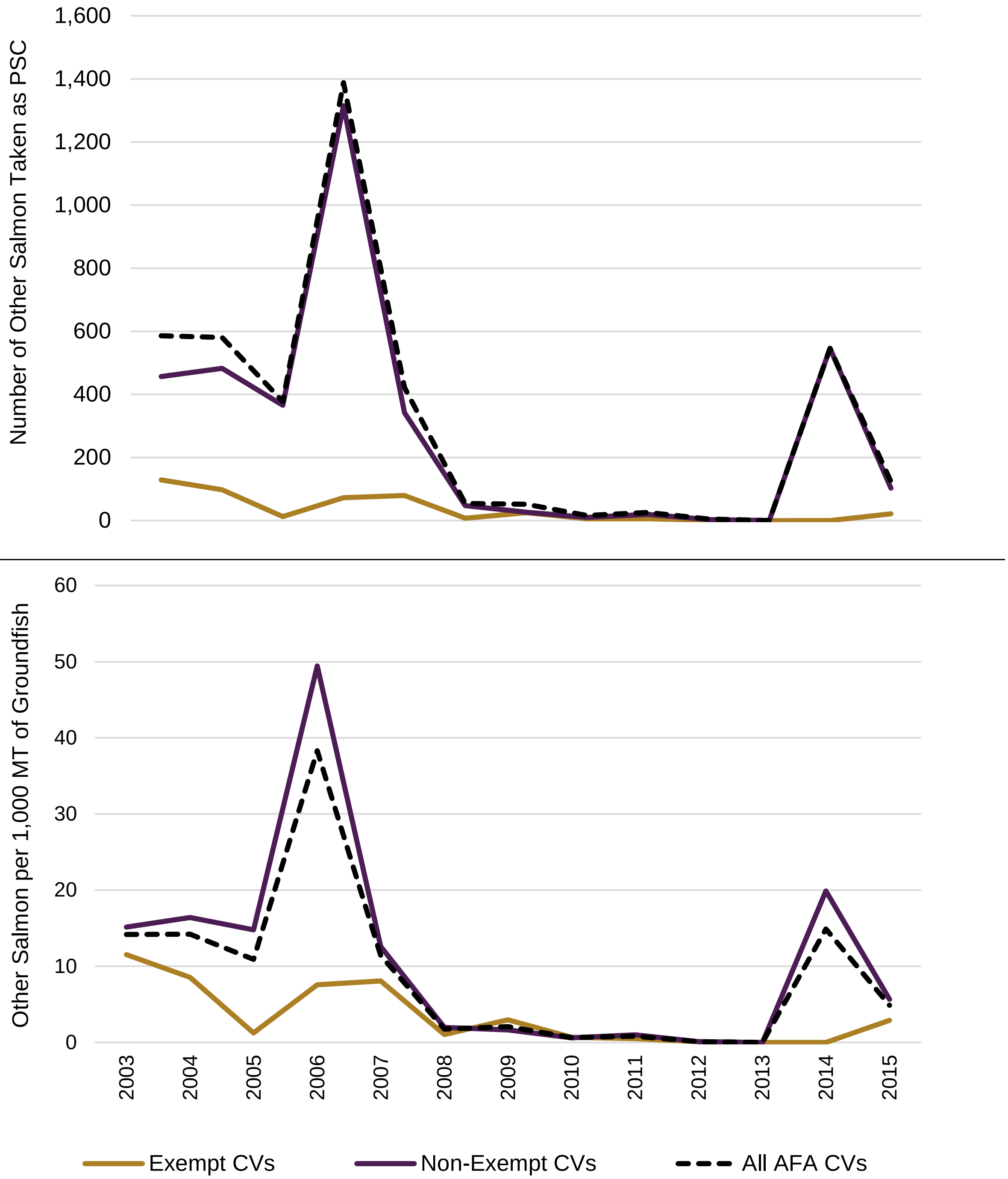
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 60. Chinook Salmon PSC Amount and Rate by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015



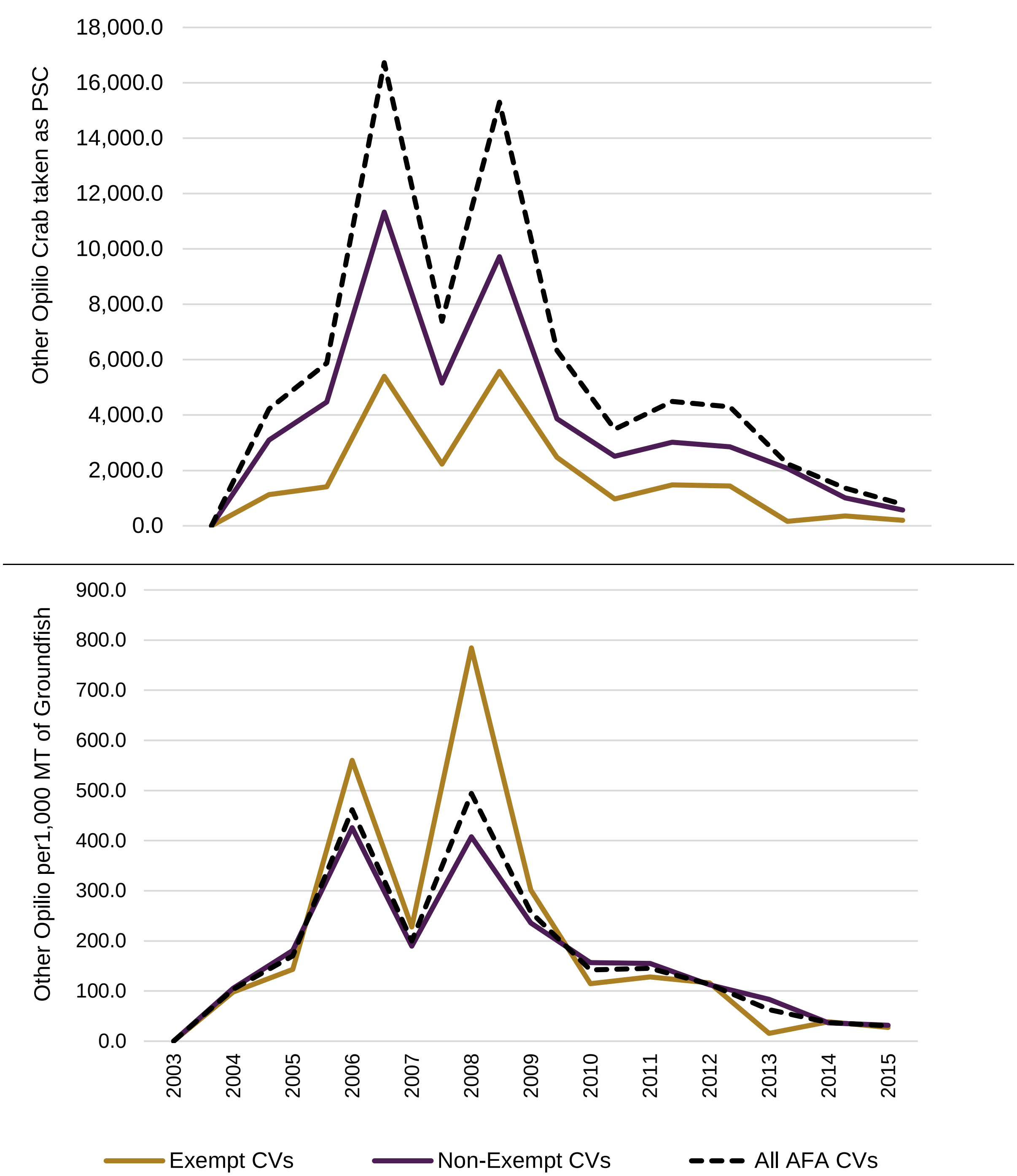
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 61. Non-Chinook Salmon PSC Amount and Rate by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015



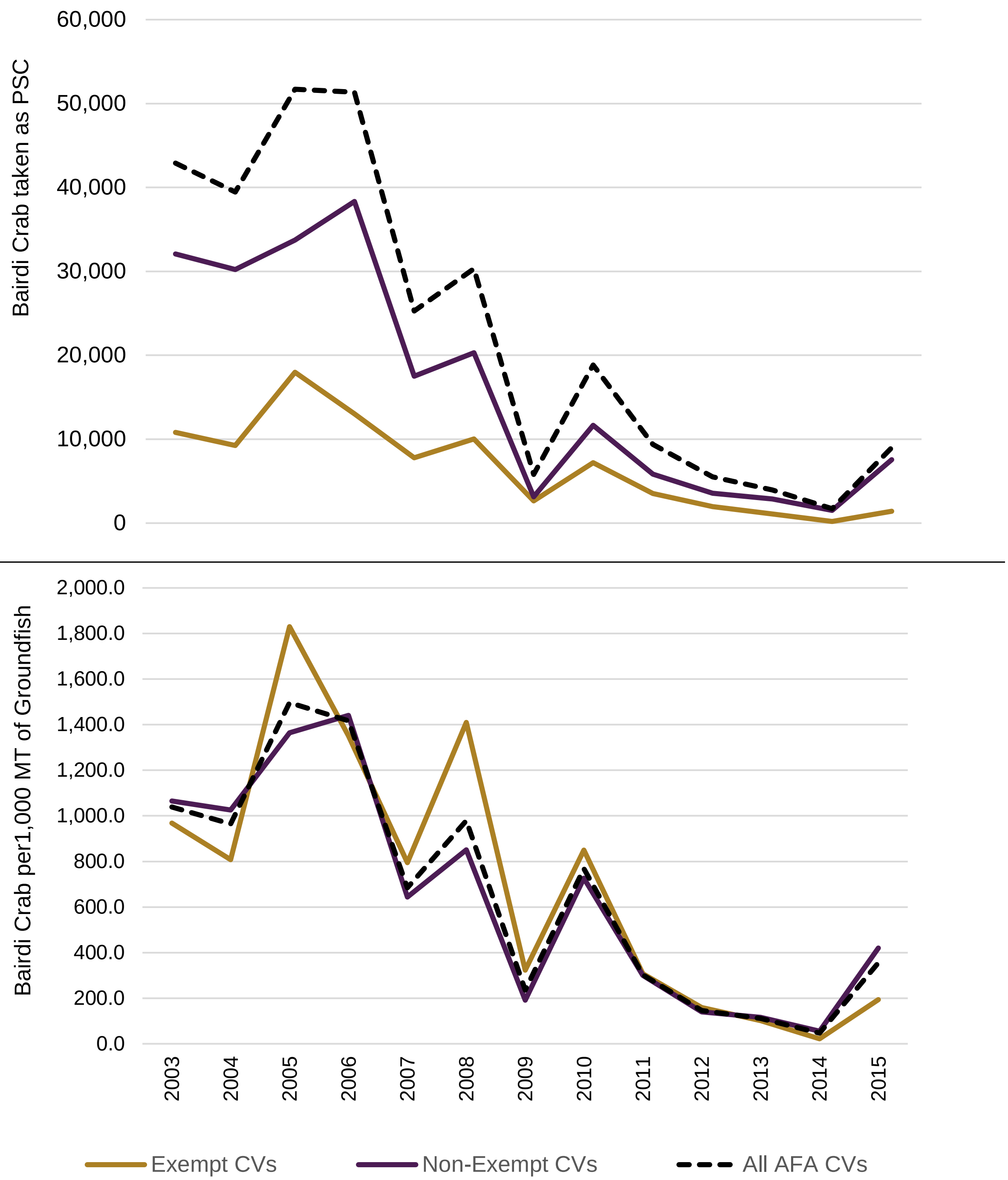
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 62. Other Opilio Crab PSC Amount and Rate by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015



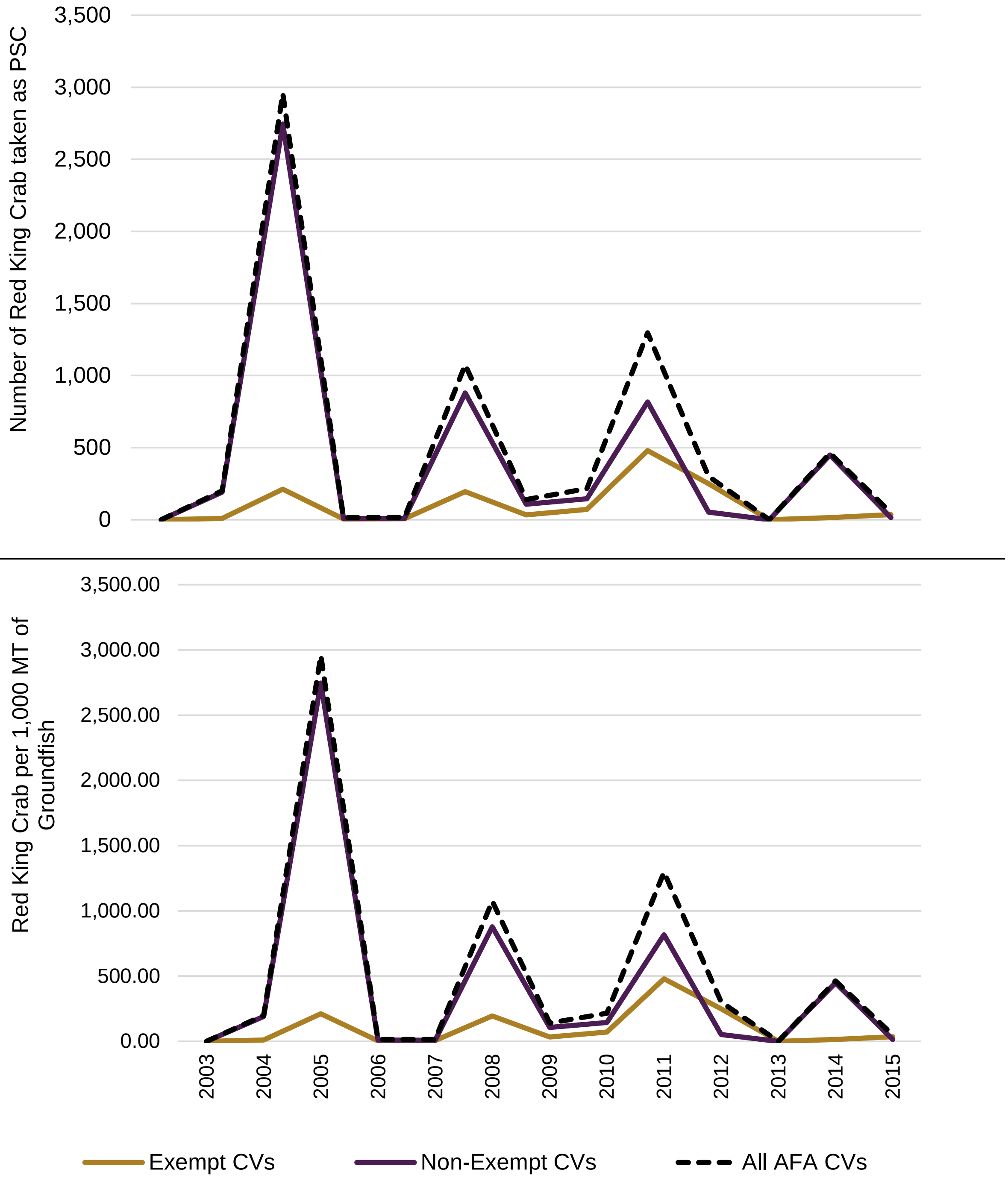
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 63. C. Bairdi Crab (All Zones) PSC Amount and Rate by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

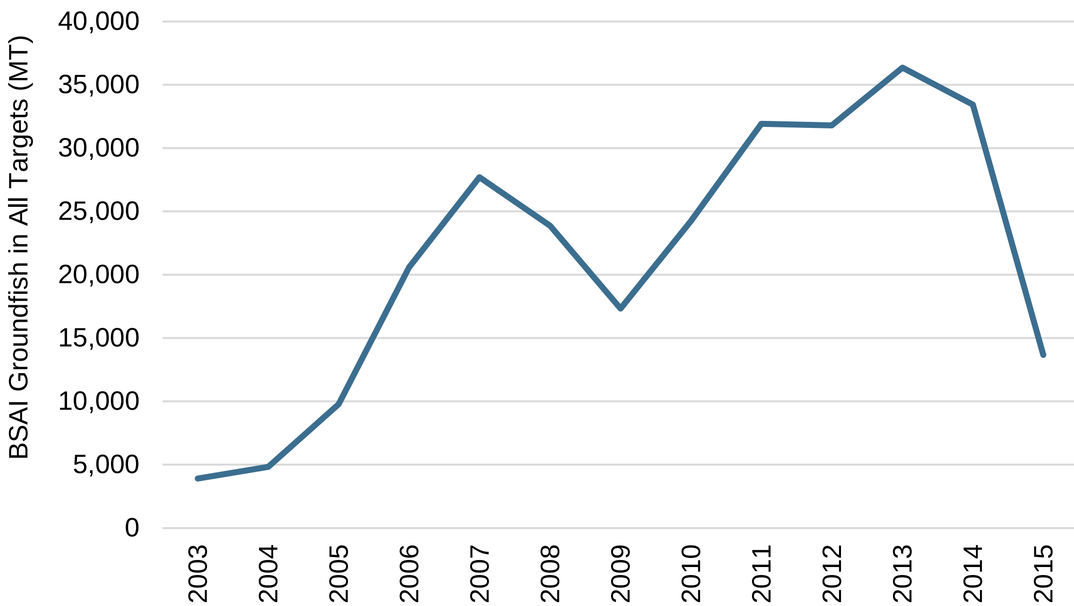
Figure 64. Red King Crab PSC Amount and Rate by AFA Catcher Vessels in BSAI Pacific Cod Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

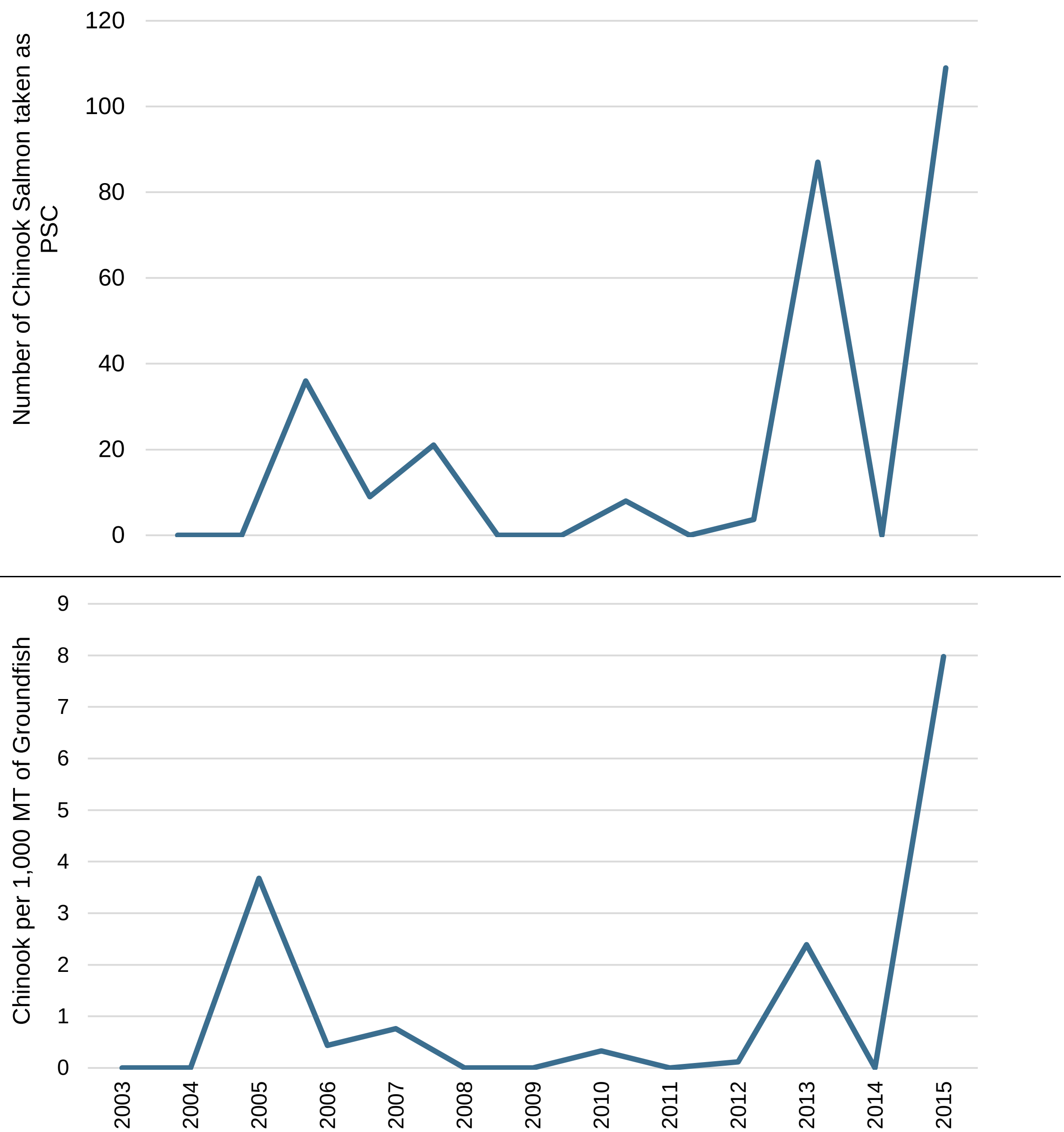
Additional PSC Amounts and Rates by AFA Catcher/Processors in BSAI Yellowfin Sole Fishery, 2003–2015

Figure 65. Total Groundfish Caught in the BSAI Yellowfin Sole Fishery by AFA Catcher/Processors, 2003–2015



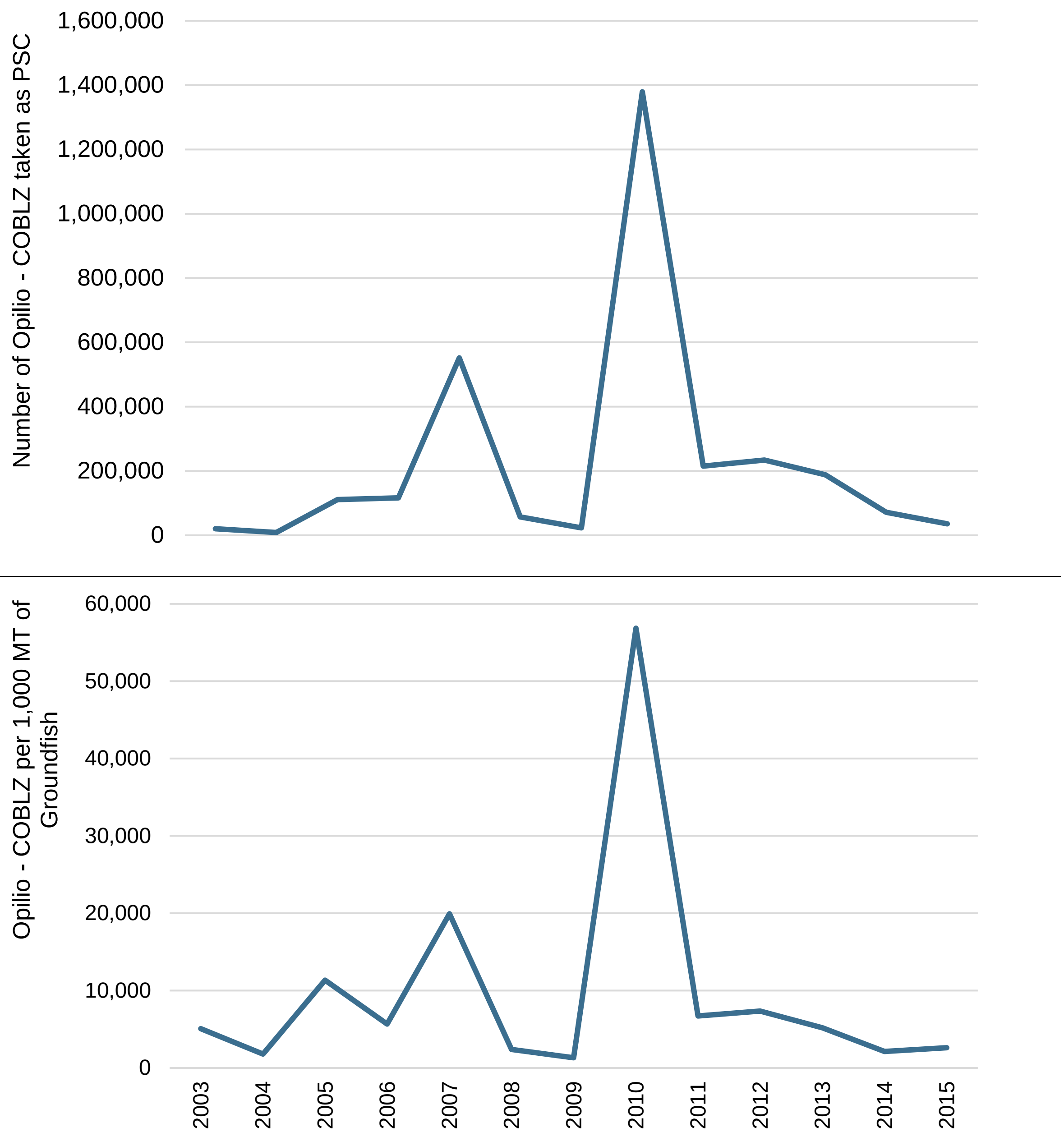
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 66. Chinook Salmon PSC Amount and Rate by AFA Catcher/Processors in BSAI Yellowfin Sole Fishery, 2003–2015



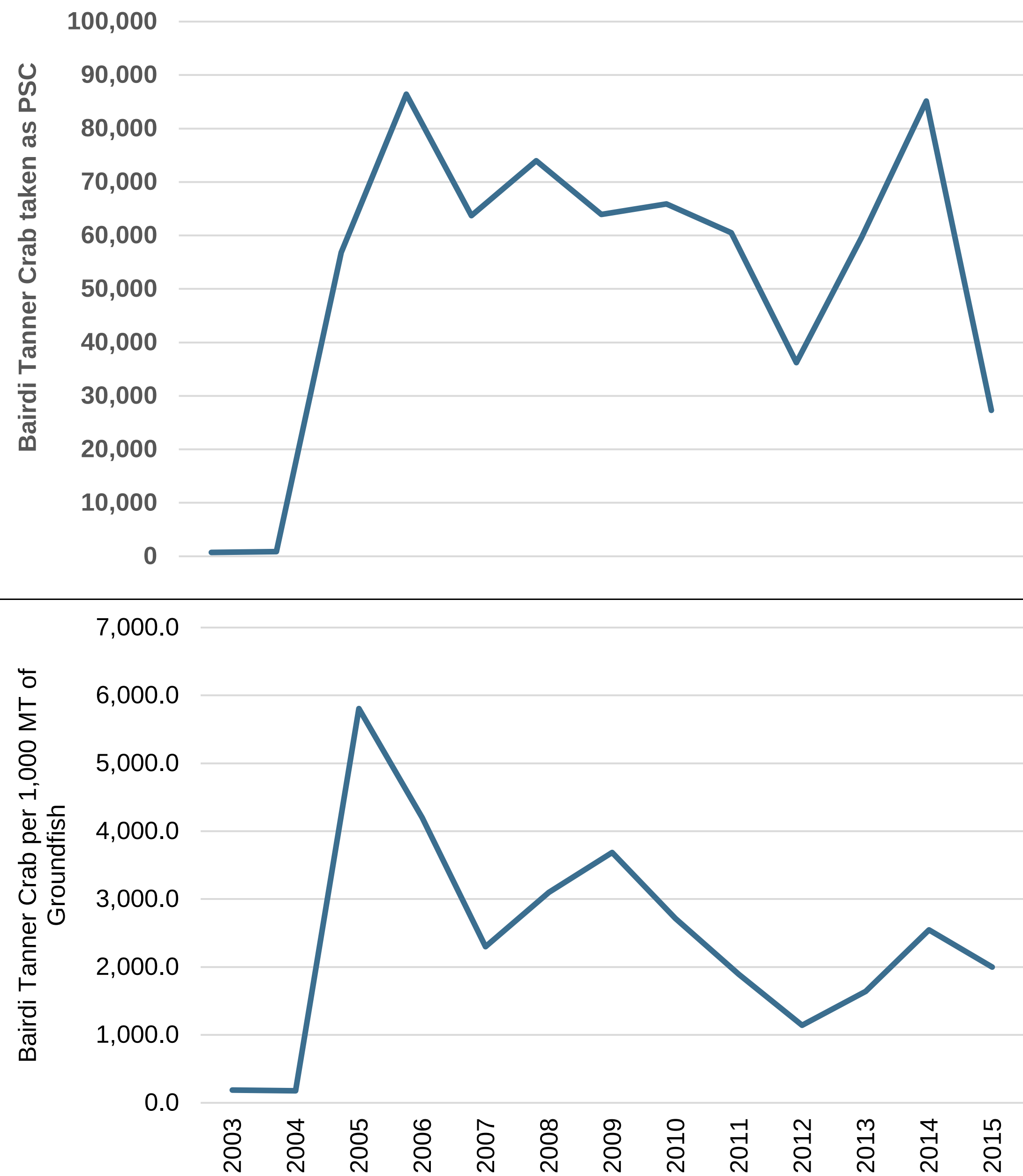
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 67. C. Opilio COBLZ PSC Amount and Rate by AFA Catcher/Processors in BSAI Yellowfin Sole Fishery, 2003–2015



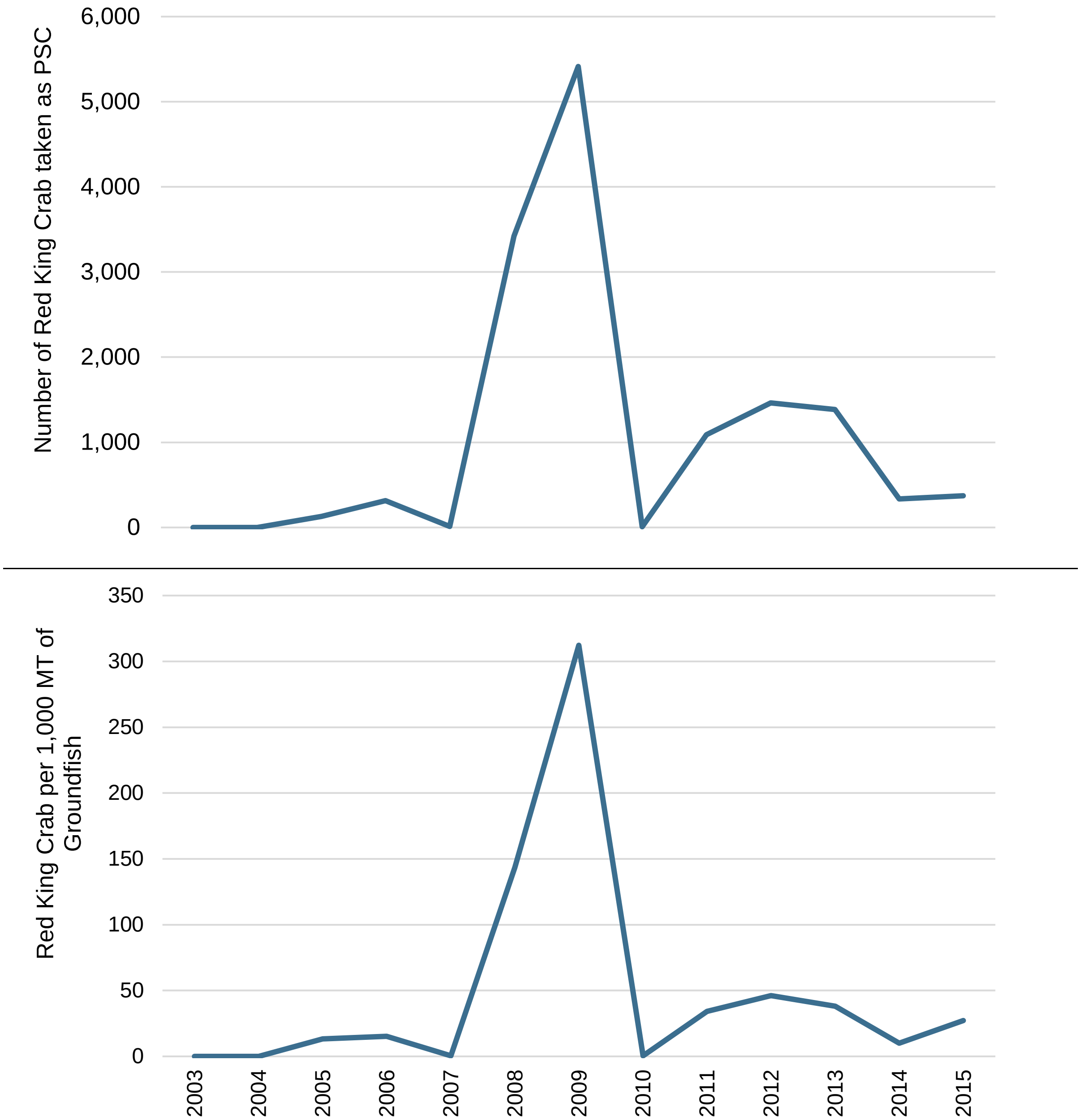
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 68. C. Bairdi (All Zones) Crab PSC Amount and Rate by AFA Catcher/Processors in BSAI Yellowfin Sole Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

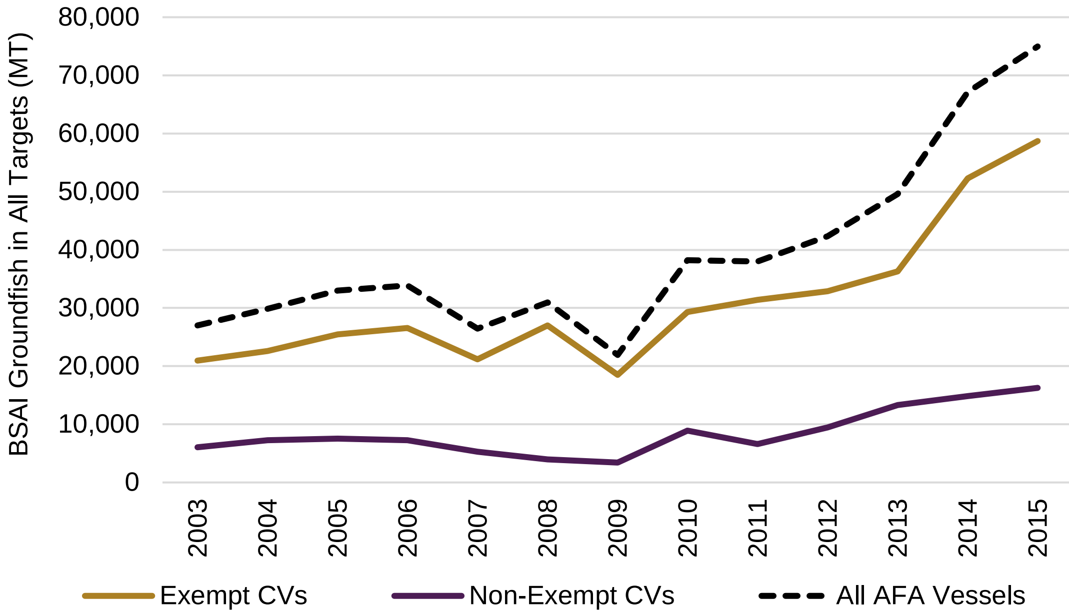
Figure 69. Red King Crab PSC Amount and Rate by AFA Catcher/Processors in BSAI Yellowfin Sole Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

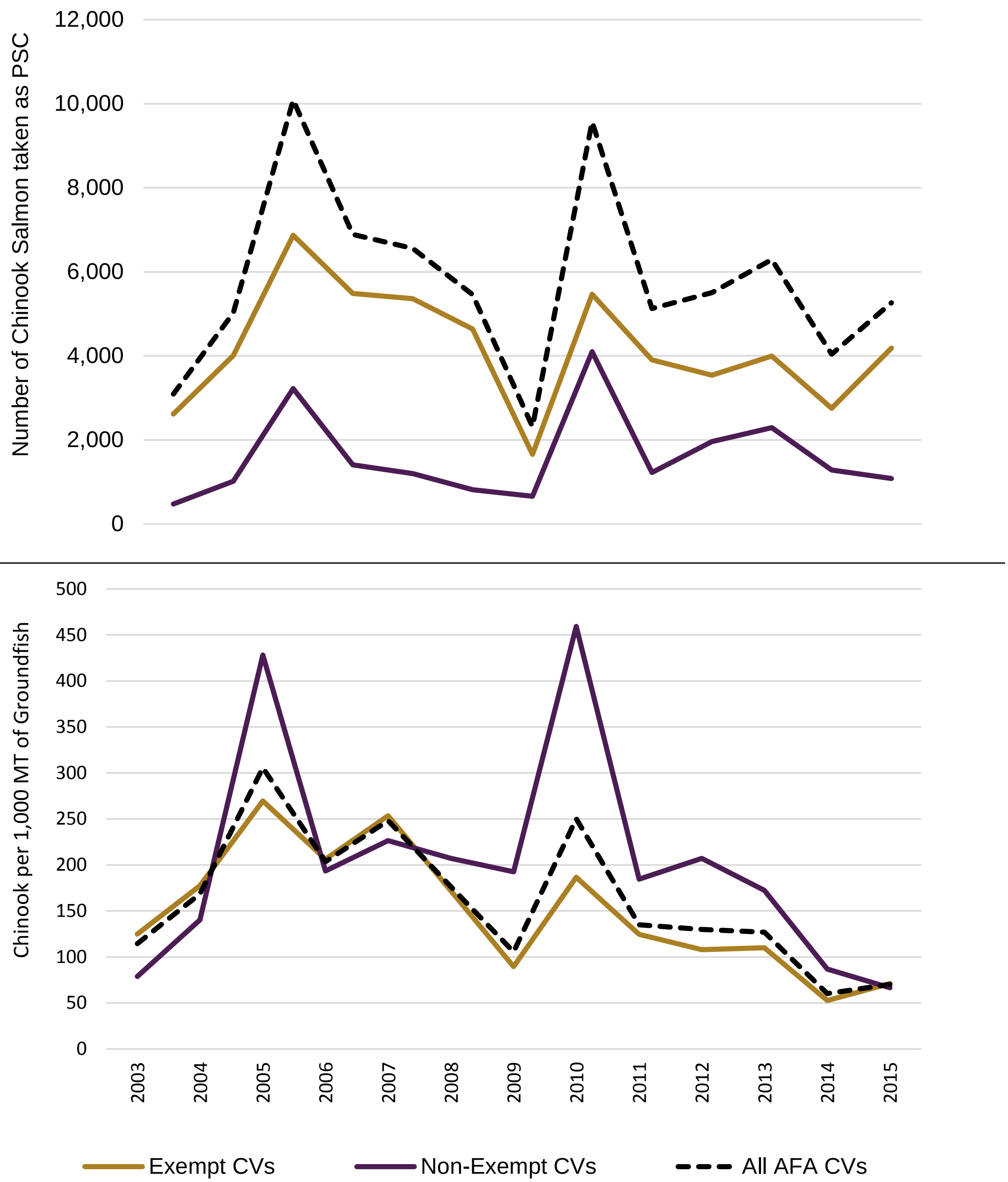
Additional PSC Amounts and Rates by AFA Catcher Vessels in GOA Shallow-Water Target Fishery, 2003–2015

Figure 70. Total Groundfish Caught in the GOA Shallow-Water Target Fishery by AFA Catcher Vessels, 2003–2015



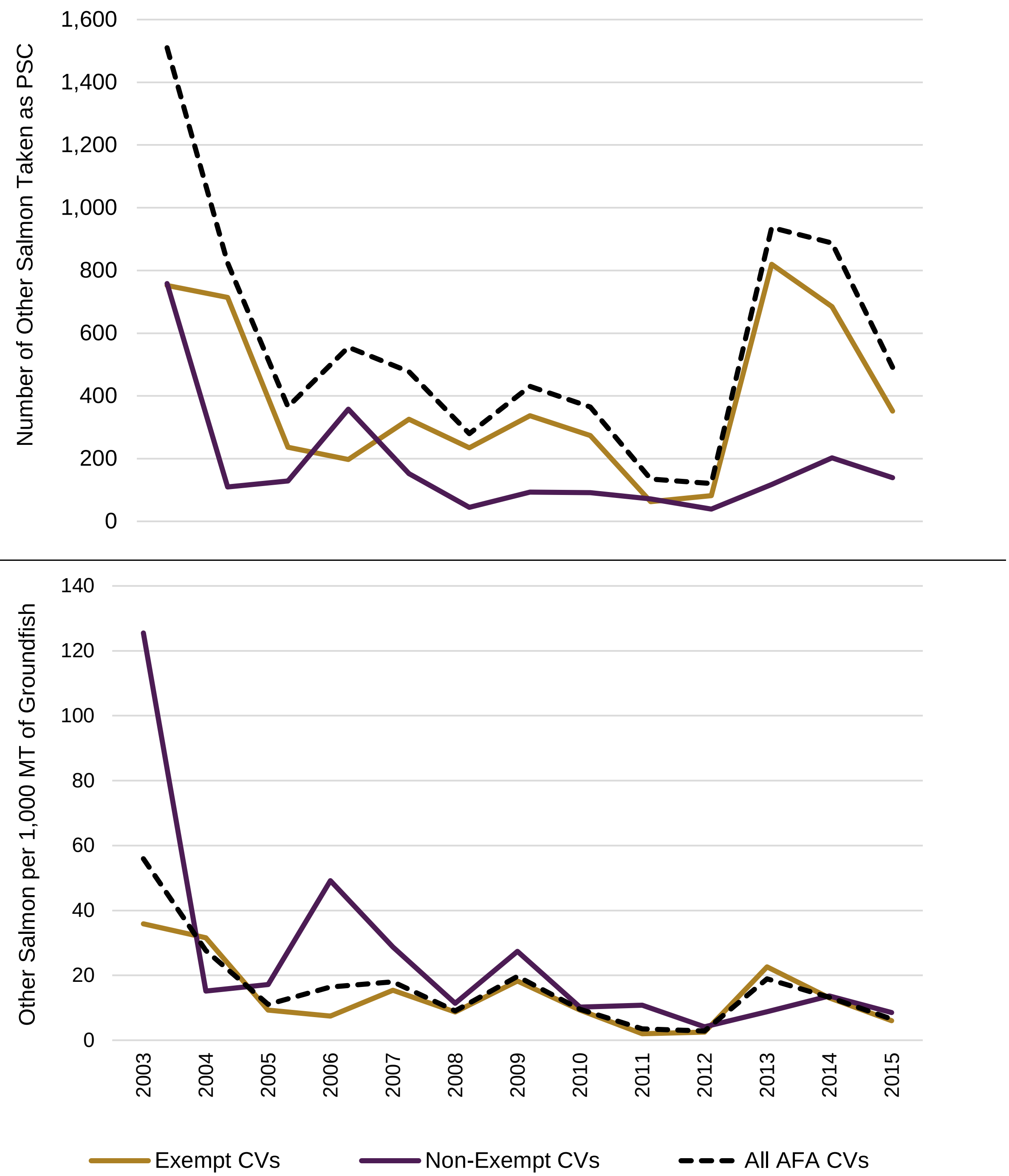
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 71. Chinook Salmon PSC Amount and Rate by AFA Catcher Vessels in the GOA Shallow-Water Target Fishery, 2003–2015



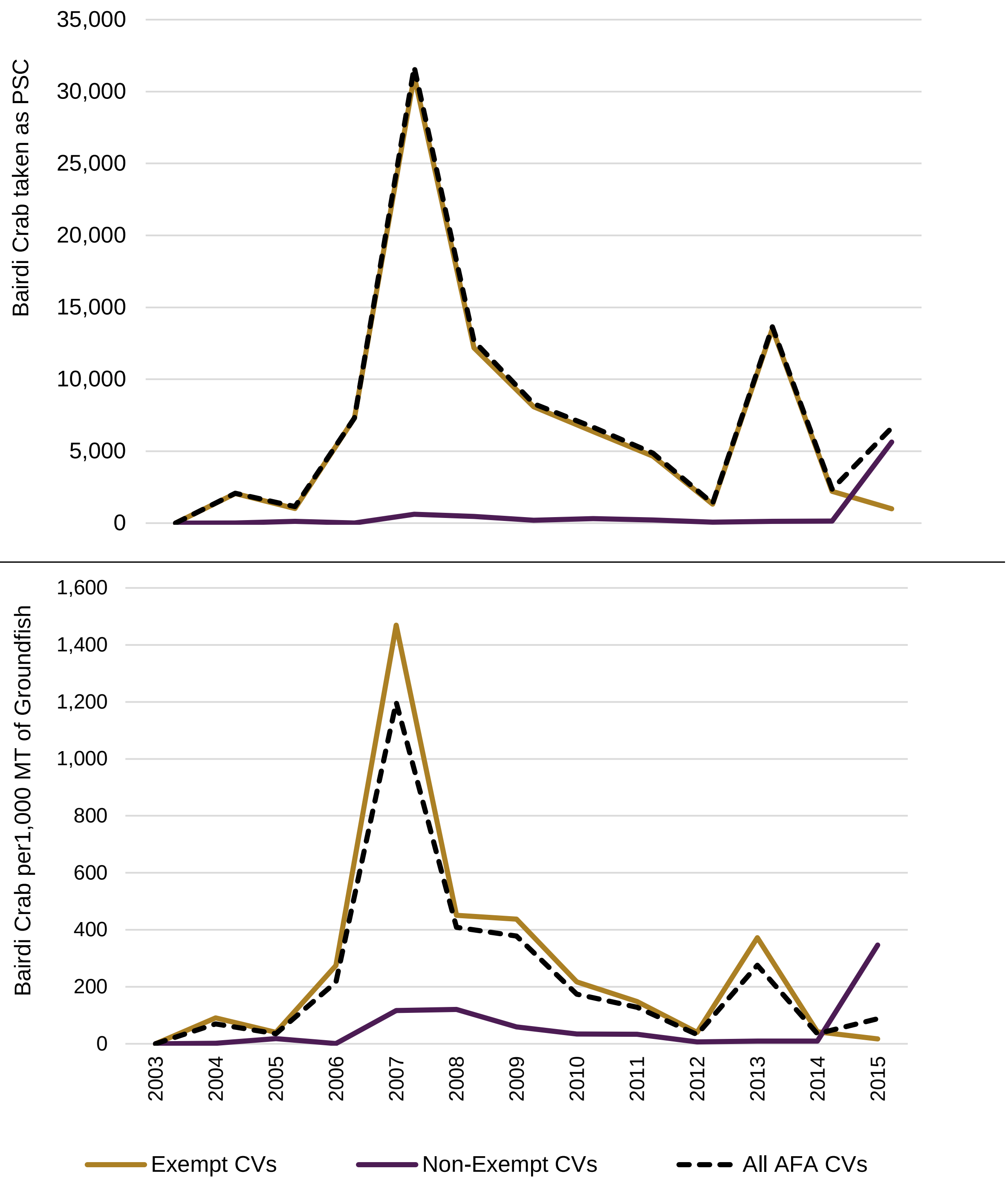
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 72. Non-Chinook Salmon PSC Amount and Rate by AFA Catcher Vessels in the GOA Shallow-Water Target Fishery, 2003–2015



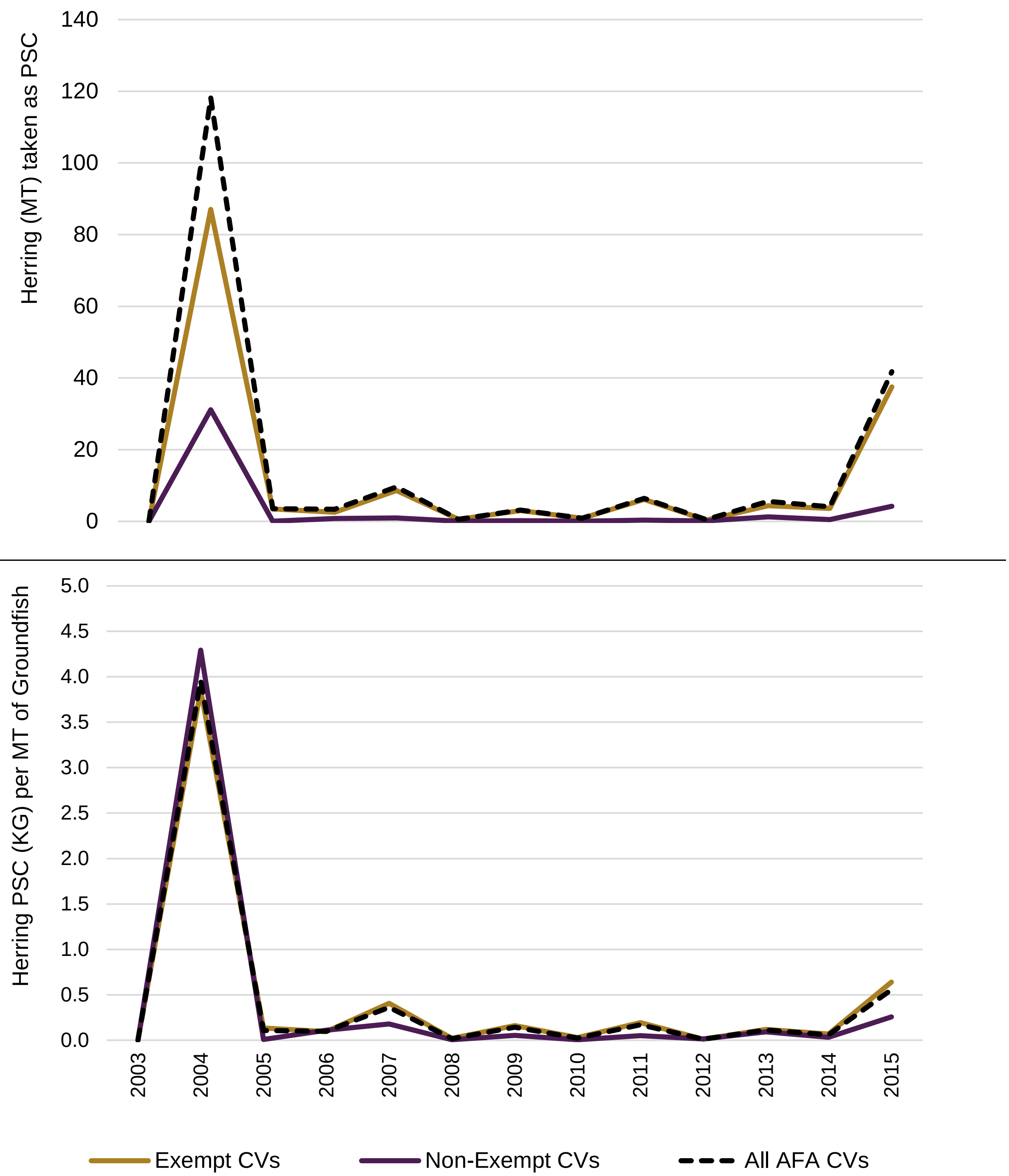
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 73. C. Bairdi (All Zones) PSC Amount and Rate by AFA Catcher Vessels in the GOA Shallow-Water Target Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

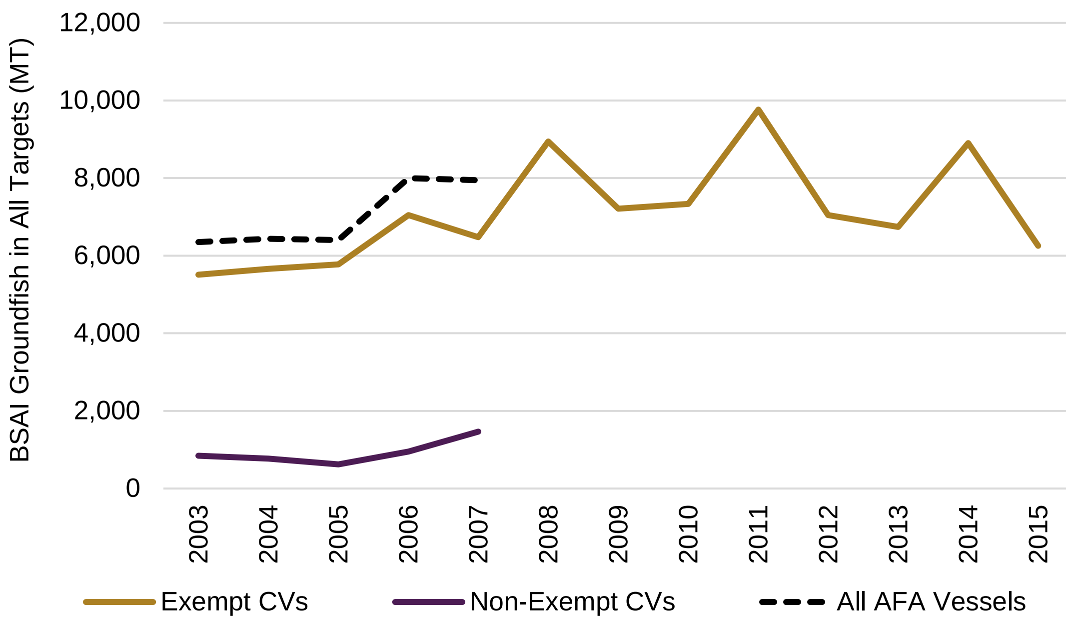
Figure 74. Herring PSC Amount and Rate by AFA Catcher Vessels in the GOA Shallow-Water Target Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

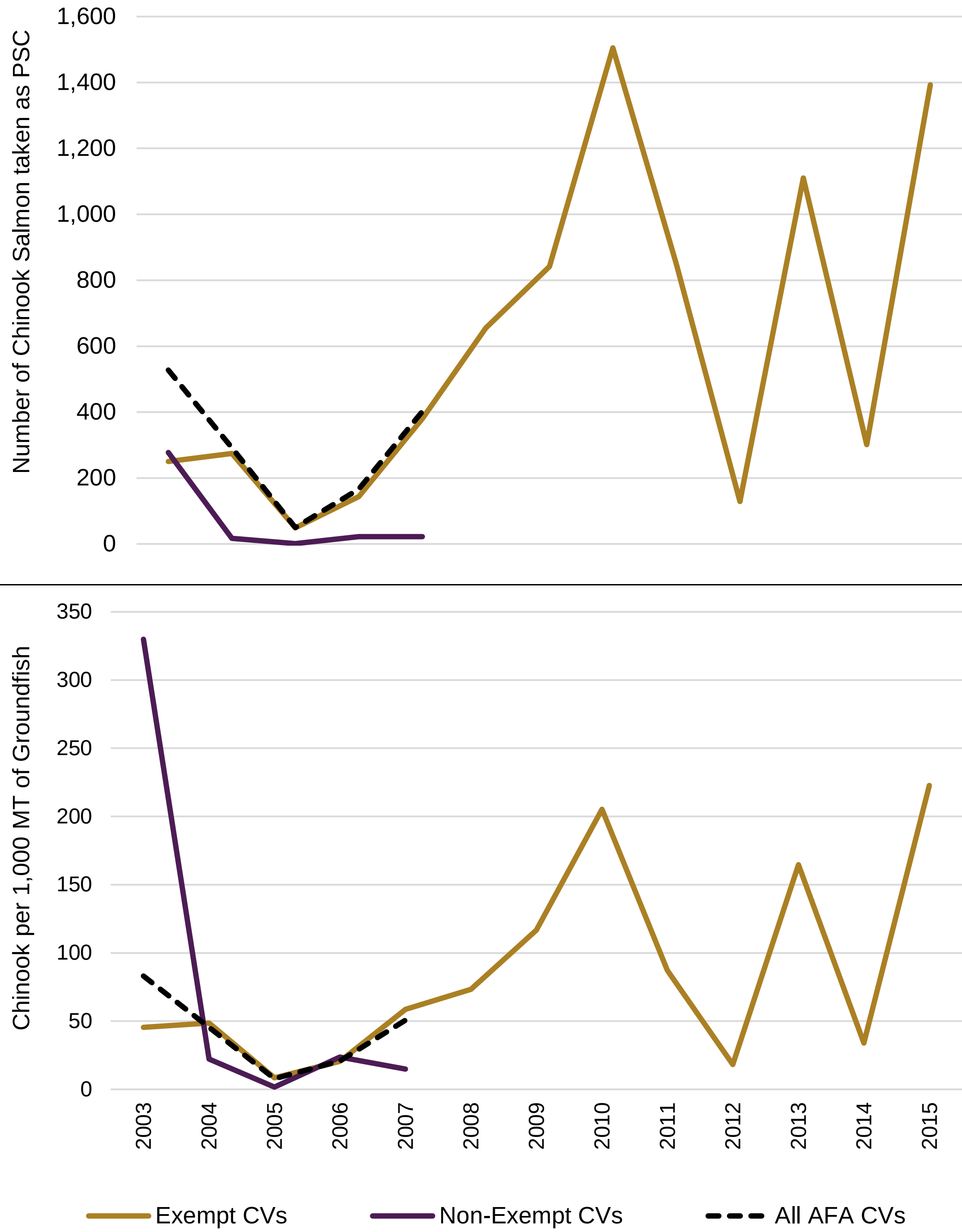
Additional PSC Amounts and Rates by Exempt AFA Catcher Vessels in GOA Deep-Water Target Fishery, 2003–2015

Figure 75. Total Groundfish Caught in the GOA Deep-Water Target Fishery by AFA Catcher Vessels, 2003–2015



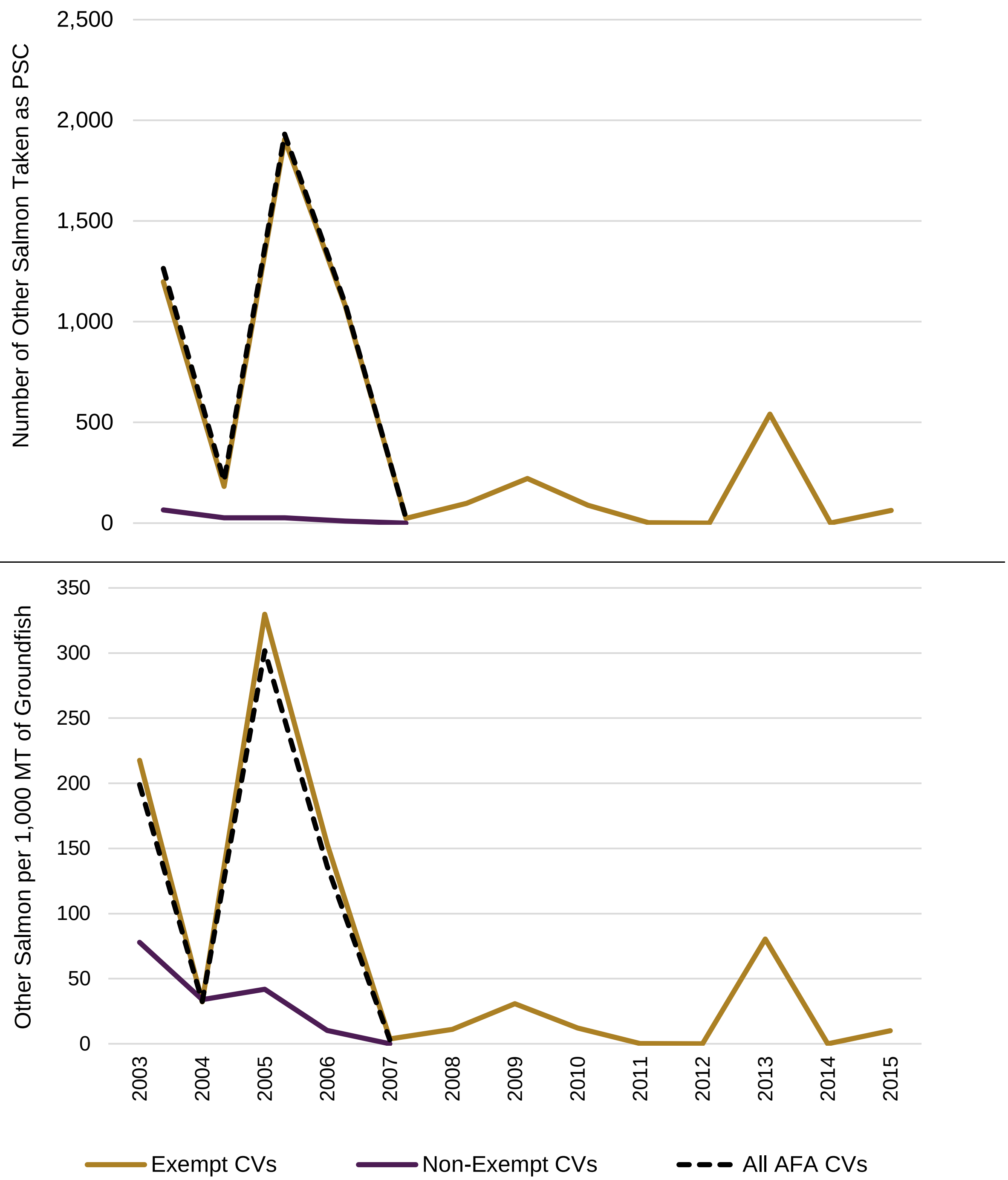
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 76. Chinook Salmon PSC Amount and Rate by AFA Catcher Vessels in the GOA Deep-Water Target Fishery, 2003–2015



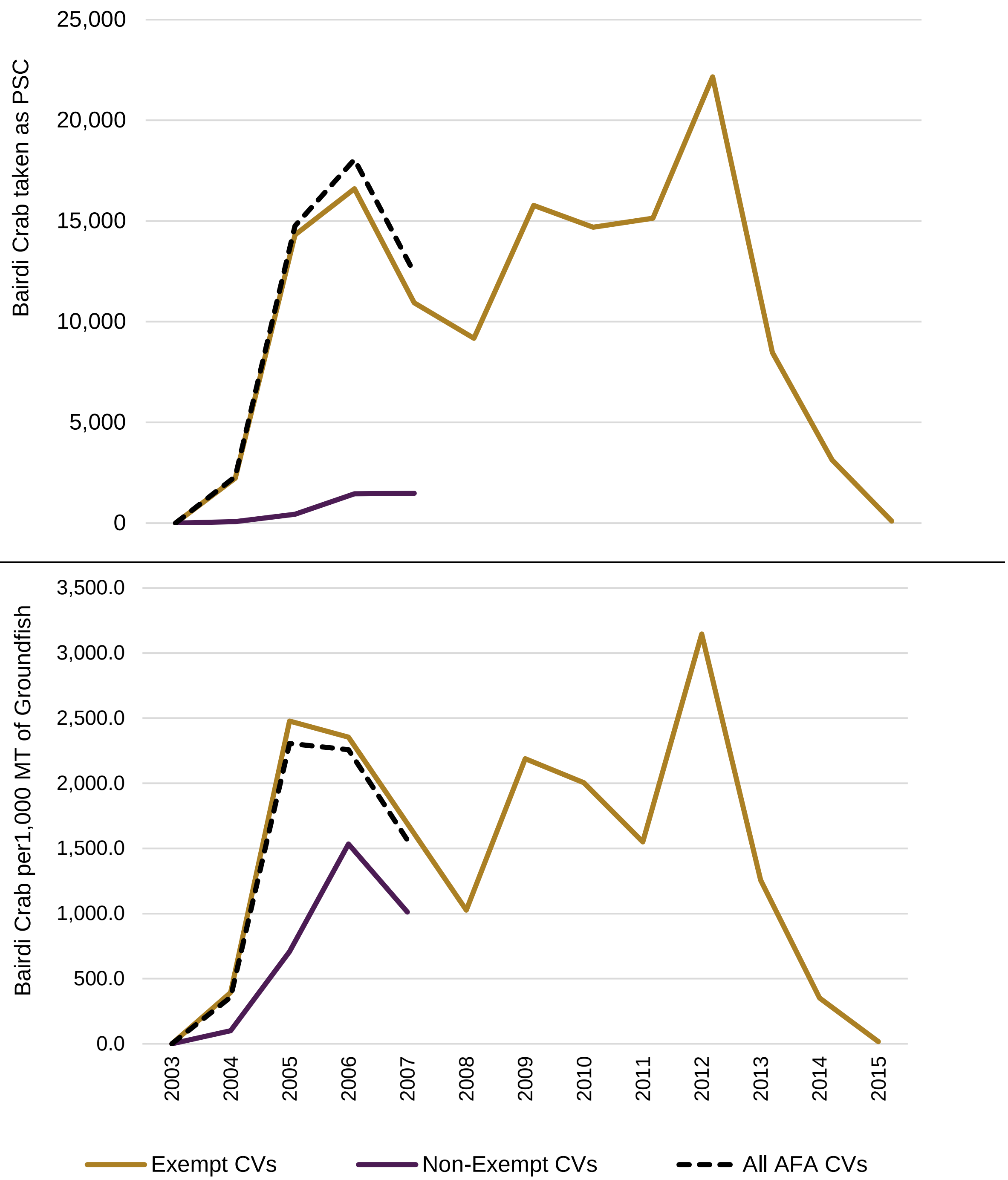
Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 77. Non-Chinook Salmon PSC Amount and Rate by AFA Catcher Vessels in the GOA Deep-Water Target Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Figure 78. C. Bairdi (All Zones) PSC Amount and Rate by AFA Catcher Vessels in the GOA Deep-Water Target Fishery, 2003–2015



Source: Developed by Northern Economics, Inc. using AKFIN data (Fey 2016)

Appendix D: Assessment of Occupational Hazards in the Bering Sea and Aleutian Islands Pollock Fleet

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Introduction

This report provides a current assessment of work-related fatalities and vessel disasters within the Bering Sea/Aleutian Islands (BSAI) pollock fleet to identify both hazards and opportunities for safety improvements within the fleet. The findings and recommendations in this report are especially relevant to the North Pacific Fishery Management Council, United States Coast Guard, and the BSAI pollock fleet.

The BSAI pollock fleet is comprised of catcher trawlers, factory trawlers, and processing vessels. Since the implementation of the American Fisheries Act (AFA), the size of the BSAI pollock fleet has been reduced (Hughes & Woodley, 2007). Passed by Congress in October 1998, AFA changed the BSAI pollock fishery from a derby-style "race for fish" to a quota-share management system. By distributing pollock quota allocations to vessel owners, vessels can operate at times that work best for them by taking weather and crew safety into consideration, rather than competing in a race for fish (Hughes & Woodley, 2007).

Previous research has assessed changes in safety outcomes in fisheries that converted from derby-style to quota-based management systems, including the BSAI pollock fishery (Lincoln, Mode, & Woodley, 2007). In that study, the safety analysis for the BSAI pollock fishery was restricted to reported nonfatal injuries that occurred between 1995 and 2005. When pre- and post-AFA implementation periods were compared, the rate of nonfatal injuries decreased by 76%. However, upon studying annual rates, it was discovered that the decline occurred prior to AFA implementation, suggesting other causes for the reduction of injuries such as the establishment of occupational safety programs by fishing companies prior to 1998.

A review of fishing fatality cases from the Alaska Occupational Injury Surveillance System (AOISS) (2015) revealed that during 1990—2002, five fatal incidents involving pollock vessels operating in the Bering Sea resulted in the deaths of eight crewmembers, and all fatalities occurred during the period 1990 to 1995. Four fatalities were due to the sinking of the Lady of Good Voyage in March 1993. The exact cause of the sinking was never determined, in part because all crewmembers were lost at sea. Apart from that fatal vessel disaster, three other fatalities were due to separate fall overboard incidents. None of the victims were wearing a personal flotation device (PFD). The cause of death was drowning for two victims, and the third victim succumbed to a head injury from the fall. The remaining fatality was the result of an unintentional overdose on prescription drugs. Additional incidents that may have occurred outside Alaskan waters were not included in AOISS.

This report summarizes more recent data on fatalities and nonfatal vessel disasters in the BSAI pollock fleet. These findings can be used to evaluate the current status of safety in the fleet and identify recommendations to reduce hazards.

Hazard Assessment Methods

Cases of fatal injuries and nonfatal vessel disasters involving vessels in the BSAI pollock fishery[65] during 2002—2014 were identified from the Commercial Fishing Incident Database (CFID) (2015). This surveillance system, maintained by the National Institute for Occupational Safety and Health (NIOSH), is a nationwide database containing case information on fatalities and vessel disasters in the U.S. commercial fishing industry. For inclusion in CFID, fatalities must be the result of a traumatic injury, including poisonings and intentional injuries such as suicides. Fatalities due to illnesses or chronic conditions are not included in the database and are therefore not in this assessment. Deckhands,

[65] For example, although an AFA vessel, the Amber Dawn was targeting Pacific cod at the time of its sinking and was not included in this assessment.

processors, captains, and fishery observers are included in the database if the event occurred on board or otherwise involved a fishing vessel.

A vessel disaster in CFID is defined as a catastrophic event that occurred to a vessel that required the entire crew to abandon ship. Types of vessel disasters include sinkings, capsizings, groundings, and fires. These serious incidents put crewmembers at risk of immersion, injury, and death. Nonfatal vessel disasters are those where all crewmembers survived the event.

All identified cases of fatalities and vessel disasters in the fleet were reviewed to assess common contributing factors and identify safety recommendations for the fleet. The cases are described in detail below.

Results

Fatalities

Five fatalities occurred in the BSAI pollock fleet during 2002—2014. Two fatalities were due to drowning following falls overboard, two were due to drowning after intentional jumps overboard, and one was the result of a fatal injury that occurred on deck.

In March 2003, a processor was transferred from the Northern Victor to the Excalibur II en route to Dutch Harbor to seek medical attention for mental health issues. In the afternoon, the crewmember was alone on deck and intentionally jumped overboard. While a search effort consisting of the Coast Guard, Alaska State Troopers, and other fishing vessels was successful in locating the crewmember, he was not revived.

In February 2007, a fall overboard occurred. While the Northern Victor was anchored in Udagak Bay, a processor failed to report to work in the morning. He was last seen two hours prior to the start of his shift. After a thorough search of the vessel, the Coast Guard was contacted to start search and rescue operations with other vessels in the area. The crewmember was not located until April 2007, when his body was found in deep water. The circumstances of his fall overboard remain unknown, except that he was not wearing a PFD when he fell overboard.

A second unwitnessed fall overboard occurred in September 2007. The captain of the Westward I contacted local police regarding the whereabouts of their fishery observer, who had not been seen or heard from that day. His body was recovered from the water near the moored vessel the day after he was reported missing. It is suspected that the observer slipped and fell into the water while transferring between moored vessels at night.

In January 2011, the Northern Victor was underway to Dutch Harbor in Canadian waters. Security footage revealed that a processor had intentionally jumped overboard. This event was heard by several crewmembers, who attempted to rescue the victim by throwing a life ring and searching for him using two skiffs. However, the 18-hour search including the Canadian Coast Guard was unsuccessful in recovering the victim's body.

In March 2014, a deckhand on the Alaska Ocean was using a cutting torch to dismantle derelict crab pots brought up by the vessel's trawl net. Unbeknownst to the deckhand, the acetylene tank had a leak between the connection of the gas valve and hose. The proximity of the leak to the torch caused an explosion, blowing open the acetylene tank locker door and striking the deckhand in the head. Crewmembers administered CPR but despite their efforts, the deckhand died from his injuries.

Nonfatal Vessel Disasters

A single vessel disaster occurred in the BSAI pollock fleet during the study period, in which all crewmembers were rescued. In March 2009, a storm developed in the Bering Sea with high winds and rough seas. As conditions worsened, the Mar-Gun ceased fishing operations and transited behind St. George Island to seek shelter and wait out the storm. The captain left instructions for the deckhand on watch to maneuver safely around the island to prevent grounding. However, the vessel began drifting toward shore, and high wind gusts and changes in sea conditions caused the vessel to run aground.

Over the course of several hours, the captain attempted to back the vessel off the rocks with no success. Although crewmembers found no damage or flooding initially, at some point the engine room began taking on water. The vessel listed hard to port as it continued to be hit by large waves. Realizing that the situation was critical, the captain changed priorities and prepared the crew of five to abandon the vessel. All crewmembers donned immersion suits and readied the life raft. A Coast Guard helicopter arrived on scene and safely hoisted the crewmembers off the vessel with no injuries.

Safety Summary

Since the implementation of AFA in 1999, five fatalities have occurred in the BSAI pollock fleet. The few cases identified in this report highlight the success of the fleet in maintaining a high level of vessel safety. Compared with other Alaskan fleets, the BSAI pollock fleet is among the safest in terms of numbers of fatalities and vessel disasters (Lincoln & Lucas, 2010). While this should be celebrated, the fatalities that did occur are reminders that serious hazards still exist in the fleet. These cases should be reviewed to inform policy and procedures on AFA vessels.

In the U.S. commercial fishing industry, falls overboard are the second leading cause of death among fishermen, a persistent yet preventable problem (Lincoln & Lucas, 2010). Four of the five fatalities in the BSAI pollock fleet during 2002–2014 were caused by drowning in man overboard situations. To prevent further deaths from falls overboard, all crewmembers should wear a PFD at all times while on deck (NIOSH, 2010). Policies should also be enacted that restrict off-duty crewmembers on deck, particularly if alone, to prevent unwitnessed falls overboard (United States Coast Guard [USCG], 2007). In addition, crewmembers exhibiting mental health issues should be watched and controlled until they are transferred off the vessel to prevent intentional man overboard or other self-harm attempts (USCG, 2003).

The single onboard fatality occurred as a result of an explosion caused by acetylene leaking from a valve near an open flame. Ignition sources, including welding or cutting torches, should be kept away from flammable or combustible liquids and gasses to prevent fires and explosions (USCG, 2015). Appropriate warning labels related to hot work or hazardous substances should be in place on board the vessel (USCG, 2014).

Fortunately, the single vessel disaster that occurred did not result in any fatalities. The crew practiced appropriate vessel abandonment procedures by donning their immersion suits and preparing the life raft. The crew maintained communications with the Coast Guard and nearby vessels during the grounding in case assistance was needed. All vessels should carry functional lifesaving equipment on board at all times and regularly conduct emergency drills to familiarize crewmembers with the equipment and procedures for abandoning the vessel. All crewmembers should take an 8-hour emergency drill class at least every five years to maintain the skills needed in an emergency (NIOSH, 2010; USCG, 2015).

In 2008, the factory trawler Pacific Glacier suffered a serious fire, requiring most of the crew to evacuate the vessel while firefighting efforts were underway. No injuries were reported during the fire or vessel abandonment. While this event was not classified as a vessel disaster according to the NIOSH definition, it serves as another successful example of how regular marine safety training and drills help prepare crewmembers to effectively respond to emergencies at sea.

Future research into nonfatal injuries and vessel safety issues (e.g., loss of propulsion, loss of power) can provide further insight on safety hazards within the BSAI pollock fleet. Recent data from fisheries observers, the Coast Guard, or insurance claims could be utilized to identify additional hazards and provide a comprehensive assessment of hazards in the fleet.

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